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ABSTRACT BOOK

22nd EAHP Congress
22–24 March 2017
Cannes, France

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CALL FOR ABSTRACTS - 2018 GOTHENBURG

23rd Congress of the EAHP, 21st - 23rd March 2018, Gothenburg, Sweden
Abstract submission opens 1st August, 2017!

Original contributions from all fields of hospital pharmacy are encouraged and welcomed for poster presentation.

Deadline for submission: 15th October 2017

During the review process, the award nominees will be selected and the presenting author of the nominated abstracts will be invited to give an oral presentation after which the final judging will take place.

Please be sure to provide an email address which will not be blocked by spam servers so that EAHP may notify you for modifications and nominations.

(Abstracts may be submitted through the EAHP web site's online submission page.)

IMPORTANT NOTE: The online submission form does not recognise some symbols from certain keyboards. Therefore, please proof your abstract after it has been entered into the system and before your final submission.

Please visit the EAHP web site at http://www.eahp.eu/congresses/abstract to view the guidelines and to submit abstracts for the Gothenburg congress 2018.

Abstracts must be entered into the system by section according to the guidelines.

There will be 5 sections: **Background - Purpose - Material and methods - Results - Conclusion**

Abstracts from the EAHP 2017 Congress

POSTER AWARD NOMINEES

Presentations on Wednesday, 22 March, 14:00 – 15:00, Auditorium 1

Time	Poster number	Poster nominee oral presentations	Author
14:00	PP-001	Hypromellose prolongs the dissolution of ketamine out of gelatine capsules	Länger, Ursula
14:10	PP-003	Stability study of bortezomib (velcade) with limit test for all degradation products	Nissen, Klaus Bertram
14:20	PP-014	Stability study of 10 mg/ml paediatric cyclosporine solution in olive oil	Mortier, Charles-Patrick
14:30	PP-029	Stability of frozen 1% voriconazole eye drops in glass and in innovative containers	Roche, Marine
14:40	PS-029	Feasibility of utilisation and patient satisfaction with a nationwide standardised electronic medication plan	Ulmer, Inga
14:50	PS-038	Developing a method for identifying a university hospital's high alert medications	Tyynismaa, Lotta

Presentations on Thursday, 23 March, 09:00 – 10:00, Auditorium 1

Time	Poster number	Poster nominee oral presentations	Author
09:00	CP-086	CD69 A>G (rs11052877) genetic polymorphism on the response to tocilizumab in rheumatoid arthritis patients	Díaz-Villamarín, Xando
09:10	CP-109	Evaluation of clinical, economic and organisational impacts of pharmacists' interventions on immunosuppressive therapy management among lung transplant outpatients	Duwez, Marion
09:20	CP-116	Evaluation of the clinical significance and value of a clinical pharmacy service at a teaching hospital	Mueller, Dora
09:30	DI-052	Developing an interactive tool to educate patients on good management of drugs	Gschwind, Liliane
09:40	PKP-003	Influence of cytarabine metabolic pathway polymorphisms in effectiveness of acute myeloid leukaemia induction treatment	Megías-Vericat, Juan Eduardo
09:50	PKP-009	Relation between clinical remission and trough infliximab levels in children with inflammatory bowel disease	Cordelle, Claire

EAHP INVITES YOU
TO ATTEND THE 2017
SYNERGY INTERACTIVE SESSION

ANTICOAGULANTS - SHOW ME THE EVIDENCE

supported by an educational grant from Bayer

Wednesday, 22 March 2017 - 2:00pm to 3:30pm

Thursday, 23 March 2017 - 9:00am to 10:30am

Auditorium K

FACILITATOR | KORNELIA CHRAPKOVA

PRESENTERS

SOTIRIS ANTONIOU
MEDICINES OPTIMISATION – IMPROVING ANTICOAGULATION GLOBALLY – INTRODUCTION

CRAIG COLEMAN
THE IMPORTANCE OF ADHERENCE TO NON-VKA ORAL ANTICOAGULANTS IN NONVALVULAR ATRIAL FIBRILLATION

FILIPA COSTA
OPTIMISING ADHERENCE IN ATRIAL FIBRILLATION

HELEN WILLIAMS
ADDRESSING UNMET NEEDS IN MANAGING AF ACROSS THE GLOBE

ACPE UAN: 0475-0000-17-005-L04-P. An application based activity.

Clinical pharmacy

CP-001 WITHDRAWN

CP-002 WITHDRAWN

CP-003 WITHDRAWN

CP-004 **A REVIEW OF URINARY TRACT INFECTION MANAGEMENT FOR PATIENTS ADMITTED TO THE EMERGENCY DEPARTMENT: ASSESSMENT OF ADHERENCE TO GUIDELINES AND IDENTIFICATION OF HOSPITALISATION CRITERIA**

[1]A Ramdani*, [2]S Rebaudet, [3]N Beni-chougrane, [4]G Penaranda, [1]E Coquet. [1]Hôpital Européen, Pharmacy Department, Marseille, France; [2]Hôpital Européen, Infectious Diseases Department, Marseille, France; [3]Hôpital Européen, Sanitary Department, Marseille, France; [4]Alphabio, Biostatistics Department, Marseille, France

Background Community acquired urinary tract infection (UTI) is one of the most common indications for antibiotic prescription. Previous studies on adherence to guidelines on antibiotic use reported a prevalence of inappropriate prescriptions varying from 20% to 50%, in both community and hospital settings. The misuse of antibiotics not only has an important economic impact but can also lead to therapeutic impasses.

Purpose This study aimed to establish the current management of UTIs in patients admitted to the emergency department (ED) of our hospital.

Material and methods In this retrospective observational study conducted between January 2015 and May 2016, consecutive patients admitted to the ED for a suspected UTI were assessed, including patients hospitalised (n=50) or discharged (n=50) after their ED admission. Assessment of adherence to guidelines for antibiotic prescription was conducted using the guidelines of the French Speaking Society of Infectious Disease (SPILF).

Results In the hospitalised group, 22 (44%) antibiotic prescriptions initiated at the ED did not comply with national guidelines. The two main causes for inappropriate prescriptions were the use of two antibiotics in patients with no severity criteria (15.68%) and/or the use of a non-recommended drug (6.27%). In this group, 17 (35%) antibiotic prescriptions ordered by the urologist on patient discharge did not comply with national guidelines. The two main causes of inappropriate prescriptions were the use of a non-recommended drug (9.53%) and an inadequate duration of treatment (9.53%).

In the discharged group, 29 (60%) of the antibiotic prescriptions ordered at the ED did not comply with national guidelines. The two main causes of inappropriate prescriptions were an inadequate duration of treatment (23.79%) and the use of a non-recommended drug (19.66%).

We also identified discrepancies between reasons for hospitalisation in our cohort compared with the criteria for hospitalisation mentioned in the national guidelines.

Conclusion This study has identified areas for improvement in the management of UTIs in our hospital. Our suggestions for optimisation include educational materials and a decision tree displayed in the ED, and specific therapeutic protocols in our computerised prescription system.

REFERENCES AND/OR ACKNOWLEDGEMENTS

SPILF Guidelines 2015: http://www.infectiologie.com/fr/recommandations.html

No conflict of interest

CP-005 | WITHDRAWN

CP-006 | WITHDRAWN

CP-007 | **MEDICATION ERRORS IN VOLUNTARY REPORTED INCIDENTS AT A UNIVERSITY HOSPITAL**

[1]K Abu Hamour*, [2]M Abdel Jalil. [1]*Jordan University Hospital, Amman, Jordan*; [2]*University of Jordan, Biopharmaceutics and Clinical Pharmacy, Amman, Jordan*

Background A significant yet preventable cause of inpatient and outpatient morbidity and mortality is medication errors. Appropriate error reporting systems are the cornerstone of any plan designed to enhance patient safety.[1]

Purpose The aim of the study was to assess the prevalence, origin, type and severity of reported medication incidents at a university hospital, utilising a voluntary non-punitive reporting system.

Material and methods The present study had a retrospective design. All voluntary non-punitive incident reports that occurred between January 2014 and March 2015 at the hospital were retrieved from the quality department. Detailed content analysis was conducted to obtain all relevant information. Data were coded anonymously and analysed using SPSS version 20.

Results There was an increase in reporting of medication errors over time, and almost all of the reports were from nurses. A total of 58 medication error reports, involving 86 medications, were related to errors in the medication management process, from prescribing and dispensing to administration of medications. Two-thirds of the reports originated from the internal medicine department and the neonatal intensive care unit. The most common drug classes associated with these reports were anti-infectives, cardiovascular and chemotherapy agents. The majority of errors occurred during the administration phase where missed doses and wrong time accounted for more than 52% of the reported incidents. Approximately 98.8% of reported incidents did not cause major harm to patients.

Conclusion A low number of medication errors were reported in multiple hospital departments that increased over time, utilising a non-punitive system of reporting, suggesting an initial success of the system. Additional research is required to

identify possible improvements to optimise and encourage reporting in addition to enhancing the response to each report.

Conflict of interest Corporate sponsored research or other substantive relationships: Dr Khawla Abu Hamour is the head of the pharmaceutical unit at the hospital.

E Molina*, P Nieto, B Franco, S Cañizares, B Tauste, F Sierra. *Andalusian Health System, Pharmacy, Almeria, Spain*

Background Antiretroviral therapy for the treatment of human immunodeficiency virus type 1 infection has improved steadily since the advent of combination therapy.

Purpose To compare the prescription patterns of antiretroviral therapy between 2014 and 2016.

Material and methods Antiretroviral therapies used in 2014 were compared with those used in 2016 in patients affiliated with a tertiary care hospital in the Spanish Health System. Data were collected from the medication consumption files of the institution.

Results 604 patients were treated in 2014 using 71 different combinations compared with 618 patients treated with 76 combinations in 2016. The percentage of men was 73% in both years. Total expenditure was € 4 358 576 in 2014 and € 4 414 864 in 2016, with an average cost per patient of € 7216 and € 7144, respectively. The 10 most common combinations of 2014 were used to treat 73.51% of patients, accounting for 69.31% of the total spending on antiretrovirals whereas the top 10 combinations of 2016 accounted for 78.64% of patients and 74.51% of the total spending. Some of these combinations were in the top 10 in 2014 but not in 2016. Similarly, some new combinations reached the top 10 in 2016. Taken together, 14 combinations were analysed in order. The change in number and per cent of patients with these combinations between 2014 and 2016 were as follows: emtricitabine/tenofovir/efavirenz (155 (25.66%), 91 (14.72%)), emtricitabine/tenofovir/rilpivirine (64 (10.60%), 117 (18.93%)), emtricitabine/tenofovir/lopinavir/ritonavir (52 (8.61%), 6 (0.97%)), emtricitabine/tenofovir/atazanavir/ritonavir (48 (7.95%), 16 (2.59%)), emtricitabine/tenofovir/darunavir/ritonavir (28 (4.64%), 15 (2.43%)), emtricitabine/tenofovir/nevirapine (25 (4.41%), 17 (2.75%)), emtricitabine/tenofovir/raltegravir (22 (3.64%), 27 (4.37%)), darunavir/ritonavir (18 (2.98%), 10 (1.62%)), lopinavir/ritonavir (16 (2.65%), 6 (1.29%)), abacavir/lamivudine/nevirapine (16 (2.65%), 8 (1.29%)), emtricitabine/tenofovir/elvitegravir/cobicistat (0 (0.00%), 95 (15.37%)), abacavir/lamivudine/dolutegravir (0 (0.00%), 84 (13.59%)), dolugravir/rilpivirine (0 (0.00%), 14 (2.27%)) and emtricitabine/tenofovir/dolutegravir (0 (0.00%), 10 (1.62%)).

Conclusion Changes made from 2014 to 2016 have permitted a slight decrease in cost per patient. Emtricitabine/tenofovir based therapies continue to be the backbone of antiretroviral therapy. A large decrease in the use of protease inhibitors in favour of integrase inhibitor family agents was observed, probably due to their better interaction pattern and metabolic profile.

No conflict of interest

CP-009 | WITHDRAWN

eahp synergy

GOOD MORNING PHARMACISTS!

CASE STUDIES ON ANTIMICROBIAL RESISTANCE

THURSDAY, 23 MARCH 2017 - 7.30 TO 9.00
THÉÂTRE CLAUDE DEBUSSY

HOSPITAL PHARMACISTS ARE AN IMPORTANT PART OF THE MULTIDISCIPLINARY TEAM IMPLEMENTING "ANTIMICROBIAL STEWARDSHIP PROGRAMMES" IN HOSPITALS. IN THIS SEMINAR SIX HOSPITAL PHARMACISTS WILL PRESENT A CLINICAL CASE FOCUSING ON AN INFECTIOUS DISEASE.

FACILITATOR - TORSTEN HOPPE-TICHY

EXPERTS

ANTONELLA TONNA (ROBERT GORDON UNIVERSITY)
INESE SVIESTINA (UNIVERSITY CHILDREN'S HOSPITAL)
MARTIN HUG (MEDICAL CENTER – UNIVERSITY OF FREIBURG)

CASE 1 | FRANCES KERR (MONKLANDS HOSPITAL, NHS LANARKSHIRE)

CASE 2 | INGA URTANE (PAULS STRADINS CLINICAL UNIVERSITY HOSPITAL / RIGA STRADINS UNIVERSITY)

CASE 3 | EVA MEYLE (HEIDELBERG UNIVERSITY HOSPITAL)

ACPE UAN: 0475-0000-17-006-L04-P. A knowledge based activity.

The European Association of Hospital Pharmacists (EAHP) is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education

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CP-010 USE AND EFFECTIVENESS OF PLERIXAFOR FOR HAEMATOPOIETIC STEM CELLS MOBILISATION

M Sanchez*, JM Ortgega, L Calvo, N Gomez, I Navarro, C Abarca. *HM Sanchinarro Hospital, Pharmacy, Madrid, Spain*

Background Plerixafor is an immunostimulant used in combination with granulocyte–colony stimulating factor (G-CSF) to mobilise peripheral blood for collection and subsequent autologous transplantation in patients with lymphoma or multiple myeloma. Peripheral blood stem cell mobilisation, which is important as a source of haematopoietic stem cells for transplantation, is generally performed using G-CSF alone but is ineffective in about 15–20% of patients. Combining G-CSF with plerixafor increases the number of people who respond to the therapy and produce enough stem cells for transplantation.

Purpose To describe the use and effectiveness of plerixafor for haematopoietic stem cell transplantation recipients.

Material and methods A retrospective observational study was conducted including patients who received plerixafor between May 2011 and August 2016. The variables collected were: sex, age, diagnosis, G-CSF dose received, plerixafor dose received and CD34+ cells/kg collected. The optimal dose of CD34+ cells collected is $\geq 5 \times 10^6$ cells CD34+/kg, the minimum dose is $\geq 2 \times 10^6$ cells CD34+/kg and an insufficient dose is $\leq 2 \times 10^6$ cells CD34+/kg. The end point was the percentage of patients who collected at least 2×10^6 CD34+ cells/kg.

Results Plerixafor was prescribed in 14 patients, 6 women and 8 men, with an average age of 44 years. A total of 11 patients were diagnosed with lymphoma and three patients with myeloma. All had been treated previously with G-CSF alone without response. The plerixafor dose given was 0.24 mg/kg. and all had previously received G-CSF 10 µg/kg daily for 4 days prior to the first dose of plerixafor. 5 patients required 2 doses of plerixafor. This increased the cost of treatment. 2 (14%) of 14 patients had an optimal mobilisation response to treatment and $\geq 5 \times 10^6$ cells CD34+/kg were collected. 10 patients (72%) had a minimum mobilisation response ($\geq 2 \times 10^6$ cells CD34+/kg). 2 patients (14%) had a suboptimal mobilisation response to treatment ($\leq 2 \times 10^6$ cells CD34+/kg). Adverse effects were not observed.

Conclusion In general, plerixafor is an effective drug for haematopoietic progenitor cell mobilisation for autologous transplantation; in 72% of patients, at least 2×10^6 CD34+ cells/kg were collected.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

CP-011 INFLUENCE OF SURGICAL STRATEGY AND BASELINE CONDITIONS VERSUS CYP2C19 POLYMORPHISMS IN ANTIPLATELET RESPONSE TO CLOPIDOGREL IN PATIENTS UNDERGOING PERCUTANEUS TRANSLUMINAL ANGIOPLASTY

[1]L Villalobos-Torres*, [2]X Díaz-Villamarín, [2]C Dávila-Fajardo, [2]M Valle-Corpas, [2]J Cabeza-Barrera. *[1]Hospital Regional Universitario de Málaga, Unidad de Gestión Clínica de Farmacia, Málaga, Spain; [2]Complejo Hospitalario Universitario de Granada, Unidad de Gestión Clínica intercentro-interniveles de Farmacia, Granada, Spain*

Background Clopidogrel is a prodrug metabolised by the isoenzyme CYP2C19 to its active form. The antiplatelet response is affected by genetic polymorphisms, with CYP2C19*2 being the most important, with the highest level of evidence associated with a poor prognosis in the treatment of peripheral arterial disease (PAD). Other factors also determine the evolution of PAD patients undergoing percutaneous transluminal angioplasty (PTA). The condition of the patient at discharged, use of stents and number of operated vessels may also affect the prognosis.

Purpose Our purpose was to compare the influence of these surgical variables and the baseline condition of patients with the influence of the polymorphism CYP2C19*2 in response to clopidogrel in patients undergoing PTA.

Material and methods This was a retrospective observational study including patients undergoing PTA treated with clopidogrel and discharged from our hospital between 2010 and 2013. Variables included: Fontaine Scale at discharge, pulse–volume recordings (PVR), ankle–brachial index, claudication distance, number of treated regions, and presence of stent and balloon with or without drugs. Endpoint for effectiveness was occurrence of cardiovascular events (thrombosis, myocardial infarction, stroke, re-intervention or cardiovascular death). The polymorphism was determined from saliva samples and test of allelic discrimination (Taqman). The influence of the variables studied on the response was expressed as odds ratio (statistically relevant) and p value. Data were collected from patients' medical records.

Results 72 patients undergoing PTA between 2010 and 2013 were recruited. Average age was 67.4±9.4 years and 16 (22.2%) were women. 18 patients (25%) were carriers of CYP2C19*2 and none of the CYP2C19*3 polymorphism. 25 patients (34.7%) had a cardiovascular event and 11 patients (15.2%) were carriers of the CYP2C19*2 polymorphism. We did not find a statistically relevant association between clopidogrel response, measured as the appearance of a cardiovascular event, and any of the variables (Fontaine Scale p=0.11, PVR p=0.11, claudication distance p=0.26, ITB p=0.49, balloon with drugs p=0.17, stent p=0.11, number of treated regions p=0.92). However, we found an important relationship between the response and the presence of the CYP2C19*2 polymorphism (OR 4.49 (1.45–13.84), p=0.009).

Conclusion The presence of the CYP2C19*2 polymorphism seems to be a better predictor of antiplatelet response to clopidogrel in patients undergoing PTA than any quantifying surgical variable or baseline condition of the patient.

No conflict of interest

CP-012 STRUCTURED PHARMACIST REVIEW OF MEDICATION IN OLDER HOSPITALISED PATIENTS: A COST EFFECTIVENESS ANALYSIS

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Background A recent cluster randomised controlled trial (RCT) conducted in a major tertiary referral hospital evaluating a structured pharmacist review of medication (SPRM), supported by computerised clinical decision support software (CDSS), demonstrated positive outcomes in terms of reduction of adverse drug reactions (ADRs).

Purpose The purpose of this study was to examine the cost effectiveness of pharmacists applying an SPRM in conjunction with CDSS to older hospitalised patients compared with usual pharmaceutical care.

Material and methods Cost effectiveness analysis alongside a cluster RCT was performed. The trial was conducted in a tertiary hospital in the south of Ireland. Patients in the intervention arm (n=361) received a multifactorial intervention consisting of medicines reconciliation, deployment of CDSS and generation of a pharmaceutical care plan. Patients in the control arm (n=376) received usual care from the hospital pharmacy team. Incremental cost effectiveness was examined in terms of costs to the healthcare system and an outcome measure of ADRs during an inpatient hospital stay. Uncertainty in the analysis was explored using a cost effectiveness acceptability curve.

Results On average, the intervention arm was the dominant strategy in terms of cost effectiveness. Compared with usual care (control), the intervention was associated with a decrease of € 807 (95% CI −3443 to 1829; p=0.548) in mean healthcare cost and a decrease in the mean number of ADR events per patient of −0.064 (95% CI −0.135 to 0.008; p=0.081). The probability of the intervention being cost effective at respective threshold values of € 0, € 250, € 500, € 750, € 1000 and € 5000 was 0.707, 0.713, 0.716, 0.718, 0.722 and 0.784, respectively.

Conclusion Based on the evidence presented, SPRM/CDSS is likely to be determined to be cost effective compared with usual pharmaceutical care. However, neither incremental costs nor effects demonstrated a statistically significant difference, and therefore the results of this single site study should be interpreted with caution.

No conflict of interest

CP-013 REVIEW OF ORAL THERAPIES IN PROSTATE CANCER

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Background Worldwide, prostate cancer is the second most commonly diagnosed cancer in men. In Europe and Spain, for many years it was the number one cancer diagnosis (436 500 in Europe in 2012 and 32 641 in Spain in 2014).[1] The use of oral therapies in metastatic patients instead of intravenous chemotherapy improves treatment comfort but the costs are much higher. According to the guidelines and protocols for chemotherapy, after failure with oral therapy, intravenous therapies must be started.

Purpose To evaluate control of the disease with oral therapies in prostate cancer patients and to determine if their treatments were switched to intravenous therapy in the event of failure of oral therapies.

Material and methods Patients treated with abiraterone or enzalutamide during the first half of 2016 in Complejo Hospitalario Universitario in Granada were included in the study. Those treatments that decreased prostate specific antigen (PSA) levels were classified as 'effective', while those that maintained PSA levels with variations of 5% were classified as 'stable'. If there was an increase in PSA levels, these patients were classified as 'non- effective'.

Results 22 patients were treated: 19 with abiraterone and 3 with enzalutamide. 63.63% (14 patients) had received 6 months or less of treatment at the time of the study. Regarding abiraterone, 9 were classified as 'effective' treatment, 4 were 'stable' and 5 had disease progression in spite of treatment with abiraterone. One patient was withdrawn due to medication toxicity. 2 patients treated with enzalutamide had disease progression and 1 had 'effective' treatment. 3 of 7 patients with progression (42.85%) continued treatment despite the poor results and did not switch to intravenous therapy. Abiraterone and enzalutamide accounted for 92.24% (€ 296 203.32 of € 321 094.84) of the total expenditure of patients treated for prostate cancer.

Conclusion There was a high percentage of patients who failed oral therapies and continued with them without switching to intravenous therapy. This constitutes serious detriment to the patient and a marked increase in drug spending.

REFERENCES AND/OR ACKNOWLEDGEMENTS

1. Prostate cancer 2016. AECC (online). Available at https://www.aecc.es/SobreEl-Cancer/CancerPorLocalizacion/cancerdeprostata/Paginas/incidencia.aspx (accessed 05/09/16).

No conflict of interest

CP-014 INTRAVENOUS ACETAMINOPHEN USE BEFORE AND AFTER PROTOCOL IMPLEMENTATION IN A TEACHING HOSPITAL

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Background Acetaminophen is an analgesic and antipyretic agent, recommended worldwide as a firstline treatment for the management of mild to moderate pain. There is a significant cost difference between parenteral and oral/rectal preparations of acetaminophen in Iran. Additionally, intravenous (IV) administration imposes an extra preparation and nursing burden. Invasive procedure complications is another concern. Although acetaminophen relieves mild to moderate pain and has a synergistic effect with other analgesics, the IV route should only be used if the oral or rectal dosage form cannot be utilised.

Purpose The primary objective of this study was to evaluate the utilisation of IV acetaminophen and clarify the role of protocol enforcement in decreasing the cost of pharmacotherapy and progressing to rational drug usage.

Material and methods A pilot study was conducted in February 2015 to evaluate the prescribing appropriateness of IV acetaminophen. Data were obtained from a randomly selected group of 230 patients. A protocol for appropriate use of parenteral acetaminophen was designed by the pharmaceutical care department in accordance with drug monograph and reliable guidelines. The protocol was implemented in two phases: in phase one, the protocol was introduced to healthcare professionals via a newsletter, text messaging and face to face meetings with influential physicians. In the second phase, the pharmacists approved dispensing of IV acetaminophen to medical wards only if the physician's order accompanied a signed paper protocol. The trend of IV acetaminophen utilisation was assessed during the intervention.

Results During February 2015, 5139 acetaminophen injections were prescribed for 1631 patients. Inappropriate orders were revealed in 41% of the dosage forms, 38% for duration and 50% for dosages. Only in 27% of patients were all three parameters correct. Following phase one, the number of prescribed IV acetaminophen doses decreased to 3152 for 932 patients in one month (approximate 38% reduction). After the second phase, the use of acetaminophen was 2328 injections in 808 patients after protocol enforcement. The net reduction was 55% after the two phase intervention.

Conclusion Development and implementation of drug protocols could improve appropriate prescribing and reduce cost in hospital settings.

No conflict of interest

CP-015 | POTENTIALLY HARMFUL EXCIPIENTS IN MEDICINES FOR HOSPITALISED NEONATES

[1]I Sviestina*, [2]D Mozgis. [1]*University Children's Hospital/Riga Stradins University, Riga, Latvia;* [2]*Riga Stradins University, Public Health and Epidemiology Department, Riga, Latvia*

Background Medicines used in neonates contain different excipients, which may not be safe in this age group.

Purpose To analyse the frequency that hospitalised neonates are exposed to potentially harmful excipients (HE) and to identify possible substitutes for medicines containing HE.

Material and methods This was a retrospective observational study at a university paediatric hospital. All hospitalised neonates were included. Neonates were divided into four groups according to gestational age (<28 weeks; 28 to <32 weeks; 32 to <37 weeks; and >37 weeks). The study period was from 1 September 2015 to 29 February 2016. All medicines and food supplements, except blood products, glucose and electrolyte solutions, vaccines, parenteral nutrition products and contrast agents, were analysed. The following excipients were analysed: parabens, polysorbate 80, propylene glycol, benzoates, saccharin sodium, sorbitol, ethanol and benzalkonium chloride. Excipients were identified from the Summaries of Product Characteristics. Substitutions were analysed according to Nellis et al (*Paediatr Drugs* 2016, Product substitution study).

Results 327 neonates were hospitalised during the study period. Of these, 296 (102 (35%) preterm) included in the study received 1472 prescriptions for 106 medicines. The most often used formulations were intravenous (48/106; 45%), oral solid formulations (20; 19%) and topical formulations (16; 15%). The total number of different excipients was 169. In total, 29/106 (27%) medicines contained at least one HE. 82/102 (80%) preterm and 118/194 (61%) term neonates received medications with at least one HE. Substitution was possible for 9/29 (31%) HE containing medicines. Therefore, the clinical pharmacist prepared leaflets and recommendations in the hospital intranet warning doctors about currently used medicines with HE. There was also information about the HE that these products contain and the possible adverse reactions.

Conclusion Usage of HE can be reduced by using HE-free products available on the European market. However, substitution was possible in only a small number of cases. Therefore, the main focus should be on information and education of hospital specialists on which HE are present in medicines, what adverse reactions they may cause and how to avoid usage of these medicines.

No conflict of interest

CP-016 | ABSTRACT WITHDRAWN

CP-017 | EFFICACY AND SAFETY OF NIVOLUMAB IN A TERTIARY HOSPITAL: EARLY ACCESS PROGRAMME

C Fontela*, M de Miguel, M Etxeberria, J Fernandez, M Sanchez, A Iruin, R San Miguel, N Larrea, M Sarobe. *Complejo Hospitalario de Navarra, Pharmacy Department, Pamplona, Spain*

Background Nivolumab is approved by the US Food and Drug Administration for the treatment of patients with melanoma, metastatic non-small cell lung cancer (NSCLC) and renal cell carcinoma (RCC), and has been included in our hospital's formulary since 2015.

Purpose To evaluate the efficacy and safety of patients treated with nivolumab in our hospital in real world data.

Material and methods This was a retrospective observational study of all patients included in the nivolumab early access programme (November 2015–February 2016). Measured variables included: age, sex, diagnosis, disease stage, ECOG, number of cycles, prior lines of treatment, objective response and adverse effects. Evaluation of the response was performed according to RECIST version 1.1, and toxicity as defined by the NCI-CTCAE, version 4.0.

Results 8 patients were included (7 men), median age 68.5 years (52–74) and ECOG 1–2. Nivolumab candidates were treated with 3 mg/kg intravenous infusions every 14 days. 6 patients were diagnosed with lung cancer (2 squamous histology, 4 adenocarcinomas) and 2 other patients had RCC. All patients had stage IV disease except one who had stage IIIA disease. They had previously received a median of two lines of treatment and the median number of cycles administered was 6. All patients with NSCLC had progressed after platinum based chemotherapy and 4 had been treated with docetaxel. Patients with RCC had received TKI therapy and everolimus previously. Regarding effectiveness, no patient obtained an objective response (complete response+partial response), 4 patients (50%) maintained stable disease (SD), 2 patients are

in progression (25%) and 2 patients are awaiting evaluation by imaging but with clinical improvement. Treatment related adverse effects of any grade were reported in all patients. The most common were asthenia, respiratory infection, hyporexia, nausea and anorexia. One patient required hospitalisation with colitis grade 3.

Conclusion The effectiveness in terms of objective response rate was lower than that reported in the literature. The tumour response rate was limited to SD. Treatment related adverse effects were similar to those described in other studies, mostly grades 1–2. To evaluate efficacy and long term safety, a longer monitoring period is required. It is essential to measure the health outcomes of new and expensive drugs to rationalise their use and optimise efficiency in the oncology area.

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No conflict of interest

CP-018 EFFECTIVENESS OF OMALIZUMAB IN ASTHMATIC PATIENTS

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Background Omalizumab is a humanised monoclonal antibody manufactured by recombinant DNA technology. It is indicated as an add-on therapy to improve asthma control in patients with severe persistent allergic asthma with forced expiratory volume in 1 $s(FEV_1)$ <80%.

Purpose To evaluate the effectiveness of omalizumab (Xolair) in asthmatic patients treated with this drug in a tertiary hospital during 2015.

Material and methods This was an observational retrospective study of patients treated for asthma with omalizumab during 2015 in a tertiary hospital. Data were obtained by Farmatools and Drago AE programmes. All patients treated with omalizumab for at less 1 year were included. Clinical variables collected were: FEV_1(RD >80%), serum total level of IgE (RD <100 UI/mL) and omalizumab dose. Effectiveness was evaluated by number of emergency department visits for asthma.

Results 66 patients were included in the study with a mean age of 37 years (40 women, 26 men). 94% of patients did not require emergency visits for asthma. At the start of the study, they presented mean serum levels of IgE of 1702 UI/mL; during this period, a mean decreased of 47% was observed. However, at the end of the study period, we observed increased serum levels of IgE in all patients. For FEV_1, at the end of study, we found that: 17% of patients had FEV_1 <60%, 57% had FEV_1 60–80% and FEV_1 was >80% for the rest of the patients. As omalizumab is indicated in patients diagnosed with persistent allergic asthma, we should consider discontinuing treatment in patients with FEV_1 <80% .

Conclusion Omalizumab was highly effective in this study, similar or even better than the effectiveness showed in clinical trials. We observed that lower baseline total IgE was associated with less effective treatment.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Technical data for omalizumab.

No conflict of interest

CP-019 RISK FACTORS FOR ANAEMIA DEVELOPMENT DURING THERAPY WITH RIBAVIRIN PLUS DIRECT ACTING ANTIVIRALS

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Background Anaemia is a common adverse event associated with ribavirin therapy in hepatitis C patients. Peginterferon/ribavirin was the cornerstone of treatment of hepatitis C virus (HCV) patients until 2011.

Purpose To assess the incidence of anaemia and the risk factors predictive of anaemia in the context of ribavirin plus new direct acting antiviral (DAA) agents.

Material and methods A 1 year retrospective study was performed during 2015. Anaemia was defined as a single occurrence of haemoglobin <10g/dL at any point during treatment. Serum haemoglobin assessments were obtained at baseline and at weeks 0, 4, 8, 12, 16, 20 and 24. Pretreatment factors with potential to act as prognostic indicators of anaemia including age, sex, type of treatment, genotype, FibroScan score, cirrhotic yes/no, HCV RNA titre, dose 1000 mg/1200 mg, glomerular filtration rate, alanine transaminase, albumin, treatment duration 12 vs >12 weeks and baseline haemoglobin, and on-treatment factor as week 2 change from baseline, were analysed by univariate and multivariate logistic regression analyses.

Results 152 patients were analysed, 78.30% men, mean age 54.73 years (95% CI 53.35–56.11), CKD-EPI 98.00 mL/min (93.17–98.55). Genotypes frequencies were: g1 (67.10%), g2 (3.30%), g3 (15.80%) and g4 (13.30%). 62.50% of patients were cirrhotic and 84.20% were treated for 12 weeks. 23 (15.10%) had anaemia. The largest decrease in haemoglobin levels was the change from baseline to week 4. The slope continued almost flat thereafter. The mean decrease in haemoglobin during treatment was 2.67 g/dL (2.45–2.90). Multivariate analysis revealed that glomerular filtration rate, baseline haemoglobin, treatment duration >12 weeks and estimated week 2 change from baseline were significantly associated with the likelihood of developing anaemia (p <0.05). As a consequence, two models were developed to predict patients at risk of anaemia: the pretreatment model, using the first three variables, with a positive predictive value (PPV) of 86.60%, and the on-treatment model, adding the fourth variable, with a PPV of 95.00%.

Conclusion The incidence of anaemia with DAA has been less than that with peginterferon combinations. Glomerular filtration rate, baseline haemoglobin, treatment duration >12 weeks and estimated week 2 change from baseline were demonstrated to predict the risk of anaemia.

No conflict of interest

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CP-020   SWITCHING TO DOLUTEGRAVIR IN MONOTHERAPY

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Background Antiretroviral monotherapy presents several significant benefits, such as reduction of toxicity, and drug and cost saving, as well as preserving future options with other classes of antiretrovirals and improved adherence.

Purpose To assess the effectiveness and safety of simplification to a monotherapy with dolutegravir (DTG) in experienced HIV patients and to evaluate the economic impact.

Material and methods A retrospective observational study was carried out. We included all patients who presented in the last 48 weeks with viral load (VL) undetectable and CD4 cell count >250, and who switched to DTG as monotherapy in 2015. Demographic and clinical characteristics were recorded at weeks 0, 12 and 24: sex, age, VL, CD4 cell count, fasting lipid profile (low density lipoprotein (LDL)/high density lipoprotein (HDL), total cholesterol (TC), triglycerides (TG)) and glomerular filtration rate (GFR).

We evaluated the saving strategy by the average cost difference of previous treatments in comparison with monotherapy with DTG for 1 year.

Results 38 patients were included: 31 (82%) were men with a median age of 52 years. No patient failed or was switched for another reason. 19 (50%) patients are at <24 weeks in the study period. Only 1 (2.6%) patient had VL 45 copies/mL at week 12, but VL was undetectable at week 24.

	Baseline (38 patients)	At week 12 (38 patients)	At week 24 (19 patients: 50%)
VL <37 copies/mL (% of patients)	100	97.4	100
CD4 cell count (cell/µL)	661	716	610
GFR <70 mL/min (% of patients)	79	79	86.4
TC (mg/dL)	194	181	177
LDL/HDL (mg/dL)	113/42	108/44	103/46
TG (mg/dL)	182	150	161

All values are expressed as median, unless otherwise indicated.

Regarding previous treatments, patients were divided as follows: 14 (37%) patients were switched from 2 nucleoside reverse transcriptase inhibitors (NRTIs) + 1 non-nucleoside reverse transcriptase inhibitors (NNRTIs), 13 (34%) patients from 2 NRTIs + 1 protease inhibitor (PI), 11 (29%) patients from 1 NNRTIs +1 integrase strand transfer inhibitors (INSTIs).

Average saving DTG vs previous treatments per patient	1 year DTG (€)
2NRTIs + 1NNRTIs	780
2 NRTIs + 1PI	3000
1NNRTIs + 1INSTIs	3480

Conclusion Switching to monotherapy with DTG proved safe (significantly improved lipid profile and GFR), effective (maintained levels of VL and CD4) and more economical. It is necessary to carry out more studies to corroborate this strategy.

No conflict of interest

CP-021   WITHDRAWN

| CP-022 | SAFETY PROFILE OF GLATIRAMER ACETATE 40 MG

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Background Glatiramer acetate (GA) is a firstline therapy approved for the treatment of relapsing remitting multiple sclerosis (RRMS). GA 20 mg/mL (GA20) administered once daily by subcutaneous injection has been used since 2009. In 2014, modified treatment regimens–alternative dosages and low frequency administration schedules were introduced—GA 40 mg/mL (GA40) three times weekly.

Purpose To analyse injection related adverse events (IRAEs) reported for GA20 and GA40 in our clinical practice.

Material and methods This was a retrospective observational study of patients diagnosed with RRMS, receiving treatment with GA for at least for 6 months (January—June 2016). We studied all patients who started on GA40 three times weekly, as well as those converting from GA20 once daily to GA40, including naive and further lines of treatment. We excluded patients who wanted to get pregnant. The IRAEs analysed according to the System Organ Class were general disorders and administration site conditions, including local injection site reactions (ISRs), and symptoms or events related to immediate post-injection reactions (IPIRs).

Results 52 patients were included: 23 patients (14 women, 9 men; mean age 43 years) were receiving treatment with GA40, 15 (7 women, 8 men) had converted from GA 20 and 10 patients were naive for GA. Five moderate/severe IRAEs related to ISRs and IPIRs were reported (21.7%), 2 of which were in patients who had converted from GA20. 29 patients (19 women, 10 men; mean age 46 years) were receiving treatment with GA20 for at least 6 months. One moderate IRAE associated with IPIR (3.4%) was reported in this group.

Conclusion To our knowledge, post hoc analyses showed that patients receiving GA40 demonstrated a 60% reduction in the annualised event rate of moderate/severe IRAEs compared with GA20. In our study, from the total number of ISRs and IPIRs reported, GA40 had a significantly increased rate compared with GA20 (p<0.04). These outcomes suggest that moderate or severe reactions related to general disorders and administration site conditions were less frequent in GA20 treated patients. Due to the size of group, these results should be interpreted with caution; future analysis in clinical practice is necessary.

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No conflict of interest

| CP-023 | USE OF INTRAVITREAL ANTIANGIOGENIC DRUG IN A LARGE STUDY IN THE TREATMENT OF RETINOPATHY OF PREMATURITY

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Background Retinopathy of prematurity (ROP) is a proliferative disease of the retinal vasculature that can cause severe visual loss in premature newborns. Intravitreal bevacizumab has shown promise as a treatment for ROP.

Purpose To evaluate the efficacy and safety of intravitreal bevacizumab in preterm infants with retinopathy diagnosed with grades 1–3+.

Material and methods This was a retrospective study of 24 months' duration involving patients less than 30 weeks' gestational age diagnosed with ROP to grade 3+ and weighing <1500 g. Patients received a single dose of 0.625 mg intravitreal bevacizumab at 3 months post-gestational age and were followed-up every 7 days with fundus examination according to the protocol of the ophthalmology unit for assessment of the degree of retinopathy and extent of the avascular zone. The primary efficacy and safety variables were defined as: complete vascularisation (CV) in both eyes (BE) and the absence of adverse event grades CTCAE (Common Terminology Criteria for Adverse Events) II or higher, respectively.

Results 9 patients (6 men and 3 women) were included, with a mean gestational age of 25 weeks (23, 29). Previous diagnoses were: 2 patients with aggressive ROP in BE, 2 patients with grade 3 ROP in zone 2+ in BE, 1 patient with grade 2 ROP in zone 2+ in BE, 2 patients with grade 1 ROP in zone 2 in BE and zone 3 ROP in 1 patient and 1 patient with ROP in zone 3 in the right eye and temporal zone II ROP I festooned in the left eye. The primary efficacy criterion (CV in BE) was achieved in 7/9 cases, with an average time to BE and CV of 4 months (1, 6). Furthermore, in 5 patients, an early response was achieved in BE at week 4. During the study period, no endophthalmitis, retinal detachment or systemic side effects resulting in discontinuation of treatment occurred.

Conclusion This study shows that intravitreal bevacizumab was used effectively and safely in the treatment of variable degrees of ROP, achieving 85% CV.

No conflict of interest

| CP-024 | FACTORS AFFECTING UPTAKE OF BIOSIMILARS

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Background 10 years ago the term biosimilar was first used to describe a similar copy of biological drugs in Europe. Since then, 19 biosimilars have been approved by the European Medicine Agency, but uptake has varied across Europe.

Purpose To compare the utilisation of human growth hormone (HGH), erythropoietin (EPO) and granulocyte–colony stimulating factor (G-CSF) biosimilars, and identify whether it is cost or other potential factors which influence their uptake.

Material and methods Secondary care prescribing data between 2007 and 2015 for HGH, EPO and G-CSF were extracted from the IMS Health database and analysed using linear regression. Correlation analysis was performed between utilisation and price.

Results Utilisation of G-CSF biosimilars increased by 12.16% (95% CI 7.81–16.51) per year on average (p>0.000), and

achieved 84% of the G-CSF market by 2015. A moderate to strong correlation existed between G-CSF utilisation and price of biosimilars. In stark contrast, utilisation for HGH biosimilars increased slightly by 0.9% (95% CI 0.63–1.16) per year on average (p>0.000) and EPO biosimilars by only 0.45% (95% CI 0.079–0.85) per year on average (p>0.025). HGH and EPO biosimilars achieved only 6% and 3% of the HGH and EPO markets, respectively, by 2015. A weak or no correlation existed between utilisation and price of HGH and EPO biosimilars.

Conclusion Uptake of G-CSF biosimilars was driven by unit cost while other factors appear to have influenced the uptake of HGH and EPO. The key differences were the advances in formulations and devices available for HGH and EPO, which increased ease of administration and potentially prescriber and patient preferences. There were also potential safety concerns with switching formulations of EPO. Therefore, cost only influences uptake in the absence of safety concerns or prescriber or patient preferences for new formulations or devices.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

CP-025   WITHDRAWN

CP-026   **RENAL SAFETY OF TENOFOVIR AND COBICISTAT**

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Background The antiretroviral combination tenofovir disoproxil, emtricitabine, cobicistat and elvitegravir (TDF/FTC/COBI/RVG) has been widely used to treat HIV infection. This regimen is related to the highest risk of kidney disease because of the ability of cobicistat to block creatinine tubular secretion, boosting tenofovir's nephrotoxic effect because this drug is cleared using the same mechanism. Hence careful monitoring of creatinine clearance, urine glucose and protein levels, and blood phosphate levels at the start and during treatment is key.

Purpose To assess the impact of TDF/FTC/COBI/RVG on renal function in our patients, evaluating the extent to which EPAR's monitoring needs are satisfied at the start and during treatment, and describing measures taken to resolve any incidences encountered.

Material and methods We undertook a descriptive retrospective study, involving all patients treated with TDF/FTC/COBI/EVG over 2 years. Data were collected from patients' digital clinical and analytical histories. We registered demographic data, previous treatments with tenofovir or cobicistat, laboratory monitoring information, adjustment of monitoring to given criteria, use of other nephrotoxic drugs and measures taken if renal function decreased (if ClCr <70 mL/min then the dose was lowered; treatment was stopped if ClCr <50 mL/min).

Results 43 patients (81% men, average age 44 years) received TDF/FTC/COBI/RVG during the study period. 53% had previously been treated with tenofovir. Average ClCr was 107 mL/min (only 19% had ClCr <70 mL/min, χ=66.5 mL/min). None were monitored satisfying all of the established criteria. Only one-third of treatments from patients with decreased renal function were stopped; in one case (ClCr < 50 mL/min) additional measures were needed. Nephrotoxic drugs were found in 28% of patients' prescriptions.

Conclusion Despite wide experience with their use, the number of cases of decreased renal function with TDF/FTC/COBI/RVG treatment has increased with time. In our study, we observed a progressive decrease in creatinine clearance, leading to hospital admission in one case. This could be because none of our patients received adequate monitoring.

No conflict of interest

CP-027 **EFFICACY OF COMPOUNDING TOPICAL TACROLIMUS FOR SUBEPITHELIAL CORNEAL INFILTRATES TREATMENT**

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Background Epidemic keratoconjunctivitis is a highly contagious infection that mainly involves the surface of the eye. Keratitis may appear approximately 10 days after the onset of follicular conjunctivitis, with the formation of subepithelial corneal infiltrates (SEIs), usually bilaterally and asymmetric. SEIs have the potential to cause significant ocular morbidity, with reduced vision, photophobia, glare, halos and foreign body sensation, and can persist for months or years after the initial infection. Tacrolimus has demonstrated effectiveness in this ocular pathology in some studies.

Purpose Our aim was to determine the efficacy of compounding topical tacrolimus treatments for SEIs after adenovirus keratoconjunctivitis.

Material and methods This retrospective study included patients who were treated with tacrolimus 0.03% eye drops twice daily or tacrolimus 0.2% ointment once daily for SEIs. The parameters measured were visual acuity before and after treatment, measured by LogMAR, intraocular pressure before, during and at the end of treatment, measured by Perkin's tonometer, and other treatments before tacrolimus and the result of SEIs after treatment. The data were analysed using IBM Microsoft SPSS Statistics V.22.0.

Results We analysed 63 patients (99 eyes); 57.1% were affected bilaterally. Mean age was 46.85 years (SD 14.93). 26 patients (41.3%) were treated with tacrolimus 0.02% ointment and 37 patients (58.7%) with tacrolimus 0.03% eye drops. Mean duration of treatment was 105 days (range 55–199) and mean follow-up was 112.5 days (57.25–426.75). In 56.56% of eyes there was a decrease in SEIs, and in 19.19% they disappeared. We had data for visual acuity (VA) for 32 eyes. We observed an increase in VA in 17 eyes (53.1%), with a mean value of 0.331 (range 0.1–0.7). In 3 eyes (9.37%), VA decreased (0.1); there was no differences for 12 eyes (37.5%). Mean intraocular pressure was reduced in the right eyes based on media data.

Conclusion Topical tacrolimus eye drops and ointment, which are compounded in the pharmacy service, seems to be an effective treatment for SEIs after adenovirus keratoconjunctivitis.

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No conflict of interest

CP-028 **SAFETY AND TOLERABILITY OF COMPOUNDED TOPICAL TACROLIMUS**

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Background Subepithelial corneal infiltrates (SEIs) are caused by adenoviral infection, a highly contagious infection that involves the surface of the eye; it is a common chronic ocular condition that typically presents significant patient symptomatology. Long term topical steroid use is usually effective but with severe side effects. Tacrolimus has demonstrated effectiveness without significant side effects. Good pharmaceutical care assistants are important for adherence and efficacy.

Purpose Our aim was to evaluate the safety and tolerability of topical tacrolimus treatment for SEIs after adenovirus keratoconjunctivitis.

Material and methods This transversal retrospective study included patients treated with tacrolimus 0.03% (TC0.03%) eye drops twice daily or tacrolimus 0.2% ointment (TC0.02%) once daily over the past year. Demographic data were recorded from the clinical history; safety and tolerability were measured by a survey that patients completed when the drug was dispensed. There were seven questions covering symptoms before and after treatment, local and systemic adverse events, improved vision and overall satisfaction. All were measured on a scale from 1 to 10.

Results We analysed 63 patients (99 eyes), 57.1% were affected bilaterally. Mean age was 46.85 years (SD 14.93). TC0.02% was given to 26 patients (41.3%) and TC0.03% to 37 patients (58.7%). Treatment with TC0.03% in 33 patients (52.38%) was well tolerated: 1 patient (1.58%) had an allergic reaction, 1 patient (1.58%) had itching and there were no data for 2 patients (3.17%). In the TC0.02% group, the treatment was well tolerated in 20 patients (31.74%) and 6 patients (9.52%) had itching and chemosis. Mean survey results: (1) symptoms before treatment: 6.5/10.2; symptoms after treatment: 3.75/10.3; adverse events because of the drug, and their intensity: 1.85/10.4; any systemic adverse effect: 1.7/10.5; intensity of the itching: 2.65/10.6; vision improvement: 6.4/10.7; and general satisfaction with the treatment: 7.5/10.

Conclusion Topical tacrolimus, which is compounded in the pharmacy service, seems to be a safe and well tolerated treatment for SEIs after adenovirus keratoconjunctivitis.

No conflict of interest

CP-029 **PIM-CHECK USED BY PHYSICIANS TO REDUCE DRUG RELATED PROBLEMS IN INTERNAL MEDICINE**

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Background Drug related problems (DRPs) are important issues for inpatient safety and may contribute to adverse drug events and hospital costs. Potentially inappropriate medication (PIM), including over prescription (medication without a valid indication), under prescription (failure to prescribe a clinically indicated drug) and mis-prescription (unwanted drug interaction; incorrect prescribing) is a risk factor for DRPs. PIM-Check (www.pimcheck.org), a prescription screening checklist, was recently developed to detect PIM in internal medicine patients.

Purpose This study aimed to determine if electronic application of PIM-Check, used by physicians, can decrease DRPs in internal medicine patients.

Material and methods This was an open label prospective study, conducted in two consecutive periods of 1 month, in patients admitted for ≥ 48 hours to seven internal medicine wards in a university hospital. In period 1, patients were treated with usual care (control group). In period 2, patients were treated with usual care preceded by a medication review performed by chief residents within 24 hours after admission using the PIM-Check electronic application (intervention group). At 48 hours, all medications, laboratory results, comorbidities and diagnoses were collected. DRPs were identified by a 'gold standard' group, composed of a clinical pharmacist, clinical pharmacologist and two internal medicine consultants, analysing all patient datasets (blinded to period group).

Results 297 patients were included: 188 in the control group and 109 in the intervention group. 909 DRPs (mean/patient $\pm$SD: 3.1 ± 2.2) were identified: 3.2 ± 2.2 in the control group and 2.9 ± 2.2 in the intervention group (p=0.21). Both groups were comparable (age, sex, number of drugs, comorbidities) and had similar mean DRPs/patient. The top 5 active compounds involved in DRPs were: esomeprazole, paracetamol, tobacco, aspirin and thiamine. In the intervention group, the mean number of statements suggested by PIM-Check was 13.9 $\pm$7/patients. Among the 311 DRPs identified in this group, 33.4% were suggested by PIM-Check but no treatment modifications were performed by prescribers.

Conclusion PIM-Check allowed identification of one-third of DRPs. However, the number of DRPs did not decrease significantly in the intervention group. This lack of impact may be explained by the high number of statements displayed and the reluctance of hospital physicians to modify the treatment plan established by the general practitioner for chronic medical conditions, especially in the first 48 hours of hospitalisation.

No conflict of interest

ASSESSMENT OF MEDICAL CARE FOR OLDER PATIENTS IN AN ACUTE GERIATRIC DEPARTMENT WITH THE STOPP/START CRITERIA

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Background STOPP and START criteria were developed to identify potentially inappropriate prescription (PIP) and potentially prescribing omission (PPO), and to improve the use of medication in older people.

Purpose The aim of this study was to evaluate the medical care for elderly patients in an acute geriatric department with the STOPP and START criteria.

Material and methods This study included patients admitted to the acute geriatric department in an academic hospital from July to October 2015. Using pre-admission treatment, a pharmacist used STOPP and START criteria version 2 to identify PIPs and PPOs. After the patient's discharge, a geriatrician and a pharmacist assessed how many STOPP and START criteria were followed according to the discharge prescription. The reason for not following STOPP/START criteria was investigated using clinical records.

Results Among 81 patients included, 224 PIPs were identified according to STOPP criteria, of which 168 (75%) were

followed by the geriatricians. Among 56 cases of non-adherence to STOPP criteria, 50 cases (90%) presented a justified reason for this decision. Among 262 inappropriate prescriptions identified by geriatricians, 94 (36%) prescriptions were supplementary and not identified by STOPP criteria. Supplementary drugs stopped the most by geriatricians were drugs related to the cardiovascular system (n=28), mostly because the treatment was ineffective (n=7).

According to START criteria, 90 PPOs were identified, of which 56 (62%) were followed by the geriatricians. Among 34 cases of non-adherence to START criteria, 27 cases (79%) presented a justified reason for this decision. Among 273 omission prescriptions identified by geriatricians, 217 prescriptions were supplementary and not identified by START criteria. The drugs started most by geriatricians were drugs related to the central nervous system (n=79), mostly because patients presented moderate pain (n=36).

Conclusion In this study, PIP and PPO STOPP and START criteria were usually followed by geriatricians. The reasons for not following the criteria were usually justified. However, cases of non-adherence to START criteria were more important than cases of non-adherence to STOPP criteria. In these cases, geriatricians added more drugs than the START criteria. More studies about following these criteria should be performed in older patients admitted to hospital, especially in others wards, without geriatricians.

No conflict of interest

INFLUENCE OF ADMINISTRATION OF ANTITHROMBIN CONCENTRATE IN CHILDREN ON HEPARIN INFUSION RATE DURING EXTRACORPOREAL MEMBRANE OXYGENATION

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Background During extracorporeal membrane oxygenation (ECMO), the risk of thrombosis is important due to the non-biological surfaces of the circuit. Unfractionated heparin (UFH) is required in children during ECMO to maintain circuit patency and prevent thrombosis. The use of heparin induces consumption of antithrombin III (ATIII) and a decrease in ATIII levels may result in decreased efficacy of heparin. Therefore, an monitoring of anticoagulation should be done (anti-factor Xa (anti-Xa), activated clotting time (ACT) and ATIII.) Anti-Xa is monitored until levels are between 0.4 and 0.6 IU/mL. ACT must be increased more than three times. When ATIII activity is lower than 70%, addition of antithrombin concentrate (ATC) is considered. This use of ATC is off-label. In some studies, administration of ATC decreased UFH dose requirements and in other studies no difference was found in the heparin infusion rate.

Purpose The aim of this study was to evaluate the impact of administration of ATC on anti-Xa levels and heparin requirements among children on ECMO.

Material and methods We carried out a retrospective study including all patients requiring ECMO in 2015 and with at least one administration of ATC. ATIII activity levels, UFH dose and anti-Xa levels were collected and compared before and after ATC administration (Student t-test).

Results In 2015, 28 patients received ATC during ECMO in our hospital; 2 patients were excluded because of lack of biological results. Mean ATIII activity pre- and post-administration was 45.8% and 85.4%, respectively. ATIII levels increased significantly after ATC administration (p<0.001). Mean anti-Xa levels pre- and post-administration were 0.36 and 0.53 IU/mL, respectively. Anti-Xa levels were significantly different before and after ATC administration (p<0.001). UFH doses pre- and post-administration were 25.8IU/kg/h and 27.1IU/kg/h, respectively. ATC administration had no influence on UFH dose requirements (p=0.39).

Conclusion ECMO is a common procedure associated with an off-label use of ATC. In this study, ATIII levels and anti-Xa levels increased significantly after ATC administration but UFH doses were not changed after ATC. This study could enable us to review our anticoagulation protocol during ECMO, particularly by decreasing UFH requiraemia. Future prospective studies are warranted to evaluate the benefits of antithrombin replacement.

No conflict of interest

EVALUATION OF BOOSTED PROTEASE INHIBITOR MONOTHERAPY WITH DARUNAVIR/RITONAVIR IN HIV INFECTED PATIENTS. STUDY IN A REAL LIFE SETTING

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Background Boosted protease inhibitor monotherapy may offer antiviral efficacy while reducing drug interactions, costs and toxicity in HIV infected patients.

Purpose The aim of this study was to assess the efficacy of darunavir/ritonavir (DRV/r) monotherapy in a real life setting.

Material and methods A retrospective analysis of all HIV infected patients, who had initiated DRV/r monotherapy between January 2009 and January 2016, was performed. Patients with previous virological control after the start, and those who were treated for at least one year with DRV/r, were included. Data analysed: sex, age, start reason, previous treatment, presence of blips and adherence based on the dispensations record of the previous 6 months. Additionally, the reason for discontinuation was analysed in those patients who discontinued treatment, and length of treatment with DRV/r was recorded. Finally, CD4 lymphocyte counts at the beginning and end of monotherapy or at the end of the study were recorded. Data were collected from clinical documentation and using computer tools(Farmatools and Intralab).

Results 53 patients started treatment with DRV/r. 71.6% (38) were men and mean age was 48 years. The reason for starting was for treatment simplification in 44%, renal impairment in 17%, gastrointestinal symptoms in 17%, dyslipidaemia in 11% and neuropsychiatric symptoms in 11.0%. Regarding previous treatment, 49.0% (26) had received triple therapy 2ITIAN+PI/r, 26.4% (14) 2ITIAN+1ITINN, 17.0% (9) PI/r (LPV/r) and 7.6% (4) different combinations. 84.0% had superior treatment adherence (90.0%). 60.4% (32) continued with DRV/r until January 2016 with a mean duration of 37.7 months. 37.5% (12) had blips in some of the controls, but in no case was this the reason for discontinuation. 39.6% (21)

discontinued treatment with an average duration of 19.4 months. The reasons for discontinuation were toxicity in 9 patients (4 gastrointestinal, 2 renal, 1 neurologic, 1 interactions and 1 gestation), loss to follow-up/death in 6, blips in 4 and virological failure in 2. Mean baseline CD4 DRV/r was 693 000/mm^3, maintaining ultimate control favourably with 693 000/mm^3. No protease inhibitor mutations were detected.

Conclusion Boosted protease inhibitor monotherapy with DRV/r was effective in a real life setting. About 40% of patients changed to DRV/r, but neither virological failure nor blips were the fundamental reasons for change.

No conflict of interest

APPLICATION ANALYSIS OF DRUG RATIONAL USE MANAGEMENT SYSTEM IN A TUMOUR SPECIALISED HOSPITAL

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Background In a tumour specialised hospital, the proportion of tumour inpatients is high, and off-label drug usage is common. In addition, there are drug interactions and compatibility issues, as well as unreasonable use of drugs. Thus several prescription review software systems are used in tumour specialised hospitals. iPHARMACARE, a drug rational use management system, different from existing clinical decision support systems, has a strong medication rule engine, and pharmacists can design individualised rules according to clinical medication guides. The control level of the iPHARMACARE drug rational use management system is divided into 8 levels; once unreasonable prescriptions are set to level 8, doctors must modify them correctly or otherwise these prescriptions will not be saved and executed. Other levels give reminders displayed in a different colour, but doctors can still save the prescription.

Purpose To analysis the application of the iPHARMACARE drug rational use management system in our hospital.

Material and methods The number of unqualified prescriptions, rules of level 8 and intercepted prescriptions were collected, covering the period from 2013 to 2015. The rate of unqualified prescriptions was then analysed and compared.

Results Since the introduction of the software in 2013, clinical pharmacists have set 134 level 8 rules, including 10 incompatibility rules, 43 improper solvent selection rules, 15 overdose limit rules, 32 super indications medication rules, 19 route of administration rules and other 15 rules. 881 unreasonable doctor's prescriptions were intercepted during the 3 years, of which 76% were antineoplastic agents or adjuvant antineoplastic agents related prescriptions. As a result, the rate of unqualified prescription has decreased year by year, from 9.8% to 4.3%. It is worth mentioning that the antineoplastic agents' prescriptions had solvent selection errors or exceeded the concentration range specified in the instructions almost never, and overdose prescriptions of adjuvant antineoplastic agents were also significantly decreased.

Conclusion The application of the iPHARMACARE drug rational use management system in our hospital has provided effective guidance and reminders for doctors when prescribing, significantly improved the rate of reasonable prescriptions and increased medication safety for patients.

No conflict of interest

EFFECTIVENESS OF THE COMBINATION LEDIPASVIR/ SOFOSBUVIR FOR THE TREATMENT OF HEPATITIS C VIRUS INFECTION

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Background New direct acting antivirals (DAAs) for chronic hepatitis C have been developed. High rates of sustained virological response (SVR) have been reported. This represents an opportunity to eradicate hepatitis C virus (HCV) in these patients.
Purpose To assess the effectiveness of the combination of sofosbuvir (SOF) and ledipasvir (LDV) in HCV patients.
Material and methods This was a retrospective observational study between April 2015 and January 2016. Inclusion criteria: patients with HCV infection treated with SOF/LDV±ribaavirin (RBV) during the study period. Exclusion criteria: patients with no data available. Outcomes collected: demographic data (age and sex); clinical data(baseline viral load (VL), SVR at week 12 (SVR12), defined as HCV RNA titres <15 IU/mL); METAVIR score(F0–F4); liver transplant; HCV genotype (G); HIV coinfection; previous treatments for HCV; and side effects. Data were collected from the medical records of patients.
Results 78 patients were included (71.79% men); mean age was 54.42±9.56 years. Based on the METAVIR score: F4 (cirrhosis) (37.18%), F3 (33.33%), F2 (23.08%), F1 (5.13%) and F0 (1.28%). HCV genotype was: 56.41% G1, 25.64% G3 and 17.95% G4. 25 patients (32.05%) were HIV coinfected. 16.66% had a liver transplant. 42.31% (33/78) had failed prior treatment, 81.81% were treated with peginterferon/RBV, 9.10% with peginterferon, 3.03% with RBV/peginterferon/protease inhibitor (IP), 3.03% with RBV/IP and 3.03% with simeprevir/SOF. According to baseline VL, 73% had VL >800 000 UI/mL. Patients with G1 (n=44) were treated with SOF/LDV for 12 weeks (5 patients were treated for 8 weeks). All patients achieved SVR12 including one patient treated with SOF/LDV+RBV for 12 weeks. Patients with G3 (n=20) were treated with SOF/LDV for 12 weeks (n=14) and achieved SVR12 in 50[p2]% (n=7); were treated with SOF/LDV+RBV for 12 weeks (n=6) and achieved SVR12 in 83.33% (n=5). Patients with G4 (n=14) were treated with SOF/LDV for 12 weeks and all achieved SVR12. The treatment was well tolerated.
Conclusion The combination of SOF/LDV±RBV was effective in non-responders and naive patients with HCV G1 and G4. The SVR12 rate achieved in our study confirms the results obtained in published clinical trials. For G3, our results are slightly lower than those achieved in the ELECTRON-2 trial; this could be due to the fact that only 10 naive patients were treated and 4 patients were pretreated with SOF/LDV without RBV.

No conflict of interest

EVALUATION OF THE THERAPEUTIC STRATEGIES USED FOR THE TREATMENT OF HEPATITIS C VIRUS GENOTYPE 3 INFECTION

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Background Hepatitis C is a serious health problem with a high prevalence rate, and is the leading cause of liver transplantation. The development of well tolerated and highly effective direct acting antivirals (DAAs) for hepatitis C virus (HCV) has dramatically changed the therapeutic landscape.
Purpose To assess the effectiveness of sosbuvir/daclatasvir (SOF+DCV) compared with sofosbuvir/ledipasvir (SOF/LDV) used for the treatment of HCV genotype 3 infection.
Material and methods This was a retrospective and observational study between April 2015 and January 2016. Inclusion criteria: patients with HCV genotype 3 infection treated with either SOF/LDV±ribavirin (RBV) or SOF+DCV during the study period. Exclusion criteria: patients with no data available. Outcomes collected: demographics(age and sex); clinical data(baseline viral load (VL), SVR at week 12 (SVR12), defined as HCV RNA titres <15 IU/mL); METAVIR score (F0–F4); liver transplant; HIV co-infection; and previous treatments for HCV. Data were collected from the medical records of patients.
Results Treatment with SOF/LDV±RBV: 20 patients were included (65% men) with a mean age of 53.05±9.05 years. Patients were treated for 12 weeks. METAVIR score: F4 (cirrhosis) (45%), F3 (35%), F2 (15%) and F1 (5%). 10% of patients were HIV coinfected, 15% had a liver transplant and 30% were pretreated with RBV/peginterferon. 45% of patients had an initial VL >800 000UI/mL. Treatment SOF/LDV: naive-non-cirrhotic patients (n=5) achieving SVR12 60%, naive-cirrhotic (n=5) achieving SVR12 only 40%; pretreated non-cirrhotic (n=3) achieving SVR12 66.66% and 1 pretreated cirrhotic who did not achieve SVR12. Treatment SOF/LDV/RBV: naive-non-cirrhotic (n=3) and naïve-cirrhotic (n=1), all achieved SVR12; pretreated cirrhotic (n=2), only one patient achieved SVR12.
Treatment with SOF+DCV: 20 patients (85% men) were included with a mean age of 53.05±9.05 years. Patients were treated for 12 weeks. METAVIR score: F4 (cirrhosis) 50%, F3 (20%), F2 (20%) and F1 (10%). HIV coinfected patients 45%, pretreated with RBV/peginterferon 25% and 30% had basal VL >800 000UI/mL. All patients (19/20=95%) achieved SVR12 except 1 pretreated cirrhotic patient.
Conclusion Treatment with SOF+DCV seemed to be more effective in our study. This matches the upper SVR12 rate achieved in ALLY-3 for SOF+DCV compared with results obtained in ELECTRON-2 for SOF/LDV in genotype 3, although the sample size and different baseline characteristics of the patients could have influenced these results.

No conflict of interest

CP-036 | WITHDRAWN

CP-037 | USE OF CHITOSAN FILM FOR REFRACTORY PAIN IN PERIOSTOMAL ULCER

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Background Healthy skin around an open stoma in colostomy patients is exposed to a humid environment and the acidity of the faeces. This condition can produce periostomal skin problems such as very painful ulcers, with difficult pain management. Chitosan is a biodegradable polymer and has an important role in clinical practice.

Purpose To evaluate the efficacy of chitosan film in a patient with refractory pain caused by a periostomal ulcer.

Material and methods Film preparation: chitosan was diluted in sterile water to a final concentration of 2% at 70°C and mixed with a magnetic stirrer. 0.2 mL of acetic acid glacial were added slowly to form a semisolid gel. The gel was allowed to dry in a plastic solid base for 24 hours at room temperature protected from UV light to form a film. Efficacy was measured on: a visual analogue scale for pain (VAS pain), the Clinical Global Impression-Global Improvement (CGI-I) Scale and the reduction of dose or withdrawal of analgesic medication base.

Results A colostomy patient presented with painful conditions refractory to conventional analgesic therapy. The patient was aged 68 years (76 kg and 168 cm). Chitosan film was applied above the periostomal ulcer and we placed a stoma disk on the abdomen. The patient was receiving magnesium metamizole rescue (575 mg three times per day) until treatment with chitosan film, resulting in no rescue magnesium metamizole on the second day of initiating therapy. VAS pain score before the chitosan film was 9 and remained at 2 for 48 hours after application of the film, achieving a score of 2 on day 1. CGI-I Scale score at the end of treatment was 1 (denoting great improvement). The patient had no changes in clinical parameters. The total rinsing treatment duration was 4 days, requiring only two rinses the first day. Cessation of pain occurred within 15 min after film application.

Conclusion Chitosan 2% film showed complete efficacy in our periostomal patient with painful conditions refractory to standard analgesic therapy. Further studies are needed to strengthen our results.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

CP-038 | USE AND ECONOMIC IMPACT OF INTRAVENOUS IMMUNOGLOBULIN AT A UNIVERSITY HOSPITAL

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Background Intravenous immunoglobulins (IVIg) are widely used to treat immunodeficiencies and autoimmune and/or inflammatory diseases, representing a significant economic burden for hospitals.

Purpose Disclosing the use of IVIg in a tertiary hospital: adequacy of labelling indications and economic impact.

Material and methods Retrospective study (January–December 2015). Descriptive analysis of IVIg use per patient and indications and associated costs were studied. IVIg adequacy of use was established based on the British *Clinical guidelines for immunoglobulin use*, 2nd edition, July 2011 update. Collected data, from the medical records, included sex, age, IVIg indication, posology, cumulative dose and treatment cost per patient.

Results 140 patients (aged 62.6 (3.1 to 91.8) years, 40.7% men) received IVIg (56% in hospital). IVIg posology when used as replacement therapy ranged from 100 to 400 mg/kg every 3–5 weeks. When used as immunomodulatory, posology ranged from 1 to 2 g/kg, as a single dose or monthly administrations.

Label indications were 62% (87/140): primary immunodeficiencies (68/87), idiopathic thrombocytopenic purpura (7/87), Guillain–Barré syndrome (5/87), secondary immunodeficiency (5/87) and Kawasaki disease (2/87). Off-label indications supported by clinical evidence were 20% (28/140): myasthenia gravis (9/28), chronic inflammatory demyelinating polyradiculoneuropathy (5/28), inflammatory myopathies (5/28), multifocal motor neuropathy (2/28), stiff person syndrome (2/28), renal transplant rejection mediated by antibodies (2/29), Lambert–Eaton syndrome (1/28), autoimmune haemolytic anaemia (1/28) and staphylococcal toxic shock (1/28).

Off-label indications not sufficiently supported by clinical evidence were 12% (17/140): systemic lupus erythematosus (6/17), systemic vasculitis (6/17), paraneoplastic syndrome (3/17), acute disseminated encephalomyelitis (1/17) and refractory childhood epilepsy (1/17). Indication was not properly established in 6% (8/140) of cases. 66.295 g of IVIg were dispensed in 2015, with a cost of €1 732 897. Label indications assumed 33% of dispensed IVIg and 42% of cost. Off-label indications both supported and not supported by clinical evidence assumed 47% and 16% of dispensed IVIg, and 33% and 19% of cost, respectively. IVIg used in a not properly established indication assumed 4% of dispensed IVIg and 6% of cost.

Conclusion Off-label IVIg indications were frequent in our hospital (32%), with an important economic impact (52%), and higher than label indications. It would be useful implementing an updated IVIg protocol, listing indications supported by scientific evidence to facilitate application of IVIg treatment in off-label indications.

No conflict of interest

CP-039 | WITHDRAWN

CP-040 | WITHDRAWN

on the budget of the use of available therapies. A budget impact analysis (BIA) was conducted.

Material and methods A BIA was performed from the perspective of the SSR and the hospital, and also involved sensitivity analysis involving possible scenarios in normal clinical practice.

Results The expenditure paid out by SSR was greater in the case of patients receiving cardioversion therapy NOAC (€ 684.40) than those receiving VKA (€ 620.79). Although the cost regarding the performance of the TAO Centre (start of therapy and subsequent monitoring) was higher (€ 115.40 first and € 93.60 after the procedure), the cost of drug therapy was less (€ 7.99 warfarin compared with € 243.09 per NOAC net of distribution costs) and therefore for the SSR it is more convenient to treat patient with VKA in the presence of optimal INR control. The threshold value of the cost of NOAC was calculated or what cost/day would cancel the difference with VKA, estimated at € 1.68/day, equivalent to a reduction of about 23% over list price/day (€ 2.19). Statements obtained showed that the costs that the centre incurs are considerably higher (€ 652.98) than the SSR repayments with the amounts of the DRG (€ 198). Sensitivity analysis confirmed the findings from analysis of the baseline scenario.

Conclusion Cardioversion presents non-negligible risks with a significant economic impact on the SSR and the hospital—in particular, anticoagulant therapy is not appropriate. The BIA has enabled us to estimate that, to date, treatment with VKA is the most convenient for the SSR. The hospital pharmacist needs to assess the prescriptive appropriateness of anticoagulant therapy in accordance with indications and to undertake a proactive role in the analysis of the profile and security management, effectiveness and sustainability.

No conflict of interest

CP-041 | **NEW ORAL ANTICOAGULANTS IN NON-VALVULAR ATRIAL FIBRILLATION PATIENTS WHO ARE CANDIDATES FOR ELECTIVE CARDIOVERSION: AN EXAMPLE OF BUDGET IMPACT ANALYSIS**

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Background Information relating to the efficacy and safety of new oral anticoagulants (NOACs) in patients with non-valvular atrial fibrillation who are candidates for electrical or pharmacological cardioversion is still limited in the literature. However, guidelines enable the clinician to choose between vitamin K antagonists (VKA) and NOACs.

Purpose Our aim was to understand the characteristics of the setting of the two treatments and the possible consequences

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CP-042 | **EMERGENCY DEPARTMENT VISITS AMONG ONCOLOGIC PATIENTS: DESCRIPTIVE STUDY IN A REGIONAL HOSPITAL**

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Background Is chemotherapy or the disease the cause for attendance at the emergency service?

Purpose The aim was to describe the characteristics of oncologic patients attending the emergency room of a regional hospital and study the relationship between the reason for admission and possible chemotherapy related adverse events.

Material and methods Observational and retrospective study of oncologic patients attending the emergency room during the period January to December 2015. Data were collected from digital medical records. The following variables were analysed: tumour location; tumour stage; chemotherapy (yes/no); antineoplastic agents involved; reason for admission and discharge diagnosis; and resolution of the episode (income, discharge).

The data were processed using SPSS.v.10

Results 118 visits of oncologic patients were analysed. 61.9% were men and mean age was 64.24 years. 20.3% were of colorectal origin; 17.8% pulmonary; and 22.8% digestive tumours. In 66% of cases patients had stage IV disease,

followed by 26% with stage III. 90.7% were being treated with chemotherapy. The most common antineoplastic was capecitabine (24 cases), followed by carboplatin (21 cases) and cisplatin (15 cases). The highlight for new antineoplastic agents were 2 cases with nivolumab whose reasons for admission were dysphagia and dyspnoea, respectively; 2 cases with pazopanib because of fever and pain, respectively; and 3 cases with sunitinib, whose reasons for admission were vomiting in two cases and anaemia in one case. The most frequent reason for admission was dyspnoea (30.5%), followed by fever (24.6%), vomiting(7.6%) and diarrhoea(5.9%). The most frequent discharge diagnoses were pneumonia (13.6%), febrile syndrome (8.5%), ITU (6.8%), febrile neutropenia (5.9%), disease progression (5.9%), pulmonary thromboembolism (5.9%) and diarrhoea (5.9%), among others. 41.5% of patients required admission to internal medicine and 17 (34.7%) died.

Conclusion Capecitabine and platinum based drugs were the most common cytostatics in these oncologic patients who attended the emergency room. The new oral antineoplastics present new adverse events and many interactions with others drugs. Reasons for admission described in this study were the usual adverse effects of cytostatic drugs. The emergency pharmacist, along with the emergency physician team, must implement clinical guidelines to manage common adverse events of antineoplastic drugs and identify those drugs interactions that may be causing the adverse events.

No conflict of interest

CP-043 | ANTIMICROBIAL STEWARDSHIPS: QUALITY IMPROVEMENT INITIATIVES

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Background According to Portuguese legislation, consumption of carbapenems and quinolones should be reduced by 50% by 2020. The aim of the Antibiotic Stewardship Programmes is surveillance of antibiotic consumption and a decrease in incidence rate of multidrug resistant microorganisms.

Purpose The objectives of GCL-PPCIRA (Local Coordination Group Prevention Programme and Infections Control and Antimicrobial Resistance) were to reduce the number of inappropriate prescriptions and duration of antibiotic therapy, and prevent the emergence of antimicrobial resistance.

Material and methods This was a prospective study. Antibiotics prescriptions between June 2015 and May 2016 were analysed by the pharmacist by reviewing patient medical records. The pharmacist classified the requirements as empirical, inappropriate and documented prescriptions. Statistics: Stata 10.1 (5% significance level).

Results 618 patients were identified, mean (SD) age 68 (16.6) years and 54.9% men, resulting in 734 prescriptions of carbapenems (71%) and quinolones (29%). The most common site of infection was the urinary tract (31.3%). According to the prescribed therapeutic intervention, 150 (20.4%) were empirical, 275 (37.5%) were inappropriate, 231 (31.5%) were documented and 77 (10.5) were according to the protocol approved by the institution.

Mean duration of treatment was 9.4 days for documented prescriptions, 8.8 days for empirical prescriptions, 7.1 days for prescriptions according to the protocol and 6 days for inappropriate prescriptions (p=0.0001). PPCIRA changed 118 (16.1%) prescriptions. The interventions reduced the mean duration of therapy: 4.7 days for prescriptions with interventions and 8.4 days for those without (p<0.0001). It was found that in 362 prescriptions with microbial isolates, 201 were multidrug resistant microorganisms (55.5%).

Prescriptions for patients who were discharged with an antibiotic (23.7%) had a lower mean duration of treatment and a lower proportion of prescriptions with multidrug resistant microorganisms than prescriptions for patients who were discharged without an antibiotic (61.7%) or for patients who died (14.6%): 6.4 days and 33.8% for multidrug resistant microorganisms, 8.2 and 62.8% and 8.1 and 49.1%, respectively (p=0.0001 and p<0.001). 14 (13.1%) deaths were directly attributed to infection.

Conclusion The PPCIRA work has resulted in a timely intervention during the prescription process. The investment in surveillance of therapeutic protocols has been reflected in a decrease in the duration of inappropriate prescriptions and the fulfilment of targeted therapy.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

CP-044 | WITHDRAWN

The patient affected by ALM, 76 years old, had white blood cells 30 400, haemoglobin 7.9 and platelets 41 000 at the start of treatment. Blasts were >20%. The patient was treated with azacitidine for 59 months, with an increase in progression free survival of 34.4 months. He is still being treated with azacitidine.

Conclusion We have shown a high efficacy for azacitidine in increasing the progression free survival in most patients treated, with two over level clinical cases (10% of the patients studied).

No conflict of interest

CP-046 | **AN ASSESSMENT OF PREFERENCE OF VISUAL AND MANUAL COMPLIANCE AIDS**

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Background Various studies have recommended that skills to assess safe self-medication management should be incorporated into routine evaluation of elderly patients. As seen in previous studies, pharmacists are more likely than other healthcare professionals to discover barriers to adherence to medication regimens among elderly patients and to undertake interventions to remove these barriers.

Purpose The aim was to investigate the issues of supporting those with impaired vision and manual dexterity in independently managing their medicines. Objectives of the study were to develop a screening tool to investigate impaired vision and manual dexterity in the elderly hospital inpatient population, to identify the prevalence of impaired vision and manual dexterity in an elderly hospital inpatient population and to determine patient perspectives of compliance aids to support manual and vision impaired patients.

Material and methods For this prospective, non-randomised, observational study, 18 consenting elderly patients were interviewed and given a choice of suitable compliance aids that could help them with their medication management. The patient's preference for a suitable compliance aid was recorded.

Results 18 of 459 patients (3.92%) on four wards were identified as having visual impairments and/or manual dexterity issues, that had an impact on their ability to self-administer medication. The majority of the study population was predominantly women (83.33%), with an overall mean age of 82 ±7 years. 77.8% of patients with visual impairment reported difficulty reading medication labels, despite using optical aids. 61.11% of patients that displayed manual dexterity issues stated their preferences for a compliance aid suitable to their impairment.

Conclusion Elderly inpatients in this study had impairments of their ability to self-administer their medication. By using a screening tool and suitable compliance aids, the pharmacist was able to detect adherence difficulties and their prevalence among the elderly inpatient population. Preference for a suitable compliance aid depended on the type of medications used.

CP-045 | **OVER LEVEL PROGRESSION FREE SURVIVAL OF AZACITIDINE IN MYELODYSPLASTIC SYNDROME AND IN ACUTE MYELOID LEUKAEMIA**

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Background Azacitidine belongs to the group of antimetabolites (an analogue of cytidine) used in myelodysplastic syndrome (MS) and in acute myeloid leukaemia (AML), with expected progression free survival(according to the characteristics product summary) of 24.6 months for patient with MS and AML with blasts ≤30%.

Purpose To describe the clinical cases of patients affected by MS and AML.

Material and methods We performed a retrospective study enrolling all patients with MS and AML treated in our hospital. We looked at the medical records and AIFA monitoring folders, and compared effectiveness with progression free survival in the characteristics product summary.

Results 21 patients were treated with azacitidine: 9 patients were affected by ALM and 12 patients were affected by MS. In the first group, we had 8 responders and 1 non-responder (treatment outcome determined with follow-up at 6 months); in the second group there were 4 non-responders. According to clinical studies with a protocol of azacitidine 1–6 +1, the administration method used was: intramuscularly for 6 days (Monday–Saturday) with a break on Sunday and the last administration on the following Monday, repeated every 28 days. We observed a longer progression free survival in two patients. The patient affected by MS, 68 years old, had white blood cells 1600, haemoglobin 8.4 and platelets 25 000 at the start of treatment. He was classified as intermediate–high risk with blasts 5–10%. The patient was treated with azacitidine for 60 months, with an increase in progression free survival of 35.4 months. The patient dropped out of therapy for progression; he is alive and is doing supportive care.

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No conflict of interest

CP-047 | **EVALUATION OF THE CLINICAL PHARMACIST IMPACT ON TOTAL PARENTERAL NUTRITION PRESCRIPTION ORDER REVIEW AND PREPARATION IN THE NEONATAL INTENSIVE CARE UNIT**

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Background Clinical pharmacist (CP) services to hospitalised patients are highly recommended, especially in vulnerable populations such as neonates. Neonates are in need of prompt nutrition support but total parenteral nutrition (TPN) practices remain unsatisfactory due to a lack of knowledge of neonatal nutritional needs. The CP plays a crucial role in all steps of TPN: prescribing review, compounding and administering instructions. However, there is insufficient evidence related to the role of the CP in the neonatal intensive care unit (NICU) setting, and most of the literature is either outdated or focuses on lack of standardisation of practices, and the role of CP as prescriber in the NICU. Few (and none in our country) have focused on the role of the CP in all TPN related processes and the impact on decreasing the potential errors and fatal events.

Purpose To evaluate the impact of involving the CP in TPN order review and preparation in the NICU on the potential errors related to 2 in 1 (dextrose/amino acids) and lipid prescription orders.

Material and methods A 6 month prospective analysis was conducted in NICU where TPN order set forms that were elaborated by the CP were filled by neonatologists and sent on a daily basis to the CP for review, calculations, issuing of labels and instructions for compounding and administration. Any noted error or discrepancy in the order was communicated to the neonatologist for prompt amendment.

Results 209 2 in 1 and 149 lipid prescription orders were analysed. 57.5% of 2 in 1 and 11.5% of lipid prescriptions contained errors in dosing, infusion rate and volume, missing components, wrong venous access or high risk of precipitation. The most common 2 in 1 order errors prevented by the CP involved: amino acid dose (14.6%), followed by total infusion volume (13.2%), rate of infusion (13.2%), heparin dose (13.2%), missing component (12.5%), precipitation of calcium and phosphorus risk (12.1%), dextrose dose (9.2%), venous access not mentioned (8.4%), venous access (central vs peripheral) (1.8%), trace element dose (1.1%) and electrolytes dose (0.7%). The most common lipid order errors prevented by the CP involved: rate of infusion (44.5%), followed by total infusion volume (37%), lipid dose (11.1%), lipid soluble vitamin dose (3.7%) and missing component (3.7%).

Conclusion This study shows the impact of including the CP in TPN processes by highlighting the potential errors of prescription/preparation and fatal events that he/she can prevent, thus achieving optimal neonatal nutritional needs and contributing to patient safety. Further studies could be conducted to assess the financial impact of CP driven TPN error prevention

as well as other roles of the CP in the NICU setting, which remains a neglected area.

No conflict of interest

CP-048 | **EARLY RECOVERY AFTER CAESAREAN SECTION AND EVALUATION OF CARBETOCIN**

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Background Early recovery is a concept involving the entire medical team following caesarean section. Carbetocin (Pabal) is currently indicated for prevention of uterine atony after delivery by caesarean section. Administration of carbetocin requires a single dose after caesarean section; this allows the removal of an intravenous drip on exit from the operating room and contributes to the early recovery of patient's autonomy.

Purpose The objective of this study was to evaluate the use of carbetocin in caesarean section.

Material and methods We compared the medical records from January 2015 where oxytocin (Syntocinon) was used for the prevention of uterine atony until March 2016 after the introduction of carbetocin in April 2015. Simultaneously with this comparison, a satisfaction questionnaire was distributed to patients who received carbetocin.

Results 71 women gave birth by caesarean section: 33 in January 2015 and 38 in March 2016. Average length of post-caesarean recovery was 7.6 days for January and 6.7 days for March (a difference of 0.9 days). The French costs for hospital stays according to the diagnosis related group (DRG) for uncomplicated caesarean section and the national length of stay for this DRG allowed us to assess the cost of a hospital day for an uncomplicated caesarean section as €667.17. The reduction of 0.9 days per stay allows a saving of €609 per stay. The average costs of administration are €25.27/per stay for carbetocin and €5.41/per stay for oxytocin, a difference of €19.86. 50% of patients were very satisfied with their recovery of autonomy, 27% somewhat satisfied and 23% dissatisfied because of pain. Of the 26 patients, 7 had a previous caesarean delivery without an early recovery protocol and 86% gave preference to the new protocol.

Conclusion Early recovery after caesarean section has enabled savings in the cost of stay of €609.45. However, these savings cannot be exclusively attributed to the use of carbetocin. Indeed, many other parameters influence the decrease in length of stay. Carbetocin is more expensive than oxytocin but its use allows a clear improvement in patients' comfort.

No conflict of interest

CP-049 | **EFFECTIVENESS OF CINACALCET VIA PERCUTANEOUS ENDOSCOPIC GASTROSTOMY CATHETER: A CASE REPORT**

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Background Cinacalcet is approved for the treatment of hypercalcaemia in patients with primary hyperparathyroidism for which parathyroidectomy is contraindicated. At present, there is little information available on the administration of cinacalcet via percutaneous endoscopic gastrostomy (PEG).

Purpose To describe the impact of administration of crushed film coated cinacalcet tablets via a PEG catheter on reduction of corrected serum calcium values in a patient with hypercalcaemia due to primary hyperparathyroidism.

Material and methods A case of hypercalcaemia in a 72-year-old man with a PEG tube, diagnosed with spinal cord injury was reported to our pharmacy department. Pharmacotherapeutic information was required by physicians since the oral route was not possible. He was unsuccessfully treated with hydration, alendronate 70 mg/weekly and intravenous zoledronic acid (4 mg) in a single dose. A systematic review of the literature was performed by searching Medline and Micromedex databases for studies about cinacalcet crushed tablets via PEG but no references were found in the published literature. According to product information, dividing tablets is not recommended. Nevertheless, it was decided to administer cinacalcet through the PEG catheter due to the ineffectiveness of other treatments previously used.

Results Cinacalcet tablets were crushed and given through the PEG tube. Dietary calcium was controlled during hospitalisation. The starting cinacalcet dose was 30 mg/day (day 1). Dosage was increased to 30 mg twice daily (day 14) and a clear variation in calcaemia values was observed over time (day 1: 11.86 mg/dL; day 7: 11.35 mg/dL; day 11: 11.40 mg/dL; day 20: 10.10 mg/dL; day 30: 9.76 mg/dL; day 60: 9.58 mg/dL). After 3 weeks, serum calcium levels declined and returned to the normal range (8.7–10.4 mg/dL) and remained stable during follow-up.

Conclusion Cinacalcet given as crushed tablets via a PEG effectively decreased serum calcium levels and normalised calcium levels in a patient with primary hyperparathyroidism not eligible for surgical treatment, although further pharmacokinetic/pharmacodynamic studies are required.

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No conflict of interest

CP-050 MEDICATION DISCREPANCIES AT THE TIME OF ADMISSION TO AND TRANSFER FROM THE INTENSIVE CARE UNIT AND THE ROLE OF A CLINICAL PHARMACIST

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Background Medication discrepancies between actual and documented therapy often arise at patient transfer between wards. Intensive care unit(ICU) patients are particularly prone because of polymedication, frequent therapy changes and impaired consciousness, with also an increased risk for drug related problems (DRPs).

Purpose To determine the type and frequency of medication discrepancies and DRPs on admission, during ICU stay and on transfer to the ward, and the clinical pharmacist's role in prevention.

Material and methods This was a prospective before and after study on adult patients after informed consent, in two ICU units (general and cardiology; 12 beds) in a tertiary care university hospital. During an 8 week observation period (October 2015 to January 2016) a clinical pharmacist conducted a standardised drug reconciliation on ICU admission, twice weekly drug review and review on patient transfer. These data were compared with physicians' notes and prescriptions. Discrepancies and potential DRPs were classified using a standardised flow chart. During a subsequent 16 week intervention period (January–May 2016), the pharmacist additionally entered compiled drug histories in the patient files, participated in clinical rounds and proactively provided feedback.

Results 111 patients were included (observation 50; intervention 61). On ICU admission, we found a significant difference in the number of drugs found after medication reconciliation by the physician compared with the pharmacist (observation 5.5 vs 8.5/patient; intervention 6 vs 8/patient; both p<0.0001). Furthermore, during the intervention period we saw a reduction in DRPs during ICU stay (5 vs 3/patient; p=0.06) and a reduction in median number of discrepancies (1 vs 0/patient; p=0.0067) and DRPs (3 vs 1/patient; p=0.0009) at patient transfer. The proportion of transfer discrepancies due to incomplete drug reconciliation showed a similar reduction (17.9% vs 5.1%; p=0.0061). Most frequent DRPs at patient transfer were incomplete reconciliation (26.2%), missing therapy duration (22.7%) and inadequate administration route (20.6%). Main transfer discrepancies were omission (59%), frequency (12%), addition (11%) and dose (11%). During the intervention period, the pharmacist proposed a total of 683 interventions with an 92.7% acceptance rate.

Conclusion A clinical pharmacist, integrated in a multidisciplinary ICU team, can make a significant contribution to medication safety by preventing drug discrepancies on admission, by identification of DRPs during ICU stay and by reducing discrepancies on transfer to a normal ward.

No conflict of interest

CP-051 COMPARING THE EFFICACY OF AFATINIB VERSUS ERLOTINIB OR GEFITINIB IN NON-SMALL CELL LUNG CANCER PATIENTS

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Background Afatinib is a second generation irreversible EGFR tyrosine kinase inhibitor (TKI), indicated as firstline therapy in non-small cell lung cancer (NSCLC). There are two other first generation EGFR TKIs indicated in NSCLC treatment, and no direct comparison of them.

Purpose To compare the efficacy of afatinib versus erlotinib or gefitinib in EGFR TKIs naïve patients with NSCLC.

Material and methods This was an observational retrospective study carried out between January 2015 and April 2016. All patients with NSCLC undergoing firstline treatment with an EGFR TKI were included. Patient data were taken from clinical records. Efficacy endpoints were overall survival (OS), progression free survival (PFS) and response rate, assessed by RECIST criteria.

Results 46 patients were included. 76% were men, average age was 71 years. 71.8% had an ECOG performance status of 0–1 and 76% were current or past smokers. NSCLC stage was III/IV in 84.4% of patients and histologic type was adenocarcinoma in 37% of patients. 43.5% were treated with erlotinib, 39.9% with gefitinib and 17.4% with afatinib. EGFR status was determined in only 16 patients, being mutated in 7 (4 treated with erlotinib and the other 3 with afatinib). Median OS for afatinib, gefitinib and erlotinib was 5, 14 and 43 months, respectively (HR (95% CI) gefitinib vs afatinib: 0.25 (0.07–0.81); erlotinib vs afatinib: 0.16 (0.05–0.55)). Median PFS was 2 months for afatinib, 8 months for gefitinib and 16 months for erlotinib (HR (95% CI) gefitinib vs afatinib: 0.18 (0.06–0.59); erlotinib vs afatinib: 0.08 (0.02–0.29)). Response rate by group was 37.5%, 61.1% and 80% for afatinib, gefitinib and erlotinib, respectively.

Conclusion According to the main clinical guidelines, EGFR mutation status should be known before the start of treatment, and EGFR TKIs should only be used in patients with a positive EGFR mutation test. Our study suggests that afatinib is less effective than erlotinib or gefitinib, but our population was small. Further studies with more patients are needed to compare afatinib with the other EGFR TKIs.

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No conflict of interest

CP-052 | ECONOMIC ASPECTS OF THE USE OF CARBAPENEMS IN CRITICALLY ILL PATIENTS

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Background Severe sepsis is a leading cause of mortality in intensive care units (ICUs). Efficient and cost effective use of antibiotics is necessary for improving treatment outcomes.

Purpose The aim was to investigate cost utility and cost effectiveness of carbapenems versus piperacillin/tazobactam, as they are commonly used in the treatment of sepsis in our ICU.

Material and methods The study was conducted from August 2014 to May 2015 in the ICU of a tertiary university hospital. The cost effectiveness and cost utility analysis included all adult critically ill patients with sepsis who had received either a carbapenem (n=56) or piperacillin/tazobactam (n=28). Results were expressed in life years gained (LYG) adjusted with estimated reduction of LYG in patients with sepsis (0.51). Quality adjusted life years (QALYs) were obtained by multiplying LYGs with the utility value for sepsis(0.69). The incremental cost effectiveness ratio (ICER) was calculated as the ratio of the differences between LYGs and cost of treatment of both groups. The incremental cost utility ratio (ICUR) was the ratio of the difference between QALYs and cost of treatment. The confidence interval was obtained using Bootstrap resampling (2000 replications). The Mann–Whitney U test was used for statistical analysis between groups.

Results There were no differences between patients regarding age, gender and length of stay in the ICU. Patients in the carbapenem group had a tendency for a higher survival rate (48%) in comparison with the non-carbapenem group (39%), but this did not reach statistical significance. Costs were higher in the carbapenem group compared with patients treated with piperacillin/tazobactam (€ 752 per patient compared with € 399 per patient; p<0.001). The ICER was € 105 per LYG and the ICUR was € 66 per QALY for carbapenem.

Conclusion The results showed that the use of carbapenems was associated with higher efficacy and costs. The low values for ICER and ICUR indicate that carbapenem is cost effective in patients with sepsis.

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No conflict of interest

CP-053 | IMPACT OF PHARMACEUTICAL CARE IN ELDERLY PATIENTS: A REVIEW OF THE LITERATURE

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Background Geriatrics is a specialty that focuses on the healthcare of the elderly. It aims to promote health by preventing and treating diseases and disabilities in older adults. While there is no set age at which a patient may be called 'elderly', patients over 60 years of age tend to have more comorbidities and prescribed drugs. Pharmaceutical care provided to elderly people is challenging as it embraces numerous pathologies, polypharmacy, drug interactions and complex care. By 2030, 1 in 6 persons will be aged 60 years or over.

Purpose The objective of this study was to identify the role and impact of the pharmacist in geriatrics.

Material and methods A literature search was conducted using PubMed and the following terms: pharmacist OR clinical pharmacy OR pharmaceutical care AND geriatrics from 1 January 1990 to 26 September 2016. Manual search was also conducted using selected articles. The selection of articles was based on abstracts. Selected articles were reviewed, analysed and entered in Impactpharmacie.org website according to a standard operating procedure. Relevant key data were extracted for each article, including the type and description of the pharmaceutical interventions and descriptive and outcomes indicators with their results. No statistical analysis was conducted.

Results A total of 140 articles were included. Described pharmaceutical interventions included drug therapy assessment (in n=121 articles), interdisciplinary work (n=83), medication reconciliation (n=58), patient care needs assessment (n=55), knowledge transfer (n=55), patient follow-up (n=46), management and preparation of medication (n=30), patient–pharmacist relationship (n=24) and competencies maintenance (n=9). The impact of pharmacists' interventions was studied using a total of 1099 indicators from which 470 (43%) had outcome measures. Of these 470 outcome indicators, 200 (43%) were positive, 266 (56%) neutral and 4 negative (1%). For instance,

the pharmacist contributed to a decrease in drug related hospitalisation, falls, inappropriate drug prescribing and to an increase in drug adherence.

Conclusion The role and impact of pharmacists have been studied in geriatrics and 43% of outcome indicators used in these studies show a positive impact of pharmaceutical interventions. Pharmacists should pay attention to this evidence to improve their practice in geriatrics.

No conflict of interest

CP-054 | **CLINICAL PREDICTORS OF RESPONSE TO TOCILIZUMAB IN PATIENTS WITH RHEUMATOID ARTHRITIS**

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Background Tocilizumab (TCZ), a recombinant humanised antibody targeting soluble and membrane IL-6 receptor, is commonly used in rheumatoid arthritis (RA) patients refractory to tumour necrosis factor inhibitors, demonstrating 60–80% effectiveness. Clinical parameters such as years of disease prior to TCZ treatment, naïve for biological therapy (BT naïve), baseline Disease Activity Score 28 (DAS28) and Health Assessment Questionnaire (HAQ), have been associated with response to TCZ, although with conflicting results. Identification of clinical predictors of response may lead to a better selection of BT alternatives in DMARDs refractory RA patients.

Purpose To assess the effectiveness of TCZ in RA patients and the influence of clinical parameters.

Material and methods This was a retrospective cohort study. Linear or logistic regression models were applied to evaluate the influence of clinical parameters (baseline DAS28, baseline HAQ, BT naïve, years of disease prior to TCZ treatment, age at TCZ start, concomitant DMARDs and corticosteroids, baseline CRP and ESR) on TCZ effectiveness, measured according to relative percentage of variation in DAS28, and EULAR response (responders vs non-responders), after 18 months of therapy in RA patients.

Results 61 patients (83.6% women; 53.4±12.6 years) were investigated, with mean disease duration of 10 (7–18) years and 8 (3–13.5) years of disease evolution before TCZ therapy. Only 22 patients were naïve for BT (22/61; 36.1%). Baseline DAS28 and HAQ were 5.6±1.15 and 1.66±0.66, respectively. EULAR response was 88.5% (54/61), and relative percentage of DAS28 variation was −58.9% (−68.8, −44.7) at 18 months. The decrease in relative percentage of DAS28 variation (R2=0.229) was higher in patients with higher baseline DAS28 (coef: −7.98; 95% CI −13.1, −2.8; p=0.03), lower baseline HAQ (coef: 14.9; 95% CI 6.02, 23.8; p=0.01) and BT naïve (coef= −11.5, 95% CI −22.3, −8.0; p=0.036). EULAR response was more frequent in patients with higher baseline DAS28 (OR 3; 95% CI 1.2, 8.3; p=0.048), shorter time of disease prior to TCZ treatment (OR 0.8; 95% CI 1.02–1.5, p=0.026) and lower number of BT failures (OR 0.31; 95% CI 0.11–0.99; p=0.016).

Conclusion TCZ effectiveness in RA patients after 18 months of therapy was >88% (EULAR), with an approximated 60% of relative reduction in DAS28. High baseline DAS28, low baseline HAQ, BT naïve patients and shorter time of disease prior to TCZ treatment have been identified as predictors of better response to TCZ therapy. Hence TCZ should become the first option of BT in refractory DMARDs RA patients.

No conflict of interest

CP-055 | **ANALYSIS OF PRESCRIBING OPIOIDS FOR CHRONIC PAIN IN HOSPITAL UNITS**

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Background Opioids are safe and effective drugs that improve the quality of life of patients with chronic pain. However, they require close monitoring and appropriate training. Pain specialists consider that pain often has a mixed origin that requires prescription aids for the treatment of neuropathic pain.

Purpose To analyse the adequacy of the recommendations for the treatment of chronic pain with opioid drugs in a tertiary care hospital.

Material and methods This was a prospective study identifying prescriptions of opioid drugs (transdermal fentanyl, delayed release morphine and delayed release oxycodone) in patients hospitalised for 2 months using the electronic health record. We collected requirements for adjuvant drugs for the treatment of neuropathic pain, laxatives and rescue analgesia, and being following or not by the unit pain (UP).

Results 79 patients were prescribed any of the opioids studied, 38 men, with a mean age of 67.7 years, and 41 women, with a mean of 64.4 years. Distribution of patients by services was: oncology and haematology (25), internal medicine (13), general and digestive surgery (15), palliative care unit (6), geriatrics (4), pneumology (4) and other services (12). 47% patients were treated with transdermal fentanyl, 34% with oral morphine and 19% with oxycodone tablets. 23% of patients were monitored by UP. Prescription of transdermal fentanyl in patients followed by UP was only 21.6%. The most frequently prescribed drug for rescue was morphine (56%). 100% of patients followed by the UP had rescue analgesia, compared with 69% in the group without monitoring. 29% had prescribed treatment for neuropathic pain, 52% with pregabalin. In those followed by UP, prescription of an adjuvant for neuropathic pain occurred in 67%. It should be noted that 57% of patients treated with gabapentin needed the an adjuvant, versus 33% with pregabalin. 70% had a laxative prescribed, with little difference whether or not patients were followed-up by UP (72% vs 69%).

Conclusion Pharmaceutical validation should be undertaken with these types of high risk drugs, so that prescription of analgesia rescue as well as prescribing laxatives can be recommended. Likewise, prescription of transdermal fentanyl should follow a protocol when favoured over oral and lower cost opioids.

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No conflict of interest

CP-056 | PATIENT TREATMENT SATISFACTION AFTER SWITCHING TO BIWEEKLY SUBCUTANEOUS PEGINTERFERON BETA 1A FROM INTRAMUSCULAR INTERFERON BETA 1A

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Background Peginterferon beta-1a (PEGIFNβ-1a) is administered subcutaneously biweekly, which is an advantage over other treatment schedules used in multiple sclerosis (MS) patients.

Purpose To compare treatment satisfaction in MS patients treated with interferon beta-1a (IFNβ-1a) intramuscularly (30 μg weekly) after switching to PEGIFNβ-1a 125 μg administered subcutaneously every 2 weeks.

Material and methods This was a prospective multicentre study. Adult MS patients switching from weekly intramuscular IFNβ-1a to biweekly PEGIFNβ-1a were included. Patient satisfaction was measured according to the Treatment Satisfaction Questionnaire for Medication (TSQM), which consists of 14 items scaled on a 5–7 point bipolar scale. Items are combined into four summary scores: effectiveness, side effects, convenience and overall satisfaction. Higher scores imply higher satisfaction. The Wilcoxon signed rank test was used for evaluating the differences. The study was approved by the ethics committee.

Results 35 patients were included. Mean age (±SD) was 44.9 ±8.6 years and 74.4% were women. Intramuscular IFNβ-1a was the firstline treatment for 88.6% of patients. Treatment duration before change was 64.4±50.5 months. Overall satisfaction and satisfaction in terms of effectiveness were higher for IFNβ-1a IM. Convenience was better evaluated for PEGIFNβ-1a. Side effects were reported in a similar percentage (table). 11.4% of patients returned to intramuscular IFNβ-1a.

	IFNβ-1a IM	PEGIFNβ-1a SC	p Value
Effectiveness	16.0±2.9	14.2±3.9	0.01
Q1. Ability to treat/prevent condition	5.4±1.4	4.9±1.5	0.03
Q2. Ability to relieve symptoms	5.3±1.2	4.9±1.4	0.06
Q3. Time it takes medication to start working	5.3±0.9	4.5±1.4	<0.01
Side effects	13.5±2.8	12.3±2.9	0.08
% who reported side effects	94.1	93.9	
Q5. Bothersomeness of side effects	3.0±0.7	2.8±0.8	0.18
Q6. Interfere with physical function	2.9±0.8	3.0±1	0.64
Q7. Interfere with mental function	4.0±1.1	3.7±0.9	0.18
Q8. Impact overall satisfaction	3.6±1	2.8±1.1	0.01
Convenience	15.3±2.8	16.9±2.6	<0.01
Q9. Ease/difficulty of use	4.8±1.2	5.8±0.9	<0.01
Q10. Ease/difficulty of planning to use	5.2±1.1	5.6±0.9	0.05
Q11. Convenience of taking as instructed	5.3±1.3	5.6±1.1	0.15
Overall satisfaction	13.1±2.4	11.9±3.2	0.02
Q12. Confidence that taking medication is good	4.9±1.5	3.6±1	0.01
Q13. Certainty that good things outweigh bad	4.9±1.4	3.5±1	0.02
Q14. Satisfaction with medication	5.2±1.2	4.8±1.4	0.08

Conclusion Switching from intramuscular IFNβ-1a to PEGIFNβ-1a resulted in better convenience and a similar reported rate of adverse effects although overall satisfaction was lower.

No conflict of interest

CP-057 | OPTIMISING PHARMACOTHERAPY IN INSTITUTIONALISED ELDERLY PATIENTS: THE ROLE OF HOSPITAL PHARMACISTS

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Background In our region, the pharmaceutical services at nursing homes (NHs) are run by pharmacists from hospitals in the public network. Furthermore, the prescription system in NHs is based on collaboration between general practitioners (GPs) working at NHs and a team of GPs from the National Health Care System specialising in elderly patients.

Purpose To determine if prescriptions proposed by GPs at NHs are appropriate to the clinical needs of institutionalised elderly patients.

Material and methods This was a prospective study conducted between March and June 2016. NHs in the reference area of two tertiary hospitals were studied. The study population was patients admitted for the first time to one of the NHs. Our pharmacy unit created a database to register the following: home medication, medication proposed at NH and medications proposed for revision. Four revision categories were created: safety, indication, adequacy and other. The team of GPs from the National Health Care System specialising in elderly patients entered the database to indicate if revisions were justified. Justified revisions involved the modification of the prescriptions proposed by GPs from the NHs.

Results 102 patients with a mean age of 81 years were included (72.5% women). 971 prescriptions were studied. Pharmacists registered 505 prescriptions suitable for revision: 25.1% (127) adequacy; 24.6% (124) indication; 17.4% (88) safety; and 32.9% (166) other. 96% of patients had at least one proposed prescription revised. 74.6% of proposed revisions were accepted as justified by the team of GPs specialising in elderly patients. The percentage of acceptance according to each category was 70% (89) adequacy; 64.5% (80) indication; 72.7% (64) safety; and 86.7% (144) other.

Conclusion Prescriptions proposed by GPs at NHs had a high degree of lack of adjustment to the needs of the elderly population due to their special characteristics. Collaboration between hospital pharmacists and a team of specialist GPs is needed for the possibility of improving the pharmacotherapy in elderly populations.

No conflict of interest

CP-058 | ANALYSIS OF CHANGES IN MANAGEMENT OF CATHETER RELATED INFECTIONS IN HAEMODIALYSIS AFTER IMPLEMENTATION OF A PROTOCOL

CP-059 | WITHDRAWN

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Background Management of catheter related infections (CRIs) depends on the severity, type of catheter and need to keep it. When it is documented, systemic antimicrobial therapy should be started, as antibiotics lock therapy if the central venous catheter (CVC) is not removed. We reviewed the management of CRIs in patients undergoing haemodialysis over 2 years and found that only 18.7% of patients were properly handled. We decided to develop a treatment protocol for this type of infections with the nephrology department.

Purpose To analyse changes in the management of CRIs in patients undergoing haemodialysis after implantation of a management protocol.

Material and methods An observational and retrospective study was carried out over 6 months in patients undergoing haemodialysis in which intravenous antibiotic therapy was initiated after implementation of a CRI management protocol. The results were compared with the results obtained in a previous study on the implementation of this protocol. The following variables were recorded: sex, age, type of venous access, type of extracted sample (blood cultures, exudate catheter or other sample), microorganisms isolated, intravenous antibiotics used and antibiotic lock therapy in patients with CVC.

Results 24 requests for intravenous antibiotics for 18 patients were analysed. 66.6% were men, median age 68.9 years and 61.1% of patients had CVC. Blood culture samples were collected in 50% of patients and other samples obtained were urine culture (20.8%), wound exudates (20.8%) and catheter exit site exudates (12.5%). There was no catheter related bacteraemia because all blood cultures were negative. There were 10 positive results for the rest of the samples and *Pseudomonas aeruginosa* was the most common isolate (50%) followed by coagulase negative staphylococcus (20%). The most common treatment was vancomycin monotherapy (25%), followed by ceftazidime monotherapy (20.8%), a combination of both drugs (16.7%) and gentamicin (12.5%). Antibiotic lock therapy was performed in 70.8% of patients with CVC. Also, 12 pharmaceutical interventions about antibiotic selection, treatment duration or suspension because of negative results were made, and 66.7% were accepted.

Conclusion Results have improved after implementation of a CRI management protocol, particularly antibiotic lock therapy (from 18.7% to 70.8%), although it is still necessary to reinforce the need for taking blood cultures in serious infection to discard CRIs.

No conflict of interest

CP-060 REAL WORLD COMPARISON OF PATIENT ADHERENCE TO NEW ORAL INMUNOMODULATORS VERSUS INJECTABLE DISEASE MODIFYING THERAPIES IN PATIENTS WITH MULTIPLE SCLEROSIS

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Background New frontline oral therapies for relapsing remitting multiple sclerosis (RRMS) are available. The change to the oral route of administration could increase adherence.[1]

Purpose The aim was to assess patient adherence to new oral disease modifying therapies (oDMT), dimethyl-fumarate (DMF) and teriflunomide (TE), in comparison with prior injectable therapies (iDMT).

Material and methods This was a descriptive, observational and prospective study conducted between June 2015 and March 2016, in a university hospital of 1100 beds. RRMS patients switched from iDMT (interferon-beta 1a/1b or glatiramer acetate (GA)) to new oDMT were included. Sociodemographic and clinical variables were obtained by structured interview, review of medical records and pharmaceutical database. Adherence, measured by medication possession ratio (MPR) and expressed as a percentage, was compared for oDMT versus iDMT. Adherence was considered if MPR $\geq$90%. SPSS (V.15) software was used for statistical analysis.

Results 38 patients were switched from iDMT to DMF (n=20) or TE (n=18). Women 87.8%, mean age (SD) 39.2 (8.5) years, mean disease duration (SD) 6.0 (5.0) years, median EDSS (range) 2 (0–6.5) and annualised relapse rate over the past year 0.7±0.8. 66.7% of patients were switched from interferon-beta and 33.3% from GA. Prior mean treatment duration (SD) was 423.4 (167.2) days. Switched patients received one DMT (63.6%) or two DMT (36.4%). The main reasons for change were ineffective (59.4%) and intolerance (40.6%). In 4 patients oDMT were stopped in the first 2 months: 1 patient on TE due to pregnancy, 4 patients on DMF due to GI intolerance (n=3) and lymphopenia (n=1). Mean oDMT duration (SD) was 166.5 (59.3) days. MPR to iDMT was 85.2% versus 98.1% for oDMT (p<0.001). No differences between the two oDMT were observed. iDMT adherence among patients who switched to TE was slightly lower (83.4%) versus those who passed DMF (85.7%) (p>0.05). Adherence $\geq$90% was observed in 70% of patients on iDMT and in 100% on oDMT.

Conclusion Patients on oDMT had better adherence than those previously treated with iDMT. This change may have an important impact on disease control. More real world data are necessary to evaluate long term adherence to oDMT.

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No conflict of interest

CP-061 POSTOPERATIVE NUTRITIONAL STATUS OF COLORECTAL CANCER PATIENTS RECEIVING TPN WITH DIFFERENT DOSES OF COMPOUND AMINO ACIDS

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Background Colorectal cancer incidence has increased year by year, and surgery is the main treatment. Postoperative intravenous nutritional support is conducive to early recovery in patients with colorectal cancer.

Purpose To assess postoperative nutritional status of colorectal cancer patients receiving total parenteral nutrition (TPN) with different doses of compound amino acids. Amino acids in intravenous nutrition play an important role in maintaining nitrogen balance and promoting protein synthesis. Therefore, appropriate doses of amino acids after surgery are very important for colorectal cancer patients, and this is worthy of the attention of clinical pharmacists.

Material and methods Clinical data for 102 colorectal cancer patients undergoing surgical treatment and receiving postoperative TPN in our hospital from October 2015 to March 2016 were retrospective reviewed by oncology clinical pharmacists. The daily doses of compound amino acids for TPN were 25 g/250 mL (group A), 50 g/500mL (group B) and 75 g/750 mL (group C). The relationship between nutritional indexes after operation and different doses of compound amino acids was analysed.

Results 102 patients met the inclusion criteria, of whom 74 had rectal cancer (72.5%) and 28 had colon cancer (27.5%). There were 70 men and 32 women with an average age of 58.5±10.6 years and an average body mass index (BMI) of 22.2±3.0. There were no significant differences in sex, age, BMI index and duration of TPN use in the three groups (p>0.05). Compared with preoperative levels, after TPN treatment for 3 days, albumin and prealbumin concentrations in group B were significantly improved compared with group A (p<0.05; p<0.05). In addition, compared with group A, concentrations of total protein, albumin and prealbumin in group C had significantly improved (p<0.05; p<0.05; p<0.01). Moreover, after TPN treatment for 5 days, albumin, prealbumin and total protein concentrations in group C were significantly improved compared with group B (p<0.05; p<0.05; p<0.05).

Conclusion The dose of compound amino acids in TPN has a great impact on recovery of postoperative nutritional indexes in patients with colorectal carcinoma. A dose of no less than 500 mL/day is recommended.

No conflict of interest

CP-062 INFLIXIMAB IN REFRACTORY COELIAC DISEASE

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Background Refractory coeliac disease (RCD) is a rare but serious complication of coeliac disease and is characterised by non-responsiveness to a gluten free diet in the presence of a clonal population of T lymphocytes within the small intestine. The risk of progression from RCD to enteropathy associated T cell lymphoma is estimated at 60–80% and is associated with a poor survival.

Purpose Therapeutic options for RCD are limited. Immunosuppression with corticosteroids, thiopurines and infliximab have been used but promote the progression to lymphoma.

Material and methods A 72-year-old woman with a 4 year history of coeliac disease was studied. She was treated initially with a gluten free diet and pharmacological treatment with azathioprine and oral corticosteroids. Some improvement in her symptoms was observed but this was not sustained. Therefore, infliximab treatment 5 mg/kg every 8 weeks was initiated.

Results In February 2014, the patient began to receive therapy with infliximab. Response to treatment after 6 months was partial, maintaining a weight of 47 kg without diarrhoea, although she continued to have hypoalbuminaemia–cholesterolaemia and anaemia. In August 2014, infliximab treatment was stopped owing to surgical intervention. In September 2014, the patient weighed 37 kg and was admitted to hospital with severe diarrhoea. During her hospital stay, infliximab treatment was restarted. In April 2015, the patient weighed 50 kg and blood test levels were in the normal range. In September 2015, the patient suffered musculoskeletal pains, mild fever (37.5°C) and weight loss of 5 kg. On 3 December/2015, the patient received an infliximab dose, after which she had dark urine, musculoskeletal pains, chills and diarrhoea. On 17 December/2015, the patient was admitted to hospital because of deterioration in her general health, fever, musculoskeletal pains which impeded walking and anti-infliximab antibodies levels of 2.27. In the absence of a response, infliximab was stopped. On 4 January 2016, CT scan of the abdomen/thorax was performed and metastatic pericardium, bone and pancreatic disease was observed.

On 12 January 2016, a biopsy was performed which determined ALK negative anaplastic large cell lymphoma. On 25 January 2016 the patient's condition aggravated and she died as a result of multiple organ failure caused by lymphoma.

Conclusion Infliximab is an effective treatment that may be considered in a small number of patients with refractory coeliac disease, resistant to other therapies due to the increased risk of lymphoma risk.

No conflict of interest

CP-063 | **ASSESSMENT OF URINARY 8-HYDROXYDEOXYGUANOSINE LEVEL IN DIABETIC CANCER PATIENTS**

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Background Both diabetes mellitus and cancer are characterised by elevated levels of oxidative stress and the production of free radicals, which further complicates the control and outcomes of these diseases.

Purpose To assess the level of urinary 8-hydroxydeoxyguanosine in diabetic cancer patients as a biomarker of both disease progression and chemotherapy administration.

Material and methods A controlled prospective observational study was carried out in 100 diabetic patients newly diagnosed with diverse cancer types and eligible for different chemotherapeutic protocols at the oncology unit. Urinary 8-hydroxydeoxyguanosine levels were assessed at baseline (before the required chemotherapy protocol schedule) and at a second reading (at the end of the required chemotherapy protocol schedule). The main outcome measure was urinary 8-hydroxydeoxyguanosine levels as a biomarker of cellular oxidative stress in diabetic patients with cancer.

Results There was a significant ($p < 0.05$) increase in urinary 8-hydroxydeoxyguanosine levels between baseline and the second readings (27.04 ± 4.33 ng/dL vs 30.77 ± 4.63 ng/dL), and between the baseline and second readings after a 7 day course (25.96 ± 4.21 ng/dL vs 28.16 ± 5.27 ng/dL), a 14 day course (27.76 ± 5.33 ng/dL vs 31.56 ± 4.47 ng/dL) and a 21 day course (27.22 ± 4.16 ng/dL vs 31.40 ± 4.24 ng/dL).

Conclusion The results of this study suggest that oxidative stress based on elevated urinary 8-hydroxydeoxyguanosine levels is related to diabetes mellitus and cancer, which is further boosted during chemotherapy administration.

No conflict of interest

CP-064 | **EFFECTIVENESS OF NEW DIRECT ACTING ANTIVIRALS FOR CHRONIC HEPATITIS C DEPENDING ON GENOTYPE IN REAL MEDICAL PRACTICE**

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Background New direct acting antivirals (DAAs) for chronic hepatitis C achieve a sustained virologic response (SVR) above 90% in clinical trials. SVR is defined as undetectable HCV RNA 12 weeks after treatment completion (SVR12).

Purpose Our aim was to evaluate the effectiveness of treatment depending on the genotype of the virus with new DAAs for chronic hepatitis C in real medical practice.

Material and methods This was an observational retrospective study. Data were obtained from 922 patients with HCV treated with DAAs from April 2015 to February 2016. All patients had finished treatment and the results of HCV RNA levels 12 weeks post-treatment were available. We considered that the drug was effective if the patient achieved SVR12. Data collected were: age, gender, HIV coinfection, prior treatment experience, genotype, hepatic fibrosis stage, DAAs regimen and HCV RNA level.

Results We included 922 patients. 57% were men. Median age was 59 years. 237 (26%) patients were HIV coinfected. Regarding previous treatment, 94 (10%) had been treated with protease inhibitors, 531 (56%) were naïve, 139 (15%) were non-responders, 132 (14%) were relapsers, 89 (10%) were partial responders and 31 (3%) patients had no data. The most frequent genotype was 1b. The hepatic fibrosis stage

was F4 in 304 (33%), F3 in 201 (22%), F2 in 359 (39%) and F1 in 52 (6%). The treatment regimens were:

dasabuvir+paritaprevir/ritonavir+ombitasvir±ribavirine 12 weeks in 159; dasabuvir+paritaprevir/ritonavir+ombitasvir ±ribavirine 24 weeks in 6; sofosbuvir+ledipasvir±ribavirine 8–12 weeks in 463; sofosbuvir+ledipasvir±ribavirine 24 weeks in 165; sofosbuvir+daclatasvir±ribavirine 12 weeks in 46; sofosbuvir+daclatasvir±ribavirine 24 weeks in 29; paritaprevir/ritonavir+ombitasvir+ribavirine 12 weeks in 22; paritaprevir/ritonavir+ombitasvir+ribavirine 24weeks in 1; sofosbuvir +simeprevir+ribavirine 12 weeks in 3; sofosbuvir+simeprevir +ribavirine 24 weeks in 1; sofosbuvir+ribavirine 12 weeks in 1; and sofosbuvir+ribavirine 24 weeks in 3. RSV12 was achieved by 894 (97%) patients. The effectiveness based on genotype was 98% in genotype 1, 95% in genotype 4 and 86% in genotype 3.

Conclusion Results of effectiveness based on RVS12 were similar to results obtained in clinical trials. Genotype 1 had better results than the other genotypes, and genotype 3 had the worst results.

No conflict of interest

| CP-065 | WITHDRAWN |

| CP-066 | **APPRECIATION OF REDUCTION OF DRUG PRICES BY POLICYHOLDERS OF HEALTH INSURANCE AND ITS IMPACT ON ACCESS TO DRUGS** |

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Background Drug prices are the main obstacle for the majority of the population without a health insurance regimen. A reduction in drug prices is an important regulation tool to improve access to drugs for patients. Sometimes this reduction is not well perceived by patients, in particular when they cannot advance the cost of purchasing their medication and be reimbursed later by their health insurance company.

Purpose Throughout this work, we wanted to evaluate patient satisfaction regarding reduction of drug prices by the Ministry of Health. We wanted to study factors that influence patients' appreciation of reduction in drug prices.

Material and methods A questionnaire was given to patients admitted to our hospital and affiliated with mandatory health insurance. The goal was to find out whether these price reductions were appreciated by patients and helped to improve their financial accessibility to drugs. A univariate and multivariate analysis was used to examine the factors that influence patients' appreciation of a reduction in prices. Statistical analysis was done with SPSS 13.0.

Results 200 questionnaires were distributed over a 6 month period; 130 were completed correctly. Men represented 69% and married patients comprised 56%. 41% had private health insurance and the rest(59%) had public insurance. 28% were not satisfied, 37% did not feel the impact and 20% were satisfied with the reduction in prices. 6% were very unsatisfied and 9% were very satisfied. The patients' sex and income significantly influenced their appreciation of the reduction in drug prices ($p=0.042$ and $p=0.049$). Education level, type of health insurance (public, private) and the remaining costs beyond the insured part did not influence their appreciation of the reduction in prices ($p>0.05$).

Conclusion 71% of patients were not satisfied or had not felt the impact of the reduction in drug prices on their accessibility to drugs. The reduction in drug prices did not have the desirable effect if patients had to pay for their drugs and be reimbursed later. A system of direct payment between the insurance provider and pharmacies to cover drugs costs would

be more appreciated than a simple reduction in medicine prices.

No conflict of interest

CP-067   MEDICATION RECONCILIATION AT ADMISSION IN A CARDIOLOGY UNIT: IDENTIFY PATIENTS AT RISK

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Background While the concept of medication reconciliation seems relatively straightforward, implementing medication reconciliation has proved to be complex and challenging. In our setting, a teaching hospital with 700 beds, it seems very hard to perform extensive and complete reconciliation for every patient.

Purpose The objectives of this study were to describe the frequency and type of medication discrepancies (MD) during admission in cardiology, and to identify patients with a high risk of unintended medication discrepancies (UMD).

Material and methods Medication reconciliation was conducted at admission in the cardiology department over 4 weeks by trained pharmacists. (1) The best possible medication history (BPMH) was obtained using multiple sources (interview with the patient/family member, prescription vials, medication list, contact with general practitioner and community pharmacy, medical and pharmaceutical files). (2) Comparison of BPMH with the initial hospital prescription, identification of MD. (3) Classification of MD (intended/unintended) with the physician. Tools have been tested and validated in a pilot study. Statistical analysis examined the associations between UMD and patient reported factors (performed using R software). Statistical significance was reached if $p < 0.05$.

Results During the study period, 100 patients were included, mean age 67.6 years (SD 17.7), sex ratio (M/F) 1.3, corresponding to 746 prescription lines. Overall, 544 MD were identified, including 77 UMD (42% of patients). The most common UMD was omission (70%). Do not speak French ($p = 0.007$), to be admitted to a hospitalisation unit (compared with intensive care unit) ($p = 0.019$), a low level of education ($p = 0.004$), ≥ 2 comorbidities ($p = 0.001$), long term illness ($p = 0.042$) and ≥ 8 drugs in the initial prescription ($p = 0.004$) were found to be significantly associated with UMD. Level of education remained significantly and independently associated with UMD after adjusting in the multivariate analysis for factors statistically significant in the univariate analysis.

Conclusion Our study allowed us to identify predicting factors for UMD. Selection of patients for medication reconciliation must take into consideration factors that have been statistically identified, but are also practical. It is difficult to obtain information about level of education. Therefore, we decided to prioritise patients with ≥ 8 drugs in the initial prescription for medication reconciliation.

No conflict of interest

CP-068   EVALUATION OF ANTIBACTERIAL CONSUMPTION IN A PAEDIATRIC HOSPITAL FROM 2009 TO 2014

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Background Antibiotic consumption and the emergence of resistant organisms represent two major priorities of the medical and administrative staff of any hospital. Monitoring of antibiotic (ATB) consumption is one of the key missions of the hospital pharmacists and allows them to sensitise physicians of the perpetual changes in the bacterial environment.

Purpose Our goal was to conduct a study as part of the rationalisation of the use of ATB, which aims to quantify, describe and follow-up consumption of ATB in different medical services of the paediatric hospital from 2009 to 2014.

Material and methods This was a retrospective study from 2009 to 2014. All classes of ATB consumed in the paediatric hospital services were classified according to the WHO ATC classification and included in the study. The methodology and tools used are those recommended in this area using the DDD (defined daily dose) per 1000 patient days.

Results From 2009 to 2014, consumption of ATB changed by 30.5%. The change was marked in the quinolone class (538%), with ciprofloxacin as a leader although it is an ATB contraindicated in children <15 years of age, followed by glycopeptides (172%) and beta lactams (25%), with a very important development for imipenem (500%) because of the emergence of resistant bacteria, penicillin A and penicillin A protected (more than 100%) and a decrease in penicillin G and penicillin M (−25%). Consumption of amphenicols and colimycin declined (by −91% and −100%, respectively). ATB consumption differed from one service to another and was significant ($p < 0.001$).

Conclusion The increase in consumption of some classes of ATB, such as glycopeptides and carbapenems, could be explained by several factors: the budget increase in ATB following a growing need and better accessibility given the introduction of generics, an increase in the incidence of resistance and dissemination of multi-resistant bacteria.[1] The decline in consumption of other classes of antibiotics such as penicillins and amphenicols is mainly due to the emergence of resistance strains and adverse effects.

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No conflict of interest

CP-069   COMPARISON OF THE DURATION OF EFFECT OF TWO HYALURONIC ACIDS IN KNEE OSTEOARTHRITIS

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Background Viscosupplementation consists of intra-articular infiltration of hyaluronic acid (HA) to improve viscosity,

reduce inflammation and relieve pain in patients with knee osteoarthritis.

Purpose To compare the percentage of patients who required more than one dose of sodium hyaluronate (AdantOne) versus more than one dose of hylan G-F-20 (SynviscOne) in the same knee in less than a year.

Material and methods This was a retrospective observational study including all patients with knee osteoarthritis who were treated with HA between February 2013 and October 2016. This period was divided into two stages: in the first stage (February 2013–January 2015, 24 months), the HA available in the hospital was AdantOne and in the second stage (February 2015–October 2016, 21 months), the HA available was SynviscOne. The variables analysed were: number of patients, dispensed units, date of infiltration and medical service. The data were collected from the hospital pharmacy software programme (Savac) and the medical records programme (Selene).

Results In the first stage, AdantOne was dispensed to 944 patients (789 (83.58%) from traumatology, 138 (14.62%) from rheumatology and 17 (1.80%) from rehabilitation). Of these, 72 patients (7.63%) required $\geq$2 doses of HA in the same knee in less than a year (63 patients (87.50%) from traumatology, 8 (11.11%) from rheumatology and 1 (1.39%) from rehabilitation). In the second stage, SynviscOne was dispensed to 1193 patients(1039 (87.09%) from traumatology, 137 (11.48%) from rheumatology and 17 (1.43%) from rehabilitation). Of these, 7.63% (91 patients) required $\geq$2 doses of HA in the same knee in less than a year (78 (85.71%) from traumatology and 13 (14.29%) from rheumatology).

Conclusion The percentage of patients who required more than one dose was the same with the two presentations of HA. However, the second stage was shorter than the first, suggesting that the duration of the effect of SynviscOne is less than the duration of AdantOne. Our results show that the percentage of patients that required two or more doses of HA in the same knee in a time period of less than one year was not very high. These results, along with the price, are important in the selection of HA.

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No conflict of interest

INTERLEUKIN-2 TREATMENT OF TWO PATIENTS WITH MULTIFOCAL PROGRESSIVE LEUKOENCEPHALOPATHY ASSOCIATED WITH HIV INFECTION

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Background Progressive multifocal leukoencephalopathy(PML) is caused by JC virus (JCV) and has severe consequences for the central nervous system. PML is an opportunistic infection, affecting HIV positive patients. There is no curative treatment, and the current approach is focused on immune reconstitution and antiviral therapy.[1]

Purpose This is a case report of two patients with PML associated with HIV infection treated with aldesleukin/interleukin-2 (IL-2).

Material and methods We report two cases, both men, aged 48 years (patient A) and 57 years (patient B), HIV diagnosed in 1992 and 1993, who developed LMP opportunistic JCV infection. Antiretrovirals were the only therapy previously employed. Patient A developed progressive neurological impairment, slow psychic reactions and right upper limb strength loss. Symptoms in patient B were progressive cognitive impairment, memory loss, lack of coordination, dysarthria, strength loss and right facial paralysis. Both patients showed hypodensity of white matter in the semi-oval centre on cranial CT.

Results IL-2 was administered intravenously to both patients at 0.5 MU/m²/day for 4 weeks. Patient-A: IL-2 treatment (from 8 February 2010 to 7 March 2010) was well tolerated, although a self-limited fever and eosinophilia were reported without clinical correlations. The patient showed improvements in image tests (disappearance of signal hyperintensity and cytotoxic oedema on CT and MRI) and clinical outcomes (improvement of neurological symptoms), although progressive spasticity and dysarthria were maintained. JCV load was undetectable in February 2011. Patient A was treated for 1 year with mefloquine 250 mg/24 hours with good tolerance and stabilisation of PML, but without resolution. The patient died in December 2012 following intraparenchymal cerebral haemorrhage. Patient-B: therapy with IL-2 and mirtazapine (from 8 September 2016 to 5 October 2016) was well tolerated, but the infusion was discontinued once by a fever episode. Cranial CT showed no significant changes. The patient´s neurological impairment, hemiparesis and dysarthria persisted, but a slight improvement was observed. JCV load declined from >100 million to 12 million copies/mL, HIV from 645 to 147 copies/mL and CD4 T lymphocytes increased.

Conclusion IL-2 could be an effective and well tolerated therapy in LMP, without severe adverse events. Patient A showed improvements in neurological and image tests, and undetectable viral load, whereas the response in patient B was only partial, with a decline in JCV and HIV, but maintaining neurological deterioration.

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No conflict of interest

PROGNOSTIC VALUE OF CIRCULATING IGF-1R/VEGFR IN ADVANCED GASTRIC CANCER

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Background Vascular endothelial growth factor (VEGF) plays an important role in the formation of new blood vessels involved in the growth and metastatic spread of solid tumours. Moreover, increasing experimental evidence suggests that insulin-like growth factor 1 (IGF-1) may modulate tumour angiogenesis via activation of expression of VEGF in solid cancers. However, there is limited information regarding the clinical significance of serum IGF-1R and VEGFR levels in advanced gastric patients.

Purpose To evaluate whether serum IGF-1R/VEGFR could serve as biomarkers for the response of firstline chemotherapy and prognosis of advanced gastric cancer.

Material and methods Patients with clinically diagnosed advanced gastric cancer, including postoperative recurrence, without any treatment, were prospective enrolled from January 2014 to December 2014. Peripheral blood (5 mL) was collected after patient admission, the supernatant was centrifuged and enzyme linked immunosorbent assay (ELISA) was used to detect serum IGF-1R/VEGFR in these participants. Clinicopathological features and survival times were recorded, and the association between IGF-1R, VEGFR levels and response of firstline chemotherapy as well as patient prognosis were analysed.

Results 32 advanced gastric cancer patients were enrolled in this study; 21 were men (76.6%) and 11 were women (23.4%). Median age was 58 years (range 34–70). Median performance status ECOG score was 1 (0–2). The histiotype of 22 patients was adenocarcinoma and the other 10 patients had signet ring cell carcinoma. 18 patients had previous surgery history. The firstline chemotherapy regimens used in these patients were mainly S-1 plus oxaliplatin (SOX) and capecitabine plus oxaliplatin (XELOX). The median values for IGF-1R and VEGFR were 126.7 ng/mL and 2388.5 ng/mL, respectively. High serum IGF-1R levels correlated with gender and previous surgery (both $p<0.05$), and high serum VEGFR levels correlated with age and gender (both $p<0.05$). Moreover, the response of firstline chemotherapy in advanced gastric cancer patients with higher serum IGF-1R or VEGFR levels was poor (both $p<0.05$). Nevertheless, serum IGF-1R or VEGFR levels were not associated with overall survival times of these advanced gastric cancer patients.

Conclusion IGF-1R/VEGFR may be useful markers for the prediction of the response to firstline chemotherapy in advanced gastric cancer.

No conflict of interest

CP-072 | CURRENT VENOUS THROMBOEMBOLISM PROPHYLAXIS PERI-CORONARY ARTERY BYPASS GRAFTING AT ST THOMAS' HOSPITAL

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Background Venous thromboembolism (VTE) is strongly associated with postoperative death and readmission after coronary artery bypass grafting (CABG) surgery, especially in urgent patients with a high risk of VTE. In the literature review, prophylaxis using pharmacological methods and mechanical prophylaxis were both shown to be beneficial in terms of VTE rate. CABG patients follow St Thomas' Hospital's general venous thromboprophylaxis guideline which requires pharmacological and mechanical prophylaxis. Therefore, an audit is necessary to review VTE prophylaxis peri-surgery for urgent and elective CABG patients and compare it to the literature.

Purpose To understand current practice and further assess VTE rate and side effects between elective and urgent CABG patients, and to propose adjustments to the hospital's guideline if necessary.

Material and methods Patients receiving CABG from 9 May 2016 to 17 June 2016 were selected as the audit cohort. The observational design was conducted from their admission to discharge. IBM SPSS 22.0 was used to present the results of this audit.

Results 53 patients were included in the data analysis, comprising 23 urgent patients and 30 elective patients. Mean age of the cohort was 65.3 (±9.8) years, and the men population accounted for the majority (n=47, 88.7%). In the urgent group, half of the patients received prophylaxic doses of dalteparin once daily (n=12, 52.2%), followed by 4 patients (17.4%) who received the dose for acute coronary syndrome. Antiplatelet therapy was used before CABG surgery in 18 urgent patients (78.3%). Also, all patients were given dalteparin (prophylaxic dose: n=45, 84.9%; treatment dose: n=8, 15.1%) and dual antiplatelets after CABG. There was no symptomatic VTE events within the audit period. Nevertheless, 5 urgent patients (9.4%) suffered from moderate to severe bleeding incidences during surgery, with a significant difference between groups (p=0.012).

Conclusion Under the strict VTE prophylaxis regimens, the symptomatic VTE rate seemed to be low. Despite its relatively high incidence, bleeding in urgent patients can be managed by transfusions. Therefore, no amendment was added to the guideline. Nonetheless, compliance with it could be improved. Also, mechanical prophylaxis could be considered, as evidence from the literature review suggests that it can reduce the asymptomatic VTE rate.

No conflict of interest

CP-073 | TRENDS IN ORAL ANTICOAGULANT USE: A 5 YEAR EXPERIENCE

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Background For more than 60 years, warfarin has been the mainstay anticoagulation therapy worldwide. Since 2008, direct oral anticoagulants (DOACs) have been introduced to the market which expands the options for healthcare practitioners to find new alternatives to warfarin for the treatment and prevention of atrial fibrillation and thromboembolic events. Domestically, dabigatran was introduced in 2011 followed by rivaroxaban in 2014. The global use of DOACs is increasing, yet we have little knowledge with regard to the adoption of DOACs into local clinical practice.

Purpose This study aimed to explore the local prescribing trends of oral anticoagulants over a 5 year period (from 2011 to 2015). Also, we aimed to explore the switching pattern among anticoagulants, from warfarin to DOACs and vice versa.

Material and methods A time series analysis was conducted using patient electronic medical records of dispensed prescriptions (inpatient or outpatient) from the main medical corporation in the country to assess the use of oral anticoagulants between the period January 2011 until the end of October 2015. For every calendar year, the data obtained were used to quantify the percentage of patients using each agent.

Results 7178 patients used oral anticoagulants over the past 5 years: 6044 (84.2%) used warfarin, 518 (7.2%) used dabigatran and 616 (8.6%) used rivaroxaban. There was a gradual increase in the percentage of patients receiving DOACs from 0.5% in 2011 to 26% in 2015. Similarly, among DOACs

users, 261 (22.3%) were previous warfarin users while 188 (16.1%) patients who were using DOACs were switched back to warfarin.

Conclusion A gradual growth in DOACs use has been observed in local practice with a trend similar to other countries. Yet, until today, warfarin remains the most used oral anticoagulant.

No conflict of interest

CP-074 NIVOLUMAB IN THE TREATMENT OF SQUAMOUS NON-SMALL CELL LUNG CANCER

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Background Nivolumab is a human monoclonal antibody against the programmed death-1 receptor (PD-1) that prevents inactivation of T lymphocytes.

Purpose To assess the efficacy and safety of nivolumab in squamous non-small cell lung cancer (NSCLC).

Material and methods This was a retrospective descriptive study of patients with squamous NSCLC who were treated with nivolumab from November 2015 to August 2016. The dose of nivolumab administered was 3 mg/kg as an intravenous infusion every 2 weeks and all patients were premedicated with granisetron 1 mg intravenously. Overall survival (OS) was considered as a measure of efficacy, obtained by the Kaplan–Meier method and defined as the time elapsed from the start of the treatment until the patient died, excluding those patients who had not died at the end of the study.

Results 8 patients (6 men and 2 women) were included, all with stages IIIa-b and IV, who were ex-smokers, except for 1 patient who still smoked 4 cigarettes/day. Only 1 patient had brain metastases at baseline. Mean age was 64±12 years and mean pre-nivolumab lines of chemotherapy were 2.12±1.35. Regarding the functional status of patients, 4 had an ECOG of 2 and the remaining 4 patients had an ECOG of 0 or 1. 2 patients died during the study period. Brain metastases were evidenced in 1 patient due to nivolumab progression. The other 5 patients remained stable. Median OS was 5 months (95% CI 3.56–6.43). Regarding safety profile, most patients reported asthenia, muscle weakness, loss of appetite and/or cough. However, in none of the cases did this result in suspension or delay of treatment.

Conclusion The median OS obtained in our study was lower than that published in the CheckMate 017 study (5 vs 9.2 months), with an acceptable safety profile. However, it should be considered that in our case, 4 patients had an ECOG of 2, whereas in the CheckMate 017 study all patients had an ECOG of 0 or 1 (20% and 79%, respectively) which, together with the small sample size, can justify the results obtained.

No conflict of interest

CP-075 PROGNOSTIC FACTORS IN PATIENTS WITH RECURRENT EPITHELIAL OVARIAN CANCER

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Background Pegylated liposomal doxorubicin (PLD) is indicated in ovarian cancer patients who have failed firstline platinum based chemotherapy. Currently, there are no clinical or biomolecular factors that can predict the benefit of PLD in this population.

Purpose To identify clinical predictors of overall survival (OS) in patients with recurrent ovarian cancer treated with PLD.

Material and methods 9 baseline variables were evaluated to assess its prognostic ability in 143 patients treated with PLD from January 2008 to January 2014. The analysed variables were: Eastern Cooperative Group Performance Status (ECOG-PS), age, histopathology, treatment line, platinum sensitivity (progression free interval(PFI)) and chemotherapy schedule (monotherapy vs polychemotherapy). Cox regression models were used to calculate the log hazard ratio, and the most parsimonious model was selected according to the Akaike information criteria.

Results The prognostic index includes four variables associated with OS: ECOG-PS (>70), age (≤70 years), platinum highly sensitive (PFI ≥12 months after completion of frontline platinum based chemotherapy) and use of combination chemotherapy (PLD and carboplatinum/gemcitabine/trabectidin were assigned 2 points and intermediately sensitive (PFI 6–12 months) was assigned 1 point). The global median progression free survival for all patients was 5.9 months (95% CI 4.0–7.3) and median OS was 18.8 months (95% CI 15.2–23.3). The score had the potential to delineate five prognostic groups whose results are shown in the table.

Point	Median	95% CI	Coef	HR	95% CI	p Value
0	6.5	4.9–11.4	-	-	-	-
1	12.0	2.0–15.2	-0.679	0.50	0.19–1.34	0.1758
2	17.7	13.7–25.5	-1.345	0.26	0.10–0.64	0.0036
3	35.1	15.0–41.1	-2.096	0.12	0.04–0.34	0.0001
4	35.3	28.9–51.5	-2.219	0.10	0.04–0.28	<0.0001

Conclusion Young age (<70 years), good performance status, platinum sensitivity and PLD based polychemotherapy proved to be predictive and prognostic factors. Therefore, these factors should be considered when making decisions about the approach to these patients. Nevertheless, this preliminary evidence must be validated in a prospective clinical trial.

No conflict of interest

CP-076 | **SAFETY PROFLE OF DIMETHYL FUMARATE IN RELAPSING REMITTING MULTIPLE SCLEROSIS**

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Background Dimethyl fumarate(DMF; Tecfidera) is an oral drug approved in Spain since February 2014 for relapsing remitting multiple sclerosis (RRMS). Oral treatments allow patients a better quality of life than injectable treatments, but are not innocuous.

Purpose To assess the safety profile of DMF in RRMS treatment in adult patients in a tertiary hospital.

Material and methods This was an observational and retrospective study of patients from a tertiary hospital who began treatment with DMF between February 2015 and March 2016. The studied variables were: age, sex, previous treatment, safety profile (adverse reactions (AR), suspension or dose reduction) and alternative treatment in the event of suspension of DMF treatment. The information was obtained from outpatient dispensing programme registration (Farmatools). AR reported by patients after clinical interview were collected in each dispensation.

Results Our study included 40 patients diagnosed with RRMS (9 men/31 women) with a mean age of 37.7 years. 15 were treated with DMF as the firstline treatment, and 25 had previously been treated with: intramuscular interferon-beta-1a (5), subcutaneous interferon-beta-1a (11); subcutaneous interferon-beta-1b (3); subcutaneous glatiramer acetate (6); and oral fingolimod (1). 14 patients did not show AR or these were not mentioned in the interview. 26 patients presented AR in the skin (flushing, itching, eczema) and gastrointestinal symptoms (nausea, vomiting, heartburn, stomach-aches) as well as fatigue and others. 69.23% of patients (18) reported skin disturbances (appearing after taking medication and remitting in 3–4 hours), 69.23% (18) gastrointestinal disorders and 19.23% (5) expressed fatigue, especially at the beginning of treatment. 5 patients suffered other AR: changes in blood glucose levels (2), lymphopenia (1), palpitations (1) and urinary tract infection (1). Several patients presented AR in multiple groups. 50% (13) had both skin and gastrointestinal AR, 15.38% (4) gastrointestinal and fatigue, 7.69% (2) had skin reactions and fatigue and 1 patient suffered three types of AR, which led to discontinuation of treatment. 8 patients required temporary dose reduction, mainly due to digestive AR. 1 patient continues with the reduced dose. The treatment was discontinued in 3 patients because of intolerance and in 1 because of failure.

Conclusion DMF is well tolerated. Patients reported mild AR, being more intense as the dose was increased and disappearing with time. However, in some cases they were limiting and did not allow the full dose to be administered or treatment was discontinued. AR are in line with those described in the data sheet and other studies, although increased monitoring is necessary to assess effectiveness and long term safety.

No conflict of interest

CP-077 | **EVOLUTION OF THE OFF-LABEL USE OF BEVACIZUMAB IN ONCOLOGY PATIENTS**

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Background Bevacizumab is a very expensive antineoplastic drug that since its commercialisation has been used in an increasing number of indications. Different studies have shown a high percentage of off-label use of this drug.

Purpose This work analyses the evolution and reasons for off-label use of bevacizumab at two different cut-off dates (2012, 2016) in the oncology unit of a regional hospital.

Material and methods An observational study of the post-marketing use of drugs was undertaken. Data collected were diagnosis, line treatment, associated drugs and doses of bevacizumab prescribed to cancer patients from January to August 2016. The technical label (TL) updated in 2016 was used to determine the frequency of off-label use. These data were compared with the results obtained in the MAR-BEV-2013-01 study (data obtained from patients in 2012).

Results The total number of prescriptions for bevacizumab was 39, which corresponded to 37 patients. The diagnoses associated with use were 20 metastatic colorectal cancers, 6 metastatic breast cancers (mBC), 5 cervical cancers, recurrent or metastatic (mCC), 3 glioblastomas (GLB), 2 ovarian cancers, 2 non-small cell lung cancers and one hepatocellular carcinoma (HPC). The frequency of off-label use was 12.8% (5 requirements). The reasons for non-compliance with the TL were 4 prescriptions (10.2%) by diagnosis (3 GLB and 1 HPC) and 1 (2.6%) prescription by line (secondline of mBC). These results are markedly lower than those obtained in the MAR-BEV-2013-01 study: 42.9% off-label use (14.6% by diagnosis, 15% by line and 12.5% by associated drug). If we apply the criteria of 2012 for off-label use to prescriptions in 2016, the result is 25.6% off-label use. There was a significant decline that is more meaningful if it takes into account the 5 prescriptions for mCC that would not be off-label use if the indication had been adopted in 2012.

Conclusion The use of bevacizumab in conditions different from those contained in the TL has decreased significantly in our health area. This decrease was motivated by a change in the criteria for the prescription and not by the modification of the TL of the drug, which may also contribute to more efficient use of bevacizumab.

No conflict of interest

CP-078 | **PROSTAGLANDIN E1 INJECTION AFTER ARTERIAL COMPROMISE RELATED TO HYALURONIC ACID FILLER**

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Background Hyaluronic acid (HA) injectable fillers have been used for restoring tissues volume or for rejuvenating facial wrinkles. Even though injection is normally well tolerated, vascular complications are the main immediate adverse event of these treatments. Early treatment with hyaluronidase has been employed as firstline therapy to prevent necrosis with positive results.[1]

Purpose To demonstrate the effectiveness and safety of the use of prostaglandin E1 (PGE1) intravenous infusion in secondline treatment of vascular compromise following HA injection.

Material and methods We report the case of a 36-year-old woman with an accidental intra-arterial injection of 0.2 mL HA in the nasolabial fold, exhibiting whitening and pain at the time of injection. Vigorous massage for 30 min, warm compresses and hyaluronidase were immediately applied. The patient returned to the clinic 12 hours later with purple discoloration of the right cheek, lip and nasal area. On palpation, the cheekbones were not tense. The patient experienced pain in the nasal and cheek area. We reported the use of PGE1 as an alternative treatment in this vascular complication.

Results PGE1 was infused intravenously at a dose of 10 μg with 50 mL of saline over 2 hours, and similar infusions were repeated once a day for 4 consecutive days. One hour after the first infusion, the purple discoloration began to fade. After 48 hours of treatment most of the discoloured area had changed to pink. 1 month after treatment, the patient showed complete recovery in the affected area. No adverse events were reported. The use of PGE1 infusion for treating arterial compromise related to HA filler injection has been previously reported.[2] However, in this previous report, the patient showed higher tissue damage and delayed treatment onset that impeded the use of hyaluronidase. The severity of tissue damage of this patient required 4 months for full skin healing.

Conclusion PGE1 could be an alternative for treating impending necrosis in situations in which early management with hyaluronidase is not effective in dealing with vascular complications resulting from soft tissue filler injections.

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No conflict of interest

| CP-079 | FACTOR IX INHIBITOR DEVELOPMENT IN CONGENITAL HAEMOPHILIA B PATIENTS WITH NONACOG ALFA TREATMENT |

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Background The incidence of factor IX inhibitor development in congenital haemophilia B is low (3–5% depending on the population) and usually occurs in the first days of treatment. Guidelines suggest that, after 150 days exposed to the drug (ED), testing is only required if clinically indicated. But we detected two cases in which the inhibitors developed on long term treatments.

Purpose To describe all worldwide reported cases in which patients developed inhibitors when they were treated with Nonacog alfa. We focused on the time it took to develop the inhibitors since the treatment started.

Material and methods We searched on VigiBase and FEDRA (global and Spanish pharmacovigilance databases, respectively), including all spontaneous reports in patients with Nonacog alfa who developed inhibitors in the past 20 years. All patients who did not have laboratory confirmation were excluded. Age, gender, reporting country, Nonacog alfa treatment starting date, EDs and confirmation inhibitor testing date were recorded.

Results 52 cases of inhibitor development were reported globally: 29 in the USA, 8 in Japan and 15 in Europe. They were primarily in men (45/52) and gender was unknown in 5 cases. Their ages ranged from 9 months to 50 years (age was unknown in 19 cases). It was not possible to confirm the EDs in any of the cases. Half of the notifications (26/52) did not correctly record the chronology of inhibitor development. Of the remainder, 19 notifications were made in the first year of treatment (12 in the first 100 days), 2 notifications between the first and second year, 1 notification between the second and third year, 1 notification between the third and fourth year, 2 notifications between the fourth and fifth year and 1 notification between the sixth and seventh year.

Conclusion These results show that patients treated for several years are also susceptible, although to a lesser extent, to developing inhibitors. Despite the major limitations of this study, it is not wrong to think that patients with longer treatments have been exposed to more doses which might even exceed 150 ED. Hence it is important to monitor all haemophilia B patients throughout all of their treatment.

No conflict of interest

| CP-080 | CLINICAL PHARMACY IN RHEUMATOLOGY WARD: 5 MONTH ACTIVITY REPORT |

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Background Several clinical pharmacy activities (CPA) were implemented in the rheumatology ward between March and April 2016: medical reconciliation at admission (MRA) and pharmaceutical analysis of prescriptions (PAP) for each patient at admission and then weekly.

Purpose These CPA set up a strong link between the hospital and post-discharge sectors to ensure medicine continuity and to improve the quality of care of patients and avoid medical errors.

Material and methods A pharmaceutical team (one resident and two interns) allowed quick and efficient implementation of these CPA. For the MRA, the pharmaceutical team performed a medication history prior to patient admission using several information sources (medical file, pharmacist, general physician, patient himself) to form the optimised medical report (OMR). Then, the admission script was compared with the OMR, and medical discrepancies (MD) were detected. Pharmacists and physicians analysed the MD to determine those to be documented or corrected. A level 3 PAP

(according to the French Society of Clinical Pharmacy) was also performed by the pharmacy resident.

Results 269 patients were admitted to the rheumatology ward between May and September 2016 (host capacity: 18 patients). 269 MRA (100% of admissions) were performed. 100 unintended MD were detected among 1934 MD and had mainly a 'significant clinical impact' (90%) according to the Hatoum Scale. 430 PAP were performed and 77 pharmaceutical interventions (PI) were made (1 PI every 9 prescriptions). Posology and treatment schedule were the most frequent types of PI (49%) and medicines from the 'N' ATC code ('nervous system') were mainly involved in these PI (68%).

Conclusion Over these first 5 months of activity, unintended MD and PI have decreased. We can therefore assume that pharmacists are useful in clinical departments and these APC have to be kept. Furthermore, we can improve the quality and safety of care and reinforce the link between hospital and post-discharge sectors by setting up medical reconciliation at hospital discharge.

No conflict of interest

CP-081 | **INNOVATION AND DEVELOPMENT IMPACT OF ACTIVITIES IN ANTIMICROBIAL STEWARDSHIP PROGRAMMES**

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Background Since April 2014, an antimicrobial stewardship programme (ASP) has been implemented in hospitalisation units in a 580 bed hospital. The ASP team comprises two clinical pharmacists, two infectious diseases physicians and two microbiologists who, through weekly meetings, carry out their activities. The reasons for intervention are: not justified associations, dosing, pharmacokinetic monitoring, duration of antibiotic use more than 8 days and inappropriate prescription as indication and/or sensitivity testing.

Purpose The aim was to assess the degree of acceptance of interventions in antibiotic therapy mediated through the multidisciplinary team compared with those developed by the hospital pharmacy department. As a secondary objective, we analysed the type of interventions developed and the impact of ASP activity on consumption of antibiotics.

Material and methods This was a retrospective observational study from its implementation period to February 2016. The hospital pharmacy department selected patients treated with antibiotics suitable for optimisation through the unit dose drug distribution and pharmacokinetics area, and depending on the degree of urgency, the intervention was direct (by contacting the prescriber orally or in writing) or through weekly meetings with the multidisciplinary team. As a pharmacoeconomic indicator, the number of defined daily doses (DDD)/100 days bed was estimated monthly, and the decline on the impact on healthcare that led to the implementation of the programme was quantified. Results are expressed as mean (SD) for quantitative variables and percentages for qualitative variables. A statistical study was performed using the χ^2 test for qualitative variables using STATA/IC-14.1.

Results After 22 months of implementation, 289 episodes in 216 patients (aged 64.8 years, SD=18.1) was proposed to optimise antibiotic therapy. Interventions mediated by the multidisciplinary group were more accepted than those mediated directly by the hospital pharmacy department (83% vs 39%; p <0.001). Acceptability in surgical and medical services was 56% and 48%, respectively. The type of intervention was: pharmacokinetics (35%), dose (30%), indication (12%), duration (12%) and association (11%). The annual NDD/100 days bed in monitoring antibiotic was reduced by 17% following the implementation of the ASP.

Conclusion The significantly greater efficiency of the interventions in the optimisation of antibiotic therapy mediated through multidisciplinary programmes was demonstrated.

No conflict of interest

CP-082 | **IMPACT OF PHARMACISTS' EXPERTISE ON PERSONALISED PARENTERAL NUTRITION PRESCRIPTIONS IN AN INTENSIVE CARE UNIT: PHYSICIANS' PERCEPTIONS**

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Background In oncology hospitals and in medium sized hospitals, a nutritional service is seldom available. Parenteral nutrition (PN) is often prescribed by physicians with little experience and without the intervention of an expert. As stated in a previous abstract, many prescriptions are not fully adherent to patient conditions. In these situations, the expertise of a pharmacist may play a role, even in the prescription phase. In order to facilitate the interaction between pharmacists and physicians, from May 2016, the pharmacy guaranteed the daily presence of a pharmacist in the intensive care unit (ICU) where nutritional management is more challenging because of the clinical setting.

Purpose The aim of this work was to evaluate physicians' perceptions of pharmacists' interventions on the evaluation of nutritional needs and the enhancement of prescriber skills in an ICU setting.

Material and methods After 2 months of daily interaction, an anonymised satisfaction questionnaire was given to all ICU physicians. The questionnaire consisted of five questions, the first one of which was to verify if the physician had had the opportunity to prescribe PN with the pharmacist. Subsequent questions were to check for opinions related to the interaction experience and the effectiveness/utility of this multidisciplinary approach. An opportunity was given to provide open comments and suggestions.

Results In the observed period, 71 of 73 PN bags were prescribed on the advice of a pharmacist. 54% of all ICU physicians replied to the questionnaire; 100% of physicians who prescribed one or more PN answered the questionnaire. All physicians rated the experience as satisfactory, 70% considered the pharmacists' interventions as 'useful', while 30% considered it 'indispensable'. 90% of physicians argued that collaboration had enriched their knowledge, while 10% felt the need for further and deeper collaboration. All respondents believed that cooperation promoted appropriate prescribing and 20% emphasised the need for a multidisciplinary approach in open comments.

Conclusion The restricted observation time does not allow us to assess clinical outcomes or other efficacy indicators. However, through administration of the questionnaire, it is possible to conclude that the physician–pharmacist collaboration had a positive impact on both the physicians' perceptions of prescriptive appropriateness and on professional enrichment.

CP-083 | **IMPACT OF THE NEW ORAL TREATMENTS IN RELAPSING REMITTING MULTIPLE SCLEROSIS. THE END OF PARENTERAL ADMINISTRATION?**

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Background Until the arrival of new oral drugs to our hospital (dimethyl fumarate and teriflunomide), the drugs prescribed for the treatment of mild forms of relapsing remitting multiple sclerosis (RRMS) were for parenteral administration. Nowadays, there is no clear therapeutic positioning for these therapies.
Purpose The primary endpoint was to analyse the prescription of disease modifying therapies over 1 year and the influence of new oral drugs.
Material and methods This was an observational retrospective study conducted in 2015 in patients with RRMS who had started a treatment or had changed treatment. Patient and treatment data were collected from the electronic clinical history and the outpatient unit of the hospital pharmacy: age, gender, EDSS, treatment, previous treatment and reason for change. Data obtained were analysed on an Excel spreadsheet.
Results 33 patients were included, 66% women, with a mean age of 44±12 years. Mean EDSS was 2. 21 patients had no received previous treatment (63%), and of these 10 (47%) received dimethyl fumarate, 1 teriflunomide (4%), 4 intramuscular interferon beta-1A (19%), 3 subcutaneous interferon beta-1A (14%), 1 glatiramer acetate (5%), 1 natalizumab (5%) and 1 fingolimod (5%). Of the other 12 patients whose treatment was modified, 5 changed from fingolimod to alemtuzumab (41%), 2 from glatiramer acetate to dimethyl fumarate (16%), 1 from subcutaneous interferon beta-1A to natalizumab (8%), 1 from intramuscular interferon beta-1A to fingolimod (8%), 1 from intramuscular interferon beta-1A to dimethyl fumarate (8%), 1 from natalizumab to fingolimod (8%) and 1 from fingolimod to natalizumab (8%). Reasons for change were adverse reactions in 8 patients, insufficient control of the disease in 3 and a more convenient oral treatment in 1. To sum up, oral treatments were prescribed in 52% of new patients and 25% of patients who changed their treatment.
Conclusion Since the arrival of the new oral treatments, most of the new patients have received them, but only a quarter of those patients who have changed their treatment. Our study shows that oral therapies are mainly prescribed to new patients with mild forms of RRMS. It is therefore urgent to unify criteria for the correct positioning of disease modifying therapies.

CP-084 | **INTERLEUKIN-6–174G>C GENETIC POLYMORPHISM (RS1800795) AND THE INFLUENCE OF CLINICAL VARIABLES ON THE RESPONSE TO TOCILIZUMAB**

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Background Interleukin 6(IL-6) is involved in the pathogenesis of rheumatoid arthritis via its broad effects on immune and inflammatory responses. Sustained IL-6 activity can cause tissue damage in different tissues. Previous studies have shown that G allele at the IL-6-174G>C (rs1800795) polymorphism is related to high producing IL-6. Other clinical variables such as being treated with methotrexate or DAS28 at baseline have been associated with interindividual differences in the response to tocilizumab.
Purpose The aim of this study was to evaluate the influence of the IL-6-174G>C (rs1800795) polymorphism and other clinical variables on the response to tocilizumab at 3 months after the first dose of the drug.
Material and methods The IL-6-174G>C polymorphism was genotyped using predesigned TaqMan genotyping assay technology and analysed on a ViiA7 real time PCR system. Clinical response was evaluated at 3 months after the first dose of the drug using the 28 joint disease activity score criteria (DAS28). Patients were classified as 'responders' (good or moderate response according to EULAR criteria) or 'non-responders' (poor response according to EULAR criteria). EULAR good response is defined as a change in DAS28 >1.2 and DAS28 ≤3.2; EULAR moderate response is defined as a change in DAS28 of 0.6–1.2 and DAS28 ≤5.1, or a change of DAS28 >1.2 and DAS28 >3.2.
Results Clinical data from 127 patients were obtained; from all the variables included, we found statistical significance ($p<0.05$) for the association between the IL-6-174 C/C genotype with non-responders (OR 2.99; 95% CI 1.07–8.34, $p=0.039$) and for having concomitant methotrexate with 'responders' (OR 5.96; 95% CI 1.49–34.82; $p=0.004$). We did not found significant associations between response and the following variables: age ($p=0.71$), sex ($p=0.22$), weight ($p=0.39$), height ($p=0.11$), body mass index ($p=0.99$), baseline DAS28 ($p=0.65$), positive rheumatoid factor (0.86), erosions ($p=0.17$); previous treatment with infliximab ($p=0.89$), etanercept ($p=0.52$), adalimumab ($p=0.93$), rituximab ($p=0.57$), abatacept ($p=0.27$), certolizumab ($p=0.41$) or golimumab ($p=0.60$); and other concomitant treatments(corticosteroids ($p=0.48$), leflunomide ($p=0.22$) and sulfasalazine ($p=0.25$)).
Conclusion Our data confirm the role of the IL-6-174G>C (rs1800795) polymorphism as a genetic marker of clinical response to tocilizumab at 3 months. Our results showed that of all the variables studied, only concomitant treatment with methotrexate influenced the response to tocilizumab.

CP-085 ROLE OF THE HOSPITAL PHARMACIST IN PREVENTING NEAR MISS TRANSCRIPTION ERRORS

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Background Transcription is considered a critical step in the medication use process, particularly in hospitals that do not utilise any computerised physician order entry systems. Sequentially, pharmacists are responsible for order verification, a step that follows transcription. Accordingly, they are the last safety net to intercept and correct near miss transcription errors before reaching the patient

Purpose The objective of this study was to assess the role of hospital pharmacist in preventing and reporting transcription errors

Material and methods This was a retrospective observational study. All hospitalised patients in a tertiary care hospital admitted from January 2009 to December 2015 were included. Patients' charts were screened for errors by clinical pharmacists. Medication related physician orders and home medication discharge orders were reviewed. All detected errors in the medication use process were recorded using a validated medication error reporting form.

Results 734 transcription errors were identified in the charts of 30440 patients. Most reported transcription errors occurred in the department of internal medicine (72.3%) followed by surgery (9.9%). Approximately 52.9% of reported medication errors occurred with prescribed parenteral medications and 35% with orally administered drugs. Antimicrobials and cardiovascular medications were the main drug classes affected (24.5% and 14.8%, respectively). Results showed that the reasons behind errors were wrong doses (21.8%), drug omissions (20.6%), wrong medications (17.3%) and wrong drug frequencies (15.7%). Errors were classified as near miss in 91.3% of cases, while only 8.7% were considered errors that reached the patient with no harm done. It was noted that wrong dose and wrong bar code increased significantly the severity of errors, compared with drug omission (p=0.026 and p=0.001, respectively). With regard to drug classes, the results showed that analgesics, and respiratory and antidiabetic medications increased significantly the risk of errors compared with antibiotics (p=0.011; p=0.029; p=0.002, respectively). Finally, reporting errors from the medicine or surgery ward increased significantly the risk of error, compared with reporting from the pharmacy department (p=0.049).

Conclusion In the absence of health information systems, pharmacists play a major role in preventing near miss transcription errors and securing patient safety. This is a continuous process through vigilant surveillance, proactive audits and effective reporting.

No conflict of interest

CP-086 CD69 A>G (RS11052877) GENETIC POLYMORPHISM ON THE RESPONSE TO TOCILIZUMAB IN RHEUMATOID ARTHRITIS PATIENTS

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Background CD69 receptor is a C lectin transmembrane protein expressed by T cells, natural killer (NK) cells and active B cells. This receptor is involved in the production and regulation of T cells, B cells and NK cells, and these are involved in interleukin 6 (IL-6) production. IL-6 is a multifunctional glycoprotein involved in the immune response, inflammation and bone metabolism; IL-6 makes significant contributions to autoimmune and inflammatory diseases such as rheumatoid arthritis (RA). Tocilizumab is a humanised monoclonal antibody inhibitor of IL-6 receptor, indicated in combination with methotrexate in the treatment of RA in patients with inadequate response or intolerance to prior therapies.

Purpose The aim of this study was evaluate the role of the CD69 A>G (rs11052877) genetic polymorphism on the response to tocilizumab in RA patients.

Material and methods The CD69 A>G (rs11052877) genetic polymorphism was genotyped using predesigned TaqMan genotyping assay technology and analysed on a ViiA7 real time PCR system. Clinical response was evaluated at 3, 6, 9 and 12 months after the first infusion of the drug, using the 28 joint disease activity score criteria (DAS28), and good responders were classified according to EULAR criteria. EULAR good response was defined as a change in DAS28 >1.2 and DAS28 ≤3.2. Statistical analysis was performed using SPSS V.20.

Results Clinical data from 140 tocilizumab treated patients were obtained. The patients were aged (mean±SD) 53.25 ±12.42 years and 79% were women. Even though we found a greater proportion of good responders among CD69 GG carriers than among A/G or A/A carriers at 3 months (60% vs 43.27%), 6 months (72.73% vs 59.17%), 9 months (76.19% vs 65.66%) and 12 months (90% vs 73.95%), these results were not statistically significant (p=0.17, p=0.22, p=0.34 and p=0.09)

Conclusion These results show that the CD69 A>G (rs11052877) genetic polymorphism by itself is not useful as a predictor of tocilizumab response in RA patients but its influence should be studied further.

No conflict of interest

CP-087 PERSISTENCE OF INTRAMUSCULAR VERSUS SUBCUTANEOUS FIRSTLINE THERAPIES IN MULTIPLE SCLEROSIS PATIENTS

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Background Parenteral firstline treatments for multiple sclerosis (MS) include disease modifying therapies (DMTs): intramuscular (IM) interferon (IFN) beta-1-a, subcutaneous (SC) IFN-beta 1-a, SC IFN-beta 1-b glatiramer acetate. Long term persistence for chronic diseases is difficult for patients to achieve, and low persistence has been related to increased mortality and morbidity as well as higher costs in medical care.

Purpose The aim of this study was to analyse firstline parenteral treatment persistence in patients with MS according to the administration route.

Material and methods This was an observational, retrospective, longitudinal study. All MS adult patients starting firstline treatment with IM IFN-beta-1-a, SC IFN-beta 1-a, SC IFN-beta 1-b and glatiramer acetate from 1 September 2005 to 31 August 2015 were included. Data were collected from the pharmacy department electronic record (Farmatools). Persistence was calculated as duration of time from initiation to discontinuation of therapy and as a dichotomous variable at the first and second year of therapy. Discontinuation was defined as a gap in treatment exposure of at least 90 days. For analysis of persistence, a survival analysis with Kaplan–Meier estimator was used. The log rank test was used to compare survival times between administration routes. The influence of covariables (age, gender, treatment, compliance) was tested according to a Cox regression model. Persistence at first and second year was compared using a χ^2 test. Statistical analysis were performed using SPSS.

Results 176 patients were included, 67.6% women and 32.4% men. Mean age (±SD) was 36.27±11 years. Treatment distribution: 36.4% SC IFN-beta 1-a, 10.2% SC IFN-beta 1-b, 39.2% IM IFN-beta-1-a, 14.2% glatiramer acetate. Mean compliance was 93.6%±16.5%. Mean overall persistence was 2043 (95% CI 1827–2260; p=0.217). Mean persistence times were 2007 days (95% CI 1580–2927) for the IM route and 2302 days (95% CI 1799–2805) for the SC route(p=0.751). 81.2% versus 75.7% (p=0.506) of patients were persistent in the first year for the IM and SC routes, respectively, and 68.2% versus 31.8% for the second year. Cox model showed no influence of age, gender, treatment or compliance.

Conclusion There were no differences regarding persistence between IM or SC firstline therapies in MS patients.

No conflict of interest

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Background To ensure the effectiveness and/or avoid the toxicity of drugs with narrow therapeutic and/or renal elimination margins, it is essential to adjust the dose according to glomerular filtration rate (GFR). To collaborate in such patient care activities, a growing number of acute care hospitals have pharmacists participating in ambulatory care clinics and hospital based home healthcare services.

Purpose To assess the adequacy of medicines prescribed in our health district in patients with decreased GFR.

Material and methods This was a retrospective observational study. Field of study: two tertiary hospitals and their reference areas. The target population consisted of 666 000 people. Study population: patients with a serum creatinine (SC) determination in our health district in February 2016. Inclusion criteria: >18 years with GFR <45 mL/min/1.73m^2. Exclusion criteria: patients whose characteristics made them unsuitable to use the CKD-EPI formula to calculate GFR. GFR was calculated from the SC provided by the laboratory. Through the electronic medical records, prescribed doses of the medications that needed dosage adjustment were recorded. Correct doses according to GFR of these medications were also recorded. Data on prescription changes made by the primary care physicians (GP) were collected. ATC groups were studied. Adequacy of the prescriptions was calculated as: (prescriptions adjusted correctly according to GFR)/(total number of prescriptions susceptible to modification).

Results 116 patients (76.7% women) with a mean age of 80.8 years were included. 73.3% of patients had GFR (mL/min/1.73m^2) between 30 and 44; 24.1% between 15 and 29 and 2.6% <15. 52.6% of patients had prescriptions suitable for adjustment (93 prescriptions in total), but only 11.8% (11) of the prescriptions were modified by the corresponding GP. The ATC groups that needed adjustment more frequently were A10A (25.8%), A10B (23.65%) and B01A (10.75%). Only 10.75% of prescriptions were adequate.

Conclusion The adequacy of medicines prescribed in our health district in patients with decreased GFR was very low. More than half of patients with a GFR <45 mL/min/1.73m^2 needed adjustment in at least one of their medications, as very few prescriptions were adjusted by their corresponding GP.

No conflict of interest

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Background Iron deficiency (ID) is an important comorbidity associated with chronic heart failure. This often leads to worsening functional class, quality of life and poor prognosis. Diagnosis and prompt treatment of ID are essential.

Purpose The aim of this study was to analyse compliance with a new protocol for intravenous ferric carboxymaltose (FCM) in the heart failure unit and the short term safety and analytical profile of intravenous FCM.

Material and methods A review was conducted by a multidisciplinary team (MT). After review, the MT decided to implement a new protocol using FCM in a definite group of patients. Absolute ID was defined as ferritin <100 µg/L, functional ID was defined as ferritin 100–299 µg/L and transferrin saturation (TSAT) <20%. All patients were administered intravenous FCM in one or two doses (maximum iron dose per infusion 1000 mg) in an outpatient setting. ID was calculated using the simplfied Ganzoni formula. Patient identification was performed using the electronic prescription programme; pharmaceutical validation mainly allowed us to identify prescription, dose, dilutions and the analytical parameters. The Student's t-test for related samples was used to compare

continuous variables before and after iron infusion. Statistical significance was defined as a two tailed p value <0.05.

Results 62 patients were analysed in this retrospective observational study. Mean age was 65.2±12.9 years, and patients were predominantly men (70%). Relevant laboratory parameters before and after treatment with intravenous FCM were requested and analysed according to the protocol. Haematological and iron status parameters: haemoglobin (13.04 vs 13.78 mg/dL), haematocrit (38.5 vs 41.6), blood iron level (67.85 vs 109.11 mg/dL), ferritin (79.65 vs 424.62 mg/dL) and TSAT (17.23% vs 33.64%) improved significantly (p<0.001) in the first 3 months after FCM infusion. No adverse reactions were observed during the study.

Conclusion In our study, this therapy safely and effectively corrected deficient iron stores in the short term. Studies that analysed the effects of intravenous iron treatment in patients with heart failure have demonstrated improved quality of life and functional capacity. The intravenous FCM protocol had an acceptable degree of compliance but the importance of diagnosis and monitoring patients must be stressed as the long term effects of intravenous iron therapy are not yet well defined.

No conflict of interest

EVALUATION OF EFFICACY AND SAFETY OF REGORAFENIB IN METASTATIC COLON CANCER

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Background Treatment with regorafenib is an alternative third-line therapy for patients with metastatic colon cancer. This new treatment option was marketed in 2013, so it should be checked if the efficacy and safety in routine clinical practice are equivalent to those reported in pivotal trials.

Purpose To assess the efficacy and safety of regorafenib in the treatment of metastatic colon cancer in routine clinical practice in a tertiary hospital.

Material and methods This was an observational, descriptive, retrospective study. All patients with metastatic colon cancer treated with regorafenib until June 2016 were included. Data were recorded from computerised clinical history and pharmaceutical dispensing software. The following variables were collected: age, gender, therapeutic indication, overall survival(OS), progression free survival(PFS), adverse reactions and dose reduction. The primary efficacy endpoint was OS and the secondary efficacy endpoint was PFS. For safety profile assessment, adverse reactions were studied.

Results 10 patients, 6 (60%) men and 4 (40%) women, were studied. Mean age was 60.8 years. All patients were diagnosed with metastatic colon cancer. Mean OS was 5.25 months and mean PFS was 2.55 months. Notified adverse reactions were: hand–foot syndrome (4), diarrhoea (2), asthenia (6), decreased intake (4), mucositis (2) and emetic syndrome (2). All patients had at least one adverse event and 80% required a full dose reduction for toxicity and/or poor tolerance.

Conclusion The results of this efficacy study of regorafenib in metastatic colon cancer therapy in routine clinical practice were inferior to those reported in pivotal trials (6.4 months OS in CORRECT or 8.8 months in CONCUR vs 5.25 months). The safety profile was similar to that described in the data sheet but the frequency of patients requiring dose reduction (80%) was higher than expected. In conclusion, comparing the efficacy of older alternatives (regorafenib PFS 1.9 months, panitumumab PFS 1.9 months, cetuximab PFS 3.7 months, best supportive care PFS 1.2 months), the use of an alternative in thirdline treatment for metastatic colon cancer should be based on its safety profile and patient tolerance.

No conflict of interest

SLC9A7 G/T (RS7055107) GENETIC POLYMORPHISM ON THE RESPONSE TO TOCILIZUMAB IN RHEUMATOID ARTHRITIS PATIENTS

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Background The SLC9A7 gene encodes a sodium and potassium proton antiporter (NHE7). This protein is localised in the trans-Golgi network, involved in protein transport for glycoprotein production. Interleukin 6 (IL-6) is a multifunctional glycoprotein involved in the immune response, and inflammation and bone metabolism; IL-6 makes significant contributions to autoimmune and inflammatory diseases such as rheumatoid arthritis (RA). Tocilizumab is a humanised monoclonal antibody inhibitor of IL-6 receptor, indicated in combination with methotrexate in the treatment of RA patients with inadequate response or intolerance to previous therapies.

Purpose The aim of this study was evaluate the role of the SLC9A7 G/T (rs7055107) genetic polymorphism on the response to tocilizumab in RA patients.

Material and methods The SLC9A7 G/T (rs7055107) genetic polymorphism was genotyped using predesigned TaqMan genotyping assay technology and analysed on a ViiA7 real time PCR system. Clinical response was evaluated at 6 and 12 months after the first infusion of the drug with the use of the 28 joint disease activity score criteria (DAS28). Remission was classified according to EULAR criteria. EULAR remission was defined as achieving DAS28 ≤2.6. Statistical analysis was performed using SPSS V.20.

Results Clinical data from 140 tocilizumab treated patients were obtained. Patients were aged (mean±SD) 53.25±12.42 years and 79% were women. Mean DAS28 at baseline was 5.71±1.13. The SLC9A7 G/T polymorphism was significantly associated with remission according to EULAR criteria at 6 months (GG vs no-GG p=0.04; OR 0.42; 95% CI 0.18–0.99) and almost at 12 months (GG vs no-GG p=0.053; OR 0.46; 95% CI 0.21–1.01).

Conclusion Our results showed that the SLC9A7 G/T (rs7055107) polymorphisms can be useful as a genetic marker of tocilizumab efficacy in RA patients. More studies are necessary to confirm these results.

No conflict of interest

CP-092 DESIGN OF CLINICAL TRIALS MANAGED IN A PHARMACY DEPARTMENT OF A TERTIARY HOSPITAL

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Background Clinical trials lead to the development of new drugs and new indications for existing ones. It is important to know the design of clinical trials to interpret and evaluate the results when applying them to clinical practice.

Purpose To characterise the main design aspects of clinical trials (CT) managed in the pharmacy department of a tertiary hospital.

Material and methods This was a retrospective descriptive study of the activity of the clinical trials unit (CTU), from October 2014 to September 2015. Clinical trials that were initiated between 1 January 2014 and 15 October 2015 were included. For each, we collected the phase of the CT, design (randomised/non-randomised, blinded or unblinded, controlled/uncontrolled), treatment arms and control arm (if applicable), and the automation handling of the CT samples (such as drugs provided by the sponsor and in the custody of the CTU of the pharmacy department). In addition, the type of promoter responsible for the development of the CT and the type of patient recruitment was studied. Information was obtained from internal records of the CTU (Gidec), from source documents and from documentation pertaining to each study.

Results In the period studied, 197 clinical trials were initiated (98 in 2014 and 99 in the study period of 2015). Of these, 105 were phase III, 59 phase II, 17 phase I, 11 phase IV and in 4 cases two phases were combined. In terms of design, 73.6% were randomised, 41.1% were double blind (the remainder open label), 74.6% were controlled (with one or more control arms) and of these 45.5% were placebo controlled. For 74.1% of CT, sample management was controlled automatically through IWRS (Interactive Web Response System). In 35 of the CT, the sponsor was an independent industry research entity. The type of recruitment was competitive in 92.4% of cases—that is, the site investigator might include in the CT as many patients as possible until the sample size was complete.

Conclusion The predominant type was a phase III randomised, open, controlled (both placebo and standard treatment) trial, with type of recruitment predominantly competitive. There was considerable informatisation (IWRS), and industry was responsible for the development of clinical trials in most cases.

No conflict of interest

CP-093 THE IMPACT OF MYELOMA MULTIPLE CLINICAL TRIALS ON MEDICATION COST SAVINGS

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Background Medication costs are increasing, and hospital budgets are small. Clinical trials are an alternative for medication cost savings.

Purpose To assess the savings for medication by inclusion of patients in myeloma multiple (MM) clinical trials (CT).

Material and methods A retrospective, observational and descriptive study was conducted from January 2013 to December 2015 in the pharmacy department of a university hospital. Ongoing MM clinical trials were included. Exclusion criteria were: CT without patients enrolled and CT without patients on treatment. The following data were collected by the pk ensayos application: protocol number, study design, phase, arms (experimental vs control), medication information (provided or not by the CT sponsor, marketed or not), patient information (randomisation number, assigned arm, start and end date of treatment, number of dispensed medications). For the economic evaluation, the direct cost recorded in the application for the medication management in the pharmacy (Gestockwin) was used. Indirect costs were estimated for medications not marketed. This was calculated by the direct cost of the therapeutic alternative in routine clinical practice.

Results 17 MM clinical trials were ongoing during the study. 64.7% (11) of the CT were excluded: 5 CT had not enrolled any patients and 6 CT did not have any patients on treatment. 100% of the CT included were phase III. The sponsor provided all the medication necessary for the study in 66.6% (4) of the CT and partially in the 33.4% (2). The investigational medications involved were: zoledronic acid, bortezomib, bulsufan, daratumumab, denosumab, dexamethasone, elotuzumab, lenalidomide and MLN9708. The total number of patients were 42. The average number of patients included in a CT were 7 (2–19). The cost savings were € 683 886. The average per CT was € 113 981.12 (€ 5463–428 846)) and per patient was € 16.283 (€ 271–12 620). The annual average was € 341 943.17.

Conclusion Conducting MM clinical trials has led to important cost savings for the hospital.

No conflict of interest

CP-094 ROMIPLOSTIM DOSE ESCALATION IN IMMUNE THROMBOCYTOPENIA PATIENTS

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Background Immune thrombocytopenia (ITP) is an autoimmune disease characterised by isolated thrombocytopenia (platelet count <100 000 mg/dL) due to both increased platelet destruction and low platelet production. Romiplostim is a thrombopoietin receptor agonist that increases platelet count and is used to treat adult chronic ITP patients who are refractory to other treatments. According to the labelling information, the recommended initial dose is 1 µg/kg once weekly. Subsequent doses are adjusted weekly in increments of 1 µg/kg to achieve and maintain a platelet count of $\geq 50 \times 10^9$/L, without surpassing a maximum dose of 10 µg/kg. There are concerns that starting doses may be too low to obtain normalised platelet counts and decrease the risk of bleeding.

Purpose We aimed to describe dose escalation and time elapsed between dose levels during romiplostim treatment in ITP patients in clinical practice.

Material and methods A retrospective observational study was performed from January 2005 to September 2016. Adults ITP patients treated with romiplostim were included. Patient

characteristics and romiplostim doses were obtained from the electronic prescription system. For each patient, time to next dose level was calculated. In those patients reaching the maximum dose, the time from initiation of therapy was also calculated.

Results 8 patients were included. 50% were men. Mean age was 50±15 years. Mean initial dose was 3.0±1.4 μg/kg. Only 2 patients started at 1 mg/kg. 88% of patients needed the maximum dose to attain a normalised platelet count. Median time on each dose level was 2 weeks (IQR 1–4). The time patients remained in the lower dose levels was much shorter than in the higher ones, as shown in the table.

Dose level (μg/kg)	Time patients remained (days)
1	9.3
2	8.5
3	11.7
4	19.2
5	12.9
6	18.3
7	43.3
8	46.5
9	51.6

Time elapsed from the beginning of treatment to the date the maximum dose level was reached was only 11 weeks (IQR=4.4–24.5).

Conclusion Most ITP patients receiving romiplostim start at doses higher than those recommended and go through a rapid dose escalation before reaching the dose that permits normalised platelet count. Most patients will require the maximum dose to achieve long term control of their disease.

No conflict of interest

CP-095 | **CONTINUITY OF CLINICAL PHARMACY ACTIVITIES FROM ADMISSION TO HOSPITAL DISCHARGE: WHICH IMPACTS DURING HOSPITAL STAY OF PATIENTS?**

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Background The teaching hospital in this study is a reference centre for the management of patients with bone and joint infections. In this dedicated unit, a pharmacist is present on a daily basis.

Purpose The aim of this study was to assess the value and complementarity of different missions of the pharmacist.

Material and methods Pharmaceutical activity is organised into three steps: medication reconciliation at patient admission, analysis of the first hospital prescription and daily analysis of prescriptions during hospitalisation. For each step, pharmaceutical time was estimated. Pharmaceutical interventions (PI) carried out were recorded and classified according to the pharmaceutical validation step and the ATC (Anatomical Therapeutic Chemical) classification of the drug.

Results The study was performed on 52 patients hospitalised in the trauma unit between November 2015 and January 2016. On average, 1 PI per hour was proposed during the reconciliation step, 3.46 PI per hour during the first analysis and 3.59 PI per hour during daily analysis of prescriptions. Most of the PI were proposed when analysing the prescriptions, whatever this was the first or a follow-up. Nevertheless, they were feasible only when reconciliation had already been made so as to establish a 'medical check-up' and to facilitate subsequent analysis. PI made during reconciliation concerned, in 55% of cases, cardiovascular and respiratory medicinal products. PI made during the first prescription analysis and during daily analysis of prescriptions concerned, respectively, in 60% and 56% of cases, anti-infectives and analgesics. Reconciliation primarily targets chronic treatments. It is complementary to the third level of prescription analysis which targets treatments introduced during hospitalisation. The large number of PI carried out during hospitalisation begs the question as to whether therapeutic protocols proposed by prescription software, widely used in the unit, can be a source of error due to lack of personalisation of drug management.

Conclusion All pharmaceutical activity steps are complementary and essential to patient care. A global pharmaceutical management system from hospital admission to hospital discharge must be considered.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Thanks to the trauma unit team.

No conflict of interest

CP-096 | **ADVERSE DRUG EFFECTS RELATED TO GENERIC CAPECITABINE IN COMPARISION WITH XELODA**

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Background 5-Fluorouracil (5-FU) is among the most commonly used chemotherapy drugs in oncology practice. Common toxicities of 5-FU and capecitabine include diarrhoea, mucositis and myelosuppression. Capecitabine (Xeloda) is an oral prodrug of 5-FU and is increasingly replacing infusional and bolus intravenous 5-FU.

Purpose The aim of this study s to assess the adverse drug effects (ADE) in all patients treated with generic capecitabine in our hospital compared with those reported for Xeloda.

Material and methods A retrospective observational study of patients treated with capecitabine for any indication over a period of 18 months (March 2014 to November 2015) was carried out. Data were collected from medical records which also stored patient characteristics, their disease, regimen received and ADE graded according to the National Cancer Institute of Canada Common Toxicity Criteria (NCIC-CTC).

Results 53 patients were included with a mean age of 68. 51% were women. 32 patients were receiving capecitabine monotherapy, 13 capecitabine and oxaliplatine, 3 bevacizumab, 4 radiotherapy and 3 mitomicine. Capecitabine was used to treat colorectal cancer in 39 patients (73.6%), breast cancer in 8 (15.1%), pancreatic cancer in 4 (7.5%), upper gastrointestinal cancer in 1 (1.9%) and ovarian cancer in 1 (1.9%). Regarding all patients, 8 (15.1%) had their dose reduced and 11 (20.8%) stopped treatment. Moreover, this occurred more frequently when capecitabine was associated with another chemotherapy. The main ADE were: diarrhoea 10 (19%), hand–foot syndrome grade 2 or more 8 (24.5%) and asthenia 5

(9%), whereas the most commonly reported adverse event (all grades) in all studies of Xeloda were hand–foot syndrome followed by diarrhoea and nausea and vomiting, and were generally slightly higher.

Conclusion We can conclude that: we saw slightly fewer ADE in our patients treated with capecitabine compared with what is reported for Xeloda; ADE occurred more frequently when capecitabine was associated with another chemotherapy; and capecitabine is a useful treatment, but careful monitoring during the first and subsequent cycles of treatment is recommended for all patients.

No conflict of interest

CP-097 | **TOCILIZUMAB FOR THE TREATMENT OF A CASTLEMAN'S DISEASE PAEDIATRIC PATIENT: A CASE REPORT**

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Background Castleman's disease (CD) is a heterogeneous group of lymphoproliferative disorders associated in a subset of cases with HIV and human herpes virus 8 (HHV-8). CD comprises at least two distinct diseases (unicentric and multicentric) with different approaches. There are currently no licensed drugs for the management of CD in paediatric patients.

Purpose To describe a paediatric case of CD in which an antagonist of the interleukin (IL)-6 receptor (tocilizumab) was successfully used.

Material and methods A retrospective case report and literature search related to the treatment of CD was carried. The information was obtained from electronic medical records, PubMed and Uptodate.

Results An 11-year-old boy (weight 32.2 kg, p3–10) was admitted to the paediatric ward for the study of asthenia, anorexia and body weight loss of 5 months' duration. Remarkable laboratory test values at that time included haemoglobin 9.8 mg/dL, MCV 76.2 fL, CRP 65 mg/L, ESR 90 mm and transferrin saturation 7%. His renal and liver function tests were within normal limits. During the study of the toxic syndrome, screening for several infections, including Epstein–Barr virus, cytomegalovirus, tuberculosis, HHV-8 and HIV had negative results. Additionally, an alteration in IL-6 (54 pg/mL) was detected. PET-SCAN showed multiple adenopathies suggesting a lymphoproliferative syndrome. The adenopathy biopsy was not conclusive, but having excluded other pathologies, the case was considered multicentric CD based on the symptoms and analytical results. Given the age of the patient, treatment with tocilizumab 8 mg/kg/month was initiated despite not being licensed for its use in CD. After five doses, the patient showed clinical improvement but acute phase reactants were still high and symptoms reappeared a few days before the next dose. Consequently, the frequency of the treatment was reduced to 8 mg/kg/21 days. After a year of treatment, the patient showed a great response with standardisation of acute phase reactants (CRP 0.2 mg/L, ESR 6 mm) and body weight gain of 22 kg (current weight 54 kg).

Conclusion In this case of a paediatric patient with CD, the use of tocilizumab (off-label use) was shown to be safe and effective when reducing the intervals of administration to 21 days. Nevertheless, more studies are needed to demonstrate its efficacy and safety profile.

No conflict of interest

CP-098 | **ECONOMIC IMPACT OF IMPLEMENTATION OF NATALIZUMAB USE WITH EXTENDED INTERVAL DOSING IN PATIENTS WITH RELAPSING REMITTING MULTIPLE SCLEROSIS**

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Background A study was presented during the 31st Meeting of the European Committee for Treatment and Research in Multiple Sclerosis (ECTRIMS) in October 2015 showing that extending the time frame between natalizumab doses from 4 to 8.5 weeks seems to neither increase the risk of relapse nor increase the risk of progressive multifocal leukoencephalopathy in patients diagnosed with relapsing remitting multiple sclerosis (RRMS). On May 2016, a joint protocol was created between the department of pharmacy and neurology to increase the standard interval for natalizumab to 5 weeks.

Purpose To assess compliance and the economic impact associated with progressive implementation of the aforementioned protocol in RRMS patients receiving treatment in our centre.

Material and methods A retrospective observational study including all RRMS patients under active natalizumab treatment was conducted from May to September, 2016. For the economic analysis, both direct and administration costs of the drug at the hospital's outpatient care unit were taken into consideration. The estimated cost of administering the antibody every 4 weeks was calculated as per the data sheet. This estimate was then compared with the cost incurred by extending the administration interval to 5 weeks, bearing in mind the real compliance of the patients. In addition, we calculated the potential amount saved if all patients had started with the extended interval after protocol approval. Unit costs associated with outpatient care were gathered from the Oblikue Consulting's e-Health healthcare costs (retrieved 2014).

Results Over the studied period, 53 patients were given natalizumab as treatment for RRMS. Progressively, 96% of patients started natalizumab every 5 weeks, as per the protocol. For our sample and during the studied period, the cost of administering natalizumab every 4 weeks was € 515 540, and € 423 708 for every 5 weeks. Therefore, the potential amount saved by switching from the first to the second administration schedule was € 91.832€ . As patients were progressively included into the new protocol, the real administration cost was calculated as € 474 020, which is equal to only 45.21% of the amount that could actually have been saved.

Conclusion Administering natalizumab under an extended interval schedule has translated into a major saving for our health centre, both in direct costs and costs related to outpatient care.

No conflict of interest

CP-099 IMPLEMENTATION OF A STRUCTURED OUTPATIENT PARENTERAL ANTIMICROBIAL THERAPY SERVICE BY THE HOSPITAL PHARMACIST IN A REGIONAL HOSPITAL

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Background Outpatient parenteral antimicrobial therapy(OPAT) has been demonstrated to be safe and effective. Therefore, it has widespread application outside our country.

Purpose To set up a framework to establish and expand qualitative and safe OPAT care in a regional hospital.

Material and methods We conducted a literature analysis and a retrospective analysis (including pharmacoeconomics) of OPAT patients discharged from our hospital. In addition, we conducted a survey questioning healthcare providers' points of view regarding OPAT. We questioned members of the antimicrobial management teams of 94 hospitals, physicians of our hospital and primary care providers in the hospital's region. Based on the results, we developed a structured OPAT service supported by validated tools and information leaflets.

Results In 2015, we treated 77 OPAT patients in our 500 bed hospital, mostly for urinary tract, bone and joint, and genital tract infections, most commonly with ceftriaxone or temocilline. The majority of OPAT patients (74%) were treated in the day care hospital. The overall average duration of OPAT therapy was 11 days. 822 hospitalisation bed days were saved. The surveys revealed that despite acknowledgment of the benefits and potential of OPAT, there was only small scale application in hospitals. Lack of procedures, high costs for the patient and restrictive legislation regarding drug delivery were mentioned as the main drawbacks. Key features of our OPAT service were a multidisciplinary approach, criteria based patient selection, delivery of antibiotics and intravenous fluids via community pharmacy, provision of intravenous administration sets and trained nurses via external home care providers and use of validated tools and information leaflets for patients and home care nurses. The hospital pharmacist has a central role in informing patients and caregivers, delivery of hospital restricted antibiotics and as the contact person after discharge. After implementation of this structured OPAT service, more than twice as many patients could be discharged on OPAT at home compared with 2015.

Conclusion Based on the international literature and local experience, a structured OPAT programme was implemented at our hospital. Next steps are raising awareness and training health care providers, conducting patient satisfaction surveys and intensifying follow-up and audit of our OPAT service.

No conflict of interest

CP-100 PEGYLATED INTERFERON ALFA 2-A IN MYELOPROLIFERATIVE NEOPLASMS

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Background Polycythaemia vera (PV), essential thrombocythemia (TE) and myelofibrosis (MF) are myeloproliferative neoplasms (MPN), characterised by a number of mutations related to proliferation and differentiation of myeloid cell lines. Peg-interferon α2a (P-IFN) is considered a promising option for the therapy of these pathologies, although in Italy this is an off-label use, as an alternative to hydroxyurea.

Purpose Evaluation of the therapeutic efficacy and tolerability of P-IFN in a cohort of PV, TE and MF patients treated according to an off-label protocol.

Material and methods The analysis consisted of review of the medical records of all patients with a diagnosis of PV, TE or MF, who were treated with P-IFN since 2010.

Results 38 patients were treated with P-IFN for MPN. 30 patients (79%) had a diagnosis of PV and 81.5% were positive for the JAK2 mutation; 89.5% of patients were undergoing phlebotomy treatment. P-IFN was used as firstline therapy in 21.00% of patients; the remaining 79% of patients previously received other treatments, mainly hydroxyurea (96.5% of previously treated patients). P-IFN was started because of the young age of patients (13.1%), to ameliorate the quality of life of patients (13.1%) or because of lack of response to previous treatments. Doses of P-IFN ranged from 45 µg/week to 145 µg/week. 12 patients (31.6%) stopped treatment; in 8 cases this was due to toxicity, in 2 cases to lack to efficacy and in 2 cases to toxicity and lack of efficacy. For 19 patients, P-IFN treatment elicited a clinical response, in terms of relief from constitutional symptoms and reduction of phlebotomy frequency, or a laboratory response, in terms of reduction of allelic load for the JAK2 mutation. 3 patients did not experience a response to treatment and for the other patient this evaluation is currently premature.

Conclusion Our data confirmed the efficacy and tolerability of P-IFN. Our study has some limits, due to the small number of patients and to their heterogeneity. Further data collection is needed to confirm these preliminary data, together with a cost-efficacy evaluation.

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No conflict of interest

CP-101 NATALIZUMAB EVERY 6 WEEKS VERSUS STANDARD DOSE: EVALUATION OF EFFECTIVENESS. PRELIMINARY STUDY

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Background Natalizumab is a selective adhesion molecule inhibitor and binds to the α4 subunit of human integrins. Natalizumab 300 mg is administered by intravenous infusion once every 4 weeks (standard dose).

Purpose To evaluate and compare the effectiveness of natalizumab administered every 6 weeks versus the standard dose in patients diagnosed with relapsing remitting multiple sclerosis (RRMS).

Material and methods A retrospective and observational study of patients diagnosed with RRMS treated with natalizumab between January 2013 and June 2016 was conducted. Inclusion criteria: patients ≥18 years old, optimal response to natalizumab and <65 kg. Variables collected: demographics (age and sex); clinical: mental state/mood (MS/M), vision (V),

language (L), hearing/vertigo (H/V), swallow (S), cerebellum (C), cranial (PC), cervical mobility (CM), motor system (MS), sensitive system (SS), balance (BA), Romberg (R), March (M), sphincters/sexual function (SF), buds (B) and presence of anti-John Cunningham virus (JCV) antibodies at 0, 3 and 6 months of dosing change. Statistical analysis was performed using the Epidat 3.1 programme.

Results 30 patients were included (23% men) with a mean age of 36.1±12.9 years. The following table shows the number of patients who developed alterations for each of the variables studied.

Variable	0 month	3 month	p 3 month	6 month	p 6 month
MS/M	10	10	1	9	0.8443
V	11	11	1	12	0.8621
L	10	9	0.8443	8	0.6841
H/V	9	8	0.8332	7	0.6614
S	2	2	1	2	1
C	7	6	0.8040	7	1
PC	3	3	1	3	1
CM	2	1	0.5706	2	1
MS	15	14	0.8817	14	0.8817
SS	20	19	0.9036	17	0.7059
BA	17	18	0.8960	14	0.6694
R	9	8	0.8332	10	0.8443
M	17	17	1	18	0.8960
SF	10	12	0.7205	12	0.7205
B	NO	NO	1	NO	1
JCV	1 +	1 +	1	1 +	1

Conclusion No statistically significant differences were observed when comparing the results obtained for each of the items studied at 0, 3 and 6 months after the change in dose, so we conclude, based on these preliminary data, that both dosing regimens appear to be equally effective in this group of patients.

No conflict of interest

CP-102 **USEFULNESS OF THE TRACEABILITY OF PHARMACEUTICAL ANALYSIS IN PATIENT MEDICAL RECORDS**

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Background Pharmaceutical analysis (PA) as a main activity of the clinical pharmacist should be achievable every day. Its implementation is often difficult because of lack of time or dedicated staff. We wanted to show the interest in tracing a complete analysis (CA) of patients' records (PR) in terms of time saved on the daily analysis (DA) while increasing quality.
Purpose To show that traceability of CA saves time on DA and to determine when all patients will have a CA traced and the time saved.
Material and methods 90 PR were analysed. 60 successive medical records for which **DA** duration was measured as follows: 30 patient files *without* CA traced and 30 patient files *with* CA traced. In parallel, **30 CA were conducted** and time measured. The sum and averages were calculated for each situation. The results were recorded from June to October

2016, and extrapolated until June 2017 (based on the previous year's monthly results).
Results To perform and draw a CA requires on average **9.2 min** for a **10.5 line prescription**(5.27–14.27). Time spent on QA with traceability was **1.14 mins** versus **3.51 min** for PR without CA traced for approximately equal prescriptions (10.8 vs 11.7 lines). At an average rate of **2 CA per day, 9 months are enough** for 94% of PR to contain a traced analysis. The remaining 6% represent the acute care and follow-up of patients for which medical reconciliation at admission is achieved and traced in the PR followed by a CA if necessary. As soon as a CA is plotted in PR, **time spent for DA decreases** (92 hou8rs before vs 64 hours after) just as the number of unanalysed prescriptions.
Conclusion This study shows that CA ultimately requires less time while increasing the number of prescriptions analysed if it is systematically traced in PR. The time saved can be redeployed on other clinical pharmacy activities, such as medical reconciliation at entry or discharge, patient's therapeutic education, etc. This traceability also improves quality and monitoring of patient care and is a first step towards medication review. However, this supposes easy access to patient records and requires complete computerisation.

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No conflict of interest

CP-103 **DEPRESCRIBING MEDICATION IN GERIATRIC PATIENTS WITH CHRONIC PSYCHIATRIC DISEASES**

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Background Chronic use of psychoactive drugs can lead to many clinical adverse events (AE), especially in elderly populations due to the associated polypharmacy and their pathophysiological conditions.
Purpose To optimise psychoactive medications of polymedicated elderly psychiatric patients in an elderly healthcare centre, to achieve better efficiency and safety profiles.
Material and methods In an elderly psychiatric inpatient care unit from a 103 bed long term healthcare facility, a multidisciplinary adequacy programme of pharmacotherapy was implemented; the team was composed by pharmacists, geriatricians and a psychiatrist. The selection criteria (SC) included in the programme were based according to the psychoactive medication prescribed to the patients: SC-1: patients with ≥3 neuroleptic prescribed; SC-2: patients with ≥3 neuroleptic prescribed plus ≥1 hypnotic; SC-3: patients with ≥2 hypnotics prescribed; SC-4: patients with typical antipsychotics prescribed (not indicated in elderly patients). The patient's pharmacotherapy was checked and discussed weekly following STOPP-START-2014 criteria over a period of 2 months, reducing the use of potentially inappropriate drugs and/or decreasing their dose. After patient inclusion, drug prescription changes and clinical evolution were registered.
Results Of 36 patients admitted to the psychiatric ward, 13 met the inclusion criteria (2 patients with SC-1, 6 patients

with SC-2, 1 patient with SC-3 and 8 patients with SC-4; 4 patients met 2 SC). Following STOPP-START-2014 criteria, we implemented 40 changes in pharmacotherapy (>3 changes per patient): 24 drugs were stopped and 16 doses were modified (8 dose reductions, 5 'as needed' prescription modifications and 3 exchanges to a suitable option). Only 4 interventions due to the changes implemented were needed: 1 increase in neuroleptic night dose and 3 cases of 'as needed' prescription (2 benzodiazepines for insomnia and 1 neuroleptic for agitation).

Conclusion A multidisciplinary adequacy programme was successfully implemented to optimise psychoactive pharmacotherapy prescriptions in elderly psychiatric patients. This implementation allowed deprescription and/or dose reduction of psychoactive drugs and, in consequence, decreased the risk of AE due to those medications.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

CP-104 | **INFLIXIMAB UTILISATION STUDY IN A TERTIARY PAEDIATRIC HOSPITAL**

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Background Infliximab is a monoclonal antibody to tumour necrosis factor, approved in paediatric patients for moderate–severe inflammatory bowel disease (IBD)—both Crohn's disease (CD) and ulcerative colitis (UC). Induction regimen consists of 5 mg/kg dose given at weeks 0, 2 and 6, followed by a maintenance regimen of 5 mg/kg every 8 weeks. An intensification strategy, increase in dose, decrease in interval infusions or both is suggested for treatment failure.

Purpose To describe the patterns of infliximab use in a tertiary paediatric hospital.

Material and methods This was a cross sectional study including all patients treated with infliximab in a maintenance regimen. The variables analysed were: age, prescribing service, indication, and dosing and interval infusions.

Results 46 patients were analysed with a median age of 15 years (4–19). Label indications were 37 patients with IBD: CD (21/46) and UC (16/46). Off-label indications supported by clinical evidence were 9: juvenile idiopathic arthritis associated uveitis (JIA-U) (6/46); and others—idiopathic uveitis (1/46), Blau syndrome(1/46) and sarcoidosis(1/46). Mean adjusted monthly dose was 5.4 mg/kg, higher doses were prescribed in patients with a rheumatological diagnosis (8.4 mg/kg for JIA-U, 6.3 mg/kg for others), followed by UC (5.8 mg/kg) and CD (4.1 mg/kg). Infliximab interval was shortened in 25/46 patients. Analysed by indications: patients with UC (11/21), patients with CD (6/16), patients with JIA-U (6/6) and patients with other diseases(2/3). The dose was stepped up and the interval shortened in 15/46 patients.

Conclusion Infliximab in paediatrics is used mostly for labelled indications, UC and CD. Indications of infliximab prescribed as off-label treatment in our centre were for JIA-U, idiopathic uveitis, Blau syndrome and sarcoidosis. About half of patients were treated using an intensification strategy, higher doses and/or shortened interval infusions. The real dosage of infliximab is higher than the summaries of product characteristics dosage but high doses are reported in the literature as a good option to optimise treatment, and some studies recommend this option as a good way to prevent infliximab antibody formation. Further studies are necessary to clarify which is the best option to achieve a response using the minimum dose with maximum patient benefit.

No conflict of interest

CP-105 | **CLINICAL TRIALS IN HAEMATOLOGY**

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Background UFA—'Unità farmaci Antiblastici' of our hospital is involved in the management of several profit and non-profit clinical trials, increasingly based on new molecules or therapeutic associations that are administered intravenously or subcutaneously.

Purpose The aim of this study was to evaluate the trend in clinical trials and to emphasises the role of the hospital pharmacist.

Material and methods For the two haematology departments in the hospital and the use of Log80 software, we collected qualitative and quantitative data from a dedicated database which contains the number of trials approved, type and phase of the trials, drugs used, number of patients enrolled and date of authorisation by the ethics committee.

Results From 2011 to August 2016, 40 profit and 18 non-profit trials were authorised; 328 patients were enrolled, including 160 patients with multiple myeloma, 101 patients with non-Hodgkin's lymphoma of various histology, and 23 patients with acute lymphoblastic leukaemia and chronic lymphocytic leukaemia. The largest number of trials were for multiple myeloma and non-Hodgkin lymphoma. Regarding the drugs used, 15.50% of patients were treated with carfilzomib and 12.16% with bortezomib. 25 of 58 were phase 2 studies.

Conclusion The data show that clinical research is constantly evolving, allowing the study of new therapies in onco-haematology and subsequently the increase in the number of clinical trials conducted in highly specialised centres. In accordance with this scenario, the hospital pharmacist plays an important role in the management and monitoring of clinical trials. The development of new organisational procedures and cooperation among all professionals involved are required to ensure adherence to Italian Norme di Buona Preparazione

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No conflict of interest

CP-106 | PHARMACEUTICAL VALIDATION: ASSESSING A COMPUTERISED ASITANCE PROGRAMME

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Background Traditionally, pharmaceutical validation (PV) has been done by pharmacists, who analyse treatments prescribed to hospitalised patients using their own criteria, based on their knowledge or bibliography. On the other hand, medication errors are one of the main causes of adverse events related to healthcare. New technologies may help professionals to minimise risk in treatments for patients.

Purpose To evaluate the increase in pharmacotherapeutic recommendations (PR) after implementation of a computerised assistance programme (CAP) for PV.

Material and methods This was an ambispective, descriptive, quasi-experimental study over 2 months, carried out in several clinical services assigned unidoses drug distribution, with manual prescriptions, at a level II hospital. The study consisted of two phases: period A (before CAP) in August 2016, involving only manual validation; period B (after CAP) in September 2016, with manual validation plus support software (AltoMedicamentos). PV was performed using the software FarmaTools-Dominion, recording PR, which were communicated to physicians. Variables collected: demographics (sex, age), clinics (clinical service), pharmacotherapeutic (therapeutic group involved, type of PR, degree of acceptance) and origin (manual validation/AltoMedicamentos). PR classification was based on the Iaser method. Data processing: Microsoft Office Excel.

Results 279 PR were made over the 2 months (99 in period A; 181 in period B), which represented an increase of 81%. They were related to 196 patients (82 A; 114 B), 51% men (42.7% A; 57% B), median age 80 (81 A: 79 B). The main clinical services were general surgery (100 :38 A; 62 B), traumatology (47: 13 A; 34 B) and internal medicine (46: 16 A; 30 B) The majority of therapeutic groups involved were analgesics and antipyretics (38 B) and proton pump inhibitors (34: 16 A; 18 B). The mainly PR motives were change dosing regimen/route of administration/sequential therapy (131: 35 A; 96 B), alert days/interaction/duplicity (70: 35 A; 35 B) and replacement of a drug not included in the hospital guide for an alternative (51: 20 A; 31 B). According to degree of acceptance, 61% were accepted by physicians (50.5% A; 57.7% B), excluding PR not assessable (10%). Change dosing regimen was the most accepted type of PR (47% A, 59.7% B). A comparison between these two periods showed that about 37% of the increase from period B to period A was due to AltoMedicamentos.

Conclusion A CAP for PV is an extra support for pharmacists, but there is not enough evidence to affirm that it has created an improvement in relation to the control month regarding an impact on PR. A larger prospective study is needed to provide more evidence.

No conflict of interest

CP-107 | DRUG UTILISATION STUDY OF HUMAN NORMAL IMMUNOGLOBULIN IN IMMUNODEFICIENT PATIENTS IN A TERTIARY PAEDIATRIC HOSPITAL

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Background Human normal immunoglobulin (HNIg) indications are replacement therapy for primary or secondary immune deficiencies (ID) and as immunomodulatory therapy for several autoimmune disorders. Since the only way to obtain HNIg is from plasma donors, it represents a valuable, limited and expensive resource. As a consequence, it is necessary for pharmacists to evaluate their use based on scientific indications.

Purpose To describe the use of HNIg as replacement therapy in chronic patients with ID in a tertiary referral paediatric hospital.

Material and methods Based on medical history records, we collected and analysed cross sectional data from immunodeficient patients in our immunology department receiving replacement therapy with either subcutaneous or intravenous HNIg. We established a normal dosage range for subcutaneous replacement therapy of 100–200 mg/kg, self-administered on a weekly basis. For the intravenous infusion, the normal dosage range was defined as 200–800 mg/kg every 3–4 weeks, although our centre's standard initial dose was 400–500 mg/kg every 4 weeks. In both cases, the initial dose was later titrated based on plasma immune globulin levels and number of infectious episodes.

Results After analysing data obtained from 34 patients, we found that the majority of immunodeficiencies treated were primary ID (29/34), mainly common variable immune deficiency disease (CVID, 12/34) the primary indication, followed by Bruton syndrome (5/34) and ataxia telangiectasia (4/34). Most of the patients were treated by intravenous infusion (28/34) with a median monthly dose of 441 mg/kg (355–739). Regarding patients treated by subcutaneous injection (6/34), the median monthly dose was 459 mg/kg (416–541). One patient needed a shortened interval to every 3 weeks to control recurrent infections episodes.

Conclusion Primary ID is the major diagnostic immunodeficiency treated by our immunology department, which might be due to the complexity of patients treated by this unit. No patients exceeded the normal dosage range reported in the literature; most patients were treated with a monthly periodicity showing a favourable clinical evolution, although the shortened interval treatment allowed a clinical response to be achieved without increasing the monthly total HNIg dose.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

| CP-108 | ADHERENCE TO PARENTERAL FIRSTLINE DISEASE MODIFYING THERAPY FOR MULTIPLE SCLEROSIS |

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Background Several firstline disease modifying therapies (DMTs) have shown significant benefit in preventing relapses and slowing disease progression among multiple sclerosis (MS) patients. Lower adherence may be associated with lower efficacy and thus with a higher risk of relapse. Adherence to DMTs was also associated with a lower likelihood of hospitalisation and relapse, and lower medical costs.

Purpose The objective of this study was to analyse adherence to parenteral firstline treatments in MS patients and related factors.

Material and methods This was an observational, retrospective, longitudinal study. All MS adult patients starting firstline treatment with intramuscular(IM) interferon(IFN)-beta-1-a, subcutaneous(SC) IFN-beta 1-a, SC IFN-beta 1-b and glatiramer acetate from 1 September 2005 to 31 August 2015 were included. Data were collected from the pharmacy department electronic records. DMT adherence was measured using the medication possession ratio (MPR) calculated as the number of days of any DMT medication over the study period (MPR had a maximum value of 100%). Patients with MPR $\geq 90\%$ were classified as adherent. Patient characteristics compared between adherent and non-adherent patients included demographics (age, gender), treatment and route of administration. Categorical variables were compared using the χ^2 or Fisher's exact tests; continuous variables were compared using the non-parametric Wilcoxon rank sum test. One way analysis of variance (ANOVA) was performed to explore treatment influence. A logistic regression model was used to estimate the risk adjusted rate of non-adherence. A p value ≤ 0.05 was considered to indicate a statistically significant difference.

Results 176 patients were included, 67.6% women and 32.4% men. Mean age ($\pm$SD) was 36.27$\pm$11 years. Treatment distribution: 36.4% SC IFN-beta 1-a, 10.2% SC IFN-beta 1-b, 39.2% IM IFN-beta-1-a, 14.2% glatiramer acetate. 84.1% of patients were adherent. Mean ($\pm$SD) adherence was 93.6% $\pm$16.5%. In univariate analysis no difference was observed regarding gender (OR 1.2, 95% CI 0.5–2.8; p=0.85) and route of administration (OR 0.7, 95% CI 0.3–1.6; p=0.533). Adherent patients were older (mean age difference=2.2 years, 95% CI 9.4–0.6; p=0.04). No difference was observed between treatments in ANOVA analysis (p=0.52). In multivariate analysis, age was the only associated variable (OR 1.05, 95% CI 1.01–1.10; p=0.02).

Conclusion Firstline adherence was high among MS treated patients although nearly one sixth of patients were non-adherent. Younger patients were more likely to be non-adherent.

No conflict of interest

| CP-109 | EVALUATION OF CLINICAL, ECONOMIC AND ORGANISATIONAL IMPACTS OF PHARMACISTS' INTERVENTIONS ON IMMUNOSUPPRESSIVE THERAPY MANAGEMENT AMONG LUNG TRANSPLANT OUTPATIENTS |

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Background Lung transplant recipients require multidisciplinary care because of the complexity of therapeutic management. Clinical pharmacists are able to detect drug related problems (DRPs) and provide recommendations to physicians. The potential significance of pharmacists' interventions (PIs) has never been studied by a multidimensional approach in lung transplantation (LT).

Purpose We aimed to assess the clinical, economic and organisational impact of PIs on immunosuppressive management among lung transplant outpatients.

Material and methods In our centre, PIs are comprehensively and prospectively collected on Act-IP database, a free access website observatory created by the French Society of Clinical Pharmacy (SFPC) from 2009 onward. Each PI includes patient features, a description of the DRP and the PI according to the SFPC classification. A retrospective analysis of the PIs was performed from 1 January 2009 to 31 December 2015 by an expert committee including a clinical pharmacist, pharmacovigilant and pneumologist. The impact of accepted PIs was assessed according to the validated multidimensional 'CLEO' scale, which includes three dimensions: CLinical (harmful, null, minor, moderate, major, lethal, non-determined), Economic (cost increase, no change, cost decrease, not determined) and Organisational impacts (unfavourable, null, favourable, not determined).

Results Among the 1568 PIs performed over the 7 year period, 713 (45.5%) were related to immunosuppressive therapy for which the physician's acceptance rate was 94.0%. The expert committee considered the clinical impact of PIs as major, moderate and minor in 9.6%, 67.0% and 22.8%, respectively. Major clinical impact was mainly related to drug–drug interactions between immunosuppressants and antifungals (56.0%). Wrong dose was the main cause of moderate clinical impact (75.0%). While 41.6% of PIs led to a cost increase due to dose increase or adding of drug monitoring, 44.8% of PIs helped a cost decrease due to dose decrease or drug discontinuation (44.8%). Most PIs did not have an organisational impact for healthcare professionals (99.1%).

Conclusion This is the first study which has evaluated the clinical, economic and organisational impacts of PIs in lung transplant outpatients. Our findings show that clinical pharmacists play a key role in optimising immunosuppressive therapy management in LT. As experts in drug therapy, clinical pharmacists are able to detect and resolve DRPs to improve patient care.

No conflict of interest

CP-110 MULTIDISCIPLINARY VIEWS TOWARDS THE CLINICAL PHARMACIST: A HOSPITAL PALLIATIVE CARE TEAM PERSPECTIVE

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Background Successful provision of palliative care requires multidisciplinary collaboration from various healthcare professionals.[1]

Purpose To explore the views of the multidisciplinary healthcare team towards the role of the clinical pharmacist within the palliative care unit of an oncology hospital.

Material and methods Open ended and close ended questions in the form of recorded semi-structured focus groups were chosen as the most appropriate tool to explore the views of the team. The questions (referred to as the topic guide) were formulated after an extensive literature review and were then assessed for face and content validity by an expert panel. Willing eligible participants (n=26) were randomly assigned into three heterogenous focus groups with one group acting as the pilot study. The recorded data were then transcribed ad verbatim into raw text where participants were anonymised. The transcripts were analysed using the framework method whereby emerging categories and themes were devised. Quotations were then selected depending on their relevance to context of narrative text.

Results The framework analysis resulted in five main categories, namely: pharmacists as the expert reference point, ward availability, personal characteristics, attitudes towards potential clinical services and the link with the community. Key study outcomes were then highlighted as follows. Clinical pharmacists are considered as a valuable reference point for guidance in mixture compatibility and documentation issues. They are desired in the ward (including ward rounds) for their pharmaceutical expertise, especially in stock management and medication review. They are also believed to have a role in formulary management, principally in making protocols more lenient. They are required for patient counselling to increase compliance and to educate both patients and doctors alike on waste management. A missing link with the community in terms of hospital pharmaceutical services was acknowledged. Innovative concepts were also mentioned, including medication reviews on an outpatient basis.

Conclusion The general view of healthcare providers on the clinical pharmacist's role in palliative care was largely supportive and positive. This should encourage policy makers to introduce clinical pharmacy services within this setting.

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No conflict of interest

CP-111 ASSOCIATION BETWEEN POTASSIUM CHLORIDE INTRAVENOUS CONCENTRATION AND SEVERITY OF PAIN

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Background Local reactions related to intravenous administration of potassium chloride occur in up to 25% of patients. Given that hypokalaemia is common in hospitalised patients, it is important that intravenous potassium replacement be carried out with a minimal chance of infusion failure caused by phlebitis, extravasation or patient refusal due to intolerability.

Purpose To measure the relationship between intravenous potassium preparation concentrations and duration of infusion with severity of pain.

Material and methods The study was conducted in a tertiary hospital for a period of 1 month. A sample of 150 prescriptions were selected randomly from patients who presented to the pharmacy. 5 prescriptions were selected daily. The patient was eligible to be included if he/she could be interviewed. The intravenous cannula was inserted at least 1 hour before the start of the potassium chloride infusion, and all sites were inspected before the first infusion to ensure that there was no obvious pre-existing local pain. In order to assess the patient's pain, a numeric rating scale (NRS) ranging from 1 (no pain) to 10 (worst pain) was used to rate pain at the infusion site. The pharmacist asked patients to rate the severity of pain at the infusion site using the NRS before the start and at the end of each infusion.

Results Mean patient age was 48.27 years. The average potassium level prior to infusion was 3.17 mmol/L. There was no pre-existing local pain, tenderness or phlebitis at the site of the infusion, and pain scores before the start of the infusions were 0 (no pain) for all patients. The study showed that the association between the concentration and pain was strong (p=0.048). The lowest infusion rate was 20 mL/hour and the highest was 250 mL/hour with an average of 105.25 mL/hour. The study showed that the association between the infusion rate and pain was week (p=0.062).

Conclusion The association between potassium chloride intravenous concentration with severity of the pain was established. The study showed the importance of initiation of a policy for standardisation of potassium concentrations as well as guidelines for treatment of hypokalaemia.

No conflict of interest

CP-112 A MULTIDISCIPLINARY APPROACH TO ANTIRETROVIRAL SIMPLIFICATION IN HIV INFECTED PATIENTS

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Background Simplification of antiretroviral treatment (ART) is an option to reduce pill burden, decrease drug toxicities, minimise drug interactions, improve adherence, preserve future treatment options and decrease healthcare costs, in the management of treatment experienced HIV infected patients with virological suppression

Purpose To investigate the effects of a multidisciplinary approach to simplify ART in treatment experienced HIV infected patients with virological suppression.

Material and methods This was a prospective, descriptive, observational study. ART simplifications from January 2015 to January 2016 by a multidisciplinary HIV unit (two infectious diseases doctors and a hospital pharmacist) in a second level hospital were included. The HIV unit identified patients who were the best candidates for undergoing ART simplification. Demographic and clinical characteristics, viral load, CD4 T cell count, toxicities, prior ART history, drug resistance testing, adherence and costs were recorded before and at least 24 weeks after simplification. Ease of administration, virological suppression maintenance, tolerability and toxicity, as well as cost savings arising from simplification, were analysed. Adherence was measured according to pharmacy dispensing records. Statistical analysis was performed using SPSS v21.

Results 56 ART simplifications in 56 HIV+ patients (15% of patients on ART). Median age was 50 years (IQR 45–53), 66% were men and 41% were CDC stage C. The average time since diagnosis was 10 years. 48% reduced drug exposure to a simpler maintenance regimen, 36% changed to a dual ART, 14% changed to a single tablet regimen and 1 patient changed to PI/r monotherapy. The median pill burden was 3 tablets (IQR 3–5) before and 2 tablets (IQR 1–3) after simplification. After switching, time of follow-up was 10.78 ±3.5 months. All patients showed suppressed viral loads (96% <20 copies/mL, 2 patients had 20–50 copies/mL) at the end of the study, and therefore maintained efficacy was demonstrated. Tolerance was considered successful after simplification and no adverse effects were reported throughout the study. 95% of patients were considered adherent. Overall simplification led to a cost reduction of € 10 332/month, € 123 984/year(p<0.05).

Conclusion A multidisciplinary approach contributed to ART simplification that not only maintained virological suppression and adherence but also prevented toxicities, facilitated administration and saved costs in treatment experienced HIV infected patients.

No conflict of interest.

CP-113 EVALUATION OF PROFESSIONAL PRACTICES ABOUT THE CENTRAL VENOUS CATHETER MANAGEMENT IN A SURGICAL CARDIOVASCULAR INTENSIVE CARE UNIT: BETWEEN THEORY AND PRACTICE

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Background Use of a central venous catheter(CVC) line is associated with a high risk of infections and complex infusion requirements. Evaluation of professional practices(EPP) is a useful tool in a process of quality improvement and risk management.

Purpose Our aim was to assess the differences between user knowledge and practice concerning management of a CVC.

Material and methods This was a preliminary prospective study in a surgical cardiovascular intensive care unit(ICU) in July 2016. Data were collected by direct observations of CVC settings and standardised interviews with nurses. We focused on the four items in common between the observational study and the answers given by nurses: dressing changes, unused lines management, use of CVC line for blood sample and infusion lines management.

Results We observed 61/134 infusion lines and interviewed 31/61 nurses. 100% of nurses declared changing dressings when they becomes loosened or soiled. Only 62% of the dressings had a good performance (29.5% loosened ±19.7% soiled ±11.5% lightly covered) during the observational study. This may have been due to the jugular position of the CVC and the high temperatures in July. 6% of nurses thought the unused lines of the CVC should be equipped with keep vein open infusion and 94% said it should be left with anything. In practice, only 11% were left free and a device was connected in 89%. No keep vein open infusion was observed. 100% of nurses said they performed blood samples on CVC and 100% agreed to flush the infusion line after sampling. In practice, 34% of the lines were soiled (sign of poor or no flushing). This can be explained by the need for a high number of samples. 97% of nurses claimed that catecholamines should be infused alone on the proximal line. 78% were well connected with 50% alone. 50% were infused alone with 22% on another line to avoid haemodynamic disturbances because of different infusion rates.

Conclusion The team seemed to have the knowledge but due to hard working conditions in the ICU, we found divergent results. Despite discrepancies between the two parts of the EPP, a multidisciplinary team of nurses, pharmacists and doctors should propose corrective action and support changes in technique solutions and training in performing changes.

No conflict of interest

CP-114 PERSISTENCE OF BIOLOGICAL TREATMENT IN PATIENTS WITH PSORIASIS

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Background Although the use of biological agents (BA) for the treatment of psoriasis is widespread in clinical practice, studies on its persistence over time are scarce.

Purpose To estimate the persistence of treatment with BA in patients diagnosed with psoriasis receiving their first biological treatment (FBT).

Material and methods A retrospective observational study of all patients diagnosed with psoriasis who initiated FBT since its commercialisation until August 2011 (at least 5 years of follow-up) was conducted. Variables: age, sex, treatment start and discontinuation date, PASI (psoriasis area severity index) and reason for discontinuation. Persistence was defined as time (days) from the start of treatment until its discontinuation for periods greater than 3 months to include optimisation

	Infliximab (n=10)	Efalizumab (n=22)	Adalimumab (n=33)	Etanercept (n=61)	Ustekinumab (n=6)	Total (n=132)
No discontinuation	10% (n=1)	0% (n=0)	0% (n=0)	5.0% (n=3)	0% (n=0)	3.0% (n=4)
Discontinuation	90% (n=9)	100% (n=22)	97% (n=32)	90% (n=55)	83.3% (n=5)	94% (n=123)
Reasons for discontinuation						
• Failure	22.2% (n=2)	45.5% (n=10)	31.3% (n=10)	34.5% (n=19)	20% (n=1)	34.1% (n=42)
• Clinical improvement/remission	33.3% (n=3)	40.9% (n=9)	50.0% (n=16)	40.0% (n=22)	80% (n=4)	43.9% (n=54)
• Toxicity Intolerance Infections	22.2% (n=2)	0% (n=0)	3.1% (n=1)	1.8% (n=1)	0% (n=0)	3.3% (n=4)
	11.1% (n=1)	0% (n=0)	9.3% (n=3)	7.4% (n=4)	0% (n=0)	6.6% (n=8)
• Other (lack of drug, positive Mantoux test, pregnancy)	11.1% (n=1)	13.6% (n=3)	6.3% (n=2)	14.5% (n=8)	0% (n=0)	11.3% (n=14)
• Patient preference	0% (n=0)	0% (n=0)	0% (n=0)	1.8% (n=1)	0% (n=0)	0.8% (n=1)

regimen. Persistence was calculated with Kaplan–Meier survival curves (log rank test).

Results 132 patients (56.8% men) were included. 7.6% (n=10), 16.7% (n=22), 25% (n=33), 46.2% (n=61) and 4.5% (n=6) received FBT with infliximab, efalizumab (until its market withdrawal), adalimumab, etanercept and ustekinumab, respectively. Mean age was 44.61 years (SD=14.5). Median overall persistence was 239 days (95%CI 181.3–296.7). Persistence for infliximab was 339 days (95% CI 0.0–780.61), efalizumab 184 days (95% CI 43.8–324.2), adalimumab 337 days (95% CI 26.4–388.7), etanercept 176 days (95% CI 177,5–234,5) and ustekinumab 350 days (95% CI 0.0–880.0). No significant differences were found for median persistence between FBT (p=0.121). 3% of patients continued, 94% discontinued and 3% were lost to follow-up.

Mean PASI at the beginning (90 unknown) was 14.5 (SD=6.6) and at the discontinuation date (84 unknown) was, for clinical improvement/remission, 0.4 (SD=1) and for the remainder, 9.2 (SD=6,9).

Conclusion Median overall persistence was low (less than a year). Persistence was approximately 1 year for infliximab, adalimumab and ustekinumab and 6 months for efalizumab and etanercept. These outcomes could indicate they are not well tolerated or ineffective. However, the main reason for discontinuation was clinical improvement/remission, followed by failure.

No conflict of interest

CP-115 | **OPTIMISATION OF ANTI-INTERLEUKIN BIOLOGICAL THERAPIES IN PSORIASIS PATIENT ABOVE 100 KG**

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Background Biological agents targeting interleukin such as ustekinumab and secukinumab are strategies employed in psoriasis treatment. Ustekinumab requires double doses in patients over 100 kg, which implies an increase in costs due to the absence of a 90 mg injectable solution in our national market. Secukinumab, recently approved for psoriasis, does not require dose modification based on weight.

Purpose To describe the experience and assess the clinical response and economic impact of switching from ustekinumab to secukinumab in moderate–severe plaque psoriasis patients weighing more than 100 kg in the maintenance phase with optimal (Psoriasis Area and Severity Index (PASI) <5) or suboptimal (PASI 5–10) response.

Material and methods This was a retrospective observational study of psoriasis patients previously treated with ustekinumab double dose, from March to October 2016. Variables were: sex, age, weight, diagnosis, previous therapy with ustekinumab 90 mg quarterly and PASI. Patients with PASI 5–10 during maintenance received secukinumab 300 mg with reduced induction (weeks 1, 3) instead of normal induction (weeks 1, 2, 3, 4), followed by monthly administration; and patients with PASI <5 had no induction (monthly). Clinical response was assessed as no change in PASI in patients with optimal response or improvement in those with suboptimal response. Economic impact was measured comparing the patient year cost of ustekinumab double dose versus secukinumab to calculate the patient year savings.

Results 6 patients, 83.3% men, mean age 55 years (49–67), were evaluated. 3 patients had suboptimal response with ustekinumab (mean PASI 6.8); they received secukinumab with reduced induction and 2 achieved improvement in PASI and the third has not yet been evaluated. 3 patients had optimal response with ustekinumab (mean PASI 3.1); they received secukinumab without induction, achieving improvement in PASI. Switching from ustekinumab double dose to secukinumab with reduced induction involved an economic patient year saving of € 8971.68 (34%) compared with ustekinumab maintenance; while switching to secukinumab without induction gave a patient year saving of € 10 218.66 (39%).

Conclusion Optimisation of anti-interleukin biological agents is a strategy to manage psoriasis patients over 100 kg based on clinical activity criteria and costs in our settings. Our experience using alternative dosing of secukinumab induction depending on PASI revealed a decrease in costs, providing direct savings for the hospital while maintaining treatment efficacy.

No conflict of interest

CP-116 | EVALUATION OF THE CLINICAL SIGNIFICANCE AND VALUE OF A CLINICAL PHARMACY SERVICE AT A TEACHING HOSPITAL

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Background Clinical pharmacy services (CPS) have been shown to provide significant clinical benefits for patient care. The paucity of literature reports within the Austrian healthcare system highlights the urgent need for studies providing evidence for CPS.

Purpose To assess the clinical significance and value of CPS by determining the number, type and clinical significance of identified drug related problems (DRPs), acceptance rate of suggested interventions and their benefit to inpatient care.

Material and methods This was a two phase mixed method study: (1) prospective descriptive study of number and type of identified DRPs, suggested interventions and their acceptance rate based on a validated classification system[1]; (2) independent expert panel rating of the clinical significance of identified DRPs and the clinical value of suggested interventions based on a reliable rating method.[2] The setting **was** a 455 bed teaching hospital in Vienna. The CPS was across two surgical, two trauma, one cardiology and two internal medicine wards.

Results The pharmacists identified 200 DRPs in 162 patients giving an average of 1.2 ($\pm$1.8) DRPs/patient: the most common DRPs included 'drug interaction' (23%), 'drug without indication' (20%) and 'non-conformity to guidelines/contraindication' (14%). The most frequently suggested interventions were 'drug discontinuation' (32%), 'dose adjustment' (18%) and 'drug monitoring' (18%). 70% of the suggested interventions were accepted by the medical professionals. The experts assessed 84% of the DRPs as clinically significant (67%) or serious (17%), and 83% of the suggested interventions as significant (60%), very significant (22%) or extremely significant (1%). The overall inter-rater agreement was moderate for both the severity of error/event and the value of the pharmacy service (Kendall-W 0.525 and 0.461, respectively).

Conclusion The expert panel assessed the CPS as of great clinical significance and of high clinical value to inpatient care. The prevalence of identified DRPs and the high rate of accepted interventions reflect the contribution of the service to the reduction and prevention of adverse drug events, treatment failure and the achievement of therapy goals. This suggests that the CPS is a valuable contribution to improve patient safety and patient care.

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Many thanks to the expert panel members for their invaluable contribution.

No conflict of interest

CP-117 | USE AND EFFECTIVENESS OF FIRSTLINE CHEMOTHERAPY REGIMENS IN ADVANCED GASTRIC CANCER: EVOLUTION FROM 2009 TO 2016

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Background There is neither consensus on firstline chemotherapy for advanced gastric cancer (AGC) nor new drugs or schemes approved in recent years.

Purpose To evaluate the evolution in use and effectiveness of firstline polychemotherapy regimens over an 8 year period in AGC.

Material and methods Patients with AGC treated with polychemotherapy were included from 2009 to 2016 in the AGAMENON multicentre observational study to assess prognostic factors and patterns of care. Firstline regimens were grouped into docetaxel or epirubicin containing triplets, fluorouracil plus oxaliplatin, cisplatin or irinotecan doublets, capecitabine plus oxaliplatin or cisplatin doublets and others. According to the year of their first chemotherapy cycle, patients were assigned to one of two groups: the first, from 2009 to 2012, or the second, from 2013 to 2016. Clinical data were obtained from the medical records, after approval by the ethics committee, and introduced into the website of the study. The main clinical variables, progression free survival (PFS) and overall survival (OS), were analysed using the Kaplan–Meier method and compared with a log rank test.

Results The AGAMENON registry contains data from 1252 patients, 448 of whom were treated with a chemotherapy regimen in the first period and 804 in the second. Clinical baseline characteristics of the two populations, 2009–2012 versus 2013–2016, were similar: ECOG performance status $\geq$2, 16.5 versus 13.7%; men, 66.2% versus 71.7%; median age 65.0 versus 64.0 years; Lauren classification, intestinal 52.2 versus 49.1%; HER-2 overexpression, 18.7 versus 17.9%; and $\geq$3 metastatic sites, 38.4 versus 31.2%, respectively.

The use of fluorouracil and oxaliplatin increased from 5.4% to 18.3% while capecitabine–cisplatin (22.1 to 12.3) and docetaxel triplets (13.0 to 6.0) use decreased, comparing the first and second periods. Median OS were 10.3 (95% CI 9–11) and 10.8 (10–12) months for patients in the 2009–2012 and 2013–2016 groups, respectively. Median PFS were 6.5 (95% CI 6–7) and 6.7 months (95% CI 6–7) in 2009–2012 and 2013–2016, respectively. These results show that OS and PFS were similar in both groups (log rank p=0.684 and 0.714).

Conclusion Although there were changes in chemotherapy regimens usage, survival remained almost constant over time, pointing to the need for new treatment strategies in AGC.

REFERENCES AND/OR ACKNOWLEDGEMENTS
The investigators of the AGAMENON study.

No conflict of interest

CP-118 | **DOES A STRUCTURED PROTOCOL INCREASE IMPLEMENTATION OF BIOLOGIC THERAPY DOSE REDUCTION AMONG CLINICIANS AND PATIENTS? A PILOT STUDY**

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Background Biologic therapies (eg, tumour necrosis factor inhibitors (TNFi)) used in the management of inflammatory arthritis are associated with potential risks (including local reactions, infections and possible malignancy). Increasing RCT evidence suggests stable patients can dose reduce without increased disease activity and a previous patient engagement event explored patient perceptions of dose reduction. There are no clear guidelines or strategies reported in the literature to facilitate implementation in clinical practice.

Purpose For 2 years at the local NHS Trust, stable patients (out of the 460 patients on subcutaneous TNFi) were offered the opportunity to reduce their dose on an ad hoc basis with variable regimens. The purpose of this pilot study was to develop a structured programme for standardising dose reduction of subcutaneous TNFi therapy to support implementation among clinicians and patients.

Material and methods An inflammatory arthritis TNFi 5 step dose reduction programme was developed (30% interval extension for 3 steps, followed by a 60% extension, before stopping treatment), with a patient information and compliance record (informing of treatment escalation following a disease flare up). The programme was reviewed by a consultant rheumatologist and patient representative group, and presented to the clinical team, and treatment checklists were updated to include a prompt. Patients started on dose reduction schemes were recorded.

Results In the 2 years preceding the pilot, 27 patients attempted TNFi dose reduction (average rate of 1.1/month). In the first 6 months following introduction of the programme, an additional 42 patients (56% increase) were initiated on dose reduction schemes (average rate of 7/month). Of the 42 additional patients, 31 (74%) were initiated on the formal BTRIM programme and 11 (26%) were extended via an alternative schedule.

Conclusion The pilot showed that adopting a structured dose reduction programme increased implementation in clinical practice. It is unclear whether this was attributable to increased patient and/or clinician confidence or raised clinician awareness. Reasons for opting out were not assessed. Further work has been identified following the pilot, including potential gainshare discussions with commissioners and approval of a research grant to conduct a qualitative study assessing patient perceptions of biologic therapy dose reduction.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Rheumatology patient representative group, Local Trust.

No conflict of interest

CP-119 | **NEW DIRECT ANTIVIRAL AGENTS IN HEPATITIS C: RESULTS IN REAL LIFE**

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Background New direct antiviral agents have caused marked evolution in the treatment of hepatitis C. However, it is necessary to demonstrate that this new therapeutic achieves higher response rates, lower complexity and better tolerability than older regimens in clinical practice.

Purpose To analyse the viral response and tolerability of direct antiviral agents in clinical practice in patients with hepatitis C.

Material and methods This was a prospective observational study conducted at the pharmaceutical care outpatient unit. All patients receiving treatment with new free interferon treatment from January 2015 to April 2016 were included. We evaluated analytical and clinical data: type of patient and treatment, degree of fibrosis, side effects, and viral load on completion of treatment and 24 weeks after completion of treatment. The information was obtained from the pharmacotherapeutic history, patient interview and laboratory register. Results are expressed as percentages and side effects as median (IQR)

Results 229 patients were included (72% men; 51% naïve; 22% coinfected): 10.6% had been treated with daclatasvir/sofosbuvir, 19.4% with ombitasvir/paritaprevir/ritonavir ± dasabuvir, 42.7% with ledipasvir/sofosbuvir and 27.3% with simeprevir/sofosbuvir. In 59.9% of cases, these treatments were combined with ribavirin. Degree of fibrosis: 0.9% F0, 6.1% F1, 22.5% F2, 22.5% F3 and 55.1% F4. Duration of treatment was 12 weeks for 86.7% of patients and 24 weeks for the reminder. When the treatment was finished, 89.7% obtained undetectable viral load, 0.4% detectable viral load, 6.6% unknown viral load and 1.3% death before the finish. At 24 weeks after the finished treatment, 95.8% obtained undetectable viral load: 100% of patients treated with daclatasvir/sofosbuvir, 91.4% treated with simeprevir/sofosbuvir, 98.1% treated with ledipasvir/sofosbuvir and 100% treated with ombitasvir/paritaprevir/ritonavir ± dasabuvir. Regarding side effects, 23.4% of patients had asthenia, 17.5% had skin reactions, 12.9% had gastrointestinal reactions and 22.6% other reactions. The median number of side effects was 1 (0–7).

Conclusion New drugs show a high rate of response and are well tolerated. However, follow-up and pharmaceutical care in these patients has contributed to better management of side effects, resulting in better adherence and effectiveness.

No conflict of interest

CP-120 | **MEDICATION RECONCILIATION IN HOSPITALS**

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Background Medication reconciliation (MR) is a required organisational practice by accreditation and should be implemented in all hospitals. There are numerous issues reported with the implementation of MR.

Purpose The main objective was to survey the current MR practices in hospitals

Material and methods This was a descriptive cross sectional study conducted between May and June 2016. A survey of 34 questions was sent by email to all hospital pharmacy directors. The survey was managed online (SurveyMonkey, Palo Alto, CA, USA). Respondents were asked to share their policies, procedures and forms. Only descriptive statistics were performed.

Results 28 respondents (45 sites) completed the survey (response rate 82%). There was someone in charge of MR in 68% (30/44) of sites but only 43% (19/44) had a committee. The best possible medication history (BPMH) was always or often collected by pharmacy technicians (53%), pharmacists (51%), nurses (16%) or physicians/residents (7%). A second source of information was used systematically in 42% of cases (eg, patient drug profile (33/45), Quebec electronic health record (10/45), patient personal list (5/45), labels/bottles (3/45)). The BPMH was sometimes collected electronically (36%, 16/45). The BPMH (paper/electronic) was also used to prescribe drugs (47%, 21/45). Discrepancies were identified always or often by pharmacists (73%, 32/44), pharmacy technicians (39%, 17/44), physicians/residents (9%, 4/44) and nurses (2%, 1/44). Re-prescription was always/often done by physicians (65%, 26/40) and pharmacists (65%, 26/40). Only 29% (13/45) of the sites confirmed the consultation of the BPMH by the physician. Half of the sites (49%, 22/45) required the consultation of the BPMH before drug ordering at patient discharge. Pharmacists were involved in supervising discharge drug orders in 60% (26/44) of cases. A minority of respondents (27%, 12/45) gave additional material to patients at discharge. A majority (93%, 42/45) had contacts with community pharmacists whenever required to ensure seamless care. Staff involved in MR required inhouse certification (43%, 18/42) but almost all (91%, 39/43) provided tools to their staff to support the MR process.

Conclusion This cross sectional study revealed a need to standardise the MR process.

No conflict of interest

CP-121 | **SEVERE HEPATOTOXICITY INDUCED BY CERITINIB IN A METASTATIC NON-SMALL CELL LUNG CANCER PATIENT: A CASE REPORT**

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Background Ceritinib is indicated for the treatment of adult patients with non-small cell lung cancer (NSCLC), when the disease is advanced, the patient is anaplastic lymphoma kinase (ALK) positive and the disease has been treated previously with crizotinib. The data sheet for ceritinib describes hepatotoxicity as an uncommon adverse reaction observed in less than 1% of patients in clinical trials. In addition, ceritinib is on the European list of medicinal products under additional monitoring.

Purpose To describe a case of severe hepatotoxicity in a patient with advanced NSCLC treated with ceritinib.

Material and methods This was a descriptive and retrospective clinical case. Data were obtained by review of the electronic medical records.

Results A 57-year-old man was followed by the oncology service for an ALK positive advanced NSCLC. He had received treatment with crizotinib 250 mg twice a day from November 2015 to June 2016 when this treatment was interrupted because of disease progression which was determined by imaging tests.

Consequently, ceritinib treatment was started in June 2016 with a daily dose of 750 mg. Before starting this medication, laboratory hepatic parameters were controlled (including AST, ALT and total bilirubin), as indicated in the data sheet, and all were in normal range. A month later, there was a marked elevation in transaminases: GPT 455 (grade 3), GOT 123 (grade 2), GGT 721, alkaline phosphatase 662. Ceritinib was discontinued and transaminases started to decrease. The Karch–Lasagna algorithm established a 'probable' relationship between hepatotoxicity and ceritinib based on temporal correlation of the facts and the apparent lack of another perpetrator of hepatic damage.

Conclusion Drug induced hepatic injury is one of the most common reasons for withdrawal of an approved drug. For this reason, health professionals must be vigilant in identifying drug related liver injury, especially those related to drugs on the European list of medicinal products under additional monitoring. In our case, hepatic transaminases increased progressively throughout the course of the treatment with ceritinib and have continuously decreased since ceritinib discontinuation. This adverse reaction was reported to the national pharmacovigilance system.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

CP-122 | **PEMBROLIZUMAB AND INMUNE MEDIATED NEPHRITIS: A CASE REPORT**

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Background Pembrolizumab is a selective humanised IgG4 monoclonal antibody known as a programmed cell death 1 (PD-1) immune checkpoint inhibitor. It is the first PD-1 Inhibitor approved for unresectable or metastatic melanoma. With the arrival of this new mechanism of action, immune mediated adverse reactions have also been detected.

Purpose To describe immune mediated nephritis in a diagnosed nodular melanoma patient, treated with pembrolizumab as a secondline treatment.

Material and methods Data were obtained by review of the electronic medical records.

Results A 78-year-old man had a BRAF mutated metastatic nodular melanoma. He was included in the Columbus clinical trial and received a combination of BRAF inhibitor and MEK inhibitor as firstline treatment from April to September 2015. At that time, disease progression was determined by imaging tests. In October, the lesion was operated and patient received

radiotherapy for 4 months. In March 2016, pembrolizumab was started as a secondline treatment, and was well tolerated at the beginning (cycles 1 and 2). After cycle 3, creatinine started to increase, reaching 3.59 (grade 3), and estimated glomerular filtration rate was 17.57 mL/min/1.73 m². These laboratory abnormalities caused the patient's emergency admission to hospital and treatment discontinuation. Renal function analytical parameters decreased to the normal range a month after treatment discontinuation.

Nephritis occurred in 0.4% of patients receiving pembrolizumab in the Trials keynote 001, 002 and 003. The median time to onset of nephritis was 5.1 months (range 12 days to 12.8 months). The Karch–Lasagna algorithm established a 'possible' relationship between nephritis and pembrolizumab treatment due to the existence of a temporal correlation between the facts.

Conclusion Health professionals must be vigilant in identifying drug related adverse reactions, particularly those related to drugs on the European list of medicinal products under additional monitoring. Nephritis has been reported in patients receiving pembrolizumab, and consequently patients should be monitored for changes in renal function, and other causes of renal dysfunction should be excluded. In our case, creatinine dramatically increased after the third cycle of treatment with pembrolizumab (onset of 3 months) and it has continuously decreased since pembrolizumab discontinuation, eventually reaching the normal range. This adverse reaction was reported to the national pharmacovigilance system.

REFERENCES AND/OR ACKNOWLEDGEMENTS
European list of medicinal products under additional monitoring, 2016.

No conflict of interest

CP-123   **A COST EFFECTIVENESS ANALYSIS OF NIVOLUMAB COMPARED WITH PEMETREXED FOR THE TREATMENT OF NON-SMALL CELL LUNG CANCER IN REAL PRACTICE**

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Background A total of 1.6 million new cases of lung cancer are diagnosed each year, with 1.4 million deaths annually. Nivolumab (NIV), a programmed death 1 (PD-1) immune checkpoint inhibitor antibody, has demonstrated improved survival in previously treated advanced NSCLC.
Purpose This analysis aimed to evaluate the incremental cost effectiveness ratio (ICER) for NIV compared with pemetrexed (PMX) for previously treated advanced NSCLC in our hospital and appraise the findings of the manufacturer submitted indirect treatment comparison (ITC) of the relative efficacy of nivolumab versus pemetrexed in advanced non-squamous cell NSCLC patients receiving secondline or higher-line therapy.
Material and methods A retrospective observational study was carried out to estimate our population progression free survival (PFS), measured by the response evaluation criteria in solid tumours (RECIST). The study lasted 15 months (July 2015–September 2016) and included all 0–1 ECOG performance status and patients in the Expanded Access Programme for NIV. Total drug costs were calculated from the ex-

manufacturer; administration, indirect or social costs were not considered. The ICER was obtained.
Results Our sample comprised 23 patients, 12 treated with the NIV (group A) and 11 with the PMX (group B) for previously treated advanced NSCLC. Group A: median age was 74 years (range 55–80), median dose was 200 mg and median PFS was 7 months (range 1–13). Median number of cycles was 12 (2–29) with a median cost of €32.160 per patient. Group B: median age was 70 years (range 51–79), median dose was 700 mg and median PFS was 3 months (range 1–14). Median number of cycles was 3 (1–7) with a median cost of €5.762 per patient. NIV compared with PMX resulted in an ICER of €6.600/PFS month gained.
Conclusion Treatment with NIV represents an important advance in previously treated advanced NSCLC, is more effective than PMX but its ICER is high from the payer's perspective, with a significant impact on spending, according to the manufacturer submitted ITC. Evaluation of the economic impact of these agents on the health system is necessary to guarantee sustainable access to new medicines.

No conflict of interest

CP-124   **ANALYSIS AND REVIEW OF PATIENTS WITH A MAGISTRAL FORMULA OF SODIUM CROMOGLYCATE 200 MG WITHOUT EXCIPIENTS**

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Background Both indolent systemic mastocytosis and mast cell activation syndrome are considered rare diseases, and in Spain there are no commercial medicines available of sodium cromoglycate without excipients.
Purpose To describe all patients treated with a magistral formula of sodium cromoglycate 200 mg without excipients: indications, concomitant therapy and response to therapy are reported.
Material and methods We ran a descriptive study in which we included all patients treated with a magistral formula of sodium cromoglycate 200 mg without excipients. The data were obtained through the magistral formulas programme, outpatient dispensation programme and review of medical records. From each patient we extracted data on sex, age, diagnosis, duration of treatment with the formula, dose received, response to therapy, concomitant antihistamine treatment and adverse effects.
Results 8 patients were treated with a magistral formula of sodium cromoglycate 200 mg without excipients: 2 women and 6 men with a mean age of 45.3 years (range 38–59 years). Regarding the indication for the prescription, 3 patients were diagnosed with indolent systemic mastocytosis and the remaining 5 were diagnosed with mast cell activation syndrome. In all cases, the diagnosis was established by examination of the bone marrow in the Mastocytosis Studies Institute of Castilla La Mancha (Spain). On average, patients were treated for 12.75 months (range 3 months to 24 months). The dose received was 200 mg every 8 hours in 7 patients, and was increased to 400 mg three times daily in 1 patient due to a poor response to the therapy. In the remaining patients, the treatment response was optimal. In relation to concomitant antiallergic treatment, 6 patients were receiving

fexofenadine daily during the study. No adverse effects related to the therapy were reported.

Conclusion Treatment with this magistral formula of sodium cromoglycate 200 mg without excipients was effective and well tolerated in all patients, improving their symptoms as well as their quality of life, and could be a solution for the lack of marketing of the drug currently in Spain.

No conflict of interest

EVALUATION OF ANTICOAGULATION IN NON-ST SEGMENT ELEVATION ACUTE CORONARY SYNDROME PATIENTS

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Background Non-ST segment elevation acute coronary syndromes (NSTE-ACS) are a leading cause of morbidity and mortality from cardiovascular diseases. The need for anticoagulation during the acute phase is especially important, but balancing ischaemic and bleeding risk is challenging. The European Society of Cardiology provided periodic practices guidelines to guide clinicians in the management of NSTE-ACS: appropriate dosing of low molecular weight heparins (LMWH) or fondaparinux is provided.

Purpose We assessed the appropriateness of anticoagulation regimens in the acute phase of NSTE-ACS patients, to identify risks and implementation of our pharmaceutical care plan.

Material and methods We conducted a retrospective study on NSTE-ACS patients in three district general hospitals during a 3 month period (February–April 2014). Baseline characteristics, antiplatelets and anticoagulation regimens were recorded and analysed for trends in prescribing.

Results Medical charts for 179 patients were reviewed. 31 were excluded due to unclear or incomplete information about anticoagulation and hence148 patients were eligible for analysis. 19 patients did not receive any antithrombin agent. Fondaparinux was administrated to 84 patients and LMWH (ie, enoxaparin or dalteparin) to 45 patients. The baseline characteristics were well matched between the two groups. The antiplatelet regime did not differ significantly between the two groups. Among patients treated with LMWH, enoxaparin and dalteparin were administrated to 31 and 14 patients, respectively. Overall, 65% of patients received LMWH for more than 72 hours. For patients with normal renal function, 8 (20%) received 90–110% of the theoretical dose regimen (adequate dose), whereas 9 (22%) received a dose in excess (over 130% of the theoretical dose regimen) and 24 (58%) received a lower than recommended dose (less than 90%). For patients with severely reduced kidney function (4), 3 received non-adequate dosing of LMWH.

Conclusion LMWH prescribing was inappropriate in terms of dose and duration according to the European Society of Cardiology guidelines. Variations in dosing are associated with a higher risk of ischaemic or bleeding events. To minimise dose alterations, a fixed dose of fondapariux should be opted for where available. If centres are to use a LMWH, we would advocate a tool to ensure accurate weight and renal function is taken into consideration prior to dosing.

No conflict of interest

EFFECTIVENESS AND SAFETY ASSESSMENT OF DIRECT ACTING ANTIVIRAL IN THE TREATMENT OF CHRONIC HEPATITIS C VIRUS INFECTION

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Background Direct acting antivirals (DAA) have become the elective treatment for chronic hepatitis C virus (HCV) infection but definitive data regarding routine medical practice are still limited.

Purpose To assess the effectiveness and safety of DAA in the treatment of chronic HCV infection in a 300 bed general hospital.

Material and methods This was an observational, retrospective, descriptive study conducted from December 2014 to February 2016. Inclusion criteria: HCV patients who started treatment with dasabuvir+paritaprevir–ombitasvir–ritonavir (DAS+OMBI/PARI/r), simeprevir (SIM), sofosbuvir+daclatasvir (SOF+DACL) or sofosbuvir–ledipasvir (SOF/LD) during the study period. Exclusion criteria: patients not achieving 12 weeks of treatment during the study period. Effectiveness variables: gender and age, genotype, fibrosis degree (F1–F4), HIV coinfection, basal viral load (VL), fast virologic response (FVR, VL ≤15 IU/mL) at week 4, VL at the end of treatment and sustained virological response (SVR) at week 12 post-treatment. Safety variables: adverse drug reactions (ADRs) and detected drug–drug interactions (DIs). Data were collected from the pharmaceutical managing programme, Farmatools, and from clinical reports, and were analysed using the SPSS statistical package.

Results 40 patients were included (30 men). Mean age: 55 ±2.36 years. 15 naïve patients (37.5%), 14 (35%) were HIV coinfected. Fibrosis degree: 21 F4 (52.5%), 11 F3 (27.5%) and 8 F1–F2. HCV genotype: 29 genotype 1 (72.5%), 6 genotype 4 (15%) and 5 genotype 3 (12.5%). 23 patients were treated with SOF/LDV (57.5%), 6 with DAS+OMBI/PARI/r (15%), 8 with SOF+DACL (20%) and 3 with SIM (7.5%). Effectiveness: 28 patients (70%) had basal VL >800 000 IU/mL. 31 patients (77.8%) achieved FVR. 100% achieved undetectable VL at the end of treatment. 34 (85%) patients maintained undetectable VL at 12 week post-treatment, 5 patients did not have VL determined and 1 rebounded (VL >800 000 IU/mL, HIV coinfected). 34 patients (85%) had no ADRs, 4 had gastrointestinal ADRs, 3 had asthenia, 2 had a mild allergic reaction and 1 had dizziness. DIs were detected with home medication in 17 patients: 12 with proton pump inhibitors, 5 with statins and 2 with oral antidiabetics and digoxin.

Conclusion DAAs represent a great advance in HCV treatment. In our study, 100% of patients achieved undetectable VL at the end of the treatment and a high rate of SVR at week 12. DAAs are well tolerated but they require pharmacist intervention to avoid DIs.

No conflict of interest

CP-127 SWITCHING FROM INTRAVENOUS TO SUBCUTANEOUS FORMULATION OF TRASTUZUMAB: COSTS AND SAFETY

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Background Trastuzumab containing regimens are the standard of care for HER2+ breast cancer. While intravenous trastuzumab (Tiv) is administered as a weight based dose using an initial 90 min infusion followed by a subsequent 30 min infusion, subcutaneous trastuzumab (Tsc) is administered as a fixed 600 mg dose over 5 min without compromising its efficacy and safety. Potential savings associated with Tsc include loading dose avoidance and time reductions related to preparation and administration tasks.

Purpose To evaluate the impact on drug costs, patient chair time and safety profile of switching from the intravenous to the subcutaneous formulation of trastuzumab

Material and methods A retrospective study of all patients with HER2+ breast cancer who received trastuzumab from March 2015 to March 2016 in our hospital was conducted. Data collected were: age, body weight, route of administration, number of cycles and dose per cycle. Costs were calculated based on the use of vials and the trastuzumab posology (Tsc fixed dose 600 mg; Tiv 1 loading dose (8 mg/kg) plus maintenance cycles (6 mg/kg). Patient time in the infusion chair was considered 5 min for Tsc and 90 min for a loading dose of Tiv and 30 min for a maintenance dose of Tiv.

Results 74 patients were included: 44 were switched from Tiv to Tsc, and 30 started with Tsc. Median age was 60 years (35–87) and median body weight was 63 kg (42–103). Patients received a median of 10 cycles (1–18) and 378 mg (252–618) per cycle. Subcutaneous administration was cheaper above 63 kg in body weight. In spite of having patients with a median body weight of 63 kg, the savings generated by the change in administration to subcutaneous were €39 836. This was due to the difference in dosification between both treatment options. Tsc administration led to a six-fold reduction in patient chair time (447 hours). Tsc was well tolerated. Only in 1 patient was switching to the Tiv formulation necessary because of pain at the site of administration after two treatment cycles.

Conclusion Switching from Tiv to Tsc was associated with costs savings and reduced chair time, maintaining the safety of the treatment.

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No conflict of interest

CP-128 ANALYSIS AND EVOLUTION OF SPENDING ON ORPHAN DRUGS

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Background Orphan drugs mean a high economic impact and cost per patient, and in the past years there has been an increase in the number of patients.

Purpose To describe and analyse the evolution of spending on orphan drugs based on diagnosis.

Material and methods A retrospective study including all patients receiving treatment with orphan drugs from January 2013 to December 2015 was conducted. Collected parameters were: number of patients per drug, diagnosis, economic spending (€) and percentage of total and annual expenditure. Data were obtained through SAVAC, a prescription and validation programme; Discoverer, its complementary programme for exploitation of the data and a designed Excel base were used for data collection.

Results A total of 25 drugs were identified. Evolution from 2013 2015 is shown in the table.

	2013	2014	2015
Total expenditure (triennial)(€)	15 121 487		
% of expenditure	28%	31%	41%
No of patients	184	204	235
Expenditure per patient(€)	23 011	22 979	26 382
Evolution of annual expenditure			
Oncological disease	19%	27%	31%
Pompe disease	33%	30%	25%
Multiple myeloma	24%	21%	31%
Idiopathic thrombocytopenic purpura	5%	3%	3%
Gauche disease	4%	4%	6%
Other	15%	15%	4%

Triennial analysis the distribution of total spending over the 3 years for diagnosis (€15 121 487) was: Pompe disease 28%, oncological diseases 27% and multiple myeloma 22%. Other expenditures were allocated to various diagnoses. Regarding drugs, lenalidomide was 25% of the total expenditure, followed by alglucosidase alpha (24%), and azacitidine, bretuximab and nilotinib (<10% for each). Regarding average cost per patient/year, Pompe disease involved a cost per patient of €357 419, followed by Gauche disease with €172 808, and myelodysplastic syndrome and multiple myeloma with €34 835 and €32 781, respectively.

Conclusion In the past 3 years there has been an increase in the number of patients prescribed orphan drugs. This has led to an increase of about €2 million with regard to cost per patient. Pompe disease, oncological diseases and multiple myeloma represented approximately 80% of the total expenditure of orphan drugs. Only 2 drugs (lenalidomida and alglucosidase alpha) represented about 50% of the total expenditure. Pompe disease represents one of the largest expenses every year, a limited number of patients and a high cost per patient/year.

No conflict of interest

| CP-129 | USE OF MACITENTAN ON PULMONARY ARTERIAL HYPERTENSION AS AN ALTERNATIVE TO OTHER ENDOTELIN RECEPTOR ANTAGONISTS |

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Background Macitentan is a new endothelin receptor antagonist (ERA) which was compared with placebo in the SERAPHIN trial. The results showed no superior efficacy or safety compared (indirectly) with other ERAs but better hepatic tolerance.

Purpose To assess adaptation of pulmonary arterial hypertension (PAH) treatment prescriptions under our hospital protocol and its economic impact, and to describe the clinical results of using a new ERA, macitentan.

Material and methods A use protocol for ERAs was established in September 2016 in our hospital, evaluating cost effectiveness as the main criterion for prescription. Thus bosentan was chosen as the first option for treatment as macitentan had not shown superiority with regard to either efficacy or safety. According to the use protocol, macitentan should be used in naïve patients with liver dysfunction or in those patients treated with bosentan who have developed treatment related hepatic toxicity. Several clinical parameters assessed PAH disease before and after treatment: functional class, baseline oxygen saturation ($\%SpO_2$) and NT-proBNP levels.

Results After designing the use protocol for ERAs, 9 prescriptions for macitentan from the respiratory department were registered. 44% of patients (4/9) met the requirements of use of macitentan (increased transaminases before using bosentan). The treatment cost per month with a standard maintenance dose of bosentan 125 mg/12 hours was € 414, while the treatment cost per month with a standard dose of macitentan 10 mg/24 hours was € 2063. After 4 months of treatment with macitentan, patients with elevated transaminases had returned to normal levels but all patients maintained the same functional class and there were no clinically significant differences in$\%SpO_2$ or NT-proBNP ($p > 0.05$).

Conclusion If compliance with the use protocol for ERAs had been 100%, 5 of the patients would have been treated with bosentan, leading to a cost saving of about € 1649 for patient per month, a total amount of € 74205 so far this year. Implementation of a consensual use protocol for ERAs could enhance the rational use of this drug, but further collaboration with physicians is needed to achieve better optimisation of available resources.

No conflict of interest

| CP-130 | WITHDRAWN |

CP-131 | A COMPARISON OF THE COMBINATION OF APREPITANT AND DEXAMETHASONE VERSUS THE COMBINATION OF DROPERIDOL AND DEXAMETHASONE FOR THE PREVENTION OF POSTOPERATIVE NAUSEA AND VOMITING

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Background Postoperative nausea and vomiting (PONV) that occurs after general anaesthesia is frequent and can lead to fatal complications during surgery. The incidence of PONV is approximately 30% and may reach 80% in high risk patients.
Purpose Comparison of the efficacy and tolerability of the combination of aprepitant and dexamethasone versus the combination of droperidol and dexamethasone in reducing the incidence of PONV in patients with a high risk of developing PONV according to the Apfel score.
Material and methods This was a comparative, prospective, randomised, double blind study. After written informed consent, patients scheduled for otorhinolaryngology or visceral surgery under standardised general anaesthesia were randomly assigned to receive a capsule of oral aprepitant 40 mg or a capsule of placebo 1 hour before induction of anaesthesia, and an injection of saline solution as placebo or an injection of 1.25 mg droperidol (IV) at the end of the surgery, respectively. All patients received 4 mg of dexamethasone (IV) after induction of anaesthesia. At multiple time points after surgery (2, 6, 24 and 48 hours), episodes of nausea and vomiting, nausea severity, based on a 0 to 10 point numeric rating score, and the need for rescue medication were recorded.
Results 72 patients completed the study. The cumulative incidence of nausea at 48 hours was 41.9% in the aprepitant group and 43.9% in the droperidol group (p=0.02). The cumulative incidence of vomiting at 48 hours was 16.1% in the aprepitant group and 14.6% in the droperidol group (p=0.03). From 0 to 48 hours, there was no difference between the aprepitant and droperidol groups in the need for rescue antiemetic (metoclopramide; 12.9% vs 12.1%).
Conclusion The combination of droperidol and dexamethasone was more effective than the combination of aprepitant and dexamethasone for prophylaxis against postoperative vomiting in adult patients under general anaesthesia. However, it was less effective for prophylaxis of postoperative nausea. There was no difference between the groups in the need for rescue antiemetic.

No conflict of interest

CP-132 | MEDICATION ERRORS AND THEIR SEVERITY DETECTED IN THE OBSERVATION AREA OF AN EMERGENCY DEPARTMENT OF A TERTIARY HOSPITAL

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Background Medication errors and their severity represent a failure in the medication use process and can increase morbidity and mortality in the emergency department.
Purpose To describe the types of medication errors (ME) and severity in the observation area of an emergency department (ED) in a tertiary hospital.
Material and methods This was a 1 month descriptive and prospective study. Variables included in the analysis were: age, gender, medical comorbidities, patient pharmacotherapeutic history, reason for admission, and emergency and home medication administration. The type of ME was classified according to the 'Guidelines on preventing medication errors in hospitals' issued by the American Society of Hospital Pharmacists (AASHP), and severity was addressed according to the 'Taxonomy of medication errors (1998)' from the Coordinating Council for Medication Error Reporting and Prevention (NCCMERP).
Results 157 pharmaceutical interventions (PI) were performed in 113 patients, an average of 1.38±1.66 per patient. Mean age was 71±16.4 years. 72% were men. The mean value for administration medication in the observation area was 5.4 ±4.25. Drug groups for which interventions were made were: 30% cardiovascular, 18% respiratory, 8% antibiotics, 7% antiepileptics, 7% immunosuppressive, 7% antidiabetic and 4% anticoagulants. The most common types of ME were: prescribing errors (omission of dose, route or frequency) (48%), medication not prescribed (37%), wrong dose (5%), wrong transcription (4%), improper monitoring (3%), omission of treatment (2%) and preparation error(1%). Regarding severity, 44% of errors impacted on the patient but did not produce any damage, 38% of errors occurred but did not impact on the patient, 6% affected the patient and required monitoring, 4% caused temporary damage to the patient and required intervention, 4% caused temporary harm to the patient and prolonged hospital stay, 2% caused a life threatening condition to the patient and required intervention to keep the patient alive and another 2% caused temporary harm to the patient.
Conclusion This study, in common with others in the same area, demonstrates that the presence of a pharmacist in the ED positively contributes to detecting and classifying medication errors and making recommendations to increase patient safety. A pharmaceutical programme for detection of medication errors is necessary in the ED.

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No conflict of interest

CP-133 | **DRUG RELATED PROBLEMS IN EMERGENCY DEPARTMENT PATIENTS: ROLE OF CLINICAL PHARMACIST**

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Background Drug related problems (DRP) are relatively common in hospitalised patients and can result in patient morbidity and mortality. It has been shown that pharmacists, as members of an inpatient care team, can reduce the number of these problems.

Purpose To analyse DRP detected by the clinical pharmacist in the emergency department observation unit (EDOU).

Material and methods The study was conducted in September 2016. The activity of a clinical pharmacist in the EDOU was assessed. The pharmacist undertook clinical activity from Monday to Friday in the morning, selecting patients at increased risk of having a DRP: those patients >65 years of age, polypharmacy, pluripathological and home treatment with high risk medications. The pharmacist interviewed the patient/caregiver and reviewed the electronic medical records to develop the home medication list, and checked the prescribed treatment. With that information, the pharmacist revised: medication reconciliation, dose regimens, adaptation to the guidelines, adjustment of the drug dose in the setting of renal failure, allergies, interactions and other DRP, and provided information to the responsible physician to optimise the treatment prescribed in the EDOU. Our own classification was used for interventions.

Results Of the 140 patients in the EDOU, 42 inpatients were included (30%). 54.8% were men and mean age was 75.4 ±11.6 years. The average home medication per patient was 7.6±5. The main diagnoses in the EDOU were: 14.3% urinary infection, 11.9% congestive heart failure, 9.5% chest pain, 7.1% atrial fibrillation and 7.1% angina. 88.1% of patients were admitted later.

74 DRP were found (1.8±1.5 per patient): 40.5% treatment omission, 24.3% adaptation to medication available in the hospital, 9.5% different dose or regimen prescribed, 6.8% chronic treatment optimisation, 5.4% acute pathology treatment optimisation, 4.1% adjustment for renal failure, 2.7% prescribed drug that the patient no longer takes, 2.7% drugs of low therapeutic utility, 1.4% therapeutic duplication, 1.4% incomplete prescription and 1.4% allergies or intolerances. 90.5% of the interventions made by the pharmacist were accepted.

Conclusion We found that physically locating the pharmacist in the EDOU improve the quality of care, obtaining a high percentage of acceptance by physicians.

No conflict of interest

CP-134 | **NEW DOSAGE PROTOCOL OF VANCOMYCIN IN NEONATES**

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Background In our hospital, most neonatal inpatients had subtherapeutic serum concentrations of vancomycin in the first therapeutic drug monitoring assessment.

Purpose To evaluate NEOFAX recommendations and to establish a new dosage protocol for vancomycin in neonates to obtain vancomycin serum concentrations of 10–15 µg/mL at the first therapeutic drug monitoring session.

Material and methods A retrospective analysis over a 25 month period from January 2014 to February 2016 was conducted. Hospitalised neonates treated with vancomycin of gestational ages 23–41 weeks were included in the study. The dosage regimen established was based in the manual drug neonatology NEOFAX, which has established the vancomycin dosage as 10 mg/kg, and varying the therapeutic range in relation to gestational age and postnatal age, every 18 hours, 12 hours, 8 hours or 6 hours. To develop a new dosage protocol, we estimated the appropriate dosage for obtaining serum vancomycin trough concentrations between 7.5 and 15 µg/mL using the pharmacokinetics programme PKS.

Results We reviewed the first determination of vancomycin in 43 patients; 60.5% (n=26) were preterm gestational age ≤29 weeks. Of these, 84.6% (n=22) had a postnatal age ≤14 days. 67.4% of all patients had a vancomycin trough concentration before the third dose <7.5 µg/mL, 79% <10 µg/mL, 14% between 10 µg/mL and 15 µg/Ml, and 7% >15 µg/mL.

After the pharmacokinetic study, the pharmacy service and the paediatric department decided to change the dosage protocol and keep track of new patients to evaluate the protocol. For the new protocol we modify the dosing interval established every 18 or 12 hours to every 12 or 8 hours, respectively, and increased the dosage by kg body weight to 12 mg/kg in regimens where the interval was set every 8 or 6 hours. We estimated that 74.4% of serum concentrations of the study patients would have a value between 7.5 and 15 µg/mL.

Conclusion Most of our patients had not attained a correct vancomycin serum concentration at the first determination using the NEOFAX dosage recommendations. Therefore, we have estimated and designed a new dosage protocol to achieve correct vancomycin serum concentrations from the beginning of treatment.

No conflict of interest

CP-135 | **A CLINICAL PHARMACIST'S INTERVENTIONS IN SURGICAL PATIENTS IN A LARGE URBAN TEACHING HOSPITAL: A CLINICAL AND COST ANALYSIS**

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Background The role of the clinical pharmacist in the care of surgical patients has been largely under studied, both nationally and internationally. Surgical patients experience 2.0–27.7 adverse drug events per 100 admissions, of which 15.4–53.6% are preventable. No cost impact analysis conducted in the Irish setting has been done previously.

Purpose The aim was to ascertain the frequency and type of interventions made by a surgical pharmacist in a large teaching hospital in order to provide a quantitative value to this role.

Material and methods

Design observational study of a single clinical pharmacist's interventions. All interventions made over a time period were

recorded. **Identify and classify interventions:** medicines involved were categorised by Anatomical Chemical Therapeutic (ATC) classification and medication error type. **Peer review:** interventions were reviewed by a panel of five independent experienced healthcare professionals with assignment of risk ratings using the Dean and Barber visual analogue scale (VAS). **Assignment of monetary values:** costs potentially avoided were calculated by linking peer review results to values from a previously designed economic model by Campbell (eg, a mean VAS score of 7 was linked to a cost of € 183.57).

Results 163 interventions were analysed for 87 patients with an acceptance rate of 97.6%. 1.23% of interventions were classified as minor (<3) with no patient harm anticipated. The majority, 97.54%, were classified as moderate to serious (3–7) with the potential to cause patient harm and cause increased length of hospital stay. 1.23% of interventions were classified as having the potential to cause severe harm (8–10). A cost benefit ratio of 10.6:1 was calculated, meaning € 10.6 avoided for every € 1 invested. The most common medication classes were analgesics, antithrombotics and drugs for acid disorders.

Conclusion This study details the frequency and types of interventions made by surgical pharmacists in terms of ATC classifications and medication error types. With peer review of all interventions along with assignment of monetary values to the costs avoided, the study provides a robust evidence base for the value of the surgical pharmacist. Further study of greater numbers and types of surgical patients would enhance findings.

No conflict of interest

CP-136 | **MANNITOL 10% FOR THE PREVENTION OF CISPLATIN INDUCED NEPHROTOXICITY: A COMPARISON OF CONCOMITANT MANNITOL 10% ADMINISTRATION WITH CISPLATIN VERSUS HYDRATION ALONE**

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Background Cisplatin induced nephrotoxicity is a dose limiting adverse effect that occurs in nearly one-third of patients. Mannitol administration has been used as a means to negate this toxicity.

Purpose The aim of this study was to evaluate the incidence of cisplatin induced nephrotoxicity in patients treated with and without mannitol. Specfically, the study tested if the addition of mannitol to cisplatin reduced signficantly the increase in serum creatinine from baseline and the incidence of acute nephrotoxicity.

Material and methods This was a comparative prospective study. All eligible patients treated with cisplatin during the study period were enrolled in the study. All patients received 500 mL of normal saline (0.9%) infused over 1 hour prior to cisplatin therapy, and 1000 mL infused over 2 hours after cisplatin therapy. The mannitol group received 250 mL of mannitol 10% concomitant with the cisplatin dose, infused over 1 hour if the dose of cisplatin was <70 mg/m^2 or over 3 hours if the dose of cisplatin was >70 mg/m^2. The primary outcome was mean change in serum creatinine from baseline. Secondary outcomes included incidence of acute nephrotoxicity. Difference in the incidence of nephrotoxicity was compared using the Fischer exact test. The average change in serum creatinine was compared using the Student's t-test. Statistical signficance was defined as $p < 0.05$. All statistical analyses were done using SPSS (V.21).

Results 35 patients (17 treated with mannitol and 18 without) were evaluated. The average increase in serum creatinine (mg/dL) was 4.37 in patients who received mannitol and 5.41 in those who received hydration alone (p=0.39). In the group that received mannitol, 15.3% experienced nephrotoxicity while 33.2% of the patients in the hydration alone group experienced nephrotoxicity (p=0.44). Patients who received doses ≥ 80 mg/m^2 of cisplatin had non-significantly lower rates of nephrotoxicity with mannitol (8% vs 13%; p=0.34).

Conclusion There was no significant difference observed with regard to increase in serum creatinine from baseline and the incidence of acute nephrotoxicity between the two groups treated with and without mannitol.

No conflict of interest

CP-137 | **ECONOMIC ANALYSIS OF AZACITIDINE VERSUS DECITABINE FOR THE TREATMENT OF ACUTE MYELOID LEUKAEMIA**

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Background Acute myeloid leukaemia (AML) is the most frequent adult leukaemia. Hypomethylating agents such as azacitidine or decitabine are indicated for patients not eligible to receive intensive treatment (patients >65 years of age, which represents about 70% of the total AML cases).

Purpose To compare treatment costs for azacitidine and decitabine in adult AML patients, taking into consideration the stability of reconstituted vials as well as the use of vial sharing strategies.

Material and methods Analysis of published stability studies and clinical trials assessing azacitidine in older patients with newly diagnosed AML with >30% blasts (AZA-AML-001 study) and decitabine (DACO-16 and 17 studies—phase III and II, respectively) in the management of AML was undertaken.

Results Mean number of received cycles: 4 for decitabine, 20 mg/m^2 for 5 days, and 6 cycles for azacitidine, 75 mg/m^2 for 7 days (28 day cycles in both cases). Reconstituted and diluted in a compatible fluid (NaCl 0.9% or dextrose 5%) decitabine bags can be kept in cold storage (2–8 °C) for 3 hours, plus 1 hour at room temperature (20–25°C) prior to administration, making vial sharing not feasible. Polypropylene azacitidine 25 mg/mL solutions were stable for 8 days at −20°C, allowing vial sharing.

The costs per vial were decitabine 50 mg vial, € 1109; azacitidine 100 mg vial, € 299. Assuming a standard body surface of 1.75m^2, each decitabine cycle (5 days) costs € 5545 (€ 22 180 for a mean of 4 cycles), while the cost of each azacitbine cycle (7 days) was € 2747 (€ 16 482 for a mean of 6 cycles).

Conclusion Whereas published studies report similar efficacy between both drugs, treatment with azacitidine resulted in savings of € 5698 per treated patient.

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No conflict of interest

CP-138   SPIRONOLACTONE IN PAEDIATRICS. TOXICITY UPDATE

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Background Spironolactone is widely used in paediatrics for cardiovascular disease despite being an off-label treatment. After detecting a case of severe gynaecomastia in a 4-month-old child with spironolactone and no other likely causes, it was decided to make a more thorough review of the cases globally reported.

Purpose To describe worldwide reported cases in which the paediatric population developed breast disorders (BD) associated with spironolactone treatment. We focused on the time it took to develop the disorder since the treatment started. We also focused on whether there was another reason which could have induced the condition.

Material and methods A search was conducted on Vigibase and FEDRA (Global and Spanish Pharmacovigilance Database, respectively), including all spontaneous reports performed in patients >18 years of age with BD treated with spironolactone. We calculated how long the BD appeared after treatment had started. We also checked the product information to determine if concomitant medication could produce this adverse drug reaction (ADR). We included as BD: gynaecomastia, breast enlargement, galactorrhoea and nipple pain. Age, gender, reporting country, spironolactone treatment starting date, date of diagnosis of BD and list of concomitant medications were recorded.

Results 14 cases of BD were reported globally: 7 in Asia, 5 in Europe, 1 in Australia and 1 in the USA. They were 11 boys and 3 girls. Median age was 2 years (21 days–17 years). 7 cases developed BD early (in the first month of treatment), 2 cases developed it late (more than 4 years after treatment) and in the other cases (5) the time it took for BD to appear could not be correctly identified. Regarding possible causes of BD, 10 cases could be attributed to spironolactone and 4 cases to concomitant medication. The drugs involved were digoxin, ramipril and domperidone.

Conclusion Reported cases occurred after a few days of treatment with spironolactone, especially in infants. Despite the off-label use, this draws attention to the low incidence of notifications in a drug widely used in paediatrics. This may be because this ADR is well known, and ADR notifications in paediatrics is generally low.

No conflict of interest

CP-139   EVALUATION OF ACTIVITY OF TOTAL PARENTERAL NUTRITION IN A HOSPITAL PHARMACY

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Background The preparation of total parenteral nutrition (TPN) is subject to a great deal of variability in clinical practice due to the complexity of TPN and the variety of professionals involved. Nutritional support is an important care activity in a pharmacy service.

Purpose To evaluate the activity of a parenteral nutrition unit in a hospital pharmacy.

Material and methods This was a retrospective study analysing TPN during 2015 in a pharmacy service of a tertiary hospital. Data were obtained from the pharmacy service's nutritional database and the pharmacy service's dashboard of activity and quality. Pharmaceutical care in adults patients is based on validating the indication to assess the patient's nutritional status, calculating the nutritional requirements, developing a nutritional plan and deciding on the composition of the TNP. In paediatric patients, the clinical pharmacist´s functions with regard to TPN are to ensure the quality (stability and osmolarity) and safety of the solutions prepared. The formulations were prepared by the hospital pharmacy, in totally or from three compartment bags (commercial preparations), or prepared by an external service.

Results During the study period, 1510 patients (698 adults, 812 children) were treated with TPN. 21 008 TPN were dispensed from the hospital pharmacy. In institutionalised patients, 16 576 TPN were dispensed (42% adults, 58% children); 4432 TPN were delivered to home patients (9% adults, 91% children). A total of 11 146 formulations were prepared in whole by the hospital pharmacy (37% adults, 63% children); 1197 TPN were commercial preparations (all in adults) and 8665 TPN were prepared by an external service (24% adults, 76% children). The prescribing units in adult TPN were: anaesthesia–intensive care medicine (40%); oncologic-haematologic patients (26%); surgery patients (26%); haemodialysis patients (2%); and other units (6%). In paediatric patients, the prescribing units were: neonatal–intensive care

unit (71%); oncologic and haematologic patients (11%); surgery patients (11%); and other units (7%).

Conclusion Most TPN (60%) were prepared by the hospital pharmacy and 40% of TPN were acquired through an external service. Most TPN were dispensed to paediatric patients (65%). They were mainly prepared for critically ill patients (46%). The department of pharmacy was involved in the management of TPN to support the clinical and therapeutic needs of the patient.

No conflict of interest

CP-140 | **ANALYSIS OF DISTRIBUTION AND ACCEPTABILITY OF PHARMACEUTICAL INTERVENTIONS AFTER IMPLANTATION OF THE ELECTRONIC ASSISTED PRESCRIPTION**

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Background Pharmacist interventions are important to improve patient safety, avoid physicians prescriptions errors and reduce unnecessary expenses. Electronic assisted prescription is a differential factor to document pharmaceutical interventions, and to analyse their distribution and acceptability quickly and easily.

Purpose To assess clinical pharmacist interventions made using a computerised physician order entry system (CPOE) for hospital patients and physicians' acceptance after electronic assisted prescription implementation.

Material and methods A retrospective study of pharmaceutical interventions was conducted over 9 months (January 2016 to September 2016) after implementation of electronic assisted prescriptions. Differences between original prescriptions and pharmaceutical recommendations were reported to the physicians using the Farmatools application from CPOE. Types of recommendations, medical departments, pharmacotherapeutic group of drug involved, degree of acceptance and type of accepted pharmaceutical interventions were recorded.

Results There were 863 pharmaceutical interventions. Withdrawal treatments proposals were 430 (49.8%): 378 (43.8%) for excessive treatment duration, 23 (2.7%) for therapeutic duplications, 22 (2.5%) according to an antibiogram, 5 (0.6%) for allergies and 2 (0.2%) for other reasons. There were 152 (17.6%) suggestions for therapy change: 83 (9.6%) according to an antibiogram, 41 (4.8%) for interactions, 21 (2.4%) according to therapeutic protocol change and 7 (0.8%) for others causes. Dose adjustment interventions were 133 (15.4%), due to 82 (9.5%) overdosing, 29 (3.4%) renal insufficiency and 22 (2.5%) under dosing. Proposals for modifying administration frequency were 117 (13.5%). Pharmaceutical interventions were detected in internal medicine (37.4%), surgery (10.3%) and pneumology (9.7%) departments, among others. Antimicrobials were the most frequent therapeutic group involved in recommendations (52.3%), followed by haematopoietic drugs (12%) and cardiovascular drugs (11.8%). There were 401 (46.5%) interventions accepted by physicians, 449 (52%) not accepted proposals and the rest were not evaluable. The most accepted suggestions were 158 (41.7%) treatment withdrawals for excessive duration, followed by 47

(57.3%) overdosage adjustment and 33 (39.7%) therapy change according to an antibiogram.

Conclusion Almost half of the pharmaceutical interventions were withdrawal treatment proposals. Excessive duration was the main reason for suggesting withdrawal of treatment. The most frequent recommendations were recorded for the internal medicine and surgery departments. More than half of the interventions involved antimicrobials drugs. About half of the proposals were accepted. The most frequently accepted interventions were withdrawal of treatments due to excessive duration.

No conflict of interest

CP-141 | **VENOUS THROMBOEMBOLISM PROPHYLAXIS ADEQUACY OF MEDICAL PATIENTS: CROSS SECTIONAL STUDY**

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Background Venous thromboembolism (VTE) in adults is associated with high morbidity and mortality. However, adherence to standards of prophylaxis care is not always optimal in medical units.

Purpose To analyse the adequacy of VTE prophylaxis in clinical practice in a cross sectional study.

Material and methods A review of thromboprophylaxis standards and assessment of the adequacy of these guidelines in medical units was conducted. The analysis was carried out in all patients admitted to medical units. The risk of VT in hospitalised nonsurgical patients was estimated using the scale of Padua. According to the scale, the adequacy of prophylaxis at the care units was established.

Results 87 of the total patients admitted to the medical services (excluding paediatric, intensive care and intermediate care services) were analysed. 26.4% (23) of patients were receiving anticoagulant therapy for different reasons. 65% of the remainder (73.6%) were men and the average age was 69.6 ±13.4 years. The patients analysed belonged to the following services: internal medicine 30%, neurology 19%, digestive 15.6%, nephrology 14.1%, cardiology 11%, rehabilitation 6.3% and pneumology 4.7%. 37.5% (24) of patients had no prophylaxis, 11% (17.2) had low dose prophylaxis and 45% (29) had high dose prophylaxis. Drugs used for prophylaxis were: enoxaparin 80.4% and bemiparin 19.6%. 28% of patients achieved ≤3 points and 72% 4–10 points on the scale of Padua. In addition, 32.8% (21) wandered and 67.2% (43) did not. Regarding the adequacy of prophylaxis, 72% of treatments were correct. In 17 cases (35% of nephrology and 35% of internal medicine) the prophylactic treatment was incorrect. The reasons were: lack of prophylaxis in patients in whom it was necessary (6), sub-therapeutic doses (6) and patients who had prophylaxis but did not need it (5).

Conclusion This transversal analysis allowed us to detect areas where an improvement in some aspects of thromboprophylaxis is necessary. To ensure proper prophylaxis of medical patients, it is necessary to establish recommendations and to disseminate these recommendations. A programme of pharmaceutical care of thromboembolic prophylaxis has been agreed in internal medicine and nephrology, areas in which a greater lack of

adherence to guidelines and recommendations for prophylaxis has been detected.

No conflict of interest

CP-142 **ANTIRETROVIRAL THERAPY OPTIMISATION IN MULTITREATED HIV PATIENTS: CLINICAL AND PHARMACOECONOMIC APPROACH IN THE ECOVIR STUDY**

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Background Some patients infected with multiresistant HIV receive lifelong antiretroviral (ARV) treatments. Long term drug effects on the patient and economic burden for society have to be weighed. These patients have a long virological history and a treatment optimisation strategy requires a multi-parametric and individualised evaluation.

Purpose Evaluating the clinical and economic impact of a therapeutic optimisation strategy for patients receiving multitherapy.

Material and methods Eligible patients were receiving 4 ARV and had a viral load(VL) of <50 copies/mL for >12 months. A multidisciplinary expert team suggested a new optimised treatment with <3 ARV, based on analysis of drug resistance mutations, history of ARV treatments and drug–drug interactions. The first endpoint was the proportion of patients with VL <50copies/mL after 6 months. Economic impact was evaluated according to drug and laboratory costs (VL, CD4, drug level testing). Quality of life data were also collected for a cost–utility analysis.

Results Of the 4277 patients receiving HIV treatment, 146 were on >4 ARV drugs. 89 patient files were discussed with HIV experts, 82% treated with 4 ARV, 17% with 5 ARV and 1% with 6 ARV. Median age (min–max) was 58 years (33–85), HIV diagnostic period was 27 years (2–33), ARV treatment period was 22 (2–30) and number of treatment lines was 14 (2–32). To date, 71 (79.8%) patients have switched to tri- or bi-therapy (77.5% and 22.5%) and 56 (78.9%) have reached the first endpoint. Therapeutic optimisation leads to significant diminution of prescriptions for (non-)nucleoside reverse transcriptase inhibitors (−74%), protease inhibitors (−37%) and maraviroc (−48%). Only integrase inhibitors were prescribed more often after therapeutic optimisation (+6%, 77.5% of bi-therapies). The median monthly drug cost significantly decreased from € 1746 to € 1112 (−36%, Wilcoxon test) with annual savings of about € 0.5M for this cohort. Cost savings remained significant even with the integration of laboratory costs (−26%). To date, virological

suppression has been maintained in 93.0% of patients. Quality of life criteria will be analysed at the end of this ongoing study.

Conclusion Multi-therapies represent a minor part of the current strategies. Therapeutic individualised optimisation reduces the daily number of ARV and has a significant economic impact, despite additional costs due to the resulting follow-up of a treatment switch, to ensure virological success and tolerance of the new treatment.

No conflict of interest

CP-143 **EVALUTION OF THE IMPLEMENTATION OF ANTIBIOTIC STEWARDSHIP PROGRAMME IN AN INTEGRATED MODEL OF CARE**

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Background Antibiotic Stewardship Programmes (ASP) help clinicians improve the quality of patients care by optimising the treatment of infections and reducing adverse events related to the use of antibiotics.

Purpose To evaluate the activity of the ASP since its implementation.

Material and methods This was a retrospective description of the activity of ASP in an acute care hospital and in an intermediate care unit, from June 2015 to September 2016. The multidisciplinary team was formed of a clinical pharmacist, microbiologist and two infectious diseases experts. The team met once a week and reviewed selected antibiotic treatments: restricted use according to the antibiotic policy guideline of the hospital, unusual doses or associations and antibiotic candidates for therapeutic drug monitoring. All interventions were agreed with the responsible clinician before modifying the treatment, and then registered in the electronic prescription programme (EPP).

Results 227 patients were evaluated; 121 (53%) women, mean age 77 years. Compliance of the team to weekly meeting was 78%; in each session an average of 4 patients were reviewed. 543 interventions were done, a mean of 2.4 interventions per patient, 348 in the acute care hospital (220 in medical departments, 115 in surgical departments and 13 in the emergency department) and 195 in Intermediate care unit.

Interventions were classified as follows: renal impairment dose adjustment 26% (142); change in antibiotic 15% (79); change in dose, frequency and/or duration of antibiotic 17% (95); antibiotic removal 13% (70); switch from intravenous to oral therapy 6% (32); therapeutic drug monitoring 3% (17); and antibiotic treatment that needs to be monitored 20% (108). 26 drugs were involved in the interventions. Five groups of antibiotics were involved in 55% of the

interventions: quinolone 29%, cephalosporin 23%, aminoglycoside 18%, carbapenem 16% and vancomycin 13%.

Conclusion The multidisciplinary team allowed global control of treatments and more effective communication with prescribers. More than one-third of the interventions were due to dose adjustment in renal impairment or protocol non-compliance. The fact that a small group of drugs were related to more than half of the interventions allows us to focus on future interventions. It might be useful to relate these results to health related results.

No conflict of interest

CP-144 | **FIRSTLINE TRIPLET OR DOUBLET CHEMOTHERAPY FOR HER2 NEGATIVE ADVANCED OESOPHAGOGASTRIC CANCER: AN ANALYSIS FROM A COMMUNITY PRACTICE REGISTRY**

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Background There is currently no consensus for firstline chemotherapy in patients with advanced gastric cancer (AGC), not eligible to receive trastuzumab.

Purpose To evaluate the efficacy and tolerance of triplets versus doublets by analysing a national gastric cancer registry.

Material and methods Patients with AGC treated with polychemotherapy, excluding trastuzumab, were included from 2008 to 2016. The effect of triplets versus doublets was compared using three methods: Cox proportional hazards regression, propensity score matching (PSM) and coarsened exact matching (CEM).

Results 970 patients were recruited (doublets n=569, triplets n=401). In the Cox model, the use of triplets was associated with better overall survival (OS), hazard ratio (HR) 0.84 (95% CI 0.72–0.98), p=0.035, after adjusting for confounding factors. After PSM, the sample contained 340 pairs. A significant increase in OS(11.14 months (95% CI 9.60–12.68) versus 9.60 months (95% CI 8.44–10.75)) was seen in favour of triplets; HR 0.77 (95% CI 0.65–0.92), stratified log rank test, adjusted for percentile groups of the PSM, p=0.004. The effect appeared to be comparable for anthracycline based triplets (HR 0.78 (95% CI 0.64–0.94)) or docetaxel based triplets (HR 0.78 (95% CI 0.60–1.009)). The trend was similar after applying the CEM algorithm, with a HR of 0.78 (95% CI 0.63–0.97), p=0.03.

Triplet therapy was viable and relative dose intensities exceeded 85%, except for cisplatin in DCX. Triplets had more severe toxicity overall, especially haematological, hepatic and mucosal adverse events.

Conclusion Triplet therapies are feasible in daily practice and are associated with a discreet benefit in efficacy at the expense of a moderate increase in toxicity.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

CP-145 | **QUALITY OF LIFE IN MULTIPLE SCLEROSIS PATIENTS: EXPERIENCE IN A UNIVERSITY HOSPITAL OUTPATIENT PHARMACY**

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Background Multiple Sclerosis (MS) is a chronic demyelinating CNS disease that negatively affects patient quality of life (QoL). The hospital pharmacist dispenses MS disease modifying therapies (DMT) at the outpatient pharmacy.

Purpose To analyse QoL in MS patients who collect firstline DMT at the outpatient pharmacy.

Material and methods A prospective study was performed from March to September 2016. QoL was assessed according to an internal questionnaire. It was designed by a pharmacist and included: demographic characteristics, employment status, home adaptations, mobility, need for support with everyday activities, vacation and leisure habits, and MS medical history during the last year. An Excel database was designed to analyse the results. All MS patients were asked to complete a questionnaire at the outpatient pharmacy when collecting DMT. Firstline DMT included: parenteral drugs (interferon beta-1A and 1B, glatiramer acetate) and oral drugs (dimethyl fumarate, teryflunomide).

Results 100 of 107 MS patients with the following characteristics completed the questionnaire: mean age 44.83 years (±11.08), 73% women and 91% lived with relatives. 16% were treated with firstline oral DMT. Nearly half of MS patients (45%) were occupationally active. Home adaptations were reported by 13% of patients. 55% did not require support for everyday activities and 79% could move normally. 36% of patients had changed their holiday habits and 58% their leisure activities because of MS. During the last year, 7% of MS patients had suffered a relapse and were admitted to hospital, and 51% reported daily activity disturbances because of MS (mean lost days per year 57). The average number of visits per patient to the neurologist during the last year was 2.

Conclusion Most patients included in this study were young active women living with relatives. A high percentage of patients reported an acceptable QoL related to mobility, home adaptations and independence with routine activities, which could be explained by early DMT treatment according to clinical guidelines. Assessing QoL in MS patients is not common in everyday clinical practice. As part of clinical practice, it has the potential to improve communication between the patient and pharmacist, identify frequently overlooked problems and detect those patients most in need of pharmaceutical care.

No conflict of interest

CP-146 | EVALUATION OF AN EDUCATIONAL PROGRAMME ON ORAL ANTICOAGULANTS 3 YEARS AFTER ITS IMPLEMENTATION IN A CARDIOLOGY DEPARTMENT

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Background In January 2013, a multidisciplinary educational programme, 'ETAP', for patients treated with oral anticoagulants was implemented in our cardiology department.
Purpose To evaluate skills and adherence regarding anticoagulant therapy of patients included in an educational programme. To examine factors associated with poor skills scores.
Material and methods Patients were enrolled in the ETAP programme and received individual education from a multidisciplinary team (dietician, nurse and pharmacist) from January 2013 to February 2016, and those who gave their oral consent were included in this assessment. During hospitalisation, an initial evaluation skill score (E1 score: 0 to 1) was assessed with a specific questionnaire designed by our team. At least 1 month after the educational intervention and discharge from the hospital, patients were called by a trained pharmacy student. Patients were submitted to the same skill questionnaire (E2 score: 0 to 1) and an 8 item Morisky medication adherence scale (MMAS-8). Furthermore, patients were interrogated on the occurrence of haemorrhagic or thrombotic events and INR value at the time of the call.
Results 412 patients were enrolled in ETAP. 27% (365/1336) of patients receiving VKA and 16% (47/286) of patients receiving DOA were educated. Mean skill scores were 0.82 (±0.23) points and 0.81 (±0.18) points for E1 and E2, respectively, and no significant difference (p=0.47) was observed the two. 66% of patients had high level of adherence. Thrombotic and haemorrhagic events were observed in 11% (18/161) of interviewed patients. 58% (93/161) of patients were aware of their INR, and INR was in the target area. The skill score declined with age (p<0.05).
Conclusion Only 16% of patients receiving DOA were educated; most patients did not start DAO treatment in our department and VKA patients were favoured. As the mean E2 skill score assessed was not significantly different from the mean E1 score, patients seem to keep their skills in the long term. 44% of patient had a poor level of adherence. This study underlines the necessity to improve education in elderly patients and in patients treated by DOA.

No conflict of interest

CP-147 | A MEDICATION THERAPY MANAGEMENT PROGRAMME FOR CHRONIC PATIENT: PATIENT SATISFACTION IN CARDIOLOGY

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Background The Health System Modernisation law recommends better information and support to patients in their health path. In this context, a medication therapy management programme, AIPAT, was implemented in our hospital.
Purpose The aim of this study was to assess patient satisfaction with this programme.
Material and methods Since March 2015, medication therapy management interventions (MTMi) are offered to outgoing patients from the cardiology department. These interventions, about 15 min and conducted by a pharmacist or specifically trained physician, were structured around two educational tools, designed for this programme:(1) a card game to help patients understand the therapeutic goals of their drugs;(2) a personalised medication schedule, filled in with the patient, listing their treatments with their therapeutic goals and delivered by hand to the patient at the end of the interventions. Finally, a satisfaction survey, completed by the patient, was proposed. Data from this survey were collected and analysed.
Results Over a period of 15 months, 237 MTMi were conducted and 208 satisfaction surveys were returned. Median age of respondent was 77 years. Discharge prescription included a median of 7 drugs. The intervention was found 'useful' or 'essential' in 84% of patients. Almost all patients (99%) were 'satisfied' or 'very satisfied' by messages and information delivered. 79% of patients judged that answers to their questions were satisfying. Most patients (90%) felt they had acquired new knowledge about their pathology and/or their treatments. Regarding the personalised medication schedule, 81% of patients found it 'easy to use', 75% 'essential' and 76% 'adapted to their pathology'. Nearly 9 out of 10 patients declared that they will use this personalised schedule in everyday life.
Conclusion Results showed a very high satisfaction rate and the tools proposed and information provided were very well received by patients. These results highlight the need to continue and extend this programme to other departments and/or hospitals. An assessment of MTMi benefit, particularly for patient compliance, should subsequently be implemented. Finally, electronic transposition of the tools, such as a 'smartphone/tablet' application, could be designed to make them interactive and to enable patients or healthcare providers to update the personalised medication schedule.

No conflict of interest

CP-148 | ACUTE CONFUSIONAL STATE: CASE REPORT

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Background A 78-year-old woman was admitted to hospital with a hip fracture. Medical history included: hypertension,

type 2 diabetes, atrial fibrillation, Graves' disease and dyspepsia. Domiciliary medications included: omeprazole 20 mg/24 hours, tiamazole 10 mg/24 hours, apixaban 5 mg/12 hours, metoprolol 15 mg/12 hours, enalapril 20 mg/24 hours, atorvastatin 40 mg/24 hours and alprazolam 0.5 mg/24 hours.

Purpose To report a case of acute confusional state (ACS).

Material and methods Medication reconciliation, electronic medical records review and clinical patient interview.

Results

Medication reconciliation was performed The pharmacist verified patient adherence to the treatment, compiled a complete and accurate list of the patient's home medications and identified discrepancies in the drug regimens. Alprazolam is a potentially inappropriate drug in the elderly (PRISCUM 2010 criteria). The pharmacist recommended gradual tapering of the dose but it was abruptly discontinued. Omeprazole duplicity was detected. The patient required a hip replacement. The pharmacist advised stopping apixaban 36 hours before surgery. On day 1, the patient suffered from acute and neuropathic pain and was prescribed amitriptyline 25 mg/24 hours, tramadol 100 mg/8 hours, ketorolac 30 mg/8 hours and pethidine as rescue analgesic. The pharmacist proposed ketorolac dose reduction (which was accepted), amitriptyline starting dose of 10 mg at bedtime and an alternative opioid to pethidine (not recommended in elderly population) but these two suggestions were not accepted by the physician. At night, the patient experienced fever (39°C) and chills. Blood pressure was 120/90 mm Hg, and heart rate was 110 beats/min. Chest radiography revealed a community acquired pneumonia and levofloxacin 500 mg/24 hours was started. On day 2, she developed severe agitation, fluctuating levels of consciousness and visual hallucinations (the presence of a cat in her room). She was diagnosed as suffering from ACS and prescribed haloperidol 5 mg. The pharmacist suggested discontinuation of anticholinergic drugs (amitriptyline and pethidine) and low dose benzodiazepine re-introduction along with non-pharmacological measures, with a favourable evolution for the patient

Conclusion ACS could have been prevented, avoiding factors known to cause or aggravate it—for example, anticholinergic drugs, withdrawal states (benzodiazepine), dehydration, immobilisation and sleep disturbances. The pharmacist contributed to the integral patient care providing continuity in individualised pharmacotherapeutic care. Interventions included correcting/clarifying orders, providing drug information, suggesting alternative therapies and dose adjustments, checking discrepancies and improvement in ACS manifestations

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No conflict of interest

CP-149 | **EVALUATION OF RESTRICTED ANTIBIOTIC PRESCRIPTIONS: A PROSPECTIVE STUDY**

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Background Inappropriate prescription of restricted antibiotics is a major public health concern and is related to the development of antimicrobial resistance.

Purpose The aim of this study was to assess the appropriateness of restricted antibiotic prescriptions by non-infectious disease physicians in a hospital setting in Spain.

Material and methods A prospective study was undertaken in patients with restricted antibiotic prescription (cefepime, daptomicine, ertapenem, imipenem, linezolid, meropenem and piperacillin/tazobactam) over a period of 6 months (January 2016–June 2016). The prescription was validated on day 4 by the infectious disease physician and the pharmacist according to the institutional clinical practice guidelines. Data were collected from medical records, which also stored sociodemographic characteristics, medical conditions, symptoms that required medical attention, diagnosis, prescribed antibiotic and whether or not cultures were ordered.

Results 77 patients were included (61% men, median age 62 years), with a median of 8 days (3–19) of antibiotic treatment. The most prescribed restricted antibiotics were Imipenem (35%), piperacillin/tazobactam (18%), ertapenem (29%) and cefepime(14%). In 48 (62%) of the prescriptions, the physician did not order blood cultures and in 20 (26%) no culture.

26 (33.7%) recommendations to de-escalate antibiotics were made and 16 (62%) were accepted. The most frequent prescribers were surgeons and internal medicine physicians, and almost half of the illnesses for which antibiotics were prescribed were respiratory tract infections (22%) and cholecystitis and cholangitis (21%). The restricted antibiotics that were more appropriately prescribed were piperacillin/tazobactam (75%), ertapenem (58%), meropenem (50%) and imipenem (50%).

Admission to a medical ward was more likely to be associated with correct antibiotic use (61%) than having surgery (53%). Having a healthcare institution acquired infection was more likely to be associated with appropriate antibiotic use (73%) than having a community acquired infection (64%).

Conclusion This study shows a high prevalence of patients with a prescription for restricted antibiotics and without a blood culture. Moreover, it shows inappropriate restricted antibiotic prescriptions in our hospital. Therefore, actions such as educational programmes should be considered to optimise restricted antibiotic prescriptions.

No conflict of interest

CP-150 | **EVALUATION OF INFLIXIMAB (REMICADE) SUBSTITUTION BY INFLIXIMAB BIOSIMILAR (INFLECTRA): COST SAVINGS AND THERAPEUTIC MAINTENANCE**

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Background In the light of scientific data, the medical and pharmaceutical community (rheumatology, gastroenterology, internal medicine) decided to use Inflectra for any patient requiring initiation, and proposed substituting Remicade with Inflectra in patients requiring maintenance therapy. Infliximab represents the first drug cost in our hospital.

Purpose The mains objectives were to evaluate the therapeutic maintenance rate after the third infusion of Inflectra and the cost savings. A secondary objective was to analyse the reasons of stopping Inflectra or returning to Remicade.

Material and methods Since October 2015, Inflectra was prescribed to adult patients requiring initiation, and substitution of Remicade with Inflectra was proposed to adult patients needing maintenance therapy (at least three Remicade infusions). The number of refusals and return to Remicade after substitution was analysed. Costs savings during the 10 month study period were estimated. Disease activity between the beginning and end of the study, changes in infliximab biosimilar residual levels and tolerance were also studied.

Results Inflectra initiations involved 66 patients (41 in rheumatology, 23 in gastroenterology, 2 in internal medicine). Substitutions were carried out in 267 patients (178 in rheumatology, 63 in gastroenterology, 26 in internal medicine). 1 patient remained on Remicade for current in vitro fertilisation. The therapeutic maintenance rate at the third infusion was 85.4% (228 patients). Among the 39 patients who discontinued Inflectra after substitution, 31 returned to Remicade, 4 changed to a subcutaneous biotherapy, 2 stopped the anti-TNF therapy for medical reason and 2 were lost to follow-up. The main reason for returning to Remicade was loss of efficacy of Inflectra (30 patients). Tolerance was deemed satisfactory with the exception of an allergic reaction requiring discontinuation of treatment. Cost savings were estimated at € 733 236 (29.7% savings): € 133 596 for patients with Inflectra initiation and € 599 540 regarding substitution. Analysis of other secondary clinical and biological criteria is ongoing.

Conclusion The therapeutic maintenance rate obtained (greater than 80%) is encouraging. The main reason for stopping Inflectra was loss of efficacy. Substitutions allowed 4.5 more savings than initiations alone to be made. Finally, analyses currently ongoing will provide additional information on the efficacy and safety of Inflectra and prediction of maintenance.

No conflict of interest

CP-151 | ASSESSMENT OF AN EXPERIMENTAL CALL CENTRE DEDICATED TO DRUG INFORMATION FOR OUTPATIENTS

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Background A national innovative telephone drug information service, called MiS, was implemented in April 2016 to improve diffusion of information about drugs and health products. MiS consists of four networked drug information centres (DIC) which provide free, reliable and objective information to healthcare providers and patients. All telephone queries are processed by experienced and trained pharmacists.

Purpose The aim of the study was to assess the perceived clinical impact of pharmacists' interventions and users' satisfaction of the unique MiS DIC dedicated to outpatients.

Material and methods Three surveys were conducted from the analysis of the first 200 queries:(1) extraction from MiS question/response database to highlight the main themes;(2) peer review of each intervention to highlight perceived clinical and/ or economic impacts, using the Hatoum scale; and (3) a satisfaction survey was conducted by telephone interview with patients.

Results Of 200 queries, 89% concerned approved drugs, 9% other health products (eg, dietary supplements) and 2% medical devices. The main patient concerns were adverse effects (23%), drug interactions (20%) and indications/contraindications (14%), mainly regarding cardiovascular (20%), nervous system (16%) and anti-infective (10%) treatments. MiS interventions were judged to have a clinical impact in 86% of cases by optimising drug therapy (68%) and preventing potential adverse events (32%), and an economic impact in 25%. Drug therapy optimisation consists of improving patient compliance (28%), seamless care (18%) and proper use of drugs (15%) whereas iatrogenic prevention consists of avoiding drug misuse (12%). Globally, the perceived impact of MiS was deemed 'significant' in 53%, 'very significant' in 24% and 'vital' in 4%. In addition, the satisfaction survey revealed that most patients (>80% of 149 respondents) were very satisfied with the relevance and usefulness of the information delivered.

Conclusion Despite self-assessment bias, our results highlight the fact that most MiS interventions had a perceived clinical impact, particularly in improving patient compliance and proper use of drugs, guaranteeing drug effectiveness. Associated with a high level of user satisfaction, MiS represents a real need for outpatients who search for reliable drug information and the accessibility of this service must be sustained and expanded.

No conflict of interest

CP-152 | APPROPRIATENESS OF ART PRESCRIPTION IN HIV INFECTED NAÏVE PATIENTS ACCORDING TO THE GESIDA GUIDE (GESIDA/SPANISH AIDS NATIONAL PLAN RECOMMENDED GUIDELINES)

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Background Proper management of HIV treatment is important because of the complexity and speed with which knowledge changes, requiring the development of guidelines for antiretroviral therapy (ART), but also frequent updating of these guidelines. In Spain, the Society of Infectious Diseases annually produces a consensus document (GESIDA) for ART.

Purpose The aim of this study was to evaluate adjustment to the recommendations of the GESIDA consensus document in Spain for the prescription of ART in naïve patients between January 2014 and March 2016.

Material and methods This was a retrospective observational study. The medical records of all HIV naïve adult patients were reviewed. Epidemiological and laboratory data on viral load (blood VL) and CD4+ were retrieved from the clinical management programme. Therapeutic regimens at treatment initiation and clinical data were collected. A descriptive statistical analysis was performed. A central tendency was expressed, with median and minimum and maximum values.

Results Between 2014 and March 2016, 28 patients were started on ART; 18 (85.7%) were men, mean age was 43.13 years (IQR 24–64), blood VL was 94 396 copies/mL (IQR 800–749 000) and CD4 was 384.5 cells/mm^3 (IQR 11–850).

The treatments described in the Guide were prescribed to 27 patients (96%). 7 (25%) received a preferred treatment to the Guide, 20 (71%) an alternative treatment described from the Guide and only 1 patient received a therapeutic regimen not described in the Guide for a justified reason.

Conclusion The initial prescription for a naïve HIV patient during the period of this study was conducted in accordance with the recommendations from GESIDA.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

CP-153 | **LIRAGLUTIDE ADEQUACY AND EFFECTIVENESS IN REAL PRACTICE TYPE 2 DIABETES THERAPY**

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Background According to the latest NICE Guidelines for the management of type 2 diabetes, glucagon-like peptide 1 analogues (GLP-1) are indicated after failure of other therapies and should be considered ineffective in the absence of a metabolic response after 6 months of treatment.

Purpose To analyse the adequacy and effectiveness of liraglutide use in type 2 diabetes management in clinical practice.

Material and methods A retrospective study was conducted in diabetic patients who started treatment with liraglutide in 2013 in a health area comprising 450 000 inhabitants. Prescription data were obtained from the official prescription database (Microstrategy). Clinical data for assessing adequacy and effectiveness were obtained from medical records. It was considered appropriate to use liraglutide when basal HbA1c was $\geq$7.5%. Treatment was considered effective when HbA1c reduction was $\geq$1% 6 months after the start of therapy. The absence of HbA1c data was considered an inadequacy criterion. Effectiveness was evaluated only for those patients with analytical results. The percentage of patients in which the treatment was adequate, percentage of patients in which the treatment was effective and percentage of patients in which the treatment was withdrawn following lack of effectiveness were determined.

Results During 2013, 82 patients began treatment with liraglutide. It was a suitable treatment in 55% of patients (n=45). Lack of analytical results for HbA1c led to the inadequacy criterion in 25 patients. Only 51 patients had analytical data to assess effectiveness. 45% (n=23) of patients had a reduction $\geq$1%, with a mean HbA1c reduction of 0.85% (95% CI 0.31 to 1.37). Treatment was continued for a year later despite being ineffective in 22 patients (79%).

Conclusion Liraglutide use did not meet the criteria for adequacy for the indication in half of the patients. In more than half of the patients, liraglutide was ineffective in the metabolic control of type 2 diabetes. Despite the lack of effectiveness, liraglutide was continued in most patients.

No conflict of interest

CP-154 | **REVERSAL FIBROSIS FOLLOWING NEW DIRECT ACTING ANTIVIRALS FOR HEPATITIS C**

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Background Multiple studies have shown that patients with hepatitis C show significant improvement in inflammatory grade and have reversal of fibrosis following hepatitis C therapy, particularly when a sustained virologic response (SVR) is attained. However, data on new direct acting antivirals (DAAs) in fibrosis regression are reported less frequently because of their recent introduction.

Purpose The aims of this study were:(i) to investigate the effect of new DAAs on the evolution of liver fibrosis; and(ii) to examine what conditions can influence this.

Material and methods A retrospective study was undertaken in all hepatitis C virus (HCV) infected patients with SVR treated with the new DAAs from May 2015 to May 2016 with at least one measurement of hepatic fibrosis by FibroScan before and after treatment. Fibrosis stage was defined as mild (Metavir F0–F1) if stiffness $\leq$7.1 kPa; moderate (F2) if 7.2–9.4 kPa; severe (F3) if 9.5–14 kPa and cirrhosis (F4) if >14 kPa. Data were collected from medical records, which also stored sociodemographic characteristics, HCV genotype, baseline viral load, coinfection with human immunodeficiency virus (HIV), pretreatment, HCV treatment, hepatic fibrosis and transaminases, bilirubin and platelet count before and after treatment.

Results We obtained data from 22 patients (age 51.2±16.8 years, 19 (86.3%) men), genotype 3=2 (9.1%), HCV-HIV coinfected patients=51.9%, stage F3 8 (36%) and stage 4 12 (55%) patients. After treatment, in 14 (63.6%) patients liver fibrosis was partially reversed (median kPa pretreatment 17.1 vs 13.8 post-treatment); 77% of all HCV monoinfected patients and 53.8% of HCV-HIV coinfected but none of genotype 3. There was equal fibrosis regression in patients with mild to moderate fibrosis (F1/F2/F3) compared with those with advanced stage of fibrosis (F4). Moreover, all patients with improved fibrosis regression also had improved bilirubin and transaminase levels. There was no relation between platelet count and fibrosis regression.

Conclusion It is likely that patients included here had a worse fibrosis stage at baseline. However, we can conclude that fibrosis regression in HCV patients can be reversed with the new DAAs, regardless of the stage but dependent on genotype. Moreover, patients with improved fibrosis regression also experience a decrease in transaminases.

No conflict of interest

CP-155 | **PREVALENCE AND EFFECTIVENESS OF ANTIRETROVIRAL TREATMENT COMBINATIONS USED IN HIV PATIENTS NOT INCLUDED IN GUIDELINES**

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Background Most studies in HIV infected patients focus on the effectiveness of antiretroviral therapy (ART) combinations included in clinical guidelines. However, few studies have analysed combinations not listed in these guidelines.

Purpose To analyse the prevalence and effectiveness of ART combinations not included in HIV guidelines.

Material and methods A retrospective observational study was carried out between January 2014 and December 2015. All patients with ART followed for at least 1 year by the outpatient pharmacy were included. ART were classified in two groups:(1) all combinations listed in the Spanish National AIDS Plan Recommended Guidelines (GESIDA) for initial antiretroviral therapy 2014–2015; and combinations not listed in GESIDA Guidelines.

To determine the effectiveness of the treatment, plasma viral load (VL) and CD4+ lymphocytes were reviewed. Two analyses according to different criteria were conducted:(1) criteria reflected in Spanish GESIDA guidelines: VL <50 copies/mL (undetectable) and CD4 repeatedly >300 cells/μL, on at least two consecutive occasions;(2) criteria reflected in the American DHHS guidelines: VL <200 copies/mL (to prevent errors by blip) and CD4 repeatedly >300 cells/μL, on at least two consecutive occasions. Data were analysed with SPSS 20.0 software.

Results 245 patients were analysed. 68.6% (168) were men. The median age was 48.5 years (IIC: 43.5 to 53).

Patients	ART combinations included in guidelines	ART combinations not included in guidelines	
Total (n (%))	224 (91.4)	21 (8.6)	
VL <50 copies/mL and CD4 >300 cells/μL (n (%))	110 (49.1)	9 (42.9)	OR=1.287 95% CI OR: 0.521–3.174 p=0.584
VL <200 copies/mL and CD4 >300 cells/μL (n (%))	174 (77.7)	14 (66.7)	OR=1.740 95% CI OR: 0.666–4.545 p=0.253

Conclusion This study shows that few patients receive ART combinations not included in clinical practice guidelines. The high power of current ART could explain the similar effectiveness between the listed and non-listed therapies in the guidelines.

No conflict of interest

EVOLUTION OF CONSUMPTION OF THREE ANTIBIOTICS CLASSES AND OF THE RESISTANCE OF ESCHERICHIA COLI TO THESE CLASSES

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Background Antibiotic bacterial resistance is one of the major challenges for hospitals worldwide. *Escherichia coli* (*E coli*) is the main bacterial germ in healthcare services in our hospital. this bacteria has changed its sensitivity to different antibiotic classes remarkably in the last decades.

Purpose Our objective was to study consumption of three classes of antibiotics: penicillins (amoxicillin and amoxicillin/clavulanic acid), cephalosporines (ceftriaxone and ceftazidim) and quinolones (ciprofloxacin), and also to study the evolution of *E coli* resistance to these three classes of antibiotics.

Material and methods We studied consumption of the three antibiotic classes using daily defined dose (DDD) per 1000 hospitalisation days between 2006 and 2015. Also, we monitored the change in *E coli* resistance to these three classes between 2009 and 2015 using the WHONET 5.3 percentage of resistant strains with respect to all the strains collected.

Results 3603 *E coli* strains were collected (57% of BGN). Consumption of the three antibiotics classes and *E coli* resistance to these molecules are summarised in the table.

Conclusion *E coli* resistance to the three antibiotic classes has increased over the years. Selection pressure is one of the most important reasons for this evolution of resistance and the high antibiotic consumption. The increasing resistance of *E coli* to penicillins has pushed consumption towards other classes, such as the cephalosporines and quinolones, increasing consumption of these two classes which will undoubtedly accelerate the emergence of bacterial resistance phenomenon to cephalosporins and fluoroquinolones. Consequently, close monitoring of antibiotic consumption must be established by hospital pharmacists.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Resistance to penicillins				36%	35%	41%	60%	53%	55%	49%
Resistance to third generation cephalosporins				11%	11%	8%	12%	10%	17%	16%
Resistance to fluoroquinolones				27%	26%	20%	27%	25%	31%	30%
Penicillins	415	440	404	401	334	338	358	338	389	384
Cephalosporins	59	93	110	108	102	96	105	110	135	141
Fluoroquinolones	130	124	143	196	162	167	153	177	179	201

RISK FACTORS ASSOCIATED WITH THROMBOEMBOLIC DISEASE IN HOSPITALISED PATIENTS: AN ASSESSMENT IN A GENERAL SPECIALTIES HOSPITAL

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Background Thromboembolic disease (TED) is a complex condition in which the interaction between genetic, acquired and environmental factors determines the onset of an episode.

Purpose This study aimed to assess the risk factors (RF) associated with TED in hospitalised patients.

Material and methods A retrospective, descriptive study was conducted in which hospitalised patients with TED from January 2015 to June 2015 were included. Variables included: age, sex, type of TED, previous events, hospitalisation duration, D-dimer elevation, obesity, renal impairment, tabaquism, cardiac and respiratory comorbidities, recent immobilisation or major surgery, family history/genetic predisposition, oncohaematologic history, and treatment with chemotherapy regimens, hormonal therapy, angiogenic agents or erythropoiesis stimulating factors (ESF).

Data were obtained from electronic prescription software (APD-Prisma) and medical records.

Results 108 patients were analysed. There were 6.8 new cases per 1000 admitted patients during the study period. 55% were women. Mean age was 71 years (18–97). 20.3% presented previous TED. Median time of hospitalisation was 8 days (1–91). D-dimer elevation was observed in 63.8% with an average value of 6926.91 (2-48453) (26% absent data).

Of 108 patients, 40.7% presented tabaquism, 22% respiratory complications, 21% cardiac comorbidities, 14.8% obesity and 11% renal impairment. Recent immobilisation or major surgery was noted in 27.8% and 4.6% of cases, respectively. A family history of TED or genetic predisposing mutations were present in 7.4%. Oncohaematologic history was observed in 24%. 8.3% received chemotherapy, 6.5% hormonal therapy and 6.5% ESF. No patient received angiogenic therapy. 28 days mortality was 7.4%.

Conclusion Among our studied population, the incidence of TED was an important issue that grew according to genetic, acquired or environmental factors, consistent with published data. RF evaluation is an essential measure during hospitalisation to minimise these events. Multidisciplinary active programmes for TED prevention should be available.

No conflict of interest

USE OF ANTIRETROVIRAL DUAL THERAPY AS AN ANTIRETROVIRAL TREATMENT SWITCH STRATEGY. EXPERIENCE IN A COMMUNITY HOSPITAL

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Background Dual therapy (DT) can be a therapeutic option for antiretroviral therapy (ART) in the case of resistance, simplification, toxicity and adherence compliance.

Purpose The purpose of this study was to analyse the causes that led to a change in DT, the combinations used and course of viral load (VL) and CD4+ count, as well as the degree of adherence before and after the change.

Material and methods A retrospective observational study was conducted between March 2013 and March 2016. All patients who had been treated for at least 24 weeks with ART with DT were retrieved from the hospital´s pharmacy database. Epidemiological and laboratory data for VL and CD4+, and level of adherence prior to switching to DT and at study completion were retrieved from the clinical management programme. Treatment related information was obtained from the pharmacy´s database. A descriptive statistical analysis was performed. A central tendency is expressed, with median and minimum and maximum values.

Results Of 267 patients on ART, 20 (7.5%) were switched to DT. Before the switch, 14 (70%) patients had VL <40 copies/mL (undetectable) and median CD4+ 550 cells/mm^3 (IQR 162–1104). The reasons for switching to DT were: toxicity 9 (45.0%), simplification 6 (30.0%) and virologic failure 5 (25.0%). 75% of patients had complied with adherence to ART before the switch. DT schemes were: non-nucleoside reverse transcriptase inhibitor (NNRTI)+ritonavir enhanced protease inhibitor (PI/r) (8; 40.0%), nucleoside/nucleotide reverse transaminase inhibitor (NRTI)+PI/r or PI/cobicistat (PI/COBI) (7; 35.0%), PI/r or PI/COBI+integrase inhibitor (INI) (4; 20.0%) and NNRTI+INI (1; 5.0%). At the end of the study, 17 (85.0%) had VL <40 copies/mL and median CD4+ 592 cells/mm^3 (IQR 135–1127). 100% remained on DT; mean time on DT was 67.6 weeks (IQR 26–142) with increased treatment adherence of 90%.

Conclusion All patients on DT remained on the prescribed regimen and after the switch there was an increased number of patients with undetectable VL, enhanced CD4 and adherence. DT can be a safe and effective option in cases of toxicity, simplification, resistance or interactions.

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No conflict of interest

DRUG COST AVOIDANCE IN HIV-1 CLINICAL TRIALS

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Background The economic impact of human immunodeficiency virus type 1 (HIV-1) infection is increasing in relation to incidence and improvement in patient survival. Clinical trials are essential to evaluate the efficacy and safety of new treatments and additionally may also result in economic benefits by avoiding the cost of investigational medicinal products (IP) to the National Health System (NHS).

Purpose Our objective was to determine the avoided cost for IP in clinical trials of HIV-1 infection conducted in a tertiary hospital.

Material and methods We carried out a cross sectional study of HIV-1 patients enrolled in clinical trials at the outpatient pharmaceutical care unit. All HIV-1 trial protocols and drug dispensing data were reviewed. The collected data involved IP (innovation and/or marketed drugs), and cost avoidance during the study period (June 2014–October 2016) was calculated.

HIV-1 drug costs were obtained from the drug catalogue of the institution. The average cost of treatment of an HIV patient was used in the case of innovative drugs.

Results We included in this review 6 of 7 clinical trials on HIV-1 patients that met the selection criteria. All were phase III, multicentre, international clinical trials and incorporated at least one innovative drugs. 68 patients were included, 11% of the total number of HIV-1 patients treated in our hospital. Only 2 patients were outside the clinical trial at the time of the study, 1 who developed a rash and the other who developed neoplasia. The average number of treatment weeks per patient was 80 (SD±46). Only one of the six trials meant partial cost to the hospital, for the rest the sponsor provided all of the medication. The total cost estimated was € 926 173 and total cost avoidance was € 803 407€ (86.8% of total cost), and an average cost avoidance by clinical trial of € 133 901. Average cost avoidance per patient was € 11 808.

Conclusion Clinical trials can be a source of economic benefits for the NHS, not only by the income directly generated by each trial. Drug cost avoidance is an additional benefit that clinical trials can bring to an institution.

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No conflict of interest

CP-160 | **CARBAPENEM DE-ESCALATION THERAPY FOR INTRA-ABDOMINAL INFECTION**

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Background The Antimicrobial Stewardship Programme promotes strategies to improve antibiotic prescriptions, optimise clinical outcomes, minimise costs and avoid adverse effects. It is also recommended for the prevention and decrease in the appearance of emerging resistant bacteria. One of the goals of this programme is therapy de-escalation with broad spectrum antibiotics.

Purpose To analyse carbapenem prescriptions and de-escalation therapy in intra-abdominal infections, and determine the impact of de-escalation on hospital stay and inhospital mortality.

Material and methods This prospective observational study of carbapenem prescriptions and de-escalation performance was conducted in a third level hospital between 1 August 2013 and 31 July 2014. Data were gathered on the number of carbapenem prescriptions and patients characteristics, carbapenem treatment duration, culture requests, de-escalation performance, length of hospital stay and mortality rate. The oncology–haematology, traumatology, neurosurgery and neurology departments were excluded.

Results 489 prescriptions for 437 patients were recorded during this period. Mean age of patients was 65.3 years; 57.7% were men. The median Charlson Index score was 4 (2–6). 76.5% of inpatients were from the surgical department and 7.6% had sepsis. 78.9% of prescriptions were for monotherapy. 64.4% of carbapenems were prescribed as firstline therapy and 35.6% as rescue therapy. 68.9% of microbiological cultures were requested and 50.4% were positive. The most

prescribed carbapenems were ertapenem (44.4%) and imipenem (30.7%). De-escalation was performed in 31.9% of cases, and 53.6% in the presence of positives cultures versus 46.4% of negative cultures(p=0.418). Median duration of carbapenem therapy was 6 (4–9) days, 5 days in the de-escalation group versus 6 days in the no de-escalation group(p=0.006). Length of hospital stay was 10 (6–20) days, 10 days in de-escalation group versus 12 days in non-de-escalation group (p=0.052). Total inhospital mortality was 10.8%; in de-escalation group 4.7% versus 13.9% in the non-de-escalation group(p=0.003).

Conclusion The de-escalation of carbapenem therapy reduces patient mortality, exposure to carbapenems treatment and length of hospital stay.

No conflict of interest

CP-161 | **A CLINICAL AND COST ANALYSIS OF MEDICATION RECONCILIATION BY PHARMACISTS AT DISCHARGE FROM THE ACUTE MEDICAL ASSESSMENT UNIT (AMAU) OF A LARGE URBAN TEACHING HOSPITAL**

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Background The transition between primary and secondary care is one of the most common points of medication errors, with much published information relating to errors at admission. There is currently a lack of comprehensive data on the prevalence and severity of medication errors occurring at the point of discharge and the impact of these errors on both patient safety and healthcare expenses, along with the role of the pharmacist in reducing these.

Purpose The aim of this study was to assess the impact of a pharmacist discharge service within the acute medical admission unit (AMAU). This was achieved by (i) quantifying and categorising the unintentional medication variances, (ii) assessing the potential patient safety benefits using a validated tool and (iii) estimating the cost of providing a pharmacist discharge service and the cost avoided.

Material and methods A medication reconciliation at discharge was conducted by the clinical pharmacist once completed by the medical team. A seven member peer review panel reviewed the interventions using the visual analogue scale (VAS) validated severity tool to assess the potential patient harm and the potential for readmission. Cost avoidance was then calculated per intervention by linking VAS scores to a monetary value.

Results 71 patient discharges with 146 interventions were reviewed. 83.1% of discharges required an accepted pharmacist intervention. 72.6% of interventions related to 'prescription errors' and 27.4% related to 'communication errors'. 26.7% of the interventions were classified as minor (<3) with no patient harm expected. The majority (71.2%) were classified as moderate to serious (3–7) potential to cause patient harm. 2.1% of the interventions were classified as potentially severe (8–10). The potential to prevent readmission was moderately likely in 48% of interventions. The estimated total cost avoidance was € 107.45 per intervention and a cost:benefit ratio of 59.50:1 was calculated.

Conclusion A pharmacist discharge service was shown to have a hugely positive effect in terms of patient safety and cost

avoidance to the hospital. These results will inform the expansion of the pharmacist role in the study hospital.

No conflict of interest

CP-162 | WITHDRAWN

CP-163 | **ONCO-HAEMATOLOGICAL OUTPATIENTS TREATED WITH ORAL ANTINEOPLASTIC AGENTS: PHARMACIST INTERVENTIONS**

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Background Currently, oral antineoplastic agents (OAA) represent approximately 40% of all chemotherapy agents. Thus, onco-haematological outpatients have acquired more autonomy and responsibility since OAA require self-administration at home. Hospital pharmacists are the last health professionals in touch with patients and should detect problems related to these drugs (DRP).

Purpose To assess pharmacist interventions performed in outpatients treated with OAA in a tertiary hospital.

Material and methods All patients who started treatment with OAA between January and September 2016 in the outpatient pharmacy were included. Pharmacist interventions took place during the pharmacist interview at the beginning of the treatment. Other variables were: demographics, ECOG, type of tumour, OAA and concurrent medication. These data were collected from medical records and also directly from patients at the pharmacist interview. Severity of DRP was classified as minor, moderate or serious.

Results 170 patients (mean age 67.3 years, 64.7% men) were included. 7.9% of patients had ECOG >1. Prostate cancer (18.8%), renal cancer (17.0%), liver cancer (12.4%) and multiple myeloma (11.2%) were the most prevalent tumours. The most frequent OAA were: sorafenib (11.8%), everolimus (10.6%), abiraterone (10.0%) and lenalidomide (9.4%). 84 pharmacist interventions were performed in 62 different patients (90.5% oncological and 9.5% haematological patients). Interventions were classified as follows: 46.4% interactions (66.7% drug interactions and 33.3% herb interactions), mainly with omeprazole (35.9%), green tea (10.3%) and statins (7.7%); 17.9% reinforcement of health education (management of side effects and improvement in healthy lifestyle); 10.7% correcting inappropriate drug administration; 7.1% reinforcement of adherence; 7.1% dose modification; and 10.7% others. The OAA with more DRP (DRP/patient) were: pazopanib 1.1, sunitinib 1.0, enzalutamide 0.8, erlotinib 0.8, gefitinib 0.5, everolimus 0.4 and axitinib 0.4. Severity of DRP was: 41.7% minor, 38.1% moderate and 20.2% serious.

Conclusion Pharmacist interventions and follow-up have detected DRP and improved the treatment of onco-haematological outpatients. The most frequent interventions consisted of identifying drug and herb interactions and improving the management of side effects.

No conflict of interest

CP-164 | **AN AUDIT OF SELF-ADMINISTRATION OF MEDICINES IN CARDIOVASCULAR WARDS AND PATIENT'S PREFERENCE FOR MEDICINES ADMINISTRATION WHILE AN INPATIENT**

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Background Self-administration of medicines (SAM) is a transfer of patients' responsibility to manage their medication themselves. Studies show great value of SAM in increasing patient engagement, and improving patients' knowledge about medicines. As the UK's government encourages the implementation of SAM, this is a crucial first published study about an audit of SAM in cardiovascular wards.
Purpose 1. To identify whether the SAM standards are being achieved, which are:(i) 100% of patients are offered the SAM programme;(ii) 100% of both informed consent and assessment forms are documented; and(iii) 100% of medicines are stored and labelled properly.

2. To analyse the criteria which can encourage patients to participate in SAM.

3. To provide evaluations for improvements in the SAM practices.
Materials and methods A 6 week prospective study was conducted in five cardiovascular wards. The study included finding eligible patients to participate in a structured interview and observing how the standards were being applied. A convenience sampling method was chosen with verbal consent for interviews. The questions covered were: (1) whether patients self-administered their medicines; (2) whether patients had been offered to self-administer; and (3) patients' preferences for administration (assessed using the Mann–Whitney, Kruskal–Wallis and χ^2 tests (significance level, p<0.05).**Results**

Of the 422 patients interviewed, 22% self-administered their medicines. The findings were unsatisfactory since all wards did not achieve the target percentage. The average percentages were 4%, 10% and 21%, respectively. A total of 43% indicated a preference to self-administer while inpatients. This finding is similar to that of other studies, but has further analysed patients' preference. Younger people were significantly more willing to self-administer than older people. Those with a lower number of medicines were significantly more willing to self-administer than those with a higher number.
Conclusion This audit showed that the actual percentage was far from achieving the targets. This was mainly due to lack of awareness of the policy, and therefore there is a need to increase awareness of the policy. Some patients were interested in independently managing their medicines, particularly those who were younger or those taking fewer medicines. Further study could identify patients' and healthcare professionals' perspectives regarding the barriers to implementing this programme.

No conflict of interest

CP-165 | **IMPACT ON HOSPITAL READMISSION OF MEDICATION RECONCILIATION IN POST EMERGENCY GERIATRIC UNIT: A PILOT STUDY**

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Background Medication reconciliation is a process used to identify and prevent medication errors at care transition points in hospitals. Medication errors are one of the more important factors those increase fatal injuries to patients and burden healthcare systems with significant economic costs. An appropriate medical history could reduce errors related to omission of drugs previously prescribed at the time of hospitalisation. In the current literature, the rate of hospital readmissions due to this type of error in older adults (>65 years old) is 14%.[1]
Purpose The objective of this study was to evaluate the 30 day readmissions in older adults as well as medication errors at the time of hospital admission and discharge.
Material and methods A monocentric prospective study was conducted in a post emergency geriatric unit to analyse medication reconciliation activity over a 5 month period. Each patient was called back 30 days after their exit from hospital. We compared medications prescribed at admission and at discharge with hospital physician prescription.
Results 110 patients were included in the study. At hospital admission, 52 medications errors (ME) were identified and 31 patients had more than 1 ME. Physicians accepted 46 pharmaceutical interventions (88%). The most frequent ME was omission of drugs (60%: amiodarone, ciclosporin, fluindione, pregabalin, digoxin and flecainide) followed by wrong dose (31%) and frequency (9%). At discharge, 81 medication reconciliations were performed and 33 ME were detected. Three types of discrepancies were noted: omission of drug (75%), wrong frequency (12%), wrong dose (6%) and other (7%). Over the 5 month period, 9% of patients were readmitted to hospital and 4% died.
Conclusion Our findings confirm that admission and discharge to hospital is a critical point for patient safety because ME occur at this time in almost half of elderly patients. We showed that the rate of hospital readmissions was less than reported in the literature. An interventional monocentric and randomised clinical trial (ConcReHosp) was recently started in our hospital to demonstrated the impact of medication reconciliation on early hospital readmission.

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No conflict of interest

CP-166 | **IMPACT OF GUIDELINE IMPLEMENTATION ON ALBUMIN AND INTRAVENOUS PANTOPRAZOLE EXPENDITURE IN A REFERRAL TEACHING HOSPITAL, TEHRAN, IRAN**

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Background Irrational use of medicines is a widespread problem in healthcare and imposes huge costs on health systems.

Purpose To promote rational drug prescription and expenditure, we performed a study on albumin and pantoprazole expenditure in our hospital.

Material and methods A cross sectional study was conducted to examine the role of a restrictive protocol on intravenous pantoprazole and albumin consumption. The protocol was designed by clinical pharmacists and after approval by a drug and therapeutics committee, was presented to hospital wards. The pharmacists from the hospital pharmacy approved dispensing of pantoprazole and albumin to medical wards only if the physician's order accompanied a signed paper protocol and the prescription conformed to the protocol. Otherwise, the pharmacist consulted with the physician to prescribe appropriate alternatives. The average consumption and cost of albumin and pantoprazole were analysed, comparing 3 months before with 3 months after protocol enforcement. The average number of consumed vials per month and related expenditure were obtained from the hospital information system.

Results The average monthly consumption of albumin was 1832 vials before and 858 vials after the intervention. The mean albumin cost per hospital bed day was $2.6 before and $1.5 after the intervention, leading to a cost difference of about $1.1 per hospital bed day with a mean monthly saving of about $29 751 (43% decline in albumin expenditure). The mean monthly consumption of intravenous pantoprazole was 6043 vials before and 4713 vials after the intervention. The mean expenses per hospital bed day was $7.6 before and $6.2 after implementing the intervention. The protocol successfully decreased pantoprazole consumption by $1.4 per hospital bed day with a mean monthly saving of about $38 803. (Approximately 19% reduction in monthly pantoprazole expenditure.)

Conclusion Our study confirms that our protocol may substantially reduce albumin and pantoprazole use and lead to significant cost savings.

No conflict of interest

RENAL DONOR OR RECRUDESCENCE AS ORIGIN OF MALARIA INFECTION

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Background Immunity to malaria is complex, due to the replicative cycle of the parasite through intracellular and extracellular phases. Cellular and humoral immunity are necessary to contain the infection; it is more complicated in patients who regular receive immunosuppressive treatment.

Purpose To report a case of malaria after recent kidney transplantation without recent exposure to an endemic area.

Material and methods The patient was a 42-year-old man who presented to the hospital after 2 days of nausea, vomiting, fever, headache and malaise. He was from Nigeria and had lived in Spain since 2004. His medical history was significant for renal transplantation from a live donor a month before this episode. Regarding the donor, the 58-year-old man was HLA identical with normal examination results, including PCR negative for *Leishmania spp* and *Plasmodium spp*. Blood smears were negative. Concerning his medical history, he had malarial disease 6 years previously.

Results Haemogram showed normal range levels except for lower platelet count and increased serum creatinine. Blood smears demonstrated *Plasmodium falciparum* and parasitaemia at 1%. Blood was sent to the laboratory for PCR confirmation. The patient was started on treatment with Quinimax (a combination of four alkaloids related to quinine) and doxycycline adjusted dose, for 7 days. This treatment required special follow-up for glycaemia. Also, renal function was monitored and immunosuppressive drug levels (tacrolimus–prednisolone) were measured, owing to interaction with malaria drug treatment. Dose adjustment was required. No parasitaemia was found after malaria treatment. The patient was discharged with follow-up appointments.

Conclusion To date, there are some cases of malaria after kidney transplantation with unknown origin; it could be considered a recrudescence years after exposure. In conclusion, routine malaria prophylaxis treatment is likely necessary for renal transplantation and in the post-transplantation period for patients from endemic areas although they do not have to have had recent contact, especially if the donor is also from an endemic areas.

No conflict of interest

ECONOMIC IMPACT OF CLINICAL PHARMACIST´S INTERVENTIONS ON ANTIMICROBIAL THERAPY IN CRITICALLY ILL PATIENTS

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Background A clinical pharmacist (CP), as part of the healthcare team (HT), can contribute to adequate anti-infective use. Few studies have evaluated the economic impact of CP´s interventions (CPI) in the intensive care unit (ICU), and most consider only drug costs.

Purpose To analyse the economic impact of CPI regarding antimicrobial therapy (AT) in the ICU.

Material and methods We conducted a retrospective analysis of CPI regarding AT in the ICU over a 5 month period. The CP spends 5 hours/day, 5 days/week in the ICU. 33% of CPI are anti-infective related. Information regarding CPI is recorded daily in the hospital´s information system and includes the drug involved, type of intervention, acceptance by physicians and estimated costs (incremental and avoided) as a consequence of the CPI. These costs include changes in drugs, time and products for drug preparations and administration, and the pharmacist's time. To estimate costs (incremental or avoided) we assumed that the change to the recommended and accepted therapy would have happened 2 days later the without CPI (CPI contribute to earlier changes). For sensitivity analysis, we considered that the change would have happened in 1–4 days. The ratio 'avoided cost to invested money' was calculated.

Results 212 interventions were recorded, corresponding to 114 patients. Most frequent types of CPI were: modification of drug dose and/or interval (MD) (50.9%), drug discontinuation (DD) (22.6%), change to a more cost effective administration route (CR) (14.6%), initiate a drug (7.5%) and change to a

more cost effective drug (CD) (2.4%). Physicians´ acceptance rate was 97.6%.

Over the 5-month period, we estimated a total decrease in costs as a consequence of CPI of €7013 (34.8% decrease), corresponding to €33.1/intervention and €61.5/patient. According to sensitivity analysis, total savings varied from €2779 to €19 011. This estimation included the cost of the CP's time during the studied period (€2859). Therefore, €3.5 were avoided per €1 invested in the CP. Types of CPI associated with greater total savings were (in decreasing order): DD, MD and CR(and per intervention: CD, CR and DD).

Conclusion Having a CP as a member of the HT in the ICU performing interventions related to antimicrobials is economically beneficial.

No conflict of interest

INFLUENCE OF CONCOMITANT TREATMENT WITH STATINS ON SURVIVAL OUTCOMES OF PATIENTS WITH METASTATIC CASTRATION RESISTANT PROSTATE CANCER RECEIVING ABIRATERONE AS FIRSTLINE THERAPY

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Background Previous studies have analysed the effect of statins on the response duration to androgen deprivation therapy in metastatic prostate cancer (mCRPC)[1] but without using abiraterone.
Purpose The aim of this study was to explore whether statins affect survival outcomes in our population of mCRPC patients treated with abiraterone as firstline therapy.
Material and methods We performed a retrospective observational study with mCRPC patients who received abiraterone as firstline therapy in our department between August 2014 and October 2016. The variables collected were: patient age, duration of treatment with abiraterone, progression to abiraterone (y/n) and concomitant treatment with statins (y/n). All patients had bone metastases and had not received prior chemotherapy. For descriptive statistics we estimated medians for continuous variables and populations, and frequencies for categorical variables. Progression free survival (PFS) was calculated and analysed with the Kaplan–Meier test using SPSS 15.0. We assumed statistical significance when p (log rank) was ≤0.05.
Results 45 men with mCRPC treated with abiraterone as firstline therapy were investigated. Median global age was 80 years (51–92). 22 (49%) had never received statins, while 23 (51%) were using statins concomitantly during treatment. Median age for both groups was very similar: no statins 80 years (51–92) versus statins 80 years (52–90). 18/45 patients had progression during treatment: 12/22 from the no statins group and 6/23 from the statins group. Global PFS was 20.6 months (17.7–23.6). PFS for the no statins group was 8.7 months (3.2–14.1) while in the statins group it was 20.6 months (17.1–24.2). We observed a statistically significant difference in PFS between both groups (p (Log rank)=0.017).

Conclusion Although our results seem to show a clear benefit from concomitant treatment with statins in patients with mCRPC receiving abiraterone, we need to interpret these results with caution. Some limitations could affect the results: small sample size (which involves low power analysis) and other external factors which could affect survival outcomes in our population. As this was an exploratory study, further better designed studies are needed to clarify these preliminary results.

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No conflict of interest

ABSTRACT WITHDRAWN

BIOLOGICAL DRUGS: PERSISTENCE RATE IN PATIENTS WITH RHEUMATOID ARTHRITIS AND SPONDYLARTHRITIS

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Background Rheumatic diseases, such as rheumatoid arthritis and spondylarthritis, are chronic autoimmune diseases that can be treated with new biological drugs.
Purpose The purpose of this study was to evaluate drug retention as a surrogate for the effectiveness of biologic therapy.
Material and methods In a rheumatological centre in Apulia, Italy, 210 patients with rheumatoid arthritis (RA) and 336 patients with spondylarthritis (SpA) were evaluated, following treatment with 'biologics' from 1 January 2001 to 31 May 2016. The effectiveness of the biological drugs was evaluated using Kaplan–Meier drug retention curves.
Results For RA patients, we analysed data after 2, 4 and 5 years of therapy. At 2 years, the drug persistence rates were: 75% for etanercept, 63% for rituximab, 60% for adalimumab, 50% for abatacept with a rapid decrease during continuation of therapy; and 42% for infliximab at 2 years and 25% at 4 years. At 5 years the values were: 57% for tocilizumab and 35% for rituximab, adalimumab, etanercept and certolizumab.

For SpA patients, we analysed the data after 2 and 4 years of therapy. At 2 years, the drug persistence rates were: 50–56% for etanercept, infliximab and adalimimab, 35% for certolizumab and 31% for golimumab. Ustekinumab was not statistically evaluable because marketing authorisation was less than 2 years. At 4 years the values were: 44% for etanercept, 38% for adalimumab, 34% for infliximab and 13% for golimumab. Certolizumab was not statistically evaluable because it was commercially available for less than 4 years for psoriatic arthritis.
Conclusion A comparison of RA and SpA showed that RA patients had a higher persistence after 2 years of treatment

(75–60% vs 55–50%) than SpA patients; at 4 years the drug persistence rate was 50% for RA compared with 35% for SpA. In this study, RA patients probably responded better to 'biological drugs' because the biological targets were defined; in SpA, targets are less known, having recently discovered the IL-23/IL-17 (interleukin-23/interleukin-17) aetiopathogenetic way. Therefore, the different clinical responses and frequent change in drugs shows that it cannot predict either therapeutic response or appearance of adverse events.

No conflict of interest

CP-172 | **VISUAL COMPATIBILITY OF BLINATUMOMAB WITH SELECTED CO-ADMINISTRATED DRUGS DURING SIMULATED Y SITE ADMINISTRATION**

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Background The Food and Drug Administration has just approved blinatumomab for the treatment of paediatric patients with Philadelphia chromosome negative acute lymphoblastic leukaemia (ALL).[1] Recommended doses in children are 5 $\mu g/m^2$/day for 1 week followed by 15 $\mu g/m^2$/day for 3 weeks (continuous infusion for 1 month). A major risk of interactions with other drugs during a putative Y administration appears.
Purpose The objective of this study was to evaluate the visual compatibility of blinatumomab with intravenous drugs commonly administered in paediatric populations.
Material and methods Usual concentrations of 39 drugs, including anti-infectious, corticoids, sedatives, analgesics and cardiovascular agents, were evaluated. Two blinatumomab concentrations were used, 0.125 $\mu g/mL$ and 0.375 $\mu g/mL$. The effect of mixing the order was ascertained by studying both the tested drugs added to the blinatumomab solution and the blinatumomab solution added to the tested drugs. Visual examination was performed by three different experimenters just after mixing and 60, 150, 240 and 720 min later at room temperature. Compatibility was defined as the absence of any colour change, haze, fibres, particles, gas generation or precipitate.
Results Only caffeine, hydrocortisone and liposomal amphotericin B presented no evidence of visual incompatibility with blinatumomab whatever the tested conditions (mixing order, concentration and time). Different types of visual modifications were observed with others drugs such as particles, flakes, thin needles or haze.

14 tested drugs demonstrated a transient reaction (caspofungine, ceftazidime, ceftriaxone, cotrimoxazole, daptomycin, imipenem–cilastatin, midazolam, naloxone, nefopam, ondansetron, pantoprazole, pediaven, rivotril, vancomycin). 22 tested drugs presented a persistent reaction at least once according to tested concentrations or order of mixing (acetaminophen, albumin, alizapride, ciprofloxacin, cloxacilin, dexamethasone, dexchlorpheniramine, furosemide, rasburicase, dextrose, heparin, hydroxyzine, metronidazole, methylprednisolone, meropenem, morphine, nalbuphine, omeprazole, phloroglucinol, potassium, teicoplanin, tranexamic acid). For seven of these, particles became

bigger and bigger, or more numerous between observations time points (alizapride, ciprofloxacin, dexamethasone, heparin, methylprednisolone, omeprazole, teicoplanin).
Conclusion Numerous drugs were identified as visually incompatible with blinatumomab and should not be administered simultaneously through a common intravenous port. For others, further studies need to be done to ensure chemical stability.

No conflict of interest

CP-173 | **EVALUATION OF PROFESSIONAL PRACTICES: RETROSPECTIVE ANALYSIS OF CLONAZEPAM PRESCRIPTIONS**

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Background Since 2010, the French Drug Agency (ANSM) has strengthened prescription and delivery conditions for clonazepam. This drug, indicated as an anticonvulsant, exposes patient to a risk of abuse, dependency and misuse according to the summary of product characteristics (SmPC). Prescriptions are limited to neurologists and paediatricians, for up to 12 weeks.
Purpose Our objective was to verify that clonazepam use was in line with ANSM recommendations in our hospital.
Material and methods Clonazepam computerised prescriptions for patients hospitalised between January 2015 and May 2016 were retrospectively gathered from the prescription software, Actipidos. Analysis of electronic medical records from Mediweb allowed us to obtain information on dosage and indication.
Results 263 collected prescriptions concerned 200 patients during 248 hospital stays. Hospital wards with the most prescriptions were internal medicine (15%), pneumology (12%) and oncology (11%). Clonazepam oral solution was prescribed more often (67%) than the injectable solution (18%) or tablet (15%). Daily dose average was 1.5 mg (dosage unknown in 50% of cases). Prescriptions were related to treatment continuation (51%) or initiation (19%) while no information was found in 30% of cases. Among all initiations, 56% were performed by the internal medicine and oncology department and 57% were indicated for epilepsy. After hospitalisation, treatment was continued (50%), stopped (10%) or on track (1%) while no information was found in 39% of cases. The main indications were neuropathic pain (33%), convulsive status (16%), epilepsy and pain for cancer (9%), sleep disorders (4%) and restless legs syndrome (3%).
Conclusion These results indicate that clonazepam use is not always in line with ANSM recommendations, which has also been observed in other studies.[1–2] Indeed, clonazepam indication was respected in 16% of cases. Moreover, we cannot be certain that treatments were stopped under the 12 week limit as clonazepam was often prescribed in a renewal context and maintained after patient discharge in half of the cases. Despite an information campaign relayed by our hospital drug committee, a reminder about recommendations and therapeutic alternative seems to be necessary for prescribing physicians. Pharmacists may play an educative role in setting up effective, corrective and maybe coercive action.

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No conflict of interest

CP-174 | **SUCCESSFUL DESENSITISATION IN A PATIENT WITH LENALIDOMIDE HYPERSENSITIVITY**

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Background A man with relapsed and refractory myeloma and previous neuropathy to intravenous chemotherapy (CyBorD) was treated with daily lenalidomide 25 mg orally plus dexamethasone. On the third day of treatment, more than 12 hours after taking the last lenalidomide pill, the patient presented with generalised macular erythema, periocular oedema, scalp pruritus and fever (38.0°C). Lenalidomide treatment was discontinued and he was successfully treated with systemic corticosteroids and antihistamines. The patient was subsequently referred to the allergy centre for desensitisation.

Purpose Lenalidomide plus dexamethasone is a highly effective regimen that has significantly improved outcomes in patients with multiple myeloma. Hypersensitivity reactions to lenalidomide may preclude its use in patients who would otherwise benefit from this treatment. We report a successful oral desensitisation protocol for lenalidomide in a patient with relapsed and refractory myeloma with hypersensitivity reaction to this drug.

Material and methods In brief, lenalidomide was dissolved in isotonic sodium chloride and diluted to concentrations of 0.0025 mg/mL (solution A), 0.025 mg/mL (solution B) and 1 mg/mL (solution C). After pretreatment with dexamethasone, he was gradually given increasing lenalidomide doses to take orally at 15–60 min intervals (cumulative dose 25.2415 mg). The patient tolerated the escalating doses with no reaction and subsequently begun lenalidomide 15 mg daily, plus 8 mg dexamethasone 3 times per week. He tolerated continuous lenalidomide dosing with no evidence of recurrent hypersensitivity for 21 days.

Results This protocol was repeated on a monthly basis, and the patient has successfully completed 13 cycles of lenalidomide plus dexamethasone. During the desensitisation, he was monitored for any symptoms, skin or mucosal lesions, and had his blood pressure, heart rate, temperature and pulse oximetry regularly checked.

Conclusion The patient remains asymptomatic and free from any evidence of multiple myeloma progression. Limited literature exists on drug desensitisation with lenalidomide. This is a successful report of a lenalidomide desensitisation protocol. It supports the utility of adapted drug desensitisation in the oncology setting for lenalidomide administration in patients with drug hypersensitivity and without effective treatment alternatives.

No conflict of interest

CP-175 | **DESCRIPTIVE ANALYSIS OF ACTIVE CLINICAL TRIALS IN CARDIOLOGY SERVICE**

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Background Cardiovascular diseases are the leading cause of death in Europe making it necessary to promote research projects.

Purpose To describe active cardiology clinical trials (CT) and the distribution of included patients. To analyse investigational drugs (ID).

Material and methods This was a descriptive observational study in a tertiary hospital. Active cardiology CT were considered from January 2015 to October 2016. ID were classified into: new molecule, new indication and new scheme. Collected data were: number of CT and patients, medical conditions included, ID and phase, trial design, location of study and promoter.

Results 26 CT with a total of 336 patients, and a mean of 13.4 patients per CT (range 0–96) were studied. The number of CT/number of patients by medical condition was: chronic heart failure n=13/55 (50%/16.4%); acute coronary syndrome n=4/110 (15.4%/32.7%); cardiomyopathy n=2/6 (7.7%/1.8%); unstable angina n=1/32 (3.8%/9.5%); dyslipidaemia n=1/96 (3.8%/28.6%); atrial fibrillation n=1/21 (3.8%/6.25%); pulmonary hypertension n=1/3 (3.8%/0.9%); platelet reactivity after transcatheter aortic valve implantation n=1/11 (3.8%/3.3%); and patients with bicuspid aortic valve and venous thromboembolism n=1/1 (3.8%/0.3%). Regarding the ID, the distribution of CT/patient was: 12/211 new molecules (46.2%/68.8%), 12/90 new indications (46.2%/26.8%) and new schemes 2/35 (7.7%/10.4%). Depending on the phase, the number of CT/number of patients was: 6/47 phase II (23.1%/14%); 15/246 phase III (57.7%/73.2%); and 5/46 phase IV (19.2%/13.7%). A total of 25 CT (96.1%) were multicentre and controlled; 20 (76.9%) double blind; 16 (64%) with placebo; and six (23.1%) were open label. According to the study location, 21 (80.8%) were international. The industry promoted 22 CT (84.6%).

Conclusion There has been a predominance of multicentre, randomised, phase III, double blind, placebo controlled CT. Most were international and promoted by industry. There was a high number of patients per cardiology CT, showing a predominance of those included in phase III and acute coronary syndrome. However, the largest number of trials was focused on chronic heart failure. No differences were shown for the number of CT studying new drugs or new indications, although more than two-thirds of patients were included in CT that were studying new drugs.

No conflict of interest

CP-176 | **INNOVATION AT ANY COST? MANAGEMENT OF INNOVATIVE THERAPIES IN A HEALTH FACILITY**

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Background Access to innovative therapies has been regulated since 1994 by the introduction of the first temporary authorisation for use (TAU) for drugs without marketing authorisation (MA) in patients with acquired immunodeficiency syndrome. This provision was compassionate and free. Nowadays, the process still exists but has evolved, particularly regarding treatment costs imposed by pharmaceutical companies without any competent authorities' regulation, impacting on national health expenditure objectives.

Purpose The aim of this study was to design and validate the organisation of TAU drug administration reports in hospital to ensure their specific refund to the hospital

Material and methods The scope was drugs under TAU, administered at a health facility over 18 months. Financial issues were assessed by (i) annual balance 'E/I' (€): expenses (from financial management software: FMS) over incomes (from national allocated budgets), (ii) lack of completeness (E/I corrected ratio: we removed from the annual expenses those without income expected) and (iii) evolution of expenditures for the next year. Finally, process escape was evaluated by refund modalities of drugs recently out of the TAU process.

Results The organisation relies on four principles: regulatory monitoring of TAU status change to MA, hospital data pharmaceutical validation, exhaustive drug administration statements to competent authorities (regulatory framework governing TAU requires refunds related to administration declarations) and refund tracking.

In 2015, we identified a balance E/I=3 million/2.7 million; 6% lack of completeness was attributable to errors in FMS, administration traceability or newest TAU drugs late integration in the competent authority's refund database. The first semester of 2016 showed evolution of these parameters: E/I=5.7 million/5.6 million, 1% lack of completeness, associated with market share increase of oncologic immunotherapy (+48%). After the TAU period, some drugs no longer benefited from a specific refund and then relied on hospital budgets (€200 000 in 2016).

Conclusion Although interest in treating patients with these drugs is validated, issues arise when specific refunds in the TAU period are no longer financed post-market. Then the TAU strategy tends to lose its original virtue of providing innovating molecules without additional cost for hospitals. Without an early cost control strategy (since TAU initiation), high prices for innovative and monopolistic medicines could jeopardise healthcare financing systems.

No conflict of interest

Material and methods This was a prospective study in patients with requiring total parenteral nutrition support from March to April 2016 in a tertiary care hospital. The prescriptions included were received via the form 'treatment parenteral nutrition' from the medical record programme Selene and were managed through the parenteral nutrition programme Kabisoft. A database was created with: demographical data (age and sex), type (individualised adult diet, notarised diet, marketed tricameral diet or individualised paediatric diet), service of the prescribing doctor, modifications of grams of nitrogen (N), grams of lipids, grams of carbohydrates (HC), sodium content (Na), potassium (K), calcium (Ca), magnesium (Mg), phosphate (P), chlorine (Cl), acetate (Ac), supply of vitamins, trace elements, insulin intake, grams of glutamine, and volume and acceptance of the amendment. Modifications were consulted via telephone with the prescribing doctor.

Results There were 633 prescriptions for PN, corresponding to 69 patients, and in 39 (6.2%) at least one modification was required. The prescriptions requiring PN modification belonged to 18 patients with a median age of 54 years (interquartile range 38.5–68), 66.7% men. Prescriptions for PN that were modified corresponded to 59.0% in intensive care and 33.3% in endocrinology. The rest belonged to paediatrics and the neonatal unit. 32 (82.0%) of the prescriptions for PNP were individualised for adults, 2 (5.1%) were protocolised for patients with renal failure, 1 (2.6%) was protocolised for degree of stress, 3 (7.7%) were paediatric PN and 1 (2.6%) was a marketed tricameral PN. A total of 69 amendments were made. Distribution: 23.2% (lipid), 8.8% (HC), 15.9% (volume), 8.7% (N), 4.3% (glutamine) and 4.3% (insulin). Both vitamins and trace elements corresponded to 2.9% of the changes. Changes in electrolytes were distributed as follows: 8.7% (Na), 2.9% (Ca and P) and 1.4% (Mg, Cl and Ac). No changes were made in the contributions of K. All amendments were accepted by the prescribing doctor.

Conclusion The largest number of modifications corresponded with grams of lipids, N, HC and volume. The PN prescribed by the intensive care unit needed more changes. Knowing that the ratio of non-protein calories per gram of N represents an objective and quantifiable amount for the use of protein in metabolism, it is important to highlight the role of the pharmacist in controlling this ratio, especially in critically ill patients, being one of the parameters that mostly goes unnoticed by prescribing doctors. Integration of a pharmacist in the prescription of PN provides more security and increases the adequacy of the PN for the patient's needs.

No conflict of interest

CP-177 | INDIVIDUAL PARENTERAL NUTRITION: PHARMACIST WORK AS A MULTIDISCIPLINARY TEAM MEMBER

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Background Parenteral nutrition (PN) provide nutrients required for any pathology. However, it is a technique with complications and represents a substantial health care burden and a considerable economic cost.

Purpose To describe the contribution of a pharmacist in the prescription of PN and to analyse the degree of acceptance by the prescribing doctor.

CP-178 | MEDICATION PERSISTENCE AND INCREASED DOSE INTERVALS OF BIOLOGICAL TREATMENTS IN PATIENTS WITH MODERATE TO SEVERE PSORIASIS

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Background Success with biological agents could be measured by the proportion of people who achieve and maintain a 75% reduction in Psoriasis Area and Severity Index (PASI-75). In patients with a positive response to the treatment (PASI-75),

increasing the dose intervals can reduce treatment costs without affecting the efficacy of the drug.

Purpose To evaluate the medication persistence to biological treatments in patients with moderate to severe psoriasis.

To calculate costs savings in selected patients with increased dose intervals.

Material and methods This was a retrospective observational study conducted in the outpatient pharmacy of a tertiary hospital. Eligible patients were those with moderate to severe psoriasis who had received any biological agent between January and August 2016. Collected data were: demographic variables (age, gender), disease variables (PASI) and treatment variables (current biological drug to treat psoriasis, and dose, frequency of administration and medication persistence of the drug). In patients with PASI-75, costs savings due to increased dose intervals or dose reductions were calculated.

Results 102 (72% men) were included with a median age of 47.5 years (39–54). 49 (48%) were taking ustekinumab, 31 (30%) adalimumab, 20 (20%) etanercept, 1 (1%) golimumab and 1 (1%) secukinumab. For 67 patients (66%) this was their firstline treatment. Medication persistence was 1071 days (472–2362) for etanercept, 993 days (372–1535) for ustekinumab and 827 days (487–1848) for adalimumab. The frequencies of administration were 7 days (7–7) for etanercept, 14 (14–23) for adalimumab and 98 (91–98) for ustekinumab. Median reduction in PASI was −87% (−71%; −100%).

In 56 patients (55%) the physician increased the dose interval; 40 (81%) were taking ustekinumab with a dose interval of 98 days (91–105), 12 (39%) adalimumab every 28 days (21–38) and 4 etanercept (20%) every 10 days (9.5–10). This represented a total cost saving of €223 366/year (€66 893 for ustekinumab, €129 525 for adalimumab and €26 948 for etanercept). Median reduction in PASI in patients with increased dose intervals was −89% (−70%; −100%).

Conclusion Medication persistence for ustekinumab and etanercept was higher than that for adalimumab. Increasing dose intervals in patients with a positive response to the treatment is a useful strategy to reduce costs and maintain effectiveness.

No conflict of interest

EFFECTS OF REIMBURSEMENT CHANGES ON USE OF ERYTROPOIESIS STIMULATING AGENTS IN DIALYSIS PATIENTS

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Background A certain number of hospital drugs are listed, at the national level, to be charged to health insurance in addition to hospital stay fees, based on diagnosis related group (DRG) tariffs. This list is regularly updated with new entries as innovative and expensive drugs reach the market. When they begin to be used more widely and/or their cost decreases, drugs should be removed from this list and put back into the DRG system. This was the case for erythropoiesis stimulating agents (ESA) that were removed in March 2014.

Purpose The aim of this study was to evaluate the impact of change in reimbursement system on the use of ESA for the treatment of anaemia in patients with chronic kidney disease (CKD) on dialysis.

Material and methods A comparison of practices between the 22 month-period before and after ESA withdrawal from the list was conducted retrospectively. All adult patients with CKD on dialysis and receiving ESA treatment during one of these two periods were included. The following criteria were collected: patient age and sex, time on dialysis, primary kidney disease, monthly haemoglobin concentration, iron and ESA total consumption.

Results 569 patients were included in the first period (1 May 2012–29 February 2014), 585 in the second period (1 March 2014–31 December 2015). The characteristics of the patients were similar between the two patient groups: median age (67 years), sex ratio (1.5), median time on dialysis (3 years) and primary kidney disease. Median haemoglobin level was 110.5 g/L during the first period compared with 108.8 g/L during the second period (p<0.05). The average consumption of iron increased significantly during the second period, and the total consumption of ESA increased proportionally to the number of patients.

Conclusion This study showed a lower haemoglobin rate target (which can also be related to the evolution of the recommendations) and an increase in iron use, but no decrease in ESA consumption. It seems that the reimbursement change had little impact on the use of ESA for treatment of anaemia in patients on dialysis. Further criteria, such as the Charlson comorbidity index, erythropoietin resistance index and number of transfusions, should be evaluated to explain these results and confirm the clinical relevance of the effects observed.

No conflict of interest

REASONS FOR SWITCHING FROM INTEGRASE INHIBITORS IN A REAL COHORT OF HIV PATIENTS DURING A 3 YEAR STUDY

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Background Integrase inhibitors (INSTIs) are recommended as firstline antiretroviral treatment (ART) in HIV patients. However, several factors such as toxicity, virological failure or a low adherence can lead to a switch of ART.

Purpose To assess the frequency and compare the reasons for switching among the INSTIs in a HIV unit in a tertiary hospital.

Material and methods A retrospective study including all patients who switched from INSTIs to other ART (January 2014–September 2016) in our cohort of 1750 HIV infected patients was conducted. Switches involving ART other than INSTIs were not included. Data collected: demographics, hepatitis C virus coinfection, previous and new ART. Reasons for switching were classified as: adverse events (neuropsychiatric toxicity, dermatologic, gastrointestinal and others), schedule optimisation (convenience, simplification or food restrictions), drug–drug interactions, pregnancy and low level viraemia (LV).

Results 733 patients were treated with INSTIs during this period: 223 (30.4%) raltegravir, 159 (21.7%) elvitegravir and 351 (47.9%) dolutegravir. The INSTI was switched in 133 patients (7.2% of total patients): 101 (75.9%) men, age 47.0 ±13.2 years, HCV 39 (29.3%).

	INSTIs			p Value
	Raltegravir (n=223)	Elvitegravir (n=159)	Dolutegravir (n=351)	
Patients switching from INSTI (n=133)	66 (29.6%)	40 (25.2%)	27 (7.7%)	<0.001
Reasons for switching				
Schedule optimisation 70 (52.6%)	42 (18.3%)	28 (17.6%)	5 (1.4%)	<0.001
Drug–drug interactions 3 (2.3%)	0 (0%)	3 (1.9%)	0 (0%)	<0.001
Pregnancy 2 (1.5%)	0 (0%)	0 (0%)	2 (0.6%)	<0.001
LV 18 (13.5%)	16 (7.2%)	2 (1.3%)	0 (0%)	<0.001
Adverse events 40 (30.1%)	8 (3.6%)	7 (4.4%)	20 (5.7%)	<0.001
Neuropsychiatrics	3 (1.3%)	1 (0.6%)	9 (2.6%)	0.002
Dermatologic	0 (0%)	0 (0%)	5 (1.4%)	0.001
Gastrointestinal	1 (0.4%)	2 (1.3%)	12 (3.4%)	<0.001
Others	4 (2.2%)	4 (2.5%)	3 (0.9%)	<0.001

New ART treatment included INSTIs in 97 (72.9%) (6% raltegravir; 24.8%elvitegravir; 42.1% dolutegravir); non-nucleoside reverse transcriptase inhibitors in 11 (8.3%); protease inhibitors in 20 (15.0%); and others ART in 5 (3.8%) patients.

Conclusion In more than 50% of patients, the INSTIs were switched in order to optimise the ART schedule. Raltegravir was the INSTI more frequently switched, because of schedule optimisation and presence of LV (due to poor adherence in almost all patients). Drug interactions leading to an INSTI switch were exceptional and were only seen with elvitegravir, probably related to its coformulation with cobicistat. The most common reason for stopping dolutegravir was adverse events, mostly gastrointestinal, while none of the patients experienced LV.

No conflict of interest

CP-181 | **CLINICAL PHARMACIST INTERVENTIONS IN THE EMERGENCY DEPARTMENT AND THEIR IMPACT ON PREVENTABLE ADVERSE DRUG EVENTS AND ASSOCIATED COST AVOIDANCE**

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Background An emergency department (ED) is a dedicated area in a hospital that provides continuous access to emergency medicine services for undifferentiated, urgent presentations across the entire spectrum of medical, surgical, trauma and behavioural conditions. An adverse drug event (ADE) has been defined as 'any harm associated with any dose of a drug'. A preventable ADE is 'harm caused by the use of a drug as a result of an error'.

Purpose Clinical pharmacists can play an important part in the identification and reduction of preventable ADEs in the ED. This study evaluated the type and frequency of a clinical pharmacist's interventions and their effect on preventable ADEs and their cost implications in the ED of an Irish teaching hospital.

Material and methods The study was a cross sectional observational study of all clinical pharmacist interventions completed on ED lodged (inpatient) adult (≥16 years old) prescriptions over 22 consecutive working days. The Pharmaceutical Care Network Europe 2010 classification system for drug related problems and the National Coordinating Council for Medication Error Reporting and Prevention Index for Categorising Medication Errors were used to categorise interventions. Cost benefit analysis was also performed through the Nesbit method using probability scoring of patient drug harm in the absence of pharmacist intervention.

Results 92 patients required no ED pharmacist intervention and 169 patients required at least one intervention. 289 interventions were completed on 169 patients with a prescriber acceptance rate of 61.9%. The predominant intervention type was omission of regular medication on admission (36%). 65.1% of ED pharmacist interventions were categorised as a potential ADE and 3.5% were categorised as actual ADEs by two ED consultants. Comparatively, the ED pharmacist categorised 67% of interventions as a potential ADE and 11.4% as actual ADEs. A cost benefit of € 20 876 and a cost benefit ratio of 3.76:1 was associated with the ED pharmacist service through the avoidance of ADE costs in the study.

Conclusion An ED clinical pharmacist service has demonstrated a positive impact on identification and reduction of preventable ADEs. This reduction in patient drug harm corresponds to a cost avoidance in excess of three times the cost of the pharmacist service.

No conflict of interest

CP-182 | **POTENTIAL ECONOMICAL IMPACT OF BIOSIMILAR ADALIMUMAB**

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Background Adalimumab is a subcutaneous anti-tumour necrosis factor antibody therapy used in the treatment of numerous pathologies related to rheumatology, dermatology and gastroenterology. This drug is on the top ranking of the annual hospital budget. The data exclusivity period on the reference drug (Humira) is close to expiration.

Purpose To analyse the cost of treatment with the biosimilar adalimumab in comparison with its reference drug.

Material and methods All patients treated (September2015– August 2016) with adalimumab were included. Data were obtained from electronic medical records (SAP). The total cost was calculated using the current reference price, € 436.06, and separated by clinical department: rheumatology, dermatology and gastroenterology. Considering the same price reduction (30% less than the reference price) for the biosimilar adalimumab than that observed for other biosimilar drugs, we estimated the price of biosimilar adalimumab as € 305.24. Cost savings were calculated considering the expected biosimilar adalimumab price for the same period.

Results 326 patients were treated with 5894 doses of adalimumab during the study period. The annual cost was € 2 570 137.6. Divided by department: rheumatological pathologies

accounted for 53.4% of the cost, followed by gastroenterological pathologies 28.8% and dermatological 17.1%; the cost for other areas accounted for less than 1% of the total cost. The economic impact of switching to a biosimilar could result in annual savings of € 771 041.3.

Conclusion As biosimilar therapy has shown similar results to those observed with the reference drug in clinical practise, we consider that the cost savings associated with the use of biosimilars contributes to the sustainability of the National Health System.

No conflict of interest

CP-183 | **EFFECTIVENESS AND SAFETY OF BIOLOGICAL THERAPY OPTIMISATION IN CHRONIC PLAQUE PSORIASIS**

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Background Biologic drugs have demonstrated efficacy and safety in the treatment of chronic plaque psoriasis. Frequently, label doses tend to be reduced in clinical practice when a sustained response has been reached.

Purpose To assess the effectiveness and safety related to the optimisation of biological therapies in mild to moderate psoriasis (mmP) patients.

Material and methods A prospective observational study of patients with mmP receiving treatment with optimised doses of etanercept(ETA), adalimumab(ADA) or ustekinumab(UST) was conducted. Patients with response maintained for at least 6 months (defined as maintenance of at least 75% improvement in psoriasis area and severity index (PASI75) reached with standard doses) were included.

Treatment regimens, based on the frequency of dosage, were: ETA—50 mg/10 days; 50 mg/14 days; 50 mg/30 days; ADA—40 mg/21 days; 40 mg/28 days; and UST—45 mg/16 weeks; 45 mg/20 weeks. The primary effectiveness endpoint was the proportion of patients with response maintained(ie, PASI reached with standard doses) at weeks 12 and 24 after dose reduction. Secondary endpoints were proportion of patients with a maintained response distributed by drug, treatment regimen and quality of life, assessed by the Dermatology Life Quality Index(DLQI, score from 0 (no impact of skin disease on quality of life) to 30 (maximum impact)) at weeks 0 and 24. A checklist to record the main adverse reactions was developed.

Results 32 mmP patients with biological therapy optimised doses were included. At week 12, 96.8% of patients achieved a maintained response. 1 patient with ETA/10 days treatment did not maintain PASI and returned to standard doses. Effectiveness at week 24 was 89.3% for 28 patients (insufficient data available for 4 patients). 3 patients lost effectiveness at week 24: 1 patient with ETA/10 days, 1 with UST/20 weeks and 1 with ADA/21 days. Patients' treatment distribution was: 12 ADA/21 days and 5 ADA/28 days; 9 ETA/10 days and 2 ETA/14days; 3 UST/16 weeks and 1 UST/20 weeks. Mean DLQI after and before dose optimisation was maintained in 1. At week 24, DLQI was above 10 in 1 patient. There were no adverse drug events.

Conclusion Efficacy was maintained after biological therapy dose optimisation in most of the mmP patients. Adalimumab was the most frequent biological drug optimised, followed by etanercept and ustekinumab. Safety and quality of life after drug dose reduction was maintained in most patients.

No conflict of interest

CP-184 | **CORRELATIONS OF VANCOMYCIN CLEARANCE DURING INTERMITTENT INFUSION WITH MEASURED AND ESTIMATED CREATININE CLEARANCE IN CRITICALLY ILL PATIENTS: 6 HOUR URINE COLLECTION MAY BE BENEFICIAL**

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Background Although vancomycin dosing recommendations are based on creatinine clearance estimated using the Cockcroft–Gault formula, it may not be optimal for critically ill patients due to their physiologic changes. A direct measure of creatinine clearance can provide more accurate information on renal function and dose adjustment of vancomycin.

Purpose The objective of the current study was to determine vancomycin clearance during intermittent infusion and to explore its correlations with measured and estimated creatinine clearance in critically ill patients with normal renal function.

Material and methods 20 critically ill patients who received treatment with vancomycin intermittent infusion were enrolled (16 men, 4 women, age 46.8 ± 19.8 years, body mass index 24.0 ± 2.8 kg/m^2, estimated glomerular filtration rate (eGFR) 108.0 ± 44.3 mL/min, Acute Physiology and Chronic Health Evaluation (APACHE) II score 12.7 ± 5.0 at admission). Vancomycin clearance (CL_{van}) was determined 1–2 times for each patient during the study (n=32). Its correlation with measured creatinine clearance in 6 hour urine (CL_{6-h}) and estimated creatinine clearance from the Cockcroft–Gault formula (CL_{CG}) was investigated.

Results Data analysis revealed that CL_{6-h} was a stronger predictor of CL_{van} rather than CL_{CG} (Pearson coefficient correlation=0.83 vs 0.67; $p < 0.001$). The relationship between CL_{van} and CL_{6-h} was utilised to develop the following equation to estimate clearance of vancomycin in the critically ill patients without renal impairment: CL_{van} (mL/min)$=26.55+0.73$ CL_{6-h} (mL/min).

Conclusion Measured creatinine clearance estimated from a 6 hour urine collection is a simple test that provides more reliable and practical information compared with the Cockcroft–Gault formula for vancomycin dose adjustment in critically ill patients with normal renal function.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

CP-185 | AN INNOVATIVE TREATMENT ADHERENCE TOOL

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Background Non-adherence in heart failure leads to hospital admissions and fatalities. The Morisky scale may be adequate in some clinical scenarios, yet the score is selected by balancing sensitivity and positive predictive values.[1]

Purpose To measure treatment adherence using a novel model that achieves a good outcome in pharmaceutical care.

Material and methods The questionnaire was developed and validated in Maltese 'Kwestjonarju ghall-Uzu tal-Medicina u l-pazjent' (KUMP) and forward translated into English 'Treatment adherence questionnaire' (TAQ). The tool is a 13 item questionnaire with the last question embedding 7 sub-questions on various non-adherence scenarios. The questions tackle knowledge, patient self-care, access, communication and appropriate medicine use with six possible answer categories from 'never' to 'always'. Scoring for parts A and B is different, to facilitate understanding of all of the questions by the individual respondent with a maximum score of 100. A higher score indicates higher adherence.

Results The questionnaire's good content coverage and acceptable item properties resulted in positive expert review ratings with a high reliability score (K=0.89; p<0.05). The tool was used to interview 50 heart failure patients (44–93 years). The mean score was 66% (n=50; SD=10) with the highest and lowest scores being 89 and 40, respectively. Only 4 patients (n=50) answered that they were never entitled to free medicines, attaining low adherence scores. 3 of the 46 patients admitted that they were confused with their prescribed medicines and needed a follow-up to organise their treatment charts for a smooth discharge. 2 of the 46 patients were buying other related medicines. 5 patients (n=50) confirmed that they had stopped taking a particular medicine, with 3 being readmitted due to such incidents.

Conclusion The mean adherence score of the studied heart failure population sample indicated moderate adherence. Dichotomous questions do not allow the outcome of the appropriate answer since there are grey areas that cannot be captured. Therefore, the novel tool provided more insight and was simple and practical to use. The tool can be applied to other clinical scenarios.

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No conflict of interest

CP-186 | FOLLOW-UP OF OFF-LABEL RITUXIMAB PRESCRIPTIONS IN A FRENCH UNIVERSITY HOSPITAL

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Background Rituximab is a chimeric anti-CD20 antibody approved in a few indications apart from oncology (rheumatoid arthritis, polyangiitis and Wegener's granulomatosis). The French funding system allows the off-label use of rituximab if the therapeutic indication is argued by the prescriber (scientific societies' guidelines, case series, case reports, patient's clinical data). This information is discussed with hospital pharmacists before the therapeutic decision, on a case to case basis.

Purpose The aim of this study was to analyse the off-label use of rituximab, outside of oncology indications, in a French university hospital.

Material and methods A retrospective study of rituximab prescriptions was performed between 1 December 2015 and 1 June 2016 by extracting data from computerised physician order entry and pharmacy management software (Pharma, Computer Engineering). Off-label prescriptions were analysed through literature analysis and clinical evidence provided by physicians. In parallel, clinical trials involving off-label use of rituximab in progress in France were identified from the European Union clinical trials register.

Results Between 1 December 2015 and 1 June 2016, 188 patients were treated with rituximab for indications apart from oncology (286 courses). 175 (93%) patients were treated for off-label indications of this drug (264 courses). For 128 patients (68%), medical justification was documented, with pertinent bibliography in 98% of cases. The most common indications were multiple sclerosis (83 patients; 50%) and neuromyelitis optica (23 patients; 13%). In total, 26 off-label indications were used during this period. 14 clinical trials were in progress in France including 7 for those indications. None of the patients studied here was included in a clinical trial.

Conclusion Rituximab is an innovative drug with restricted approved indications, besides oncology. In this context, in our university hospital, we observed wide use (more than 90%) of rituximab off-label, especially in multiple sclerosis. The process of drug delivery applied in our hospital enables follow-up of a massive cohort of patients treated with rituximab off-label, providing real life data on efficacy and toxicity. The introduction of temporary use recommendations approved by the French Health Agency could enable this data collection, facilitating approval of new indications.

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No conflict of interest

CP-187 | EFFICACY, SAFETY AND COST OF POMALIDOMIDE IN RELAPSED AND REFRACTORY MULTIPLE MYELOMA

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Background Patients with relapsed and refractory multiple myeloma (RRMM) have a median survival of about 3–6 months.[1]

Purpose The aim of the study was to analyse efficacy, safety and cost of pomalidomide in patients with RRMM.

Material and methods All patients in whom a treatment by pomalidomide was initiated between August 2013 and October 2015 for a RRMM in our hospital were included. Outcomes were predictive factors of early pomalidomide discontinuation (before the third month), overall response rate (ORR, using International Multiple Myeloma Working Group criteria[2]), overall survival (OS), safety and treatment cost.

Results 63 patients (mean age 61 years) were included. All patients received pomalidomide with dexamethasone. Pomalidomide was discontinued early in 17 (27%) patients. Time from diagnosis to pomalidomide initiation <3 years was independently associated with early pomalidomide discontinuation (OR=5.82; 95%CI 1.51–22.4; p=0.01). At 3 months, ORR was 51%. After a median follow-up of 15.1 months, 54 (86%) patients had discontinued pomalidomide. Median OS from pomalidomide initiation was 6.4 (95% CI 3.7–not achieved) months in patients who discontinued pomalidomide early versus 17.1 (95% CI 9.4–not achieved) months in patients with a stable disease versus not achieved (95% CI 9.4–not achieved) in responders (log rank; p=0.004). The independent risk factors of mortality from pomalidomide initiation were: early pomalidomide discontinuation (hazard ratio 6.8 vs no early discontinuation; 95% CI 2.3–19.6; p<10^{-3}) and a haemoglobin level below 11g/dL (hazard ratio 2.7 vs $\geq$11 g/dL; 95% CI 1.0–7.0; p=0.04). The most common grade $\geq$3 adverse events were neutropenia (14%) and infections (25%). The mean pomalidomide cost per patient was € 79 717±46 296 (range € 17 850–214 200).

Conclusion Compared with the MM-003 phase III trial,[3] we reported similar safety data but a higher ORR (51% vs 21%). We demonstrated the long term favourable safety and efficacy profile of pomalidomide in RRMM patients, even in those with stable disease.

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No conflict of interest

CP-188 | **EVALUATION OF PATIENT'S KNOWLEDGE ABOUT VITAMIN K ANTAGONIST TREATMENT**

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Background Vitamin K antagonist (VKA) is thought to be the largest anticoagulant prescribed; its iatrogenic effect constitutes a real public health problem.

Purpose The objective of this study was to evaluate the level of knowledge of patients about VKA treatment.

Material and methods During September and October, a standardised questionnaire was submitted to external patients consulting in the department of cardiology and receiving VKA. Criteria for inclusion were as follows: patients >18 years, receiving VKA and who agreed to participate in the study. The items on the questionnaire allowed identification of the main areas of therapeutic education: knowledge (knowledge of treatment by the patient, treatment modalities), know-being (healthy living, communication with health professionals) and know-how (management processing). All patients gave their informed consent. Data analysis was performed using the SPSS 13.0 software.

Results 30 patients were included in the study, 48% men and 51% women. Mean age was 55 years and 31% were illiterate. The name of the VKA treatment was known in 96% and 100% of patients who knew their dosage. 68% knew the indication for VKA treatment. 89% declared having received information about their treatment, 65% by their doctor and 34% by their pharmacist. In case of oversight of the drug, 31% of patients did not take it the same day, 83% of patients were not informed on the target value of INR. Symptoms of overdose were unknown in 21% of cases. 68% did not know risks of underdosing. Treatments contraindicated were not know in 82% of cases whereas only 17% of patients did not know forbidden foods with VKA.

Conclusion Patient knowledge about their VKA treatment was insufficient to ensure the effectiveness and safety of the treatment. It would be interesting to establish a therapeutic educational programme for patients.

No conflict of interest

CP-189 | **ADHERENCE TO ABIRATERONE AND ENZALUTAMIDE IN PATIENTS WITH METASTATIC CASTRATION RESISTANT PROSTATE CANCER**

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Background The use of oral chemotherapy (OC) is an effective and safe approach in the treatment of metastatic castration resistant prostate cancer (MCRP). Abiraterone and enzalutamide offer improved patient convenience and ease of administration. However, patients are now responsible for ensuring optimal adherence to their medication.

Purpose The aim of this study was to determine adherence to abiraterone and enzalutamide in patients with MCRP.

Material and methods A retrospective longitudinal study was carried out from September 2011 to March 2016. All patients treated with OC for MCRP were included. Patients with only one drug dispensation were excluded, because adherence could not be calculated. Patients´ medical records were reviewed and the following data were collected: demographics and pharmacotherapeutics (prior chemotherapy, abiraterona or enzalutamide treatment start and end date, dosing and dispensed data). Data were obtained from electronic clinical records, oncology prescription software and outpatient dispensing records.

Adherence to OC was evaluated indirectly using dispensation records to calculate 'medication possession rate' (MPR). MPR is defined as the sum of all days of drug supplied within a given period, divided by the total number of days in that period. Optimal adherence was defined as MPR >80%, following previous studies. The end points were: measure of adherence to enzalutamide and abiraterone; duration of treatment; and percentage of patients who achieved optimal adherence. Data analysis was carried out using SPSS 15.0.

Results 45 patients (mean age 74 years (57–87)) with at least two drug dispensations were selected from the pharmacy database. 30 patients (66.6%) received abiraterone, 3 patients

(6.66%) received enzalutamide and 12 patients (26.66%) received both drugs sequentially.

Oral chemotherapy (OC)	Patients (n)	MPR (%)		Optimal adherence: n (%) (MPR >80%)	Mean duration (months)
		Mean	Median		
Abiraterone	39	107	102	36 (92%)	12 (2–32)
Enzalutamide	15	98	97	12 (80%)	5 (1–13)

Conclusion Most patients showed high rates of adherence to OC in MCRP. The long duration of treatment and absence of symptoms in these patients could prove a threat to adherence to treatment. Oncology pharmacists have a key role by following patients with OC in MCRP and reminding them of the importance of adherence. Study limitations include measuring adherence using only one method.

No conflict of interest

IMPACT OF THE DEPLOYMENT OF A CLINICAL PHARMACY TEAM IN ENDOCRINOLOGY–NUTRITION UNIT

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Background Since 2003, the American Diabetes Association has included pharmacists in the list of diabetes care team members. Indeed, the intervention of clinical pharmacists (CP) has been associated with a decreased risk of medication error (ME) and therefore contributes to the safety of medication management during patients' healthcare circuit.

Purpose The aim of this study was to evaluate the impact of CP activities dispensed by pharmacists in an endocrinology–nutrition unit.

Material and methods An observational, prospective, monocentric study was conducted between November 2013 and September 2016 in a nutrition–endocrinology unit (50 beds). 1 senior, 1 junior and 3 student pharmacists were involved in the deployment of clinical pharmacy activities (medication reconciliation at admission and discharge with delivery of drug management plans (DMP), interview of patient (measurement of medication adherence using the Morisky scale (MMAS-4), assessment of drug knowledge (indication, dosage and precautions for use) and risk of hypoglycaemia). All patients who provided verbal consent were entered into a registry with data collected from their hospitalisation, including anthropometric, clinical, therapeutic and biological information (No DC-2009–1052).

Results 1655 and 1570 patients received medication reconciliation at admission and discharge, respectively. 596 ME in 407 patients were detected and corrected, most were drug omissions. 597 DMP were explained and delivered to patients. 255 patients received an interview with measurement of medication adherence and assessment of drug knowledge. 64 patients had a low level of adherence, the indication, dosage and precautions for use of medications were known,

respectively, in 70%, 80% and 44% of cases. Of the 358 patients interviewed about the risk of hypoglycaemia, respectively, 83 (23%) and 127 (35%) patients reported having had at least one severe hypoglycaemia incident in the year and more than one hypoglycaemia incident by week.

Conclusion Deployment of a clinical pharmacy team in the nutrition–endocrinology unit was a complete success. The CP activities allowed safe drug management with the correction of a significant number of ME before they resulted in harm, and highlighted patients requiring therapeutic education. The next step will be to demonstrate that clinical activities dispensed by pharmacist can decrease rehospitalisation of patients with endocrine diseases.

No conflict of interest

PRESCRIPTION EVALUATION OF HOSPITALISED PATIENTS AT A DISTRICT HOSPITAL, USING A PLATFORM THAT SUPPORTS ANTIMICROBIAL PRESCRIPTION : A PILOT ANALYSIS

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Background A significant percentage of antibiotics worldwide are prescribed inappropriately (context, dosage and duration), especially the use of quinolones, carbapenems and anti-MRSA agents. In order to optimise interventions in a paper-free hospital, a platform has been developed locally allowing prescription monitoring and registration of multidisciplinary interventions under the platform that supports antimicrobial prescription (PAPA), complementing automatically generated email notifications when prescribing conditioned antibiotics or outside the local guidelines. Interventions are made by physician and pharmacist members of the Prevention and Control of Infection and Antimicrobial Resistance Group (GCL-PPCIRA) in real time.

Purpose To characterise hospital prescriptions for quinolones, carbapenems and anti-MRSA agents in March 2016, using the platform.

Material and methods This was a pilot prospective analysis on the use of a PAPA platform, which integrates data relating to the prescriber, scope and characteristics of the prescription, initial GCL-PPCIRA interventions, follow-up by pharmacists, medical acceptance and registration of clinical and laboratory variables.

Results The analysis involved 220 conditioned prescriptions, automatically generated by the prescription system and introduced into platform. Of these, 48% required GCL-PPCIRA interventions. 47.2% of the suggested interventions were accepted. In only 6.6% of non-accepted interventions was there an automatic justification and in 46.2% there was no given justification. Most suggested interventions (41.5%) included antibiotic exchange, suspension (26.4%), duration of therapy (12.3%), change of dosage (4.7%) and addition of another antibiotic (1.9%). Most interventions made were for carbapenems (34.9%), followed by quinolones (13.2%) and anti-MRSA agents (9.4%), with an acceptance profile, respectively, of 17/6/4 cases. 34.9% of interventions were made in the emergency department.

Conclusion In order to reduce the emergence of resistances, conducting interventions under a PAPA should be complemented by evaluation of prescription quality and adequacy of interventions, requiring tools that integrate information and enable real time interventions by multiple professionals. This analysis concluded that the rate of interventions in total prescriptions generated meets the estimated international values, which translates into a good robustness. The data analysis related to the reasons for interventions and acceptance rate, and other data not mentioned in this analysis, makes it possible to define improvement strategies for good antibiotic prescribing practices, particularly in the conditioned antibiotics from the prescriber to the institutional level.

No conflict of interest

CP-192 ASSESSMENT OF MEDICAL COMPUTERISED PRESCRIPTIONS IN GERIATRICS USING STOPP/START CRITERIA

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Background STOPP/START is recognised as a simple and efficient tool for detecting potentially inappropriate drug prescriptions (PIP) in persons aged 65 or older. In our hospital, no screening tool allows us to detect these prescriptions.

Purpose The purpose of this study was to estimate the quality of the drug prescriptions given to patients admitted to the geriatric department. It also analysed the prescriptions to ensure patients were given a safe prescription that complied with current recommendations when they were discharged.

Material and methods Between June and August 2016, patients included were at least 65 years old, with multiple pathologies, and hospitalised in the geriatric department of a university hospital centre. Patients were excluded if they did not have a personal treatment when they were admitted to the service. When the patient was admitted, a prescription analysis was made using 115 STOPP/START criteria and clinical/biological data extracted from the electronic patient record (Axigate). When a drug was not in accordance with the recommendations, a pharmaceutical opinion (PO) was written on computerised prescriptions from PHARMA software to alert the prescriber and to suggest an alternative medication. Other prescription errors were also reported: patient weight not specified, contraindications and poor transcription of the patient's personal medication. When the patient was discharged, the prescription was analysed a second time to evaluate the appropriateness of the drugs prescribed.

Results 127 patients were included in the study. 57 prescriptions needed one or more POs, and a total of 76 POs were written. 53 POs (70%) corresponded to non-compliances related to the prescription. 32 were addressed and rectified by the prescriber. The remaining 23 POs (30%) dealt with products from the STOPP/START list. Prescribers re-evaluated and adapted treatment in 48% of cases, representing 11 of the 23 POs. The STOPP/START tool detected PIP in 11 patients and enabled treatment optimisations. Finally, 60% of POs were reassessed and modified by prescribers. Of the 127 patients included, 104 (82%) left the hospital with an appropriate prescription.

Conclusion The use of the STOPP/START tool allowed quick and easy optimisation of the prescriptions for a significant number of patients. The detection of PIP avoided the occurrence of side effects in older people.

REFERENCES AND/OR ACKNOWLEDGEMENTS

STOPP/START.
v2 criteria: PO Lang

No conflict of interest

CP-193 CLINICAL AND ECONOMIC IMPACT OF PHARMACISTS´ INTERVENTIONS RELATED TO ANTIMICROBIALS IN THE HOSPITAL SETTING: A SYSTEMATIC REVIEW

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Background In hospital settings (HS), pharmacists´ interventions (PI) can contribute to rational use of antimicrobials. Due to scarce resources, the pharmacist's time has to be dedicated to interventions with impact on patient outcomes and costs.

Purpose A systematic review was conducted to summarise published evidence regarding clinical and/or economic outcomes of PI related to antimicrobials in HS to estimate the impact of PI and to identify strategies with higher impact.

Material and methods A PubMed search of papers published from 2003 to March 2016 was conducted using the terms ('pharmacist*' OR 'clinical pharmacist*') AND ('antimicrobial*' OR 'antibiotic*' OR 'anti infective*'). Additional references were identified from citations. Inclusion criteria were: comparative studies that assessed clinical or economic impact of PI regarding antimicrobials in HS or those that evaluated intermediate outcomes, microbiological impact or appropriate antimicrobial prescription (AAP). Exclusion criteria were: studies in paediatric, primary care or community settings, and evaluations of multidisciplinary teams. We collected: study design, type of PI, impact of PI and acceptance by physicians. Risk of bias of studies was analysed using Cochrane´s tool.[1]

Results 23 studies were included; all had a high risk of bias. Most frequent design was before and after without a control group (57%) and 83% were single centre studies. Identified PI were grouped into three types: specific recommendations (SR) (in 22 studies), policy (in 4) and education (in 3). Six studies combined various strategies. A significant positive impact of PI was found in 14 of 17 (82%) studies that evaluated costs, in 11 of 15 (73%) that studied AAP, in 9 of 18 (50%) that analysed clinical outcomes (CO), in 1 of 2 (50%) that assessed microbiological outcomes (MO) and in 3 of 7 (43%) that evaluated adverse drug events (ADE). A combination of SR, education and policy had the highest impact on AAP, CO and costs; SR and education on MO; and dose adjustment on ADE. 70–92% of recommendations were accepted.

Conclusion Pharmacists´ interventions regarding antimicrobials had a positive impact on appropriate prescribing and patient outcomes, and decreased costs. Combinations of strategies seems to be superior to single strategies. Quality of published studies is poor and better studies are necessary to confirm these results.

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1. Available at http://handbook.cochrane.org/chapter_8/8_5_the_cochrane_collaborations_tool_for_assessing_risk_of_bias.htm

No conflict of interest

CP-194 | **EVALUATION OF ACCESS TO OFF-LABEL NEW THERAPIES PHARMACOLOGICAL FIELD AND THE HOSPITAL AND ECONOMIC IMPACT**

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Background Incorporation of new drugs in hospitals, for their special health, social and economic impact, are classified as high impact social and economic drugs and require a comparative analysis of their efficacy, safety and efficiency versus therapeutic alternatives available through multidisciplinary committees of pharmacists and medical specialists for each drug (SAISE) to ensure homogeneous criteria for use in all health centres of the Conselleria de Sanitat of Valencia, ensuring equal access for patients to these treatments. SAISE had established guidelines to authorise the use of off-label new therapies (OLNT).

Purpose The aim of this study was to evaluate the process of approval for the use of OLNT (requests allowed/denied treatments and time to obtain a resolution) and monthly costs of these treatments.

Material and methods This was a retrospective study that included treatment requests received in the pharmacy service from January 2013 to April 2016 and evaluated in the corresponding SAISE. The variables were: request date, service, drug, indication, outcome and date of the resolution, and cost of treatment.

Results During the study period, 4704 requests were submitted to the pharmacy service, of which 183 requests were processed as OLNT; 81.8% correspond to the oncology department, 12.7% to haematology, 3.3% to digestive medicine, 1.6% to internal medicine and 0.6% to paediatrics. The most requested treatments were 26.7% bevacizumab, 10.9% abiraterone, 6% nab-paclitaxel and regorafenib, and 5% panitumumab and rituximab. The most frequent pathologies were 21.8% colorectal cancer, 13.6% prostate cancer, 12.6% glioblastoma and 7.7% pancreas cancer. 24% of these requests were denied; 25% from oncology, 16% haematology and 50% from digestive medicine. 90% were refused for insufficient information on the efficacy of treatment and the rest were for lack of information in the clinical report.

The monthly cost of the approved request was € 585.985 and € 145.690 for the rejected request. The average time for resolution was 30 days (11–89 days).

Conclusion Due to the high cost of new drug therapies it is necessary to establish criteria to ensure that patients receive proper treatment and ensure the sustainability of the health system, although it should be a faster process because of the severity of some diseases.

REFERENCES AND/OR ACKNOWLEDGEMENTS

Pharmacy

No conflict of interest

CP-195 | **EVOLUTION OF IMMUNO-ONCOLOGY CLINICAL TRIALS IN A TERTIARY UNIVERSITY HOSPITAL**

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Background Currently, immunotherapy is a very active area of oncology research. It is a treatment that uses the body's own natural defences to kill cancer cells. New immunotherapy drugs are showing significant and extended effectiveness, but they are complex and, to date, most are available only through clinical trials (CT).

Purpose To analyse the evolution of immuno-oncology clinical trials (IOCT) developed in the oncology unit over 5 years (2012–2016) and to evaluate the principal characteristics of currently ongoing IOCT.

Material and methods A retrospective analysis of IOCT over 5 years and a descriptive, transversal study about active IOCT were conducted. Variables collected were: study phase, experimental drug, type of experimental therapy (monotherapy, combination with chemotherapy or others), indication, cancer stage, treatment line (firstline, secondline, thirdline or maintenance) and number of patients included. Data were extracted from electronic clinical trials database (PK-ensayos).

Results IOCT have increased nearly 10 times in past 5 years, from 3.3% of the total active oncology CT in 2012 (1/30) to 31.6% in 2016 (12/38). Number of patients included has also increased, from 1 in 2012 to 45 patients currently. Ongoing IOCT (n=12) are for treatment of solid tumours: 75% lung cancer, 16.7% head and neck, and 8.3% colorectal cancer. Cancer stage: 75% stage IV, 25% stage I–III. 50% are evaluating anti-PDL1 (nivolumab, pembrolizumab), 41.6% anti-PD1 (atezolizumab, durvalumab) and 8.3% anti-CTLA4 antibodies (tremelimumab). 66% are using monotherapy, 25% combined with chemotherapy and 8.3% combining two immune checkpoint inhibitors. All studies are phase II and III (25% and 75%). In relation to treatment line: 50%, 16.6%, 16.6% and 25% are being checked for first, second, third and maintenance line, respectively.

Conclusion The rapid progress of cancer immunology has produced a high increase in IOCT. In our hospital, most of ongoing clinical trials are evaluating immune checkpoint inhibitors in monotherapy for advanced lung cancer. CT are critical in bringing new and potentially effective treatments to more patients, and may represent the greatest hope for patients currently facing the disease.

No conflict of interest

CP-196 | **THE IMPACT OF SOCIAL STATUS ON THE FINANCIAL EQUILIBRIUM OF ENDOVASCULAR TREATMENT OF INTRACRANIAL ANEURYSMS IN PUBLIC HOSPITAL**

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Background The endovascular treatment of intracranial aneurysms by coiling needs specific and expensive medical devices. At the same time, management by social security coverage is dependent on the social status of patients and strongly affect's the pharmacy's budget.

Purpose The objective of this study was to evaluate the cost of medical devices in the treatment of intracranial aneurysms by coiling depending on the billing system, which itself depends on social coverage category in patients in a public hospital. Hence, a zone of budgetary equilibrium, integrating different parameters, was then sought.

Material and methods This was a retrospective study of 83 cases of intracranial aneurysms, which were embolised in the neuroradiology department between January 2009 and December 2015. Data were collected from patient cards in neuroradiology and the financial department. The costs of biological analyses, radiological imaging, hospitalisation, medication and indirect costs were not included in this study.

Results For an average of 2.75 coils per patient, the average charge for the medical devices was € 2000, which is close to 400% of the amount refunded by uninsured patients (€ 450) who represent 85% of patients treated. Health insurance of covered patients is € 5364 but represents only 15%. In these conditions, the ratio revenues/expenses is 0.65. The hospital is then in deficit.

Conclusion These results show that, for budgetary equilibrium of the pharmacy, this treatment billing must be re-evaluated, especially among uninsured patients. The figure shows the budgetary equilibrium zone where revenues are between once and twice the expense of medical devices.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Thanks to the coauthors.

No conflict of interest

CP-197 | **PROTOCOL COMPLIANCE IN THE TREATMENT OF HYPERCHOLESTEROLAEMIA WITH PROTEIN CONVERTASE SUBTILISIN-LIKE/KEXIN TYPE 9 INHIBITORS (PCSK9 INHIBITORS)**

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Background The introduction of PCSK9 inhibitors in the treatment of hypercholesterolaemia marks a breakthrough for patients unresponsive to traditional treatment. However, in our country, 44.9% of adults have high LDL-C levels ($\geq$ 130 mg/dL or under treatment), so inadequate use of these innovative drugs might have a strong impact on efficiency and safety. The national atherosclerosis association published a document regarding the restricted indications for use of the PCSK9 inhibitors, and we adapted it to our centre.

Purpose We evaluated compliance with the protocol for prescription of PCSK9 inhibitors in our centre.

Material and methods In March 2016, the pharmacy and therapeutics committee created their own protocol together with internal medicine, cardiology and endocrinology services. It turned out to be more restrictive than the national guidelines, with higher LDL-C levels required. Based on the available evidence and taking into account criteria of efficacy and safety, four indications were included: (1) HoFH: homozygous familial hypercholesterolaemia with LDL-C >120 mg/dL with the maximum tolerated dose of statin and ezetimibe; (2) HeFH: heterozygous familial hypercholesterolaemia with LDL-C >120 mg/dL with the maximum tolerated dose of statin and ezetimibe; (3) previous cardiovascular event (pCVE) with LDL-C >100 mg/dL with the maximum tolerated dose of statin and ezetimibe; and (4) any of the above with LDL-C >120 mg/dL in patients who are statin intolerant, or for whom a statin is contraindicated. We evaluated the compliance with our protocol for prescribing PCSK9 inhibitors from March to September 2016, based on computerised medical records.

Results We received 26 prescriptions, 20 from the internal medicine service, 3 from the endocrinology service and 3 from the cardiology service. All complied with the protocol, except for 1 that was approved by the committee for the treatment of hyperlipoproteinaemia. The following patients were treated: 18 HeFH, 6 pCVE and 1 pCVE who was statin intolerant.

Conclusion In our centre, there was high compliance with the protocol for the prescription of PCSK9 inhibitors. Due to the major economic impact of these new drugs, continuous follow-up would be required to ensure that every prescription meets the requirements of the protocol in the treatment of hypercholesterolaemia with PCSK9 inhibitors.

No conflict of interest

CP-198 | **REVIEW OF INTRAVENOUS IRON PRESCRIPTIONS: FOCUS ON DOSING**

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Background Ferric carboxymaltose (Ferinject) is included in our drug formulary for patients in need of rapid iron replacement. Iron replacement is usually calculated using the Ganzoni formula. Haemoglobin (Hb) values should be reassessed in 4 weeks

Purpose To compare the dose of iron prescribed with the dose recommended in the Ganzoni formula and to assess Hb values after iron therapy.

Material and methods This was a retrospective descriptive study in a 350 bed tertiary level hospital. From October 2015 to January 2016, all patients receiving intravenous iron therapy were analysed. Gender, age, weight, Hb and ferritin before intravenous iron infusion and post infusion, intravenous iron dose prescribed, treatment indication and prescriber's clinical specialty were recorded for each patient. Iron deficiency was calculated using Ganzoni's formula.

Results During the study period, 64 patients were treated with intravenous iron therapy, 59% were women and the average age was 60 years. Internal medicine was the main clinical specialty with 62% of the total cases, with anaemia the main indication, followed by gynaecology with 16% of patients and postpartum haemorrhage diagnosis. According to Ganzoni's formula, only 17% received the dose required based on calculated iron deficiency. Most of these patients had a diagnosis of anaemia and iron was prescribed by the internal medicine service. 83% received a different dose from the Ganzoni formula (70% lower dose and 13% higher dose). Average Hb

pre infusion was 9 g/dL (n=59) and ferritin 104.3 ng/mL (only obtained in 36% of patients). Average Hb post infusion was 10.5 g/dL (36% of patients).

Conclusion This study showed that doses prescribed did not correspond to Ganzoni's formula, and that most patients received lower doses. Values for Hb post iron therapy could not be found in most patients and were below the recommended target values. These results highlight the need to create a protocol to ensure correct dosing of intravenous iron and to improve patient safety.

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No conflict of interest

CP-199 **PRESCRIPTION OF QUINOLONES, CARBAPENEMS AND ANTI-MRSA AGENTS IN THE EMERGENCY DEPARTMENT OF A DISTRICT HOSPITAL: INTERVENTIONS AND DEVELOPMENT OVER 3 YEARS**

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Background Emergency departments (ED) are excellent places for implementation of policies that promote rational use of antibiotics, considering that most empiric antibiotherapies start at this level of care and tend to be maintained through hospitalisation. This is a paper-free hospital, with an electronic system capable of controlling antibiotic prescription, resulting in real time automatic notifications, whenever there is a mismatch between the chosen antibiotic and the context (infection or targeted) prophylaxis, or whenever conditioned prescription agents are prescribed, allowing a rapid onset of antibiotic stewardship.

Purpose Assessment of the trend in the use of quinolones, carbapenems and anti-MRSA agents in patients admitted to the ED, based on sampling in March 2014, March 2015 and March-2016.

Material and methods Retrospective analysis of notifications generated by the conditioned antibiotic system during the referred period.

Results In this period of time, the prescription system generated over 3 consecutive years, the following notifications: quinolones: 76/48/29 (62% reduction between 2014/2016); carbapenems: 36/40/20 (44% reduction) and anti-MRSA: 13/9/3 (77% reduction). Levofloxacin represented, respectively, 59%/65%/72% of the quinolones prescribed. For carbapenems, meropenem represented, respectively, 50%/85%/90%. Finally, with regard to anti-MRSA, reports were almost exclusively for vancomycin (respectively 100%/89%/100%). In this period, 2014/2015/2016, respectively, 882/878/906 hospitalisations were made via the ED (range from 2.7% in 2014–2016).

Conclusion During this period, there was a significant overall reduction in the initial prescription of quinolones and anti-MRSA agents, and to a lesser extent carbapenems, in patients admitted via the ED, mainly because of an increase in the number of hospitalisations and growing incidence of gram negative ESBL producers from outside, limiting the reduction in the use of carbapenems. This development reflects the phased effort interventions, starting with pharmaceutical validation and intervention "in loco" (end of 2014), reinforced by the analysis of the notifications issued by the Group of Local Coordination for the Prevention and Control of Infections and Antimicrobial Resistance (GCL-PPCIRA) under antibiotic stewardship (early 2015), as well as training activities and awareness aimed at doctors. This project shows how it is possible to reduce very significantly the use of conditioned antibiotics through a concerted and multidisciplinary intervention, under antibiotic stewardship.

No conflict of interest

CP-200 **DRUG CONTINUATION RATE OF ABATACEPT IN PATIENTS WITH RHEUMATOID ARTHRITIS**

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Background Abatacept is a biologic disease modifying antirheumatic drug (DMARD) prescribed to rheumatoid arthritis (RA) patients who have shown insufficient response to conventional synthetic DMARD. Abatacept modulates T cell function by selectively targeting the CD80/CD86:CD28 signal required for full T cell activation.

Purpose The aim was to evaluate the drug continuation rate of abatacept in RA patients in real clinical practice, and to identify the reasons for drug discontinuation and the new biotherapy initiated.

Material and methods This study was conducing in a university hospital and included all patients with RA who received at least one injection of abatacept between 1 January 2007 and 31 October 2012. Drug continuation rate was estimated in RA patients by plotting Kaplan–Meier curves. The end point of the follow-up period was 31 December 2015. The following characteristics were collected: age, sex, date of diagnosis, previous treatment, concomitant treatment with abatacept, date of first and last drug injection, motives for abatacept failure and the new initiated biotherapy. Periods with no treatment for more than 3 month were studied.

Results 53 patients were included in the study. Most patients were women (70%) with a mean age of 56 ± 12 years (24–82) and mean disease duration of 15 ± 10 years. Most of the patients had previously been treated with methotrexate (96%) and only 4% had never had biotherapy. Etanercept and adalimumab were the most common biotherapies. Concomitant MTX at baseline was given to 49%. Drug continuation rates at 6, 12, 18, 24, 36 and 48 months were, respectively, 77%, 74%, 68%, 60%, 49%, 43%. Abatacept was stopped because of inefficiency (27%) or therapeutic escape (40%). Following discontinuation of abatacept, 56% of treatments were switched to tocilizumab and 20% were switched to rituximab. Treatment of 12 patients (23%) was suspended for at least 3 months.

Conclusion Over a study period of more than 8 years, drug continuation rates of abatacept seemed to be similar to those found in studies published on this subject. Also, thanks to the safety profile of abatacept, it appears to be a good therapeutic option in rheumatoid arthritis.

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No conflict of interest

CP-201 POLYPHARMACY AND POTENTIALLY INAPPROPRIATE MEDICATIONS IN GERIATRIC OUTPATIENTS

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Background The growing ageing population and increasing prevalence of chronic diseases requires the simultaneous use of drugs, leading to issues of polypharmacy and potential interactions and inappropriate use.
Purpose To evaluate the prevalence of polypharmacy and potentially inappropriate medication (PIM) use and the association between these and number of prescribing medications and number of physician office visits in older adults.
Material and methods Using the Healthcare Information System (HIS) in Taipei City Hospital, we enrolled 159 elderly adults (aged ≥ 80 years) who had been prescribed 10 or more chronic medications (drugs prescribed for ≥ 28 days) and visited three or more different physician offices from 1 April 2016 to 30 June 2016. The EU(7)-PIM list was used to determine the potential inappropriateness of prescribed medications. Data were analysed using multiple regression analysis by the SPSS 22. A value of $p < 0.05$ was considered statistically significant.
Results We enrolled 159 patients in our study where the ratio of men:women was 89:70. Mean (SD) age of our patients was 85.8 (10.2) years. The mean rate of prescribing medications was 14.1 (2.7) (maximum=19) orders per day, and number of physician office visits was 3.5 (0.5) (maximum=6). In the study, PIM use was common (94.5%) in geriatric outpatients and the number of PIM was 2.9 (0.5) (maximum=8). The most commonly prescribed PIM were sennoside (13.1%), theophylline (8.0%), piracetam (7.7%) and PPI (>8 weeks) (6.0%). In multiple regression analysis, PIM use was significantly associated with number of prescribing medications ($p < 0.001$) and number of physician office visits in older adults ($p = 0.028$).
Conclusion Of the 159 elderly persons in the study population, 150 (94.5%) received at least one PIM. Maybe we will establish computerised warning system and embed this into the HIS to decrease the medication number and PIM. The mainstay for preventing and managing polypharmacy remains heightened awareness of patients at risk. Pharmacovigilance is required by the patient, physician and pharmacist in thoroughly reviewing and reconciling the patient's medication regimen at every opportunity.

No conflict of interest

CP-202 USTEKINUMAB TREATMENT IN REFRACTORY INFLAMMATORY BOWEL DISEASE

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Background Ustekinumab is a human monoclonal antibody against interleukin 12 and interleukin 23. Its use in inflammatory bowel disease (IBD) is little known.
Purpose To evaluate the effectiveness and safety of ustekinumab in adults with moderate to severe IBD resistant to anti-tumour necrosis factor (TNF) treatment.
Material and methods A retrospective observational study was carried out which included all patients with refractory IBD treated with subcutaneous ustekinumab from January 2012 to date. Data on demographic and clinical characteristics, indications, posology and duration of treatment, previous and concomitant therapies, adverse events and clinical evolution were collected from the electronic health record and the assisted electronic prescription programme. Effectiveness was defined as clinical improvement, and ineffectiveness as treatment suspension due to lack of response or clinical worsening.
Results 7 patients were included (mean age 40.7 years, 43% men). Indications for use were ulcerative colitis (UC) in 2/7 patients (28.6%) and Crohn´s disease (CD) in 5/7 patients (71.4%). The induction pattern was 90 mg weekly (4 doses) and the maintenance pattern 90 mg every 2 or 8 weeks; the mean number of administered doses was 8 (1–14). All patients had previously received infliximab, adalimumab or golimumab with inadequate response or intolerance, which placed ustekinumab in the second–fourth line of biological treatment. Currently, 3 patients continue receiving ustekinumab, showing clinical remission and therefore are considered cases in which the drug was effective. With regard to adverse events associated with ustekinumab, only 1 patient reported asthenia.
Conclusion Ustekinumab is a therapeutic approach for IBD treatment in clinical practice in patients with poor response or intolerance to other biological therapies, especially in patients not responding to anti-TNFα. Available data are still limited and therefore future prospective studies assessing its suitability in this context will be required.

No conflict of interest

CP-203 EFFICACITY AND SAVETY OF NIVOLUMAB IN PATIENTS WITH LUNG CANCER: A RETROSPECTIVE COHORT STUDY

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Background Nivolumab is indicated for the treatment of patients with squamous and non-squamous non-small cell lung cancer (NSCLC) locally advanced or metastatic after failure of chemotherapy. French marketing authorisation approval for this immunotherapy was based on two pivotal studies,

Checkmate-017 and Checkmate-057 for squamous and non-squamous NSCLC, respectively. They demonstrated a significant responder rate (20%) and a good safety profile: 10% serious adverse events (SAE). Immunotherapy represents an innovative therapeutic alternative, but financial costs are high.

Purpose To present the safety and efficacy of nivolumab in patients treated for lung cancer.

Material and methods A retrospective cohort study was conducted on patients who received at least one cycle of nivolumab from March 2015 to February 2016, with follow up until September 2016. A scan was performed every 2 months and evaluated using RECIST 1.1 criteria. In the case of progression on the first scan, depending on the patient's clinical condition, the treatment could be continued until the second assessment. In case of progression or SAE, treatment was discontinued.

Results 73 patients were included in the study (35–90 years old, mean age 66 years), 28% squamous and 72% non-squamous NSCLC. 33 patients followed a secondline treatment, 21 a thirdline and 19 a fourthline or more. After the fourth cycle (C4), the first evaluation revealed partial or complete response for 25% of patients, stability for 30% of patients and progression for 37% of patients. 8% of patients discontinued the treatment early. Among progressions, 16 patients continued treatment until the C6 evaluation, assuming a pseudo-progression, and the response was seen in only 2 patients. At 1 March 2016, 22% patients were still under treatment, with an average of 21.9 cures (range 12–35). 12% of patients experienced SAE: 5 pneumonitis grades 3 and 4, 1 grade 3 diarrhoea, 1 grade 3 colitis, 1 grade 4 hepatitis and 1 grade 4 diabetic ketoacidosis.

Conclusion The responder rate in C4 patient and the safety profile of nivolumab (25%) seem to be consistent with pivotal studies. The high number of pneumonitis among SAE justify particular vigilance. The long term follow-up of this cohort will consolidate these results.

No conflict of interest

CP-204 | **OBSERVATIONAL STUDY ON THE USE OF DIFFERENT THERAPEUTIC ALTERNATIVES FOR MULTIPLE SCLEROSIS TREATMENT**

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Background Multiple sclerosis (MS) is a chronic demyelinating CNS disease. The recent commercialisation of new drugs for its treatment can change prescriber and patient treatment preferences.

Purpose To determinate the most prescribed drugs at the beginning of the disease and to observe if the emergence of new drugs for MS (dimethyl fumarate, alemtuzumab, pegylated interferon and teriflunomide) has changed the prescription tendency, or if they are preserved as a secondline treatment. Also, to quantify the outbreaks/year, reasons for discontinuation and adverse events of treatment.

Material and methods This was a retrospective observational study including all treated MS patients (January 2004–March 2016). The data were obtained from their medical records and dispensation register.

Results 55 patients were included in the study, 69% women. Average age was 36±9 years. The most prescribed drugs after diagnosis were: interferon-β1b (25%), interferon-β1a 30 μg (20%), interferon-β1a 44 μg (18%), glatiramer acetate (GA) (18%), natalizumab (7%), fingolimod (7%) and dimethyl fumarate (5%). Among these, there were 8 prescriptions after the commercialisation of the new MS drugs: 3 dimethyl fumarate, 2 interferon-β1a 44 μg, 1 GA, 1 fingolimod and 1 natalizumab. With those initial treatments, 27 (49%) patients did not have outbreaks, 17 (31%) had 1 outbreak/year, 8 (15%) had 2 outbreaks/year and 3 (6%) had 3 outbreaks/year. 69% of patients were treated with 1 drug, 20% with 2 different drugs and 11% were treated with ≥3 drugs. The reasons for the change were: disease progression (52%), adverse events (47%) and patient's decision (1%).

27 patients did not present adverse events, 15 had flu-like syndrome, 5 redness, 5 discomfort at the injection site, 2 lymphopenia, 2 paresthesias, 2 mood disturbance, 1 transaminase elevation and 1 palpitations.

Conclusion MS affects young adults, especially women. Interferon and GA are the most common initial treatments but with the appearance of new MS drugs, the use of dimethyl fumarate has increased. New MS drugs are mostly used as a secondline treatments but natalizumab is still the most used when there is no response to initial treatment. 85% of patients tolerated the treatment and no medication change was necessary. This drug has been demonstrated to be effectives because 69% of patients needed one treatment line to control their illness.

No conflict of interest

CP-205 | **EVALUATION OF OUTCOMES OF THE IMPLEMENTATION OF AN EARLY ORAL SWITCH ANTIMICROBIAL STRATEGY: A BEFORE–AFTER STUDY**

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Background From October 2015, an Antimicrobial Stewardship Programme (ASP) was implemented in an internal medicine department by a multidisciplinary team. One of the interventions developed within this ASP was to promote the early switch of intravenous antimicrobial therapy to oral therapy through the introduction of Early Oral Switch Therapy (EOST) recommendations.

Purpose We aimed to assess the impact on consumption, cost and duration of intravenous antimicrobials of the introduction of EOST recommendations by clinical pharmacists as a part of an ASP.

Material and methods The study was prospective with a before–after design, divided into a pre-intervention phase (January–May 2015) and a post-intervention phase (January–May 2016). The intervention consisted of writing the advice of the EOST by the clinical pharmacist on the patient's clinical chart. Target patients were those admitted to hospital internal medicine floors. They had all received more than 72 hours of

selected intravenous antimicrobial treatment (co-amoxiclav, ceftriaxone, levofloxacin) and had clinical and analytical stability.

Variables compared between the study phases were: consumption of selected and general antimicrobials calculated by defined daily dose per 100 stays (DDD/100 stays); cost of selected and general antimicrobial treatment, calculated by total spending per 100 stays; duration of selected and general antimicrobial treatments, calculated by total days of antimicrobial treatment per patient. All statistical analysis were performed using SPSS v.19.0, with a significance level of $p < 0.05$.
Results During the pre-intervention phase, mean consumption of IV antimicrobials was 6.3 DDD/100 stays (4.7–7.9), and during the post-intervention phase it was 6.1 DDD/100 stays (4.3–7.9) ($p = 0.07$). The associated mean costs were of € 8.9/100 stays versus € 8.1/100 stays ($p = 0.90$). In terms of duration, the length of intravenous antimicrobial treatment during the pre-intervention phase was 4.3 days/patient (4.2–4.5), and during the post-intervention phase it was 3.5 days/patient (3.4–3.7) ($p = 0.05$).
Conclusion This study suggests successful implementation of an EOST. Differences were not statistically significant, but we found a trend towards decreasing intravenous antimicrobial duration, consumption and cost. ASP carried out by a multidisciplinary teams may result in a decrease in the overuse of intravenous antimicrobial treatments.

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No conflict of interest

CP-206 | **PHARMACIST CONSULTATION IN ADULT PATIENTS TREATED WITH ORAL THERAPY IN DERMATOLOGY DEPARTMENT: PHARMACOECONOMIC STUDY**

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Background Pharmacist consultations (PC) for patients with oral anticancer medication (OAM) are a real need.[1] According to the General Directorate of Care Offer (DGOS), a day hospital (DH) fee can be charged only if three consultations by different health care professionals are performed for each patient (Circular Frontier). Moreover, a new General Interest Mission (MIG) allows a refund of consultations for the first OAM prescription.
Purpose To assess the financial impact of PC conducted as part of a DH in dermatology.
Material and methods DH billing for melanoma or carcinoma patients treated with OAM is subject to completion of three consultations: medical (MC), pharmaceutical (PC) and clinician nurse consultations. Consultation of the electronic patient file has allowed us to bill each PC performed from 9 July 2015 to 8 July 2016, and to count the number of first OAM prescriptions.
Results Within 1 year, 225 PC were performed (83 patients) and billed as 46 MC and 163 DH, under the homogeneous group of sick 'Explorations and monitoring of skin diseases'. 16 PC were performed without charge, either during hospitalisation (OAM initiation), during PC (management of OAM's

side effects) alone, during patient monitoring refusal or administrative oversights.

Pharmacist/physician/clinician nurse collaboration enabled the refund of: 163 DH (DGOS funding), or € 95 544.08 (€ 586.16/DH); and 57 consultations for first OAM prescription (MIG funding), or € 5301 (€ 93/consultation). The mean gross annual salary plus social charges of a full time pharmacist (178 hours monthly) is € 97 500. The mean duration of a PC is 30 min, representing 112.5 hours annually, or € 5,135. If MCs were performed without a PC, the refund would be € 4564 (163 MC of € 28 each). Overall, PC generated a profit of € 85 845 € (via the DH billing) for the institution compared with a single MC.
Conclusion The implementation of PC in dermatology enabled the billing of DH, covering the pharmacist's pay and achieving profitability for the hospital. However, the introduction of a new MIG with the final objective to replace the Circular Frontier funding would make it less profitable, hence the need to upgrade the MIG rate.

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No conflict of interest

CP-207 | **ANALYSIS OF FREQUENCY OF UNDERDOSING IN OBESE PATIENTS TREATED WITH VANCOMYCIN**

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Background Obese patients with normal serum creatinine have increased renal clearance, and consequently the dose of some drugs, such as vancomycin, should be dosed based on actual body weight (ABW). According to the American Society of Health-System Pharmacists (ASHP) guidelines, the recommended dosing regimen is 15–20 mg/kg ABW/12 hours intravenously, with subsequent dosage adjustment based on serum vancomycin concentrations. Nevertheless, in our hospital, vancomycin is often used as a fixed dose regimen regardless of patient weight, based on the manufacturer´s labelling recommendation.
Purpose To determine the frequency of underdosing of vancomycin in obese patients and possible risk factors.
Material and methods A single centre, retrospective, observational study from January 2014 to September 2016 was carried out. Morbidly obese adult patients, defined as a body mass index (BMI) $\geq$ 30 according to the WHO classification, with at least one trough level obtained at steady state, were included. Patients were excluded if they had a creatinine clearance (CrCl) <35 mL/min, calculated by the Salazar–Corcoran formula. The therapeutic level for serious infections (endocarditis, osteomyelitis, meningitis, nosocomial pneumonia by *Staphylococcus aureus*, methicillin resistant *Staphylococcus aureus* bacteraemia) was 15–20 mg/mL, whereas for uncomplicated infections the optimal interval was 10–15 mg/mL, according to the ASHP guidelines. Binary logistic regression was done to identify variables associated with underdosing, using SPSS 15.0.
Results 46 patients were included, 63% women. Mean age $\pm SD = 70.78 \pm 12.5$ years; mean weight $\pm SD = 87.8 \pm 13.9$ kg; and mean height 1.59 ± 0.09 m. 34.8% were underdosed. No

association was found between gender and underdose (p=0.143), or BMI classification (p=0.679) or creatinine (p=0.079). On the other hand, statistical analysis suggested a relationship between underdose and age >65 years (OR 0.206, 95% CI 0.04–0.98; p< 0.05) and initial dosing regimen of 1000 mg/12 hours (OR 0.008, 95% CI 0.0–0.55; p< 0.05) compared with 1000 mg/24 hours.

Conclusion It is important to monitor levels of vancomycin in obese patients, especially in those aged <65 years and with an initial dosing regimen not adjusted to patient weight. Even so, there are currently insufficient data to make statements to guide vancomycin dosing in obese patients, so it is necessary for more studies to focus on this issue.

REFERENCES AND/OR ACKNOWLEDGEMENTS
American Society of Health-System Pharmacists (ASHP) guidelines.

No conflict of interest

CP-208 | A DECADE OF ACTIVITY IN CLINICAL TRIALS IN A REGIONAL HOSPITAL PHARMACY

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Background Being responsible for the management of the investigational medicinal products (IMPs), pharmacists should create a descriptive standard operational procedure (SOP) to ensure the management of IMPs. Pharmacists should also implement good practices that promote therapeutic compliance to minimise the occurrence of errors and enhance the information available to the patient.

Purpose To describe the activity of a clinical trial service in a hospital pharmacy since 2006.

Material and methods Records of all clinical trials that took place in the hospital since 2006 were reviewed with evaluation of recently implemented methodologies.

Results Pharmacists created methodologies to keep accurate and up to date records to provide a full audit trail from reception until destruction of an IMP. They had written a clinical trial SOP and created four specific forms for each clinical trial: clinical trial summary; clinical trial diary; IMP stock control; and IMP accountability. To ensure the correct use and compliance of medication, four self-adhesive labels and leaflets with IMP information were developed. The growth of this service is evident in all pharmaceutical activities, with a maximum of IMP dispensing (150) and the number of ongoing patients (63) in August 2016. The maximum of IMP receipts (42) was dated to 2015, and there were 7 site selection visits which resulted in an increase in the number of initiation and monitoring visits. IMP dispensing is the activity that represents the largest number of pharmaceutical activities. The clinical trials were mainly phase III (78%), in haematology (30%) and cardiology (26%), with anticoagulant and antihypertensive drugs. In August 2016, the pharmacy took part in 11 clinical trials of 6 sponsors with 5 clinical services.

Conclusion The clinical trial service began in pharmacy in 2006 and methodologies were created over time to ensure a full audit trail of IMP management. Strategies were also implemented to ensure compliance with therapy, which has proved fundamental. This service has continuously grown, particularly since 2014 due to an increase in the number of clinical trials and the number of recruited patients which has brought challenges to our service that will continue to grow over time.

No conflict of interest

CP-209 | METABOLIC COMPLICATIONS IN PATIENTS WITH PARENTERAL NUTRITION

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Background Parenteral nutrition (PN) is an important part of medical management of patients with a non-functioning and/or non-accessible gastrointestinal tract, but it is associated with some metabolic complications that prolong recovery from illness and can lead to increased length of hospital stay.

Purpose To determine the prevalence of metabolic complications in patients with PN and to study its association with different variables as well as its relationship with hospital stay and mortality.

Material and methods A retrospective observational study in a 330 bed referral hospital area was conducted. Inpatients who received PN during their hospital stay from September 2014 to August 2015 were included. Demographic (sex, age), clinical (diagnosis, weight, height) and analytical data (metabolic markers, electrolytes) were collected from the electronic medical record (Selene) and minimal basic data set, and information concerning PN (customised PN or premixed solutions and caloric, protein, carbohydrate and electrolyte content) was obtained from Kabisoft. Patients without analytical parameters required for the determination of metabolic complications were excluded. From the analytical data the presence of metabolic complications was determined. All statistical analyses were performed using statistical software SPSS V.23.0 and a p value of 0.05 was considered to be statistically significant.

Results 128 patients were included, with an average age of 67.4 years. 65.6% were men. At hospital admission, 47.7% of patients was diagnosed with digestive disease. The most prevalent chronic diseases were diabetes mellitus and solid tumours (17.2%). During the study period, 1223 PN were administered, 61.1% were three compartment premixed solutions. In terms of metabolic complications, 76.6% of patients had at least one of these complications and the most prevalent were hypokalaemia (49.2%), hyponatraemia (35.9%) and hyperglycaemia (31.3%). The statistical analysis revealed a significant association between the presence of metabolic complications, days with PN (p<0.001) and length of hospital stay (p=0.012).

Conclusion There was a high prevalence of metabolic complications associated with PN, resulting in increased length of hospital stay and hospital costs. As a result, compliance with clinical practice guidelines on starting and prescribing a PN as well as close monitoring of the patient to detect possible complications associated with nutritional support are necessary.

No conflict of interest

CP-210 | **THE ADDED ROLE OF PHARMACEUTICAL INTERVENTION ON HEPATITIS C VIRUS DIRECT ANTIVIRAL AGENT TREATMENT: A SINGLE CENTRE OBSERVATIONAL PROSPECTIVE COHORT ANALYSIS**

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Background In the era of direct antiviral agents (DAA) for hepatitis C virus (HCV) therapy, optimising treatment with multidisciplinary strategies improves compliance and efficacy.

Purpose To evaluate the pharmacist's role in HCV therapeutic management, to minimise compliance issues, and drug–drug interactions (DDI) and adverse events management.

Material and methods Prospective analysis of HCV patients treated with DAA regimens at a peripheral hospital (12 February 2015–15 June 2016) that enrolled in monthly outpatient pharmaceutical consultations. Baseline and on-treatment parameters were reassessed per consultation: need for therapeutic changes, DDI behavioural awareness, compliance and adverse events (AE).

Results Throughout 544 consultations, 142 patients (11 HIV/HCV) underwent 145 DAA regimens (3 DAA failures retreated): LDV/SOF (116 patients, RBV-19 patients), OBV+PTP/r+DSV+RBV (1), SOF/DAC (3 patients), SOF/RBV (15 patients), SOF/RBV/PegIFN (10 patients). 47 active interventions occurred at baseline consultations (32%): 21.4% (31 patients) had concomitant drugs that were reassessed. (A) Drugs with changes needed: PPI-13.1% (19 patients; intake hour change-17 patients; dose reduction alert-2 patients); statins-2.1% (3 in 11 patients were stopped at the time); antidiabetic agents-2% (3 patients; intake hour change-2 patients; awareness to stoppage-1 patient); venotropic drugs-1.4% (stoppage-2 patients); loperamide-1.4%(DDI stoppage-2 patients); antihistamines-2% (DDI stoppage-1 diphenhydramine); vitamins-2% (stoppage-3 patients); acetylcystein-0.7% (stoppage-1 patient); tenofovir DDI alert-0.7% (1 HIV/HCV); beta-blocker-0.7% (dose reduction-1 patient). Herbal tea stoppage-7.5% (11 patients).

(B) No changes needed: neuropsychiatric drugs-23.4% (34 patients); antihypertensive drugs-20% (29 patients); diuretics-15.6% (10 patients); NSAID's-6.9% (10 patients); analgesics-6.2% (9 patients); methadone-6.2% (9 patients); antiagregation therapy-6.5% (5 patients); and other drugs in 16.9% (13 patients). Awareness to keep off statins/fibrates-10 patients. On treatment: compliance assessment: pill intake mistake-17.2% (25 patients: forgot DAA once-15 patients; overdosage with 2 DAA-4 patients; RBV intake error-4 patients), 80% during first 2 months. New drugs/behaviours occurred in 20% (30 patients: St John's Wort stoppage-1 patient; PPI intake hour change-2 patients). 3 DAA failures retreated were not on PPI, had no pill error; one took St John's Wort. Available SVR12 tended to be lower in those with errors detected (69% to 88.4%). 12.4% (18 patients) telephoned mostly to report AE. AE-68.3% (99 patients); 478 non-severe; 1 severe (1%, drug related encephalopathy): most common were headache (27.6%) and fatigue (20%), 42.7% during 1st month. 3 patients were admitted to hospital, non-drug related. 2 patients stopped DAA (1 patient-encephalopathy; 1 patient-hospital admission).

Conclusion Pharmaceutical interventions at our centre helped optimise HCV treatment in one-third of cases at the start but also throughout the treatment process, validating the pharmacist role within the multidisciplinary management of HCV.

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No conflict of interest

CP-211 | **ASSESSING THE EFFECTIVENESS OF EDUCATIONAL TOOLS AND INFORMATIVE LEAFLETS FOR LUNG TRANSPLANT RECIPIENTS AND THEIR REFERRING HEALTHCARE PROFESSIONALS**

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Background A therapeutic patient education programme was created in our hospital for lung transplant recipients. Educational tools (including 'problem situation cards') and informative leaflets about immunosuppressive treatments were elaborated for patients and their community healthcare professionals.

Purpose The first aim of this study was to evaluate patients and healthcare professionals' satisfaction regarding the created tools. The second aim was to assess the effectiveness of these tools in terms of improvement in patient knowledge.

Material and methods Patients transplanted for more than 1 year who had a medical consultation between 25 April and 26 May 2016 were called to obtain oral consent for enrolment in this study. The created tools were presented and used by the patients during a pharmaceutical interview, after their consultation. Patient satisfaction was evaluated with a satisfaction survey, and their knowledge about their treatments was assessed with an educational tool (number of correct answers to the problem situations presented). If gaps were found, another interview was scheduled 1 month later to reassess patient knowledge. All patients and referring healthcare professionals were contacted and asked to evaluate the leaflets aimed at community pharmacists and general practitioners with a satisfaction survey.

Results 21 patients with an average age of 53 years (25–67) and transplanted for 4 years (1–10) were included. 95% of the patients were satisfied with the information delivered during the interview and thought it was useful in their daily life. They all found the educational tools interactive and useful. 85.7% of the community pharmacists and half of the general practitioners considered that the information given on the leaflets aimed at healthcare professionals was helpful in answering patient questions during drug dispensing or consultation.

During the first interview, patients' average knowledge score was 8.3/10. 12 patients with a score equal to or lower than 8/10 had another interview to reassess their knowledge.

These patients' average score increased from 7.5 to 8.6 (p<0.0083) at M1.

Conclusion Both patients and healthcare professionals were satisfied with the tools created. Conducting a pharmaceutical interview improved patients' knowledge of their treatments, which highlights the importance of the pharmacist intervention in their care pathway, together with community healthcare professionals.

No conflict of interest

CP-212 | **PRE-OPERATIVE NUTRITIONAL MANAGEMENT IN PATIENTS UNDERGOING COLORECTAL RESECTION IN AN ENHANCED RECOVERY (ERAS) PROTOCOL**

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Background Enhanced recovery, otherwise known as 'fast track' programmes, are evidence based protocols designed to standardise medical care, improve outcomes and lower healthcare costs. One of the main goals in fast track is optimising nutritional support and avoiding starvation to minimise negative protein balance. The consequences of preoperative malnutrition on postoperative recovery are important, detecting a clear relationship between loss of weight and morbidity and mortality.

Purpose The aim of our study was to establish a programme of nutritional assessment and preoperative management in patients undergoing colorectal resection in an enhanced recovery (ERAS) protocol.

Material and methods A multidisciplinary team was established comprising a surgeon, pharmacist and nurse. We performed a bibliographic search. We encountered various tools to perform a nutritional assessment. We analysed different tools and finally selected for our population the subjective global assessment (SGA), which defines the nutritional and functional status of patients with the aim of identifying who could benefit from a nutritional intervention. Nutritional risk index (NRI) is an adequate tool to identify patients with a nutritional risk and who would benefit from a nutritional intervention aimed at preventing associated complications. NRI included serum albumin, weight and ideal body weight. SGA included body weight, body weight change, dietary intake and change, gastrointestinal symptoms and functionality, along with a physical examination of sites related to subcutaneous fat and muscle mass.

Results Colorectal cancer patients who were candidates for surgical intervention were selected in the medical consultation. In this moment, nutritional and analytical parameters were determined: serum protein, albumin, prealbumin, transferrin, zinc, haemoglobin, leukocytes, lymphocytes, procalcitonin and C reactive protein. Within a week, patients were seen in consultation with the pharmacist and nutritional assessment (NA) was performed, which included mid-arm circumference (cm) and triceps skinfold thickness (mm). The NA was performed a minimum of 7–10 days before surgery. First, NRI was performed. If the score was < 100, the SGA questionnaire was done. Depending on the result obtained, patients received nutritional intake recommendations or oral nutritional supplementation.

Conclusion We have established a programme of nutritional assessment and preoperative management in patients undergoing colorectal resection in an ERAS protocol with the aim of improving the nutritional status of the patients and, therefore, reduce postoperative complications.

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No conflict of interest

CP-213 | **ANALYSIS OF FALLS IN INPATIENTS FROM REHABILITATION CARE CENTRE**

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Background Falls are very frequent health problems in patients hospitalised in healthcare facilities. Regarding prevention of falls, it is essential to analyse all of the factors, including medications which may be potential contributors to falls and consequently efficiently minimise these risk factors.

Purpose The aim of this study was to describe a group of patients who fell during hospitalisation, assess the iatrogenic impact on falls as well as other risk factors, and identify other drug related problems (DRPs) not directly associated with falls.

Material and methods A retrospective observational study was conducted in the rehabilitation care centre from March to November 2014. Patients who had a fall during their hospitalisation were included. Data were collected from medical records containing personal and medication history as well as information concerning the fall. Analysis regarding the relationship between pharmacotherapy and the fall comprised identification of drugs with a potential risk of fall and assessment of the individual risk based on other risk factors presented in each patient. Identification, evaluation and solution of all the DRPs were determined by SAZE (signal analysis measurement elimination) analysis. Data were processed by descriptive analysis.

Results The study sample comprised 150 inpatients (53.3% women). Mean age was 66.2 years (SD=18.4). 12.0% of patients experienced repeated falls. The most frequent diagnosis with risk of fall were arterial hypertension (79.0%), musculoskeletal disorders (59.3%), balance disorders (58.0%) and diabetes mellitus (34.0%). In total, patients used 1286 drugs, of which 55.1% had a potential risk of fall. Based on an assessment of the individual risk of falls, zolpidem, tramadol and benzodiazepines were the most frequent drugs used by patients. Unclear indication, high dose and unsuitable use of drug were the most common DRPs unrelated to the fall.

Conclusion Based on individual assessments, we identified cases in which falls caused by use of drugs could not be omitted. In the case of falls, it is necessary to search for possible causes of the fall and not forget the most commonly used drugs by patients. Clinical pharmacists with such experience in collaboration with other health professionals can contribute to solving this health problem.

No conflict of interest

CP-214 | APREMILAST: ASSESING THE VALUE IN PSORIASIS AND PSORIATIC ARTHRITIS PATIENTS

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Background Apremilast is the first oral selective inhibitor of phosphodiesterase 4 (PDE4) indicated for adults with active psoriatic arthritis (PsA) and moderate to severe plaque psoriasis (Pso). Pso and PsA are chronic disorders with significant morbidity, and patients experience diminished health related quality of life (QoL).

Purpose The primary objective was to assess changes in QoL and satisfaction of patients starting treatment with apremilast. Secondary objectives were to evaluate effectiveness and safety profile.

Material and methods This was a prospective, observational and analytic study (from April 2016 to September 2016) of Pso and PsA patients treated with apremilast in a general teaching hospital. QoL and satisfaction were measured with a questionnaire developed 'ad hoc' (utility score 0–1, satisfaction scale 0–10), before and after apremilast treatment (3 months later). Effectiveness and safety profile evaluation were based on subjective and objective clinical response. Demographic and clinical data were collected from the electronic clinical record. Statistical analysis was performed with SPSS 21.0 (Wilcoxon signed-rank test).

Results In total, 21 patients met the inclusion criteria: 11 women (52.4%), mean age 52 ± 6.8 years, 15 (76.2%) Pso and 6 (23.8%) PsA, mean treatment duration 3.6 ± 0.5 months. The utility mean difference was 0.08 (p=0.195) for all patients, 0.12 (p=0.092) in Pso patients and 0.06 (p=0.139) in PsA patients. The satisfaction mean difference was 1.5 (p=0.121) for all patients, 1.7 (p=0.099) in Pso patients and 1.1 (p=0.156) in PsA patients. Related to effectiveness, 16 (76.2%) patients reached clinical goals (14 Pso vs 2 PsA, p=0.231) and 5 (23.8%) patients had premature discontinuation of treatment, 3 (14.3%) patients who had no clinical response and 2 (9.5%) who suffered AEs (nausea and vomiting). There were no statistically significant differences in QoL and satisfaction in terms of sex, age groups or effectiveness.

Conclusion Overall, apremilast was well tolerated in this population and appeared to be effective in the adequate control of Pso and PsA with a slight improvement in QoL and patient satisfaction. Additional long term studies are needed to further elucidate its place in therapy.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

CP-215 | VALPROIC ACID INTOXICATION AND CLINICAL UTILITY OF NORMALISED SERUM VALPROIC ACID CONCENTRATION IN HYPOALBUMINAEMIC CRITICALLY ILL PATIENTS

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Background Valproic acid (VPA) frequently causes severe intoxication which is difficult to recognise in critically ill patients (CIP). Hypoalbuminaemia is a common finding in CIP associated with changes in drug protein binding. VPA is extensively bound to albumin and the unbound fraction is pharmacologically active. In patients with hypoalbuminaemia, total serum concentration (TSC) of VPA offers poor clinical usefulness and in several cases, monitoring free VPA has shown to be of greater benefit. However, very few clinical laboratories routinely analyse free VPA concentration. Nowadays, there are methods that predict normalised VPA concentrations in patients with hypoalbuminaemia. These are used by our clinical pharmacists to make dosing recommendations.

Purpose We aimed to determine the usefulness of assessing normalised VPA concentrations to take dosing decisions and the rate of intoxication in CIP with hypoalbuminaemia ≤ 3.5g/dL and VPA TSC ≤ 75 mg/L.

Material and methods A retrospective and observational study was conducted from September 2014 to September 2016. Inclusion criteria: all CIP who had been treated with VPA, with at least one VPA TSC determination ≤ 75 mg/L and hypoalbuminaemia ≤ 3.5g/dL. Data collected: VPA dose, VPA TSC (mg/L), serum albumin concentration (g/dL) and serum ammonia level (SAL) (µmol/L). Therapeutic range for VPA was 50–100 mg/L. Normalised VPA concentration was calculated based on free VPA and albumin concentration. Intoxication was considered as SAL ≥ 32µmol/L.

Results 15 CIP were included. 5 CIP (33.3%) were within the therapeutic range while the others (66.7%) had subtherapeutic VPA TSC (<50 mg/L). VPA dose was increased in 5 CIP based on subtherapeutic VPA TSC without considering normalised VPA concentration. After adjusting TSC according to albumin concentration, 80% (12 CIP) of all patients reached supratherapeutic levels. Serum ammonia levels were evaluated in 7 CIP confirming VPA intoxication in all cases.

Conclusion Despite obvious limitations, clinicians often take incorrect dosing decisions based on VPA TSC. Patients with therapeutic and subtherapeutic TSC, after normalisation, frequently reached supratherapeutic levels. Predicted adjusted VPA concentrations show approximate results but these are reasonably concordant with intoxication confirmed by serum ammonia levels. Normalisation of VPA concentrations in hypoalbuminaemic CIP may have a significant influence on dose adjustment.

No conflict of interest

CP-216 | USING RITUXIMAB FOR OFF-LABEL INDICATIONS

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Background The extended use of rituximab for off-label indications accentuates the need for creating standardised protocols to speed up both the administrative processes and the supply to the patient.

Purpose To analyse rituximab's off-label indications as well as the treatment schedule used to evaluate the degree of compliance with the Royal Decree which regulates the use of medicines under special circumstances.

Material and methods An observational retrospective study was carried out in 2015, in which all patients treated with rituximab, both exclusively or in combination with other drugs, were included. For data collection, the oncologic treatment management tool, Onconfarm, and the electronic clinic history programme, Selene, were used: age, gender, diagnosis, treatment schedule received, off-label indication or not, and, if affirmative, whether it was processed and authorised by the medical board at the hospital.

Results 74 patients were included, 38 women and 36 men, with an average age of 69 years (20–90). A total of 103 treatments were applied, the following being the most frequent: follicular lymphoma (23%), giant cell lymphoma (13.5%) and chronic lymphocytic leukaemia (CLL) (12%). The most used treatment schedules were: R-CHOP (22%), rituximab every 2 months (13.5%) and rituximab quarterly (12.5). Of all treatments applied, 48 (47%) did not comply with the indications in the technical data sheet. The most frequent indications were: membranous glomerular nephropathy (14.5%), CLL as maintenance treatment (12.5%) and Mantle cell lymphoma and Waldenström's macroglobulinaemia (10.5%). Of all the off-label treatments, 58% were processed following the procedures related to the use of medicines under special circumstances and authorised to be applied, while the remaining 42% were applied without being administratively processed.

Conclusion Prescribing Rituximab for off-label indications is very frequent in hospitals. These situations should be registered under some therapeutic protocols, mandatory for physicians, and in which regulation by the Pharmaceutical and Therapeutical Commission should be actively engaged and involved.

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No conflict of interest

CP-217 | **EVALUATION OF ANTIVIRAL PRESCRIPTION FOR THE TREATMENT OF CYTOMEGALOVIRUS INFECTION**

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Background Viral infections are extremely common and often a severe complication of bone marrow transplantation. In particular, cytomegalovirus (CMV) infection is considered a major cause of morbidity and mortality[1] in transplant recipients. This can partly justify the increased consumption of antivirals, most of which are expensive molecules with a significant budgetary share.

Purpose Evaluation of the relevance of systemic antiviral prescriptions as per our internal protocol according to international guidelines.[2]

Material and methods This was a retrospective study, carried in the haematology and transplantation department, which reviewed the appropriateness of treatment targeting 136 systemic antiviral prescriptions to prevent or treat CMV infection, from 2009 to 2014. This study included 48 patients who had at least one reactivation of CMV during the period of analysis. The evaluation tool used was the index of therapeutic adequacy (ITA): it is a score whose calculation methods are defined in the table.

If the indication of the antiviral conformed or was disputed, we evaluated the six secondary criteria as defined in accordance with international guidelines. At the end of the evaluation, we calculated the index by adding the scores obtained for each of the seven criteria. A prescription considered fully compliant over the ITA will be low and for those conforming less over the ITA will be higher.

Results The results showed that 68% (92 of 136 antiviral prescriptions) of prescriptions were deemed fully compliant with the guidelines for the indication (primary endpoint) and all administrative modalities (secondary endpoints). Non-conformities resided in the choice of molecule, dosage and route of administration with a rate equal to 2.2%, as well as for the criteria of duration of treatment and the combination of antivirals with, respectively, a rate of non-conformities of 3.7% and 4.5%.

Conclusion The non-conformities identified during this work allowed us to define the priorities that will be the starting point of a quality approach to improve antiviral prescriptions.

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No conflict of interest

CP-218 | **MEDICATION DISCREPANCIES AND THEIR CLINICAL IMPACT: A STUDY AT THE EMERGENCY DEPARTMENT**

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Background Transition between different healthcare settings is a risk factor for medication discrepancies in the patient's medication list. A large number of discrepancies has the potential to cause adverse drug events.

Purpose Obtaining a complete medication list of a patient is very important to avoid unintentional medication discrepancies and medication related problems at admission. We aimed to evaluate the added value of a structured medication review in the emergency department by a pharmacy technician.

Material and methods Well trained pharmacy technicians performed a medication review of patients admitted to the emergency department by using a structured form and different sources (patient, family, medication list, family doctor, etc). The physician acquired medication list was compared with that acquired by the technician to identify unintentional discrepancies (any difference between the two medication lists). The clinical impact was evaluated by a multidisciplinary team of pharmacists and pharmacologists.

Results From February to April 2016, 279 (74.9%) medication discrepancies were identified in 113 medication lists. The most common discrepancies were omission of a drug (43.7%),

omission of frequency (17.2%) and omission of dose (14.7%). Drugs belonging to the class of analgesics (21.1%) and obstructive airway disease (18%) were associated with the highest discrepancy rates. There was a positive association between the number of discrepancies and the number of drugs (p=0.002) and information sources (p=0.026) and the time needed to perform the reconciliation (p=0.001). 6.5% were evaluated as having a potentially very significant impact on the patient's health; 30.6% were evaluated as having the potential to cause moderate clinical impact and 2.2% as potentially having a minor or no impact.

Conclusion This study provides evidence that structured medication review is useful to obtain a complete medication history, to avoid medication related problems and to guarantee the patient's safety.

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No conflict of interest

CP-219 | **ASSESSMENT OF THE APPROPRIATENESS OF PRESCRIPTIONS OF CLOTTING FACTORS COMPLEX (OCTAPLEX) AND FIBRINOGEN (CLOTTAFACT) IN A UNIVERSITY HOSPITAL**

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Background In 2015, Octaplex and Clottafact were identified among the most prescribed medications with a high financial impact in the university hospital. Expenses for those drugs increased respectively by 10% (+€ 23 900) and 14% (+€ 239 300) in 2015.

Purpose The aim of the study was to evaluate the appropriateness of Octaplex and Clottafact prescriptions to see if this increase was justified.

Material and methods We audited the prescriptions made in the first quarter of 2016 with a set of criteria based on these medications' indications. Those criteria were divided in 3 groups: conformity of the prescription with regulatory demands (group 1), for example (IE) was there a computerised traceability of the medication's prescription? Relevance of the prescription regarding patient biological (group 2) and clinical (group 3) data.

We assigned a score for each criterion, weighted to reflect its importance. The sum of scores then gave each prescription a letter, characterising their appropriateness. The letters were: A=appropriate, B=intermediately appropriate and C=inappropriate. This method was approved by physicians and pharmacists, and members of the commission for medicines of the hospital.

Results 16% (44/272) of prescriptions were audited: 28% (14/111) were for Octaplex and 19% (30/161) for Clottafact. Group 1: 50% of prescriptions were classified as A (22/44), 36% (16/44) were B and 14% (6/44) were C. only 34% (15/44) were computerised. Group 2: 54% were classified as A (24/44), 41% (18/44) were B and 5% (2/44) were C. For 37% (11/30) of fibrinogen prescriptions, there was no hypofibrinogenaemia.

Group 3: 75% (33/44) were classified as A, 20% (9/44) were B and 5% (2/44) were C (for those 2 prescriptions, there was no mention of bleeding or blood transfusion in the patients' records).

Conclusion 25% (11/44) of the prescriptions were appropriate, 72% (32/44) were intermediately appropriate and 3% (1/44) seemed inappropriate. This is acceptable considering that these medications are usually administered in emergencies, when staff have to think and act fast. These results have been presented to the prescribers with a reminder of those medicines with indications of a 'last resort' character. This type of audit will be renewed periodically, the set of criteria being adaptable to any medication.

No conflict of interest

CP-220 | **ANTIBIOTIC PRESCRIPTION PATTERNS IN AN INTENSIVE CARE UNIT**

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Background The use (and misuse) of antibiotics not only influences therapeutic outcomes for the individual patient, but due to emerging resistance, the whole population may also be affected. Advocating a multidisciplinary approach, including pharmacists, has the potential to achieve better clinical outcomes and rationalised antibiotic consumption.

Purpose To assess the potential benefit of the recent implementation of clinical pharmacy services in an intensive care unit (ICU) by analysing the usage pattern of antibiotics prescribed by a multiprofessional team.

Material and methods The study was conducted in a 12 bed ICU from 01 September 2016 to 15 October 2016. Antibiotic medication review was carried out by clinical pharmacists using a worksheet approved by the local drug and therapeutic committee. It contained data about the patient's identity, admission parameters, length of stay, duration of mechanical ventilation, prescribed antibiotics, microbial cultures and SOFA scores.

Results 42 patients were screened, 18 of whom were older than 65 years. Length of treatment was longer than 7 days in 11 patients. 21 subjects were mechanically ventilated, 12 of whom were on ventilation for 1–4 days, while the others were ventilated for more than 5 days. 6 patients contracted a nosocomial infection which was associated with longer mechanical ventilation.

9 patients died, 14 were transferred to sub-intensive care and 19 were transferred to other departments. 18 received postoperative prophylactic antibiotic therapy, and 1 case was not in line with current guidelines. In 26 cases, empirical antibiotic regimens were issued, while only 8 patients were treated with targeted therapies. 34 subjects received one or two antibiotics, and in 11 cases, a change in the therapeutic regimen was issued due to insufficient therapeutic response. Unfortunately, de-escalation was implemented in only 6 cases, the rate of which might presumably be increased by the recent introduction of a clinical pharmacist to the ICU. The low de-escalation rate was rationalised by a highly cautious attitude of intensive care physicians.

Conclusion The attributable medical and population wide costs of antimicrobial therapies are sizable. Results from this assessment might provide an argument for the potential need of a multiprofessional approach when prescribing antimicrobial

therapies in the ICU, especially for mechanically ventilated patients.

No conflict of interest

CP-221 | CLINICAL EXPERIENCE WITH INTRATHECAL RITUXIMAB FOR TREATMENT OF PROGRESSIVE MULTIPLE SCLEROSIS

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Background Inaccessibility of inflammation compartmentalised to the CNS may underlie the lack of effectiveness of immunomodulatory treatments in progressive multiple sclerosis (PMS), turning its treatment into a challenge for researches. Intrathecal rituximab (IT-RTX) is a new treatment option which has shown promising results in clinical trials but clinical experience is limited.[1]
Purpose Case report of the use and outcomes in 3 patients with PMS treated with IT-RTX in a tertiary hospital.
Material and methods 3 cases of PMS are reported: patient A (man), patient B (man) and patient C (woman) aged 44, 48 and 42 years, respectively. All patients were treated with IT-RTX. Effectiveness and safety of IT-RTX were evaluated. Demographic and clinical data were collected from patients' electronic medical records. All patients started IT-RTX treatment following a compassionate use clinical study protocol, after hospital approval and informed consent was obtained.
Results All patients received weekly 25 mg doses of IT-RTX, over a 3 week period. Patient B also received a fourth dose of 25 mg 8 months after the first dose. Flow cytometry was performed on peripheral blood (table), revealing a remarkable effect on peripheral B lymphocytes CD45 and CD19, with undetectable levels of CD19. Similar depletion was observed with peripheral B lymphocytes CD3, CD4, CD8 and CD16 +CD56. This effect was maintained over time, rising again after several months without treatment.

No changes in the Expanded Disability Status Scale (EDSS) were observed (table), except for patient B, who developed a slight improvement. The treatment was well tolerated, although patient B suffered a fever episode after the first dose and patient C died from massive pulmonary embolism, a rare RTX related complication, 5 months after finishing treatment.

		No ADM	Patient A	Patient B	Patient C
CD45	I	1045			
	II				2285
	III		1114	1014	1517
	*		1579	1175	1901
CD19	I	123			
	II				5
	III		0	0	0
	*		37	84	1
EDSS-pre			8.5	6.5	6.5
EDSS-post			8.5	6.0	6.5

*Post-treatment analysis: 5 months (patient A), 6 months (patient B), 2 months (patient C) after the last dose.

Conclusion In our patients, IT-RTX showed limited effectiveness, with disease stabilisation (similar EDSS) and depletion of peripheral B lymphocytes (especially CD19). Although the treatment was well tolerated, a rare and severe adverse event was reported.

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No conflict of interest

CP-222 | CLINICAL EXPERIENCE OF PANITUMUMAB MONOTHERAPY AS TREATMENT FOR METASTATIC COLORECTAL CANCER

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Background Panitumumab is a fully human monoclonal antibody Ig G2 whose target is the epidermal growth factor receptor (EGFR). It is indicated as monotherapy to treat patients with metastatic colorectal cancer (mCRC) that show EGFR with wild-type KRAS, after failure of chemotherapy regimens containing fluoropyrimidine, oxaliplatin and/or irinotecan.
Purpose The purpose of this study was to evaluate the effectiveness and safety of panitumumab monotherapy in patients with mCRC.
Material and methods This was a retrospective observational study of patients with mCRC treated with panitumumab as monotherapy from June 2008 to September 2015. Demographic, clinical and pharmacotherapeutic information was collected from the computerised medical records. The main effectiveness variables were: type of response to treatment (following RECIST criteria), progression free survival (PFS) and overall survival (OS). Frequency of adverse effects and severity (according to CTCAE V.4.0) established the safety profile of the treatment.
Results 30 patients were included: 73% men (n=22), average age 65.4 years (SD=10.7), 56.6% (n=17) ECOG PS 2 at the beginning of treatment and 46.7% (n=14) stage IV diagnosed. Panitumumab was used as a second-(n=10), third- (n=11) and fourth-line (n=9) treatment. Median number of cycles was 6 (IQR 4–10) and the average treatment period was 3.9 months (SD=2.6). Objective response rate was 10% (n=3), all being partial responses. 10% (n=3) showed stabilisation of disease and 63.3% (n=19) progression. In 5 patients the response was not evaluable (2 treatment cycles until death). The SLP median was 3 months (95% CI 1.7–4.2) and the SG median was 8 months (95% CI 3.6–12.3). Dermatologic toxicities occurred in 70% (n=21) of patients, and were severe (grade 3 and higher) in 15% of patients receiving panitumumab monotherapy. It was necessary to reduce the drug dose in 3 patients (due to dermal toxicity), with an average reduction of 26% (SD=11.5, range 20–40).
Conclusion Panitumumab as monotherapy showed adequate effectiveness (SLP median 3 months and SG median 8 months) in patients with mCRC: pretreated, KRAS wild-type and poor performance status. It should be noted that dermal toxicity was observed in 70% of patients, characteristic of the EGFR inhibitor family. Future guidelines for mCRC treatment

will have to establish the optimum sequence of use of the available therapies with the aim of achieving the greatest clinical benefit in patients.

No conflict of interest

CP-224 WITHDRAWN

CP-223 WITHDRAWN

CP-225 | UGT1A1*28 POLYMORPHISM AND IRINOTECAN EFFECTIVENESS

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Background UGT1A*28 polymorphisms have been associated with an increase in SN-38, the active metabolite of irinotecan. Thus some authors also related the presence of this mutated allele with an increase in the effectiveness of irinotecan treatment.

Purpose To evaluate the influence of the UGT1A1*28 polymorphism on the effectiveness of irinotecan.

Material and methods This was a prospective, observational, 4 year single centre study (November 2012–May 2016). All adult colorectal cancer patients treated with the FOLFIRI protocol (irinotecan 180 mg/m^2/fluorouracil 400 mg/m^2/fluorouracil 2400 mg/m^2/leucovorin 200–400 mg/m^2) were included. Inclusion criteria were: ECOG 0–1, haemoglobin > 10 g/dL, leucocytes >3000/mm^3 and platelets >100 000/mm^3). Effectiveness was evaluated as progression free survival (PFS) and overall survival (OS). The rs8175347 UGT1A1 polymorphism was established by analysing the genomic DNA of a peripheral blood sample. Genetic characterisation was carried out using LightClycler 480 platform and specific allele HybProbe fluorescent probes. The study was approved by the hospital's ethical committee (CEIC) and classified as EPA-SP by the Spanish Agency for Drugs and Health Products (AEMPS) with GNC-QUI-2013-01 code. Patients were requested to sign an informed consent form prior to inclusion.

Results The study included 34 patients, average age 60 (27–81) years, of which 77.7% were men. 90.6% of patients were treated with anti-VEGFR or anti-VEGFA, and irinotecan was prescribed as secondline treatment. 44.4% of patients showed UGT1A1 wild-type (WT) alleles, while 41.2% and 14.7% had heterozygous and mutated homozygous alleles, respectively. After 4 years of follow-up, median PFS and OS were 7.0 and 23.0 months for patients with any mutated allele in the UGT1A1 gene, while for patients with the WT genotype, values were 8.0 (p=0.4590) and 15.0 (p=0.6128) months, respectively. Moreover, median PFS and OS were 4.0 (p=0.648) and 44.0 (p=0.1628) months for patients with the *28/*28 genotype and 7.0 (p=0.650) and 23.0 months (p=0.8354) for heterozygous patients.

Conclusion Our results show that the rs8175347 polymorphism in UGT1A1 does not influence the effectiveness of irinotecan. Prospective randomised studies with a large number of patients are required to establish if this polymorphism influences the effectiveness of irinotecan therapy.

No conflict of interest

CP-226 | PRESCRIPTIONS ANALYSIS: HOW CAN WE TARGET OUR WORK?

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Background Pharmacists have to dedicate a significant amount of their time to prescriptions analysis; however, some prescriptions may present less risk than others.

Purpose To evaluate focusing pharmaceutical validation on prescriptions containing one narrow therapeutic range drug (NTRD).

Material and methods For 2 months, prescription analysis (DxCare) was performed by two pharmacists. The tested group (TG) collected every prescription that included at least one NTRD (vitamin K antagonists, oral cancer drugs, immunosuppressant drugs and antiretroviral therapies) in all the departments that were computerised. Prescriptions for a single department every week (neurology, cardiology, vascular medicine and internal medicine) formed the control group (CG). Pharmacists analysed prescriptions from one group for 1 week and from the other group on the following week. PI were categorised according to relevance and to the French Clinical Pharmaceutical Society classification, and time spent was recorded.

Results 956 prescriptions were analysed. The first three causes of PI were non-conformity to a referential and contraindication (24.2%), overdose (18.5%) and omissions (16.9%). However, most relevant PI were due to interactions (13.7%) and involved mainly cardiovascular medicines (45.5%). A modification of the prescription was recorded for 60.0% of the 55 relevant PI. 478 prescriptions were analysed in each group. Compared with the CG, prescriptions from the TG contained more medicines (12.4±5.0 vs 10.1±4.5; p<0.001) and analysis required more time (0.35 vs 0.31 min/line of treatment; p<0.001). 73 PI were observed in the TG versus 51 for the CG (p<0.01), and relevant IP concerned mainly omissions (23.5%, TG) and interactions (42.8%, CG). No PI was related to an NTRD in the CG, whereas in the TG, 16 PI were related (22.0%).

Conclusion Targeting of drugs helps to select prescriptions which have a higher risk of error. However, most IP are not related to an NTRD. Patients in the TG were often suffering from multiple pathologies in parallel with the one for which they are treated with an NTRD, and the prescription of these other drugs is often forgotten. Further studies should include analysis of demographic characteristics to define additional criteria that should be taken into account for targeting prescriptions.

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No conflict of interest

COST UTILITY ANALYSES OF BIOLOGICAL AGENTS FOR REFRACTORY MODERATE TO SEVERE ULCERATIVE COLITIS

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Background Moderate to severe ulcerative colitis (UC), a chronic inflammatory disease affecting young adults, has a significant impact on patients' quality of life. Different biological agents (BAs) have been approved for the treatment of patients who have responded inadequately to conventional therapy but the selection of BAs is still controversial due to the lack of head to head trials. Indirect economic comparisons of these costly drugs are available, but they are not available from the Italian National Healthcare perspective.
Purpose The objective was to evaluate the cost utility of BAs for the treatment of refractory moderate to severe UC from the Italian Healthcare perspective.
Material and methods A Markov model was constructed using the software R 3.3.1 Markovchain package to evaluate incremental cost utility ratios (ICUR) for adalimumab, infliximab originator, infliximab biosimilar, golimumab and vedolizumab treatments in patients over a 10 year period from the perspective of the Italian Healthcare system. Three transition states were considered: remission, clinical response and relapse. Clinical parameters were derived from clinical trials. Direct healthcare costs (actualised treatment costs by 1.5%, hospital visits, laboratory tests, endoscopy examinations, hospital admissions) for every transition state were considered and obtained from the national database. Utility was expressed as QALY (quality adjusted life years).
Results From a National Healthcare perspective, direct healthcare costs per treatment over a 10 year period were, respectively, € 112 513.30, € 116 823.10, € 128 635.9, € 108 781.20 and € 112 144 for adalimumab, golimumab, infliximab originator, infliximab biosimilar and vedolizumab, with related QALY of 6.68, 6.70, 6.66, 6.66 and 7.02. Infliximab originator was the most expensive treatment with the same QALY as infliximab biosimilar. Golimumab, adalimumab and infliximab originator were all dominated by vedolizumab, although vedolizumab was dominated by infliximab biosimilar.
Conclusion The analysis showed infliximab biosimilar had the best cost utility profile. Cost utility analyses from a national perspective are useful to estimate the specific economic impact, to be able to treat more patients and to ensure optimal choice.

No conflict of interest

EVOLUTION OF THE CONSUMPTION OF ANXIOLYTICS AND HYPNOTICS IN A HEALTH AREA

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Background Benzodiazepines are a group of medicines whose consumption is increasing in Spain.
Purpose To study sedative and hypnotic drug consumption, expressed as defined daily doses by 1000 inhabitants (DHD), and to compare consumption as definite daily doses (DDD) with the variation in the population in a health area.
Material and methods This was a descriptive retrospective study of dispensations of medical specialties belonging to the ATC classification system N05B (antianxiety) and N05C (hypnotics and sedatives), carried out in a health area between 2010 and 2015. The variables considered were: year, DDD, DHD, active principle and number of inhabitants.
Results Global consumption of anxiolytics and hypnotics has grown from 84.7 DHD in 2010 to 92.9 DHD in 2015, representing an increase of 9.8%. The anxiolytics group experienced an increase of 7.5% in this period of time, the most widely consumed drugs being lorazepam and alprazolam with an average of 29.4±1.5 and 12.8±0.2 DHD, respectively. The largest increase was for diazepam (31.4%) while the largest decrease was for bentazepam (63.8%). On the other hand, the hypnotics group had an increase of 14.6%, the most widely consumed being lormetazepam and zolpidem, with an average of 16.1±1.9 and 1.6±0.6 DHD, respectively. The drug with the greatest increase was lormetazepam (19.5%) while loprazolam had the greatest decrease (57.7%). Moreover, the absolute data of consumption expressed as totals were 5 464 872, 5 407 847, 5 331 180, 5 419 403, 5 556 624, 5 557 246 for the years of the period studied. In terms of population data in the study years 2010, 2011, 2012, 2013, 2014 and 2105, there were, respectively, 176 874, 170 268, 162 559, 162 010, 162 352 and 163 792 inhabitants.
Conclusion In accordance with similar studies carried out in Spain, there was a clear trend towards an increase in consumption of sedatives and hypnotics per inhabitant in our health area. This increase occurred mainly in the group of hypnotic with an increase that was almost doubled that for anxiolytics. The tendency to a population decline in the first half of the period of our study and a stable population in the second half, had no parallel in the continued upward trend in total consumption of anxiolytics and sedatives.

No conflict of interest

ANTIVITAMIN K OVERDOSE: HOW TO USE VITAMIN K1?

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Background In 2008, the French National Authority for Health produced recommendations regarding the management of patients treated with antivitamin K for overdose, bleeding or risk of bleeding.
Purpose A retrospective study was conducted in our hospital to evaluate conformity of prescribing practices to these recommendations and to propose improvement actions if necessary.
Material and methods All prescriptions of vitamin K1 were extracted from our software for a 2 month period, excluding prescriptions from the maternity ward and paediatrics. Only patients treated with antivitamin K were selected. We then collected the necessary data to determine if the prescriptions were consistent with the recommendations: target INR (international normalised ratio), route of administration, posology and indication.
Results

	No of patients	Total No of administrations	No of administrations conforming to recommendations	No of administrations not conforming to recommendations
Haemorrhage	7	8	4	4
Unplanned surgical act	5	7	0	7
Asymptomatic overdose with 4≤INR<6	3	3	0	3
Asymptomatic overdose with 6≤INR<10	15	18	13	5
Asymptomatic overdose with INR≥10	6	6	1	5
Total	36	42	18	24

Overall, among the 24 (57.2%) prescriptions for vitamin K1 which were non-compliant with the recommendations, 19 were for over dose and 5 were for under dose.

Conclusion This study showed an important rate of non-compliance with the recommendations regarding the management of patients treated with antivitamin K1 in situation of overdose, bleeding or risk of bleeding in our hospital. Failure to adhere to the recommended doses of vitamin K1 can cause difficulties in stabilising the INR after resumption of antivitamin K treatment. Furthermore, the prescriber's attention was drawn to the recommendations through an oral presentation of the study and emails. We also reminded them of the existence of a form, included in the prescription software, designed to serve as a point of reference for the prescriber when vitamin K1 is needed.

No conflict of interest

CP-230   **FEAR OF HYPOGLYCAEMIA AMONG PATIENTS WITH TYPE 2 DIABETES: FACTORS AFFECTING AND IMPACTING ON TREATMENT ADHERENCE**

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Background Hypoglycaemia may result in significant anxiety and worry or even a fear of hypoglycaemia, which may have clinical implications for diabetes management.

Purpose This study aimed to assess the fear of hypoglycaemia in patients with diabetes type 2, to identify factors affecting this and to seek correlation with treatment adherence.

Material and methods This was an observational cross sectional study carried out in patients with type 2 diabetes in the endocrinology department. Patients with secondary or gestational diabetes were excluded. Fear of hypoglycaemia was measured using the Hypoglycaemia Fear Survey II scale (HFSII). Total scores range from 0 to 60 for the behaviour subscale and from 0 to 72 for the worry subscale. The Morisky Medication Adherence Scale 4 items (MMAS 4 ITEM) was used to asses treatment adherence. Statistical test ANOVA was applied and statistical signficance was accepted at $p<0.05$.

Results 141 type 2 diabetic patients with different therapeutic regimens were included. In the elderly, fear of hypoglycaemia was more important. Hypoglycaemia fear had a positive correlation with previous history of hypoglycaemia and hypoglycaemia fear ($p<0.001$) causing increasing worry and behaviour change among type 2 diabetic patients. Patients with a high HFS score had therapeutic adherence problems. Equivalent results were found in similar studies.

Conclusion There was evidence that fear of hypoglycaemia may have a negative impact on therapeutic adherence and diabetes management in general. This requires better care from health professionals.

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No conflict of interest

CP-231   **IMPLEMENTATION OF MEDICATION RECONCILIATION ON ADMISSION IN A PSYCHIATRIC HOSPITAL: WHO COMES FIRST?**

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Background Medication reconciliation (MR) improves safety at transition of care. This time consuming process requires patient prioritising. MR in general hospitals focuses on patients ≥65 years old admitted via the emergency department (ED). No recommendation has been specifically elaborated for MR in psychiatric hospitals.

Purpose To identify patient selection criteria among psychiatric inpatients for MR on admission.

Material and methods A 6 week prospective monocentric study was conducted in a psychiatric hospital ward. The pharmacy resident acquired the best possible medical history for each admission, using all information sources available to identify treatments and check for allergies. The psychiatrist identified and corrected the medication errors (ME). Six patient selection criteria were investigated. Proportion and CI of patients presenting ME under each criterion were estimated and compared with that in the sample. The average medications prescribed on admission was compared between patients with and without ME using a unilateral Student test.

Results 45 patients were included, with a mean age of 51 years. 10 patients presented ≥1 ME (22%, CI 11.2–37.1). 21 ME were found (omissions=16, drug errors=2, dosage error=2, timing error=1). 6 ME were graded as significant or major. They involved anticoagulant, antihypertensive, antidiabetic and corticosteroid omissions. 15 were minor.

Criteria		Sample	Patients with ME
		n	No (%) [CI]
Sex	Men	23	3 (13%) [2.8–33.6]
	Women	22	7 (32%) [13.9–54.9]
Age (years)	<65	37	8 (22%) [9.8–38.2]
	≥65	8	2 (25%) [3.2–65.1]
Patient origin	Home	28	8 (32%) [13.2–48.7]
	ED	12	2 (20%) [1.9–45.5]
	Other	5	0 (0%) [0.0–52.2]
Admission type	Voluntary	37	10 (27%) [13.8–44.1]
	Involuntary	8	0 (0%) [0.0–36.9]
Admission period	Daytime	26	6 (23%) [9.0–43.7]
	Out-of-hours	19	4 (21%) [6.1–45.6]

CI overlap. Proportions of patients presenting ME under the above criteria did not significantly differ from that in the sample. Among patients without ME, the admission prescription listed on average 6.4 medications (min=5; max=15) whereas patients with ME had a mean of 8.8 medications prescribed (min=1; max=14). Admission prescription was significantly longer among patients with ME than patients without ME (p=0.038).

Conclusion ME did not appear to be related to sex, age ≥65 years, patient origin, admission type or period. But admission prescription was longer among patients presenting ME, even though most ME were omissions. The length of medication prescription on admission should be considered as a patient selection criterion for MR for psychiatric patients on admission.

No conflict of interest

CP-232 | **EFFECTIVENESS OF CYCLIC PARENTERAL NUTRITION TO REDUCE LIVER DAMAGE**

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Background Liver involvement related to parenteral nutrition (PNALD) is a major problem, especially in patients requiring total parenteral nutrition (TPN) for a long time and in neonates. A common measurement made is the cyclisation of parenteral nutrition, interrupting administration between 8 and 4 hours to reduce liver damage.

Purpose The purpose of the study was to analyse the evolution of analytical indicators of liver damage following introduction of cyclic parenteral nutrition (CPN).

Material and methods We all patients with CPN in a period of 6 months, from 1 July 2015 to 1 January 2016. Screening conditions were: introduction of TPN for a period longer than 1 week, no previous liver disease and no deaths during the administration of TPN or on the days immediately following. We selected five analytical variables of greater importance in identifying liver damage: alkaline phosphatase (ALP), aspartate aminotransferase (AST), alanine aminotransferase (ALT), gamma glutamyl transferase (GGT) and total bilirubin (TBil). We recorded the data for these values before and at least 1 week after CPN.

Results 60 patients were included in our study. Mean (SD) values were: before CPN: ALP=250 IU/L (SD=294), AST=70 IU/L (SD=53), ALT=90 IU/L (SD=71), GGT=300 U/L (SD=302) and TBIL=4.29 mg/dL (SD=4.06). After CPN: ALP=272 U/L (SD=411), AST=40 IU/L (SD=55), ALT=59 U/L (SD=37), GGT=294 U/L (SD=373), TBIL=3.3 mg/dL (SD=4). The results were broken down into subgroups of patients: oncology, surgical oncology and internal medicine (not included).

Conclusion We observed an improvement in liver parameters for patients except AF after establishing CPN. This result could be attributed to unspecific character of this enzyme. There was a particularly significant improvement for AST and ALT in all subgroups. Finally, GGT improved in all subgroups except for the group of surgical patients

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No conflict of interest

CP-233 | **REASONS FOR SWITCHING ANTIRETROVIRAL THERAPY IN NAÏVE HIV POSITIVE PATIENTS**

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Background Although clinical trials show low virological failures rates (<10%) for initial combination regimens of antiretroviral therapy (ART), we have observed a considerable percentage of naïve patients switching to another combination regimen.

Purpose To evaluate the switch rate among naïve patients who begin ART and to determine the reasons that led to a change in the ART regimen.

Material and methods We conducted a retrospective observational study that included naïve HIV positive persons who initiated ART between January 2015 and January 2016 and attended the pharmaceutical care office. The main variable was persistence with treatment. Secondary variables were: demographics (age, gender); virological response (viral load), pharmacotherapeutics (initial combination regimen, new combination regimen) and reason for switching to another combination (virological failure, documented toxicity, prevention of long term toxicity, avoiding serious drug–drug interactions, simplification). Persistence rates were obtained through dispensing records of the pharmacy programme. The remaining variables were obtained from microbiology reports and the medical history of each patient.

Results 31 patients with an average age of 40±11 years were included. Most patients were men (90.3%). Median viral load was 23.300 (elite controller 481.000) copies/mL. The proportion of patients coinfected with hepatitis C virus was 16.1%. In all cases patients received triple therapy. More than half of patients (67.7%) began treatment with a combination regimen based on two nucleos(t)ide analogues plus an integrase inhibitor and the preferred regimen was tenofovir, emtricitabine, elvitegravir and cobicistat (58.1%). Non-nucleoside rilpivirine was used as a third drug in 25.8% of cases. Almost half of the patients switched to another treatment (48.4%). No virological failure occurred in any patient. The most common reason for changing to another regimen was documented toxicity

(6). Other reasons were prevention of long term toxicity (4), simplification (4) and avoidance of serious drug–drug interactions (1).

Conclusion This study showed that a high proportion of ART regimens in naïve HIV patients were changed, even though these regimens achieved undetectable viral load. The main reason for switching was based on safety, either documented or potential toxicity. These data might help in designing pharmacist intervention programmes to improve the efficacy and safety of ART.

No conflict of interest

CP-234 | IS HYDROXYZINE–PENTOBARBITAL ASSOCIATION EFFICIENT IN PAEDIATRIC SEDATION?

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Background Chloral hydrate, used as premedication for paediatric medical imaging, is available in France under Temporary Use Authorisation. Because of its potential carcinogenicity, its use is being restricted to a single administration per patient. Following this re-evaluation and in the absence of consensus, the alternative choice in our hospital is intra-rectal administration of pentobarbital (PTB). However, the efficacy of PTB alone is considered variable. Therefore, a protocol associating PTB with hydroxyzine 2 mg/kg (H-PTB) has been set up.

Purpose This study evaluated whether H-PTB association offered a significant improvement in paediatric medical imaging premedication compared with PTB alone.

Material and methods The efficacy of both premedication protocols was measured over 13 months, divided into two successive periods. During period 1, PTB was used. During period 2, H-PTB was used. The efficacy of premedication was evaluated regarding various criteria, such as the average time to fall asleep, procedure conditions, etc. Data were obtained during each procedure, using a paper grid that was then imported onto a spreadsheet for computer based analyses.

Results 120 patients were enrolled (period 1, 43; period 2, 77). Average age was 30 months in the H-PTB group versus 27 months in the PTB group. Average weight was identical in the two group and PTB was administered at the same dosage (4.6 mg/kg).

The rate of falling asleep (96% vs 95%) and average lag time (66 vs 64 min) were identical. Absence of sleep or waking of the patient during installation was observed in 55% and 58% of patients, respectively. The rate of procedures successfully brought to an end was also equivalent in both groups. The average sleep duration was 61 min in the H-PTB group and 49 min in the PTB group.

Conclusion Contrary to our expectations, apart from the higher average sleep duration in the H-PTB group, sedation induced by H-PTB was similar to that of PTB on its own. The H-PTB association did not seem to improve paediatric imaging premedication in comparison with PTB alone. Regarding international guidelines, short half-life benzodiazepines seem to be suitable in this indication. Would benzodiazepine be an alternative to chloral hydrate?

REFERENCES AND/OR ACKNOWLEDGEMENTS
Nice Guideline [CG112].

No conflict of interest

CP-235 | COST–BENEFIT ANALYSIS OF CLINICAL PHARMACIST INTERVENTIONS IN GERIATRIC WARDS

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Background Economic assessment of clinical pharmacist interventions is becoming essential for healthcare providers.

Purpose This study estimated the cost–benefit ratio of clinical pharmacist interventions for 5 months in three geriatric services in a secondary care hospital.

Material and methods To estimate the benefit, we computed for each intervention the cost savings related to drugs and biologic tests added or deleted, and the cost avoidance related to preventable serious adverse drug events (ADEs) avoided by multiplying ADE occurrence probability (Nesbit *et al*, 2001) by its cost (Rottenkolber *et al*, 2012). For each intervention a pharmacist and a physician blindly assigned a probability that an ADE would have occurred in the absence of an intervention, according to the Nesbit Scale. When the two experts disagreed, we used the average probability. The inter-rater agreement was assessed by the weighted Cohen's kappa. Cost–benefit ratio was defined as saved or avoided cost divided by investment. Categories of problems and interventions were also analysed.

Results The pharmacy resident performed a total of 1010 interventions and 62% were accepted. The cost savings (related to drugs and biologic tests added or deleted) were € 1.04 per intervention. The cost avoidance (related to ADE avoided) was € 147.41 per intervention. Investment costs were calculated at € 7.74 by intervention. Cohen's kappa was 0.66 (substantial level of agreement according to Landis and Koch scale). The cost–benefit ratio was 19.19:1. The most common type of problem was contraindication and non-compliance to the references, followed by inappropriate methods of administrating the drug, non-necessary medicine and over dosage. The most common type of intervention was substitution and interruption therapy, followed by dosage adjustments.

Conclusion A new model of pharmacy practice that integrates clinical pharmacists into existing clinical practice has the potential to minimise the risks with de-prescription, decrease the costs by substituting a drug that is equally effective or changing the route of administration, thereby improving the outcomes associated with drug therapy, particularly in the elderly.

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No conflict of interest

CP-236 | METABOLIC CHANGES IN PATIENTS SWITCHING FROM ANY ANTIRETROVIRAL THERAPY TO DARUNAVIR BOOSTED WITH COBICISTAT

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Background New therapies for HIV infection have brought great benefit to the patient. Protease inhibitors (PIs) are known to cause adverse effects on lipid profile and increase cardiovascular risk. Darunavir boosted with cobicistat (DRV/c) is a safe and effective alternative, providing a co-formulation of boosted DRV in a single tablet.

Purpose To evaluate variations in metabolic parameters to asess whether the lipid profile improves when a PI (ritonavir) is removed from the antiretroviral therapy (ART).

Material and methods This was a retrospective observational study of patients switching from ART to DRV/c (alone or combined), between 1 November 2015 and 30 June 2016. Blood test data, immediately prior to the change and subsequently (3 and 6 months), were recorded from 30 days after the switch. Demographics and metabolic parameters were collected: total cholesterol (TC), LDL cholesterol (LDLc), HDL cholesterol (HDLc), triglycerides (TG), creatinine (Cr) and glomerular filtration rate (GFR, CKD-EPI).

Results 193 patients switched from ART to DRV/c, 170 had a blood test of ≥ 30 days from the change. Mean age was 49.1 years, 65.9% men. Previous ART: 35% were on monotherapy: darunavir/ritonavir (DRV/r) or lopinavir/ritonavir (LPV/r), 16% had tenofovir (TDF). Most frequent combinations: DRV/r (31.2%), lamivudine (3TC)+DRV/r (19.4%), tenofovir/emtricitabine (TVD)+DRV/r (12.4%) and abacavir/lamivudine (KVX) +DRV/r (11.2%). No significant differences in baseline parameters, except TC by TDF (-19.6 mg/dL p=0.038). After the switch, 35% were on monotherapy (DRV/c), 13% with TDF. Most frequent combinations: DRV/c (34.7%), 3TC+DRV/c (26.5%), KVX+DRV/c (12.4%) and TVD+DRV/c (11.8%). After 5.8 months (n=48), changes in lipid profile were not significantly different from baseline, TC (+6.5 mg/dL p=0.04), cLDL (+11.8 mg/dL, p=0.11), cHDL (-2 mg/dL, p=0.09) and TG (-4.7 mg/dL, p=0.7). However, elevation of Cr persisted (+0.09 mg/dL, p<0.0001) and GFR (-8.9 mL/min, p<0.0001). In the subgroup of patients who stopped TDF (n=7), differences were higher: TC (+30.9 mg/dL p=0.001), cLDL (+22 mg/dL, p=0.004) and cHDL (+12 mg/dL, p=0.02). No significant differences in Cr (+0.03 mg/dL) or GFR (-1.9 mL/min) were found.

Conclusion Although DRV/c was theoretically supposed to improve the lipid profile, it was not shown to have a relevant impact on lipid parameters in the prior 6 months after switching therapies. Metabolic parameters were elevated in patients who stopped TDF and therefore its lipid lowering effect. There was an increase in Cr that persisted over time but was not clinically relevant.

No conflict of interest

CP-237 | ANALYSIS OF SURVIVAL IN PATIENTS DIAGNOSED WITH METASTATIC BREAST CANCER TREATED WITH ERIBULIN IN A TERTIARY HOSPITAL

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Background Eribulin is indicated for the treatment of patients with locally advanced or metastatic breast cancer who have progressed after at least one chemotherapeutic regimen for advanced disease. However, in our hospital its use is limited to a subgroup of patients with resistance to capecitabine and vinorelbine who have previously received treatment lines including taxanes and anthracyclines.

Purpose The aim was to analyse the effectiveness of eribulin for the treatment of metastatic breast cancer in a clinical setting. In addition, we explored factors that might influence survival of patients treated.

Material and methods Following an observational retrospective design, data for patients who received at least one dose of eribulin from February 2014 to July 2016 were obtained from the computerised physician order entry system. A data collection form was designed to record patient's demographics, time since diagnosis, sites of metastases, previous lines of treatment, number of cycles of eribulin, progression free survival (PFS) and overall survival (OS) adjusted by age, previous treatment lines (anthracyclines, taxanes, capecitabine and vinorelbine), administration of subsequent lines, and types and number of metastases. Statistical analysis and data visualisation were performed using the R programming language.

Results Clinical data for 40 patients (97.5% women, 54 years old (range 33–85)) were reviewed. With a median time since breast cancer diagnosis of 8.1 years, they had received a median of 4.6 (range 2–7) treatment lines. We detected that most patients did not fulfil local criteria for eribulin use (67.5%). However, they received 3.5 (range 1–16) cycles for metastatic disease (locations were 75% bone, 50% lung, 65% liver and 10% brain). Median PFS was 2.4 months (0.5–16.5) and OS with 45% of events was 4.2 months (0.5–20.5). 17.5% of patients died before 3 months. Only liver metastases predicted OS (hazard ratio 4.495; 95% CI 1.011–19.99; p=0.031).

Conclusion In our case, the effectiveness of eribulin in the clinical setting was modest. PFS and OS values were lower than published in the literature. Survival analysis did not identify a subgroup of patients that could benefit from this treatment in our population.

No conflict of interest

CP-238 | THE BURDEN OF CLOSTRIDIUM DIFFICILE INFECTION IN A ROMANIAN REGIONAL HOSPITAL

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Background Diarrhoea is a symptom frequently encountered in hospitalised patients with prolonged antibiotic treatment, which suggests nosocomial infection. The main cause of diarrhoeal illness associated with antibiotics is infection with *Clostridium difficile* (CD), a bacteria that is frequently encountered in asymptomatic carriers. From these reasons many healthcare settings have implemented screening for *Clostridium difficile* infection (CDI).

Purpose To assess the prevalence of CDI and CD carriage rate in patients undergoing prolonged antibiotic treatments.

Material and methods The present study included 189 consecutive patients hospitalised in Clinical Emergency County Hospital of Craiova, Romania (SCJUC) with various comorbidities, following more than 7 days of antibiotic treatment, from which were collected stool specimens. Colonisation/infection with CD was determined by immunochromatographic screening method using kit NADAL–C. Difficile Toxins A and B Test (nal von minden GMBH, Germany) and confirmed by PCR using GeneXpert II (Cepheid, USA).

Results Antibiotic associated diarrhoea was encountered in 66 patients (34.92%). Of those, 49 (74.24%) had infection with CD. Thus the CDI rate was 49/189 (25.93%). Of the 123 patients without diarrhoea syndrome, 57 (46.34%) were asymptomatic CD carriers. CDI rate was higher in the intensive care unit (ICU) (58.90%), followed by surgical departments (50.00%) with a lower prevalence recorded in medical wards (43.75%). We observed a higher prevalence of CDI (57.24%) in elderly patients over 60 years, compared with middle aged patients (51.35%, risk ratio=1.114). Multivariate analysis showed that only diarrhoeal syndrome was a significant positive predictor for CDI (OR=3.31, p=0.001). Admission to the ICU unit, age over 60 years and male sex were non-significant positive predictors for CDI.

Conclusion CDI had a relatively high frequency in SCJUC in patients treated with antibiotics, being the leading cause of diarrhoea syndrome in these patients. The carriage rate of CD was also significantly increased. Screening for CDI contributes to detection of asymptomatic carriers and orientates therapeutic choices in hospitalised patients with enterocolitis.

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No conflict of interest

CP-239 | ARE CONFIDENCE LEVELS OF HOSPITAL PHARMACISTS DIFFERENT FROM OTHER PHARMACISTS IN THE MANAGEMENT OF ANTICOAGULATION THERAPY? PRELIMINARY RESULTS FROM A MULTINATIONAL PHARMACISTS NEEDS ASSESSMENT SURVEY

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Background The International Pharmacists for Anticoagulation Care Taskforce (iPACT) is an expert group committed to enhancing the key role that pharmacists play in anticoagulation management. Pharmacists are ideally suited to monitor patients in this therapeutic area, but an assessment of their knowledge in providing consultations has not been formally evaluated.

Purpose The purpose of this needs assessment survey was to identify self-reported gaps in competences and confidence among practising pharmacists in the area of anticoagulation; to identify variances in confidence levels between community and hospital pharmacists; and to examine areas of anticoagulation with varying needs.

Material and methods An electronic link to the needs assessment survey was distributed to the pharmacists in the participating countries via their respective professional organisations or colleges. Countries with adequate response rates included in the preliminary statistical analysis were Canada, France, Portugal, Croatia, Brazil, Ireland, Hungary, New Zealand and the UK.

Results 1692 pharmacists completed the survey. The distribution of respondents were Canada 357 (21.1%), France 304 (18.0%), New Zealand 237 (14.0%), Portugal 180 (10.6%), Croatia 180 (10.6%), Hungary 171 (10.1%), Brazil 76 (4.5%), Ireland 68 (4.0%) and the UK 60 (3.5%). Community pharmacists had the highest participation 759 (44.9%) while outpatient hospital pharmacists, inpatient hospital pharmacists working on wards and other practice sites represented 133 (7.9%), 339 (20.0%) and 461 (27.2%) of the population, respectively. Overall, pharmacists were less confident in providing information on DOACs compared with VKA (83.4% vs 55.5%; p<0.0001). Confidence level was similar when comparing pharmacists in the outpatient hospital setting with the remaining respondents (mean score=25.8 vs 25.5; p>0.005) but significantly higher when comparing those pharmacists working on inpatient hospital wards (mean score=24.0 vs 26.0; p<0.001). Inpatient hospital pharmacists also cited higher confidence when advising patients about VKA (92.3% vs 85.8%; p=0.002). However, they did not show any difference in confidence when advising on NOACs (60.2% vs 61.0%; p>0.005). More than 90% of pharmacists reported they would like additional education in anticoagulation with personalised e-learning as the preferred source.

Conclusion These results highlight the apparent lack of confidence by both community and hospital pharmacists when discussing anticoagulation, particularly DOACs. Future continuing education programmes should be developed on electronic platforms focusing on practical clinical themes that apply across all settings.

No conflict of interest

CP-240 | **THE CLINICAL PHARMACIST RESOLVES MEDICATION RELATIVE PROBLEMS IN ONCOLOGIC PATIENTS. IS IT TRUE?**

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Background Cancer is becoming a chronic disease. Oncology patients have a higher risk of suffering medication related problems (MRPs) due to patient characteristics (ageing populations, polypharmacy and comorbidities) and the toxicity of cancer therapies. The presence of a clinical pharmacist in an oncology ward may be an effective intervention to reduce this risk, and may contribute to the optimisation of therapy and quality of services provided to patients.

Purpose The aim of the study was to characterise pharmacist interventions (PIs) and report acceptance rates by physicians in order to reduce MRPs.

Material and methods A satellite unit pharmacy was established in an oncology ward (27 beds) of a large teaching hospital. Clinical pharmacy services including systematic medication reviews and medication reconciliation were provided daily by the clinical pharmacist. All PIs and their acceptance rate, and MRPs were recorded during the 12 month study period (2015) according to a validated classification system (Act IP).

Results Medication reviews were performed in 2080 patients and 7020 therapy forms were analysed. Detection of MRPs led to 505 PIs that were subdivided into safety PIs (60%) and medication optimisation PIs (40%). The most frequent causes of MRPs in the safety group were: excessive dosage (44%), untreated indications (17%), interactions, especially concerning cytotoxic drugs (12%), and suboptimal dosage (11%). Most common PIs in the safety group were dose modification (41%) and drug discontinuation (23%). The drug classes with more interventions were antiemetic drugs, antithrombotic agents and analgesic drugs. The most frequent cause of MRPs in the optimisation group was inadequate choice of drug related to drug formulary (40%). Medication reconciliation was performed on 210 selected high risk patients and led to 30 PIs. The most repeated medication error was omission (57%). The overall physician acceptance rate was 81% for medication reviews and conciliation processes.

Conclusion Detection and resolution of potential MRPs, as well as high rates of PIs acceptance by physicians, confirm the clinical pharmacist's role in improved patient safety in a multidisciplinary healthcare oncology team. An interesting challenge in the future will be to explore the real clinical impact of PIs.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Thanks to all clinical pharmacists in our hospital.

No conflict of interest

CP-241 | **INVOLVEMENT OF MULTIDRUG RESISTANT FLORA IN INVASIVE INFECTIONS**

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Background The incidence of sepsis and the prevalence of antibiotic resistance of the causative microorganisms are continuously increasing.

Purpose Determination of bacterial aetiology and antibiotic resistance of microorganisms isolated from blood cultures.

Material and methods From 133 patients admitted to wards in the Clinical County Emergency Hospital of Craiova for a period of 3 months, 153 blood cultures were collected. They were incubated using Bactec BD and positive results were subjected to microbiological diagnosis using Phoenix BD analyser.

Results Of the 133 patients tested, 46 (34.59%) had blood cultures positive and 87 (65.41%) negative. With reference to the number of blood cultures, germs were isolated from 47 (30.72%) cultures and the remaining 106 were negative (69.28%). Isolated bacterial species were Enterobacteriaceae (3.92%), Acinetobacter spp (3.27%), Pseudomonas spp (1.96%), *Staphylococcus aureus* (11.11%), coagulase negative staphylococci (9.15%), Enterococcus spp (65%) and anaerobic bacteria (0.65%). Antibiotic susceptibility testing revealed that *Staphylococcus aureus* strains, including 73.33% MRSA, were 100% resistant to erythromycin, 85.7% to cefazolin, 63.6% to rifampicin, 61.5% to tetracycline and 57.1% to gentamicin and tetracycline. Coagulase negative staphylococci were resistant to oxacillin (83.3%), erythromycin (75%), cefazolin (66.7%), tetracycline (58.3%) and norfloxacin (55.6%).

All strains of staphylococci were susceptible to vancomycin. Enterobacteriaceae were completely resistant to ampicillin, ceforoxim, cefepime, ceftriaxone, 80% resistant to piperacillin/tazobactam, nitrofuratoin and 60% to ceftazidime and ertapenem. ESBL phenotype was identified in 50% of Enterobacteriaceae isolated and CPE in 34.52%. *Pseudomonas aeruginosa* was 100% resistant to most antibiotics except colistin and amikacin. Non-fermenters gram negative bacilli were 100% resistant to imipenem and meropenem, 87.5% to ceftazidime, 85.7% to ciprofloxacin, ceftriaxone and cefepime, and 71.4% to gentamicin.

Conclusion The most common pathogen from blood cultures was *Staphylococcus aureus*, which had multiple antibiotic resistances, making the management of these invasive infections difficult.

No conflict of interest

CP-242 | WITHDRAWN

Drug distribution

DD-001 | **EVALUATION OF THE IMPLEMENTATION OF THE AUTOMATED MEDICATION ORGANISATION (2009–2015)**

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Background The increasing attention to patient safety and the rejected medication organisation by the healthcare inspection in 2008 has led to implementation of an automated medication organisation. Medication distribution is based on a computerised physician order entry (CPOE) and individual medication is distributed daily by the pharmacy. The centralised pharmacy is organised using ARX-ROWA to store medication and Sinteco to produce individual medication rings. The medication for a therapy change or a new patient is provided by a computerised medication cabinet (VANAS).

Purpose This investigation aimed to compare the organisation of medication distribution before (2009) and after implementation (2015) of an automated medication distribution system.

Material and methods Medication organisation audits were performed in 2009 and 2015. The legal requirements of the prescription, administration schedule, agreement between prescription and administration schedule, patient medication on the nurse ward (the correct identification of the medication name, dose, expiry date and patient name), medication administration and distribution were investigated. The obtained data were processed in Excel.

Results The prescriptions that fulfilled the legal requirements increased: 4/87 (4.6%) in 2009, 195/236 (83%) in 2015. The correct administration schedules increased: 45/87 (52%) in 2009, 220/236 (93%) in 2015. Implementation of the CPOE resulted in complete agreement between the prescription and administration schedule. The correct medication identification on the nurse ward increased: 21/87 (24%) in 2009, 65/87 (79%) in 2015. No expired medicines were detected. The administration registration increased: 74/87 (85%) in 2009, 224/236 (95%) in 2015. In 2015 the administration time was verified. In 2015, 285/338 (84%) of the medication was distributed patient specific, 22/338 (7%) provided by the computerised medication cabinet and 31/338 (9%) provided by the nurse ward.

Conclusion Implementation of the automated medication distribution resulted in complete agreement between the prescription and the administration schedule and an increased presence of correct medication on the nurse ward. The automated medication organisation contributed to improved patient safety. In future, bedside scanning should be implemented to close the medication circle, and efforts have to be made to increase the results obtained.

No conflict of interest

DD-002 | CAN WE REDUCE OR AVOID DRUG CHANGES FOR CYTOSTATICS BY INCREASING THE BUFFER STOCK AT HOSPITAL PHARMACIES?

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Background Difficulties with drug supply is a global problem, creating local problems, such as undesirable drug changes.

Compared with other drugs, changing cytostatics for chemotherapy creates significantly more problems, including extra paperwork, quality control, quality assurance, updated production documentation and workflow. In order to decrease the number of cytostatic drug changes, an increase in buffer stock of 23 mature cytostatic products with low price (60 item numbers) was implemented at a national level. The buffer stock was increased from 2 weeks to 2 months (expected consumption).

Purpose The aim of this study was to evaluate the effects and investments of the increased buffer stock of 23 cytostatics at the hospital pharmacies.

Material and methods

Quantitative method the number of difficulties with supply were recorded together with the number and types of drug changes, before and after the buffer stock increase. Qualitative method: a questionnaire was sent to all hospital pharmacies (n=8) elucidating investments and level of challenges related to cytostatic changes.

Results With 2 weeks buffer stock (year 2013): 57% of cytostatics with supply difficulties resulted in a drug change.

Types of changes recorded: alternative package size, known supplier, new supplier or unlicensed product.

8 of 12 suppliers of cytostatics had supply difficulties that resulted in a drug change.

With 2 months buffer stock (year 2015): 41% of cytostatics with supply difficulties resulted in a drug change. Types of changes recorded: alternative package size or known supplier. No changes to new supplier or unlicensed product. 3 of 11 suppliers of cytostatics had supply difficulties that resulted in a drug change. Total investment in extra storage capacity: € 1100/1 million inhabitants (excluding drug investments). Despite a reduction in cytostatic changes, the hospital pharmacies still found that drug changes in cytostatic created stressful situations.

Conclusion Increased buffer stock of cytostatics from 2 weeks to 2 months: was shown to be effective in order to reduce the number of drug changes; cannot eliminate drug changes; does not require large investments in extra storage capacity; does not remove the stress and extra work when a drug change is necessary; reduced the complexity of the drug changes; and reduced the number of suppliers who had supply difficulties that resulted in a drug change.

No conflict of interest

DD-003 | IMPLEMENTATION OF AN AUTOMATED DISPENSING CABINET LINKED TO AN ELECTRONIC PRESCRIBING PROGRAMME IN A HOME CARE SERVICE

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Background Before October 2015, the dispensing procedure in the Home Care Service (HCS) was manual where medication for each patient was sent from the pharmacy service (PS) weekly in an individual bag. This procedure required high economic, time and human resources. For any treatment start or change, an individual order was requested as a pro re nata (PRN) medicine. Occasionally a global return of accumulated drugs was made.

Purpose In October 2015, the PS implemented an automated dispensing cabinet linked to an electronic prescribing programme (ADCLEP), Omnicell, in the HCS. PS replaced drugs automatically 2 days a week and staff from HCS placed them into the ADCLEP. The aim of this study was to evaluate the consequences of such implementation in the dispensing procedure evaluating the economic, time and human resources.

Material and methods Data were obtained from our electronic prescribing programme e-Osabide and our management computer programme SAP. A comparison between a period of 2 months (from 1 January to 29 February) was made in 2015 and 2016. The items registered were: number of PRN medicines; economic cost (€); and dispensing time and staff resources

Results

	2015	2016
No of PRN medicines	247	57
Dispensing time (min)	1920	640
Dispensing staff	8 pharmacy assistants + 1 pharmacist	2 pharmacy assistant + 1 pharmacist
Cost (€)	50 263	40 377

Conclusion • The number of PRN medicines decreased by 79%, dispensing time by 67%, dispensing staff resources by 67% and economic cost by 20%. Eliminating individual preparation and minimising the number of PRNs have had a great impact on PS care work. The main reason why the number of PRNs decreased is that the ADCLEP contains most of the medicines used by HCS.

- Economic cost was reduced due to more accurate and better adaptation to the patient's needs. Even though it has not been measured, prescriptions were updated more accurately and this could have led to less medication errors.
- Other advantages detected were no delay in the disposition of medicines and improvement in control of narcotics (book is generated automatically).

- We had no way of measuring the number of returns but the perception was that they decreased to almost none. ADCLEP is an efficient system and could be exported to other services.

No conflict of interest

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Background The unit dose dispensing of medication is a key activity in all hospital pharmacy services. On creating a new hospital, the settings for a semi-automatic Kardex verticals (KV) system for dispensing and drug storage were based on previous consumption of a hospital with less activity, needing to be upgraded.

Purpose Identification of drugs required by the unit dose dispensing circuit, external to KV, to optimise the efficiency of human resources for unit dose drug preparation and dispensing, reducing errors and improving patient safety in hospital.

Material and methods A retrospective observational study was conducted in a tertiary hospital. A database was designed with the following parameters: list of KV external drugs, frequency of these medications in unit dose circuit, their location and reasons for not being located in KV.

Results The presentations with the highest incidence of appearance as external products were: risperidone 6 mg tablets (9.29%), clotiapine 40 mg tablets (7.81%), progesterone 200 mg capsules (7.25%), dexchlorpheniramine 2 mg/5 mL solution (7.06%), cinacalcet 30 mg tablets (3.53%), calcium carbonate/cholecalciferol (3.53%), apixaban 5 mg tablets (3.35%), droperidol 2.5 mg amp/vial (2.42%), paromomycin 125 mg/5 mL (2.23%), chlorpromazine 25 mg tablets (2.23%), ketamine vial (2.23%), baclofen 25 mg tablets (1.86%), ticagrelor 90 mg tablets (1.86%), fosfomycin 3 g sachets (1.67%) and clotrimazole 1% ointment (1.67%). Locations of the external presentations were: low consumption shelf (3.41%), outpatient area (7.95%), magistral formulae (1.14%), semi-automatic drug dispensing and storage system Kardex Horizontal (60.23%), non-hospital pharmaceutical guide shelf (11.36%), paediatric products (7.95%) and restricted drugs (7.95%). The causes of not located in KV were: low consumption by the unit dose dispensing circuit (38.63%), low consumption by all hospital dispensing circuits (3.41%), special monitored dispensation (1.14%), magistral formulae (1.14%), multidose presentations (2.27%), non-hospital pharmaceutical guide (11.36%), outpatient dispensation (7.95%), required for hospital unit order dispensation (17.05%), paediatric presentations (7.95%), restricted use (7.95%) and recent inclusion in the hospital pharmaceutical guide (1.14%).

Conclusion After years in operation, this current study detected opportunities for improvement, proposing the inclusion in KV of: risperidone 6 mg, clotiapine 40 mg, progesterone 200 mg, calcium carbonate/cholecalciferol, baclofen 25 mg and fosfomycin 3 g. With this improvement, we intend to increase the work speed and enhance the distribution of staff time, reducing errors in unit dose dispensing, thus increasing the productivity of service and patient safety.

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No conflict of interest

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Background To improve quality and safety of care, multidisciplinary meetings are regularly conducted in order to retrospectively analyse undesirable events in the care system. During one of these experience feedback committees, daily mistakes by pharmacists' assistants (PhA) when filling the trollies with drugs were reported. We formulated the hypothesis that disruptions in the workload may have led to them. In fact, many studies on interruptions (IT) in nursing care have been published. They indicate that interruptions are commonplace and lead to medication errors, particularly during medication administration. Studies about ITs are limited in pharmacy.

Purpose Our study aimed at generating awareness of ITs during daily dispensing in unit dose drug distribution system (UDDS) by PhA. Objectives were to quantify those ITs and understand their causes.

Material and methods We observed 6 of 12 PhA for 20 hours of UDDS. We established an observation grid (1 for each PhA observed) which allowed us to time stamp, and identify causes and authors of each IT (who/when/how/why). Then, we collected PhA opinions through an anonymous questionnaire (6 questions) to asess their feelings about IT. PhA had been informed and had provided consent. The grid was tested twice and then modified.

Results Each observation lasted 1 hour 30 min to 2 hours 30 min. ITs occurred every 8.5 min and lasted 16 min on average, corresponding to 10% of time devoted to UDDS. The frequency of ITs observed (6.9 IT/hour) was similar to the numerous ITs described in nurse stations (6.7 to 7.6 IT/hour). The first cause of distraction was the PhA themselves (41%), initiating conversations. De facto, colleagues (30%) were the second cause due to proximity, then nurses and calls from medical staff (23%). The same types of ITs were observed in nursing stations due to patients' relatives. 10 PhA were questioned and answered they felt disturbed by ITs. Nevertheless, they were particularly understanding of medical staff since their calls are often justified by changes in treatments or discharge of patients.

Conclusion We evaluated ITs to pharmaceutical activity. Half seemed justified to allow collaboration with medical staff. After we identified interruptions, then we made the PhA aware of this and provided recommendations to improve our activity.

No conflict of interest

DD-006 | COMPARATIVE HEURISTIC EVALUATION BETWEEN TWO VERSIONS OF A COMPUTERISED PHYSICIAN ORDER ENTRY SYSTEM

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Background Computerisation of drug prescription is an essential part of securing the management of patient care. However, errors related to computer misuse can be a source of iatrogenic injuries. These errors can be partly attributed to usability problems of computerised physician order entry (CPOE).

Purpose In 2014, our hospital started computerised prescription on the CPOE ORBIS NICE developed by AGFA Healthcare. Given the difficulties encountered during ORBIS NICE implementation, a new ergonomically redesigned version called ORBIS Mobile Edition (ME) was proposed in late 2015. The aim of this study was to compare the usability of drug prescription in these two versions.

Material and methods Two pharmacists conducted a heuristic evaluation based on drug prescription in an orthopaedic surgery ward. They analysed all the screens appearing to prescribers during the prescribing process, from the connexion to the software to the prescription's signing. Each usability problem (UP) observed was analysed based on the stage of the process according to ergonomic criteria defined by Bastien and Scapin.[1] Then, a severity score was assigned to each UP from 1 (non-essential resolution) to 4 (catastrophic, imperative to fix).

Results 97 UPs were detected on ORBIS NICE with 70 (72%) strictly on the prescription part. The total average severity of these UPs was 3.0, considered a major severity. Catastrophic severity UPs were especially related to 'drug search'. During the drug's selection, the system sometimes automatically moved without the user's control which increased the workload and the probability of making errors. Only 44 UPs were identified on ORBIS ME, including complete resolution of UP on stage 'drug search'. However, 29 new UPs of average severity of 2.8 were observed on this version and the total average severity was the same between the two CPOE.

Conclusion The heuristic evaluation has highlighted a relative improvement in the ergonomics of ORBIS ME. However, several UPs with major to catastrophic severity have not been corrected and new UPs appeared in this version. Other user tests are intended to assess the satisfaction of prescribers with this new version.

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No conflict of interest

DD-007 | CONTRIBUTION OF ELECTRONIC PRESCRIPTIONS ON TIME MANAGEMENT AT THE HOSPITAL PHARMACY

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Background Medicines prescription is the centrepiece in the triad of care (patient–prescriber–pharmacy). The electronic prescription has long been considered an effective means to reduce transcription errors as well as securing the flow of drugs at the hospital level. However, the experience of the Massachusetts General Hospital of Boston team found an error rate comparable between manual and electronic prescriptions (11.7%)[1] What about the time saving that electronic prescribing can provide compared with manual prescribing?

Purpose The objective of this work was to evaluate the impact of electronic prescription of medicine on time saving of the pharmaceutical team compared with manual prescription in our hospital.

Material and methods We analysed the prescriptions received and processed in our hospital pharmacy over a period of 1 month according to good dispensing practices. We calculated the time between receipt of prescriptions and dispensation of medicines by the pharmaceutical team for both prescription modalities (electronic and manual).

Results 384 (58%) manual prescriptions and 276 (42%) electronic prescriptions were analysed, prepared and dispensed by the pharmacy team in our hospital. The average length of preparation of manual prescriptions was 25 ± 10 min and the average length of preparation of electronic prescriptions was 15 min± 5. The difference was statistically significant ($p < 0.001$). The number of drugs dispensed by prescription is more important for electronic prescriptions (2.2 vs 1.8 ($p = 0.005$)).

Conclusion Our team found a considerable gain in time (10 min by prescription or 170 min per day) between prescription of medicines by physicians and their dispensation by the hospital pharmacy despite the high number of drugs dispensed in the case of electronic prescriptions. This time saved would allow the pharmaceutical team to focus on other activities, more precisely the pharmacological analysis of prescriptions and hospital preparations.

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No conflict of interest

Drug information and pharmacotherapy

| DI-001 | MAKING PHARMACEUTICAL CARE EASY BY DESIGNING INTERACTIVE SOFTWARE |

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Background Despite living in the high tech era, there is still a lack of software tools to help pharmacists to carry out their common tasks, pharmaceutical care being one of the most important.

Purpose Designing a friendly intuitive application to gather, assess and use patients' demographic and clinical information to obtain better results in pharmaceutical care.

Material and methods We created a Filemaker database compatible with computers and tablets. Its interface was designed with Adobe PhotoshopCC. Prior to this, a bibliographical review on pharmaceutical care was performed to decide which data would be useful for pharmacists to collect.

Results An iPadMini optimised (1024x669) '.fmp12' file was obtained. The main page grants access to patient records. Each one allows demographic and clinical data, including history, current diagnosis and evolution to be collected. A button panel give access to the remaining areas. 'Therapy' section is set to collect pharmacotherapy data (drug, dose, interval, administration route, prescription date). To make follow-up easier, drugs can be flagged into five categories (restricted duration, possibility of intravenous to oral switching, common adverse reactions, potential contraindications and dose adjustment needs). A similar table records nutritional treatments. 'Laboratory' gathers the most relevant haematologic (cell counts, coagulation, haemoglobin, etc), biochemical (glucose, ion levels, etc) and microbiologic (culture findings, susceptibility testings) parameters related to pharmaceutical care. It calculates MDRD4 creatinine clearance, and warns the user if values are out of range. 'PRIME zone' allows recording of pharmaceutical problems, risk issues, drug Interactions, treatment mismatches and efficacy facts. Users can record how each problem is managed, and if they were able to influence clinicians (accepted, rejected or non-assessable interventions). The database is provided with a search engine, and can print a '.pdf' case report.

Conclusion Our database aims to make pharmacotherapy management easier, improving detection of medication related problems and allowing bedside work. In a pilot study in over 28 patients, our colleagues perceived an increase in the amount and quality of interventions to clinicians, but also regretted spending too much time when gathering data, due to the fact that the database cannot automatically collect data from official sources. Despite having enhanced our database functionality, Filemaker does not fulfil our needs, and professional software development would be desirable, which requires further funding.

No conflict of interest

| DI-002 | EFFECTIVENESS AND SAFETY OF δ-9-TETRAHYDRO-CANNABINOL (SATIVEX) IN PATIENTS WITH MULTIPLE SCLEROSIS SPASTICITY |

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Background The δ-9-tetrahydrocannabinol-cannabidiol (THC-CBD) oromucosal spray (Sativex) is a standardised cannabinoid based medicine for add on treatment of resistant multiple sclerosis (MS) induced spasticity.

Purpose To evaluate the use of oromucosal spray Sativex in terms of efficacy for symptoms and functional impairment associated with resistant MS induced spasticity and safety according to type of MS.

Material and methods A retrospective cohort study was conducted in a university hospital in South Spain in patients who commenced Sativex between March 2015 and November 2015. Data were retrieved from the electronic medical records (Diraya) and the dispensing programme for outpatient (Farmatools). Patients were classified by type of MS: relapsing remitting (RR), primary progressive (PP) and secondary progressive (SP). Evaluation was performed on day 0 and day 60 of treatment with Sativex. The Modified Ashworth Scale was used for grading spasticity where 'improvement' was defined as >20% deviation from baseline.

Results 14 patients were included. 4 (28.6%) were men with a median (IQR) age of 47.5 years (37–69). Types of MS were: 10 (71.4%) RR, 1 (7.1%) PP and 3 (21.4%) SP. The overall response, defined as 'improvement' to Sativex, was 9 (64.3%) and by type of MS: 6/10 (60%) RR, 1/1 (100%) PP and 2/3 (66.7%) SP. Only 1 patient (7.1%) discontinued treatment due to drug related adverse events. 2 additional patient were treated with Sativex but excluded from this analysis due to a diagnose different from MS.

Conclusion In our cohort, oromucosal spray Sativex was a well tolerated drug and an effective alternative for the management of resistant MS induced spasticity. As for **MS type** subgroup analysis, a greater sample size is needed for more robust conclusions.

No conflict of interest

| DI-003 | OFF-LABEL AND UNLICENSED DRUG USE IN PAEDIATRIC OUTPATIENTS WITH NEPHROTIC SYNDROME: AN INDONESIAN CONTEXT |

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Background It is interesting to note that limited studies have been done on the off-label drug use in the area of paediatric nephrology. Furthermore, information on the use of off-label drugs, especially in paediatric patients with nephrotic syndrome, is still lacking in Indonesia. Nephrotic syndrome is

responsible for one of major chronic diseases in children and subsequently patients should take their medicines long term.

Purpose To estimate the prevalence of off-label and unlicensed prescribing in paediatric outpatients with nephrotic syndrome in a major teaching hospital in Indonesia.

Material and methods A retrospective study was conducted in hospital using medical records from paediatric outpatients with nephrotic syndrome during the period January to December 2015. Patient and prescribing data were collected, and drugs were classified as on-label or off-label/unlicensed based on Indonesia National Drug Information (IONI). Thereafter, off-label drugs were categorised with a hierarchical system of age, indication, route of administration and dosage.

Results There were 1864 drugs with 70 different types of drugs prescribed to 89 patients. The data revealed that 1390 (74.5%) of the drugs prescribed were off-label/unlicensed. The majority use of off-label drugs was mainly due to age (n=1200; 88.9%) while the remaining reasons were due to dosage (n=134; 9.9%) and indication (n=16: 1.2%). With regards to therapeutic category, non-diuretic antihypertensive agents (n=689; 51%) and immunosuppressants (n=455; 33.7%) were the top two most frequent drug categories used in an off-label manner. The most commonly used off-label drugs were prednisone (n=286), lisinopril (n=171) and losartan (n=169). Further, it was found that prednisone also accounted for the most frequent unlicensed drug. Off-label prescribing was common in paediatric outpatients with nephrotic syndrome where every patient received at least one off-label drug. It appears that off-label prescribing was not affected by patient age or gender.

Conclusion Despite the high prevalent of off-label prescriptions in paediatric outpatients with nephrotic syndrome, this use conformed to evidence based prescribing. Measures should be conducted to support clinical trials in paediatrics and subsequently revise IONI as the standard drug information in Indonesia.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

DI-004 **BUSULFAN STABILITY DETERMINATION BY UHPLC-MS**

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Background Busulfan is an alkylating antineoplastic drug extensively used in myeloablative regimens prior to haematopoietic stem cell transplantation. Administration every 6 hours for 4 consecutive days and the low stability of this product induces organisational problems for cytotoxic preparation units in hospital pharmacies. A few studies have already been conducted to investigate the stability of diluted busulfan solutions but published results showed important variability.

Purpose The purpose of this study was to evaluate the stability of busulfan solutions diluted to 0.54 mg/mL with 0.9% sodium chloride and stored in polypropylene (PP) syringes or PP infusion bags with a highly sensitive, specific and rapid (<2 min) method.

Material and methods Busulfan solutions (0.54 mg/mL) were prepared from three Busilvex batch numbers and transferred into 50 mL PP syringes (n=12), or 100 mL (n=12) or 500 mL (n=4) PP infusion bags (stored at 2–8°C or 23–27°C). The chemical stability of busulfan was assessed by measuring in each container the percentage of the initial concentration remaining at each time point of analysis (max 100 hours) with an ultra high performance liquid chromatography coupled to mass spectrometry (UHPLC-MS) method. Busulfan and $[^2H_8]$-busulfan (internal standard) were detected in selected ion recording mode as ammonium adducts at m/z: 264.1 and 272.1, respectively. Stability was defined as retention of at least 90% of the initial busulfan concentration. Physical stability was assessed by visual inspection.

Results Busulfan in PP syringes proved to be stable for 30 hours at 2–8°C and 12 hours at 23–27°C. A reduced stability of 12 hours and 9 hours were obtained at 2–8°C for 100 mL and 500 mL PP bags, respectively. At 23–27°C, all PP bags presented stability for 3 hours. The main effects observed were hydrolysis at 23–27°C and precipitation at 2–8°C.

Conclusion This study demonstrated that the stability of busulfan diluted solutions depends on the container type and storage temperature. Stability for 30 hours in PP syringes stored at 2–8°C is a considerable improvement compared with the manufacturer's recommendations (12 hours). The extended shelf life of busulfan infusion in syringes allows better organisation of the chemotherapy preparation unit by reducing the number of busulfan production to once a day.

No conflict of interest

DI-005 **UPDATE AND EVALUATION OF THE MALTESE MEDICINES HANDBOOK**

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Background Maltese healthcare professionals use the *British National Formulary* (BNF) as the main source of reference for medicinal products. However, a number of products which are available on the local market are not listed in the BNF. The Maltese Medicines Handbook is a handbook designed to include medicinal products which are not listed in the BNF.

Purpose The aim was to update the formulary to its fourth version, launch an online version of the formulary and assess its use among healthcare professionals.

Material and methods Products authorised in Malta but not listed in the BNF were identified by comparing information on the Maltese Medicines List to that found in the BNF. Information concerning preparations to be included in the formulary was obtained from the SPC of the drugs and *Martindale*. Data included in the handbook version of the formulary were placed online. The final version was published and distributed to healthcare professionals. Evaluation of this version was conducted through questionnaires distributed to 30 healthcare professionals randomly chosen from all those who were given a copy.

Results The Medicines Authority list consisted of 4438 drug entries. When compared with the BNF, it was found that 629 products had their trade name, active ingredient or both not available in the BNF. From these 629 entries, 550 products

had only their active ingredient listed and 79 had neither present in the BNF. 17 medical devices were included.

All the participants (n=30) found the formulary useful and the majority stated that they use it frequently. The presentation was highly acclaimed by all since all aspects were given a high score. Participants believed that the formulary was up to date and a great service to local healthcare professionals. All participants stated that the online version of the formulary was a good innovation, although the majority (n=22) preferred using the handbook version.

Conclusion Important suggestions considered for future similar studies include the additional information regarding 'Cautionary and advisory labels' and that the time of updating the handbook is decreased from 3 years to 2 years or less. The online version of the formulary can be accessed on http://www.maltesemedicineshandbook.com/

No conflict of interest

DI-006 | **ANALYSIS OF ACTIVITY 'QUESTIONS/ANSWERS' ABOUT DRUGS IN THE PHARMACY OF A UNIVERSITY HOSPITAL**

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Background In hospitals, the pharmacist has a key role in the optimisation of the appropriate use of drugs. Everyday, the help of the pharmaceutical team of the hospital pharmacy (HP) is requested by professionals of care services to answer many questions about drugs. This pharmaceutical questions/answers (PQA) activity is scarcely described in the literature, unlike other activities of clinical pharmacy such as prescriptions, collection of drugs or therapeutic training.

Purpose To measure and analyse this activity, we conducted a prospective study in the HP of a university hospital over 9 months.

Material and methods We collected the calls received by the HP team (pharmacists, juniors hospital pharmacists, pharmaceutical assistants). Data collection was done on tables in booklets, in each pharmacy service. The data collected calls were analysed by an Excel spreadsheet.

Results 212 questions were collected, mainly coming from the emergency department/intensive care unit and oncology, paediatrics and gerontology departments. More than 25% were about administration methods. Drugs from almost all therapeutic classification were represented, especially anti-infective drugs (21%). This study enabled us to make an assessment of the PQA activity and to create a computerised tool that can be used by all HP workers and permits them to gather all data that are available to answer a question previously asked faster.

Conclusion Many possibilities can be considered such as analysis of regular questions, communication with care services using existing tools (information notice, periodical of HP) and promotion of the activity using indicators of follow-up. Furthermore, the computerised database created from this study provides a real daily help to the pharmacist. These actions contribute to making the drug use process more safe.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

DI-007 | **SIROLIMUS FOR THE TREATMENT OF COMPLICATED VASCULAR ANOMALIES IN CHILDREN**

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Background Vascular anomalies comprise a heterogeneous group of disorders. The presence of D2-40 markers and the Kasabach–Merrit phenomenon (KMP), characterised by thrombocytopenia and consumption coagulopathy, are associated with major morbidity.

Purpose To analyse the efficacy and safety of treatment with sirolimus in children with complicated vascular anomalies (CVA).

Material and methods This was a retrospective observational study from December 2014 to August 2016. Inclusion criteria: paediatric patients with CVA treated with sirolimus (off-label use). Data collected: epidemiological and clinical characteristics, treatment and evolution.

Results 2 boys with CVA received treatment with sirolimus. Case No 1: 14-month-old boy affected by lymphangiomatosis (D2-40 positive) in his right upper extremity. After receiving rehabilitation treatment with poor improvement, sirolimus (0.8 mg/m^2/12 hours) was initiated. Pharmacokinetic controls showed mean plasma concentration of 13.22 ng/mL (range 6.27–26.19). Deviation from the target range (5–15 ng/mL) was observed due to drug interaction with azithromycin but normal values were achieved by dose adjustment (0.4 mg/m^2/day) during the concomitance. After 262 days with active treatment, objective clinical improvement in the functionality of the affected limb was achieved. No adverse effects related to treatment were observed.

Case No 2: 32-month-old boy diagnosed with unresectable cervical kaposiform haemangioendothelioma presenting with KMP treated with dual antiplatelet therapy (acetylsalicylic acid and ticlopidine). He had previously received vincristine and systemic high dose glucocorticoids therapies. Given the lack of response, treatment with sirolimus (0.8 mg/m^2/12 hours) was added to antiplatelet therapy. 5 days after starting sirolimus, platelet values were normalised and remained normal during all treatment (388 days), and for 88 days after stopping treatment. Hypertriglyceridaemia was detected, but was resolved by dose reduction (0.8 mg/m^2/24 hours) without any decrease in effectiveness. Pharmacokinetic controls showed mean plasma concentration of 9.86 ng/mL (range 3.49–17.8) with a dose of 0.8 mg/m^2/12 hours and 3.73 ng/mL (range 2.9–4.95) with a dose of 0.8 mg/m^2/24 hours.

Conclusion Sirolimus has been shown be an effective therapeutic option for CVA in childhood. It was well tolerated, and adjusting plasma levels allowed minimisation pf adverse effects without compromising effectiveness. Further studies are needed to determine the contribution of mTOR inhibitors in the treatment of childhood vascular anomalies

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No conflict of interest

DI-008 | NON-VALVULAR ATRIAL FIBRILLATION: EFFECTIVENESS OF VITAMIN K ANTAGONIST VS NOVEL ORAL ANTICOAGULANT TREATMENTS

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Background Anticoagulation therapy with vitamin K antagonist (VKA) is a treatment used for prevention of ischaemic stroke associated with non-valvular atrial fibrillation (NVAF). Novel oral anticoagulants (NOAC) (rivaroxaban, dabigatran, apixaban) do not have limitations related to monitoring of anticoagulation, and have been shown to be at least as effective as VKA.[1]

Purpose To estimate the comorbidities and incidence rates for stroke in NVAF patients treated with VKA and with NOAC.

Material and methods This was an observational, non-interventional, retrospective cohort study of adult patients diagnosed with NVAF during the study period June 2013 to June 2016.

Results 5231 patients were included in the study with a diagnosis of NVAF (4940 with VKA and 291 with NOAC), of whom 63% (n=3.306) had permanent AF, 22% (n=1.135) paroxysmal AF and 15% (n=790) persistent AF. The gender distribution showed that 49% (n=2589) were men and 51% (n=2642) were women. The proportion of NVAF by age was 4.5% (n=233) of patients younger than 60 years, 16.5% (n=861) of patients aged 60–70 years, 47% (n=2460) of patients aged 70–80 years and 32.1% (n=1677) of patients >80 years. The most common comorbidities were hypertension (70%, n=3698) and congestive heart failure (42%, n=2201).

Regarding ischaemic stroke rates per 100 patient years, we found 2.73% of all VKA treated patients and 2.05% of all NOAC treated patients suffered an ischaemic stroke. We did not found a significant overall difference between stroke and different oral anticoagulants used (p=0.244). 86% (n=148) had ischaemic stroke and 12% (n=21) had haemorrhagic stroke; 2% (n=4) unknown.

Conclusion Comorbidities observed are in line with other studies conducted in NVAF and, in common with them, the disease increases with age. Rates of stroke or systemic embolism in both cohorts of NVAF did not differ by treatment assignment.

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No conflict of interest

DI-009 | NON-VALVULAR ATRIAL FIBRILLATION: CRITERIA FOR PRESCRIPTION OF NOVEL ORAL ANTICOAGULANTS

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Background Non-valvular atrial fibrillation (NVAF) is the most common cardiac arrhythmia in clinical practice, affecting nearly 1% of the general population.[1] In Spain, the stipulated recommendations to select anticoagulant are: use of novel oral anticoagulants (NOACs) in case of poor international normalised ratio (INR) control (<65% of the time in the target range (TTR)), intolerance to vitamin K antagonists (VKA) or adverse events, impediment in INR controls or patients with a medical history of stroke disease.

Purpose To determine whether NOAC prescriptions fulfil the established criteria by the Spanish Ministry of Health.

Material and methods An observational, non-interventional retrospective cohort study was conducted in adult patients diagnosed with NVAF during the study period (June 2010 to June 2014) and treated with NOACs. TTR calculation was performed using the Rosendaal method. We estimated that correct TTR was in the range 2–3 at least 65% of the time.

Results 952 patients were included in the study. 37% of these patients (n=351) was treated with rivaroxaban, 57% (n=541) with dabigatran and 6% (n=60) with apixaban. 48% (n=457) were men and 52% (n=495) were women. Mean age of the patients was 75.9±10.7 years. The results showed that only 64% of patients (n=609) met the criteria issued by the Ministry of Health, of whom 11% (n=102) were due to VKA intolerance or adverse events, 42% (n=398) due to poor INR control (48.41±19.5% mean days in target range), 2% (n=23) due to impediment in the INR control and 3% (n=33) due to switch from another NOAC. According to the different types of NOACs, 44% (n=242) of dabigatran treatments did not follow the Ministry of Health recommendations, in contrast with 26% (n=93) of rivaroxaban treatments and 13% (n=8) of apixaban treatments.

Conclusion A high percentage (36%) of patients treated with NOACs do not meet the Ministry of Health criteria. A high percentage (42%) of patients might benefit from these new anticoagulant drugs.

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No conflict of interest

DI-010 | A SYSTEMATIC LITERATURE REVIEW OF ANTIMICROBIAL STABILITY DATA IN ELASTOMERIC DEVICES

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Background Outpatient parenteral antimicrobial therapy (OPAT) is an established approach to patient care, the benefits of which are clinical, financial and preferred place of care for patients. In order to maximise these benefits 'once daily' antimicrobials should be used. Antimicrobial stewardship principles state that, where possible, narrow spectrum, organism specific agents should be used for infection management. Commercially available narrow spectrum agents frequently require administration 2, 3 or more times each day. A dilemma for OPAT services arises therefore to either: (1) use once daily broad spectrum antimicrobials going against stewardship principles; (2) administer narrow spectrum agents as a continuous infusion via a portable medical device.

Purpose Medicines administration via a portable device requires appropriate stability data. The Yellow Covered Document (YCD) stipulates the minimum dataset for assessment of stability. To facilitate OPAT services to adhere to stewardship requirements and access stability data for narrow spectrum agents, a comprehensive literature review was undertaken. This review assessed the published antimicrobial stability literature available and its compliance with the dataset required by the YCD.

Material and methods Searches were conducted in Medline, EMBASE, Global Health, International Pharmaceutical Abstracts and Biomedical Research Database in April 2014 and November 2015.

Results 420 records were identified, 299 of which were excluded following title and abstract review. Full text review of 121 citations identified no papers that met the dataset requirements of the YCD.

Table Main reasons for reference exclusion

Yellow Covered Document standard	No of papers excluded
Testing under relevant storage conditions (37°C for elastomeric devices)	111
95–105% of API	111
All samples tested in duplication	75
Low and high 'clinically significant' concentrations	72
Complete physical stability testing	63
3 samples at each time point	51
At least 4 time points plus time 0	42
Use of a stability indicating assay	13
Total	121

Conclusion Access to stability data in administration devices is a barrier to service expansion within the antimicrobial stewardship agenda. This review found no published studies that fully complied with YCD standards for shelf-life extension.

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The Yellow Covered Document:
A Standard Protocol for Deriving and Assessment of Stability- Part 1. Third Edition, 2015. NHS Pharmaceutical Quality Assurance Committee.

Conflict of interest:

Corporate sponsored research or other substantive relationships: MG and TH serve on the BSAC UK OPAT Initiative Steering Group receiving reimbursement of travel expenses only from the BSAC for attending and speaking at OPAT related events. MG reports attending advisory boards for Merck, Pfizer, Gilead and receiving educational travel and speaker grants from Merck and Astellas Pharmaceuticals/ Sanofi, respectively. MS has attended an advisory board for Baxter. TH has received support to attend conferences from Sanofi, Astellas and Novartis and attended advisory board for Cubist, Astra Zeneca, MSD, Novartis and Ferring Pharmaceuticals Ltd.

| DI-011 | ANALYSIS OF OFF-LABEL USE IN BIOLOGICAL THERAPIES |

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Background Biologics are usually prescribed off-label in severe immune mediated inflammatory diseases. Unfortunately, off-label prescription is sometimes hampered in these diseases due to a lack of evidence of effectiveness.

Purpose To assess the risk and outcome of biological therapies on off-label practices in the pharmacy department of a tertiary hospital.

Material and methods This study included all patients treated between January 2014 and June 2016 with an off-label biological prescription. The data were collected from the clinical history of the patients and from the pharmacy programmes: athos, prisma and cafydim. We analysed the following variables: treatment time, doses, adverse drug reactions (ADRs) and previous/subsequent treatments. Treatment repercussion were evaluated. The data were analysed through a statistical descriptive study.

Results A total of 5 types of off-label biologics were requested and administered to 30 patients for 9 different diseases.

In 80% (24) of cases the patient had been treated previously with corticosteroids and/or methotrexate. In 20% (6), the previous treatment was a biologic (not off-label prescription). Most of the prescriptions were adalimumab: 20 (67%), of which 8 (40%) were treatment for Behcet's syndrome, 5 (25%) for uveitis in children, 5 (25%) for sarcoidosis (1 of whom was a child of 11 years old), 1 (5%) for mesenteric panniculitis and 1 (5%) for systemic lupus erythematosus (SLE). All other prescriptions were: 2 golimumab for synovitis and sarcoidosis, 2 tocilizumab for SLE, 1 anakinra for familial Mediterranean fever, 3 ustekinumab for enteritis, Crohn's disease and Wegener's granulomatosis, and 2 certolizumab for uveitis and enteritis. Only for 1 patient (3.3%) was treatment not effective: adalimumab for sarcoidosis, moreover it produced ADRs (increased morning stiffness and pain in joints) after 30 months so the patient returned to methotrexate monotherapy. 9 (30%) patients developed ADRs: 6 from adalimumab (of which 3 were in children), the remaining 3 ADRs were from golimumab, tocilizumab and anakinra treatment. All were mild/moderate and were not grounds for treatment discontinuation.

Conclusion In our assessment, off-label biological therapies were effective in most patients (96.6%) and were safe (70%). Evaluation of the cost of off-label biological therapies, in terms of medication risk and cost to healthcare, will be essential to their widespread clinical utility.

No conflict of interest

DI-012 | EXPERIENCE WITH NINTEDANIB FOR THE TREATMENT OF IDIOPATHIC PULMONARY FIBROSIS

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Background Idiopathic pulmonary fibrosis (IPF) is a specific type of chronic fibrosing interstitial pneumonia. Nintedanib is a tyrosine kinase inhibitor which has been approved for the clinical treatment of IPF in adults.

Purpose To evaluate the efficacy and adverse effects of nintedanib in a tertiary care hospital.

Material and methods An observational retrospective study was conducted in patients receiving treatment with nintedanib from May 2015 to September 2016. Measured variables were: age, sex and smoking habits. Pulmonary function tests (PFT) such as forced expiratory volume (FEV), forced vital capacity (FVC) and diffusing capacity of the lungs for carbon monoxide (DLCO) were analysed before and after the treatment was initiated, as was the presence of non-obstructive pattern ($FEV_1/CVF > 0.7$). As FVC is the most relevant mortality predictor factor in IPF, the rate of decline in FVC (>10%) was measured to asses efficacy. The presence of adverse reactions and alterations in hepatic enzymes were reviewed to asses safety.

Results 9 patients were receiving nintedanib 150 mg twice daily. 100% of patients were men with a mean age of 63 years. 83% had been smokers. All patients showed a non-obstructive respiratory pattern. 3 of 9 patients showed a decline in FVC >10%, 1 >5%, 3 remained stable and 2 an improvement in FVC (3–14%). 8 patients had deterioration in FEV with a mean of 2% compared with previously. DLCO also deteriorated in 7 patients, the mean compared with previously was 11%. All patients remained on a non-obstructive pattern during the study. 8 of 9 patients had adverse reactions. The most frequent was diarrhoea (38%) followed by vomiting (25%); others less frequent (≤ 12.5%) adverse effects were abdominal pain, pyrosis and hypotension. Only 1 patient suffered alterations in hepatic enzymes. 3 patients had to stop treatment due to adverse events.

Conclusion Nintedanib has shown benefit in decreasing (not stopping) progression of IPF; only 33% of patients had deterioration >10% in FVC. The adverse drug reaction rate was high (89%), and 3 of 9 patient had to stop treatment. Studies with a broader population of patients should be carried out to assess whether the balance between efficacy and safety is appropriate.

No conflict of interest

DI-013 | COST PER RESPONDER TO USTEKINUMAB BASED ON THE FIRSTLINE ANTI-TNFα TREATMENT IN MODERATE–SEVERE PSORIASIS

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Background With multiple biologic agents available for psoriasis treatment and a 20% rate of biologic therapy failure within 2 years due to loss of efficacy or side effects, research on the best treatment order has become particularly relevant.

Purpose The aim of this study was to assess how firstline anti-TNFα (etanercept or adalimumab) therapy affects ustekinumab cost per responder in patients with moderate–severe psoriasis.

Material and methods A single centre, retrospective, observational, comparative study was conducted over 16 months (November 2011 to March 2013). Patients were those who had been unsuccessfully treated with adalimumab or etanercept and were then treated with ustekinumab. The costs of ustekinumab and etanercept were determined from the recommended dosing schedule, extracted from public data and presented in 2016. The primary endpoint compared the cost per responder in each group.

Effectiveness of the treatment was defined as the percentage of patients in each treatment group who achieved ≥75% improvement from baseline PASI score (PASI75) at week 16; thus to calculate the cost per responder at week 16, the total cost of treatment in each group for 16 weeks was divided by the PASI75 response rates. Indirect costs were not included.

Results 33 patients were included in the study: 17 (51.5%) patients received as firstline treatment etanercept and 16 (48.5%) received adalimumab. Median age in the etanercept group was 46.6 years and 51.4 years in the adalimumab group (p=0.276). 41.1% and 50% of patients in the etanercept and adalimumab groups were men, respectively. At week 16 of ustekinumab treatment, 76.5% (13/17) of patients who had received etanercept as firstline treatment achieved PASI75 vs 50% (8/16) in adalimumab firstline treated patients (p=0.423). Thus at week 12, cost per responder was € 9965 for firstline etanercept treated patients and € 15 247 for adalimumab treated patients, an increase of € 5282 per responder.

Conclusion Our results show that firstline anti-TNFα (adalimumab and etanercept) treatment in moderate–severe psoriasis does not affect ustekinumab effectiveness (p=0.43). So the most cost effectiveness treatment sequence is etarnecept—ustekinumab. This type of study, which analyses results in a real context setting, may contribute to optimising health resources. Future studies with a higher number of patients will assess the best cost effectiveness sequence in biologic treatment of moderate–severe psoriasis.

No conflict of interest

DI-014 CONTINUING USE OF OUTPATIENT PRESCRIPTION DRUGS IN PATIENTS HOSPITALISED ON A CARDIOLOGY WARD DOES NOT IMPROVE MEDICATION KNOWLEDGE

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Background During hospitalisation, the distribution of outpatient prescription drugs is taken over by the hospital pharmacy, and medication is administered by the nurse. Research shows that after hospitalisation, medication knowledge of patients is diminished compared with knowledge before admission, and more than 50% of patients do not know if there have been medication changes during hospitalisation.

Purpose We hypothesised that the use and management of their own outpatient prescription drugs in patients hospitalised on a cardiology ward will improve medication knowledge on correct use of prescribed medicines by 30% compared with standard care.

Material and methods Patients admitted to the cardiology ward between April and June 2016 meeting the inclusion criteria were enrolled in this study. Patients received either standard care (control group) or were allowed to continue and manage their outpatient prescription drugs (intervention group). In the intervention group, new prescription drugs were provided by the pharmacy practitioner on the ward and extra information about the drug use was provided. A questionnaire about drug knowledge and perception was applied twice, before the start of hospitalisation and after discharge.

Results 26 patients received standard care and 26 patients were allowed to continue and manage their outpatient prescription drugs. Knowledge of indication and correct medication use between the control and intervention groups was not significantly different. However, patients in the intervention group were more satisfied about the information provided by the pharmacy practitioner compared with patients who received standard care, 6.6 vs 7.6, respectively, on a 10 point grading scale (p=0.001).

Conclusion Continuing use and self management of outpatient prescription drugs did not improve medication knowledge in patients hospitalised on a cardiology ward. However, patients who continued and managed their outpatient prescription drugs were more satisfied. This study shows that in this patient population other interventions are needed to improve medicine knowledge.

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No conflict of interest

DI-015 SAFETY OF DIMETHYL FUMARATE IN THE TREATMENT OF RELAPSING REMITTING MULTIPLE SCLEROSIS: A RETROSPECTIVE STUDY

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Background Dimethyl fumarate (DMF) represents a new class of treatment for patients with relapsing remitting multiple sclerosis (RRMS). Scientific investigations are still in progress to clarify the ultimate mechanism of action responsible for the treatment effects of DMF. DMF does not have a single mechanism of action but rather has a multitude of biological effects. In vitro studies have revealed that DMF has anti-inflammatory properties linked to its ability to promote a Th2 immune response.

Purpose To evaluate the safety profile of RRMS patients treated with DMF.

Material and methods A retrospective observational study included all patients >18 years old with RRMS. Recruitment period was 12 months. Patients were treated with 240 mg every 12 hours. Safety variable considered all patients who had to discontinue treatment due to significant adverse events of DMF. The information was obtained from the outpatient dispense programme (Dominion) from where the following data were collected: age, sex, diagnosis, treatment, dosage, adverse events and duration of treatment. The data were added to a database.

Results 43 subjects were recruited (n=21), 73.4% women, mean age 44.3 years (27–63). 24.4% of patients discontinued treatment. Mean treatment time to DMF discontinuation in these patients was 6.2 months (0.5–24), producing early discontinuation at week 2 in 1 patient. 27.2% of cases were discontinued due to flushing events, 63.3% due to gastrointestinal events and 18% due to lymphopenia (normal values: 710–4530/mm^3). No changes were observed in the normal values for leucocytes, alanine aminotransferase or aspartate aminotransferase during the study period.

Conclusion To date, two of the most relevant clinical trials on DMF in this pathology, 'CONFIRMAR' and 'DEFINIR', have proven that DMF is a safe treatment. Data collected in our study showed a high percentage of discontinuation, in disagreement with the clinical trials published. However more patients and a longer periods of treatment are needed to reach definitive conclusions.

REFERENCES AND/OR ACKNOWLEDGEMENTS
To my pharmacist colleagues.

No conflict of interest

DI-016 USE OF ARILOCUMAB AND EVOLOCUMAB: LIPID LOWERING THERAPIES

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Background Monoclonal antibodies (mAb) arilocumab and evolocumab are protein convertase subtilisin/kexin type 9 inhibitors (PCSK9) for the primary treatment of hypercholesterolaemia or mixed dyslipidaemia:

- in combination with other lipid lowering therapies unable to reach low density lipoprotein (LDL-c) goals (<100 mg/dL);
- alone or in combination with other lipid lowering therapies in patients statin intolerant or statin contraindicated.

Purpose To evaluate the effectiveness, safety and cost of alirocumab and evolocumab.

Material and methods This was a retrospective observational study from April to September 2016. Data collected: sex, age, diagnosis, previous/concomitant treatment and duration of treatment. The study evaluated: (1) effectiveness: total cholesterol (total-c) and LDL-c (electronic clinical review: MambrinoXXI); (2) safety: established adverse events (AE) reported for patients in the pharmacy outpatient unit; (3) cost: cost/patient/year.

Results 12 patients were included (92% men), median age 58 years (range 25–78). Diagnosis: 41% dyslipidaemia, 25% hypercholesterolaemia, 17% hyperlipidaemia and 17% heart disease. 50% patients received arilocumab and 50% evolocumab. All patients had been treated with statins before mAb therapy. In 42% of cases statins had to be removed, mainly because of myositis (80%). The remainder of the patients were not statin-intolerant but LDL-c goals were not achieved. During mAb therapy, 17% of patients were treated with evolocumab as monotherapy; 50% with arilocumab or evolocumab plus two lipid lowering therapies (statin and fenofibrate or ezetimibe); 17% with mAb plus fenofibrate and ezetimibe; 8% with mAb and statin; and 8% with mAb and fenofibrate. At the end of the study, median duration of treatment was 15 weeks (range 11–19) and all patients continued mAb treatment. Effectiveness: before treatment with mAb, mean total-c and LDL-c values were 208.60 mg/dL and 140.7 mg/dL, respectively. At the end of the study, these values were 125.3 mg/dL and 68.9 mg/dL, with a mean reduction of 39% and 35%, respectively. No AE were reported. Estimated cost in our hospital (first year): €5000/patient.

Conclusion New lipid lowering drugs seem to be a new therapeutic alternative for hypercholesterolaemia or mixed dyslipidaemia when statins and/or other lipid lowering therapies are not effective or contraindicated. However, effectiveness is only valuable with LDL-c data, regardless of cardiovascular morbidity and mortality effects. Hence it is necessary to conduct long term studies to check any other effects of these drugs beyond reduction of LDL-c values.

No conflict of interest

DI-017 | DO PATIENTS TREATED WITH VITAMIN K ANTAGONISTS ACQUIRE A SATISFYING LEVEL OF KNOWLEDGE AFTER FOLLOWING A THERAPEUTIC EDUCATIONAL PROGRAMME?

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Background A therapeutic educational programme (TEP) 'Vivre AVeK' was organised in the cardiac rehabilitation service for patients treated with vitamin K antagonists (VKA). The programme consists of an initial evaluation, information and two evaluation workshops (board game and evaluation quiz).

Purpose To evaluate the skills acquired by patients who followed the programme.

Material and methods The TEP nurses collected the evaluation quizzes (17 questions) from January to March 2016. The TEP team pharmacist analysed the results.

Results Among the 95 patients treated with VKA, 94 benefited from an initial evaluation (99.9%). 5 patients refused to join the programme (5.3%). 75 of the 89 patients who accepted the programme participated in the workshops during the evaluated period. The pharmacist reviewed 53 quizzes. Patients had an average of 14 good answers out of 17 (from 6 to 17). 9 patients had 17 good answers (16.9%). They had good knowledge of the practical management of their treatment: the name of the examination that shows the treatment is effective quoted in 94.3% of cases, conduct if treatment forgotten (94.3%), which treatment to take if headache appears (96.2%) and INR target known (92.5%). Results concerning interpretation of the INR were not as satisfying: the consequences of a low INR were known by only 75.5% of patients and the consequences of a high INR by 79.2%. Likewise, questions about clinical aspects caused problems: 69.8% of patients could not quote all the signs evoking a bleeding. The 'visible' signs were well known: 86.8% of patients quoted nose bleeding and 75.5% blood in urine. On the contrary, the 'non-visible' signs were not well known: brutal headache 43.4% and unusual shortness of breath 28.3%.

Conclusion This evaluation allowed us to see that the programme had a high level of patient acceptance. Practical skills were acquired but clinical aspects were not properly understood. It led us to review our tools, by creating new ones that target the most complicated notions to acquire: it is made up of 27 cards that retrace clinical signs with photos and texts. The patient has to position them on a board according to INR intervals.

No conflict of interest

DI-018 | PUBLIC PERCEPTION OF PHARMACOGENETIC TESTING

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Background Pharmacogenetic (PGx) testing may enhance patients' confidence in the safety and efficacy of prescribed medications.

Purpose To evaluate public perception of PGx testing.

Material and methods A self-administered questionnaire was developed and psychometrically evaluated using a two round Delphi technique for validation and test–retest for reliability. The questionnaire consisted of two sections (A and B) with a total of 20 questions. Section A dealt with general questions about PGx testing and section B focused on participants' willingness towards PGx testing. Following ethics approval, 500 participants were recruited by convenience sampling over 6 weeks (June and July 2016); 250 from public places in 11 different localities and 250 from 5 community pharmacies in different localities. Participants in health oriented occupations were excluded. Descriptive statistics were calculated with IBM SPSS V.23.

Results Of the 500 participants, the majority (61%) were women, mean age was 45 years (range 18–86 years) and most (37%) were educated to post-secondary level. The majority (85%) were not aware of the term PGx testing. Following an explanation by the investigator, most participants indicated that they would be 'very willing' to have a PGx test performed to assess the effectiveness (37%) and safety (39%) of their prescribed medications and the majority (51%) 'strongly

agreed' that a PGx test would prevent them from taking an inappropriate drug or dose. The majority (70%) of participants identified drugs to treat cancer as the drug class for which they perceived PGx testing to be most important. The majority (67%) of participants selected the physician as the professional who should perform the test. As regards the preferred location to have the test performed, the majority (61%) selected the hospital. When asked about the cost of PGx testing, most (42%) participants thought the test should be free of charge. As regards time for result, the majority (56%) of participants would expect to have the result within a few days. Most participants (40%) 'strongly agreed' that PGx testing should be performed routinely.

Conclusion Participants in this study had a positive overall perception of PGx testing and presented expectations of PGx testing as a means to assess efficacy and safety of prescribed medications.

No conflict of interest

DI-019 | EFECTIVENESS AND SAFETY OF NEW ANTIVIRALS AGENTS IN HIV PATIENTS WITH CHRONIC HEPATITIS C

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Background The development of direct acting antiviral agents (DAAs) represents a significant improvement in hepatitis C virus (HCV) treatment, particularly in allowing interferon free therapy. HIV coinfection is common, with genotypes 1 and 4 being the most prevalent. It is important to decide which treatment is best in coinfected patients.

Purpose To evaluate the effectiveness and safety of treatment with different combinations of DAAs in HIV/HCV coinfected patients.

Material and methods A retrospective observational study was conducted of coinfected patients who initiated therapy with DAAs from April 2015 to March 2016. We included only patients with HCV genotype 4. Data were collected from electronic clinical history, electronic prescribing software and drug therapy follow-up. Variables included: sex, liver fibrosis stage, type of patient (pretreated/treatment naive), treatment duration, and RNA viral levels before starting treatment and at 4 and 12 weeks. We considered that the drug was effective if the patient achieved SVR12, which was defined as undetectable RNA viral level 12 weeks after treatment completion.

Results 11 patients (2 women, 9 men) started treatment with sofosbuvir/ledipasvir (SOF/LDP). 7 were treatment naïve and 4 had been pretreated. Hepatic fibrosis stage F4/F3/F2 corresponded to 3, 5, 3 patients, respectively. Duration of treatment was 12 weeks. 81.8% of patients achieved an undetectable viral load after 4 weeks, maintained after 12 weeks in all cases but SVR12 was achieved in 10 patients. No patient discontinued treatment for adverse events although 6 patients experienced adverse effects: asthenia (2), headache (4) and insomnia (1).

14 patients (3 women, 11 men) were treated with ombitasvir/paritaprevir/ritonavir (OTV/PTV/r) plus ribavirin (RBV). 9 were treatment naïve patients. For hepatic fibrosis stage: 1 patient was F4, 6 F3 and 7 F2. Duration of treatment was 12 weeks. 57.1% of patients achieved an undetectable viral load after 4 weeks, 100% after 12 weeks and SVR12 was achieved in all patients. Regarding safety, 8 patients reported some adverse events (most frequent was pruritus) and 1 of these discontinued treatment because of pruritus, anaemia, diarrhoea and vomiting before 4 weeks.

Conclusion 90.9% of patients treated with SOF/LDP achieved SVR12 and 100% of patients treated with OTV/PTV/r plus RBV. The adverse effects profile indicated both combinations appeared safe and well tolerated in general.

No conflict of interest

DI-020 | TOXIC EPIDERMAL NECROLYSIS RESULTING IN A FATAL OUTCOME CAUSED BY USE OF LAMOTRIGINE

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Background Toxic epidermal necrolysis (TEN) is a rare immune mediated life threatening reaction for which drugs account for more than 95% of cases. The incidence of TEN is 0.4–1.2 cases per million population per year. TEN are more commonly caused by antimicrobials, antiepileptics and NSAIDs.

Purpose To describe the case of a paediatric patient who developed a serious adverse event. The degree of causality is also described.

Material and methods The patient was aged 11 years with no known allergies and correct vaccinations. 25 days before admission, treatment was started with ibuprofen 600 mg every 8 hours after trauma to the ankle until pain relief. 24 hours later, lamotrigine 50 mg (25 mg in the morning and 50 mg at night to progressive dose) was started, scheduled after an episode of seizure. 4 days later the patient was admitted to the emergency department with a rash that had started on the face, with involvement of the skin and mucosa. There was a generalised rash on the trunk and extremities, without affecting the palms, but also affecting the genitals. She was feverish (39°C). The Naranjo algorithm was applied to determine the likelihood of whether the adverse drug reaction was due to the drug rather than the result of other factors.

Results The dermatology service concluded that the diagnosis was TEN and epilepsy. After generalisation of the rash, and the development of vesicles and skin loss over 8 days of hospitalisation, the patient was transferred to a major burns unit where the she died of cardiorespiratory arrest secondary to septic shock caused by TEN. The Naranjo algorithm had a score of 6 in the final assessment.

Conclusion TEN is the most severe acute inflammatory reaction generally caused by drugs. Because of the appearance of the first symptoms after prescription of lamotrigine, we decided to use the Naranjo algorithm for evidence of a relation to the drug. A 'probable' result of lamotrigine triggering TEN was found.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

DI-021 QT PROLONGATION IN AN ACUTE PSYCHIATRIC SETTING: FACT OR FICTION?

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Background Several psychotropic drugs can induce QT prolongation, which is a well known risk factor for developing Torsade de Pointes (TdP) and sudden death. The clinical relevance of this side effect of psychotropic medication remains unclear, especially in patients hospitalised in an acute hospital.

Purpose To interpret the clinical importance of psychotropic drug induced QT prolongation, we investigated the prevalence of these electrocardiographic changes.

Material and methods A prospective study was conducted on four psychiatric wards in a general hospital: two acute short-term psychiatric units (ASP1 and ASP2), one additional service unit (ASU) and one geriatric–psychiatric ward (GPW). All adult patients admitted between 1 October 2015 and 15 March 2016 to a psychiatric ward were eligible for inclusion. At admission, an ECG (ECG0) was performed and creatinine and potassium levels were measured. A second ECG (ECG1) was performed at least 7 days after the start of a psychotropic drug associated with a risk of QT prolongation.[1] QTc prolongation was defined as 470 ms for men and 480 ms for women. Clinically relevant QTc prolongation was defined as $\geq$500 ms.[2] Statistical analysis (R software) was done as appropriate.

Results 268 patients (mean age 55 years, 59% women) were enrolled in the analysis. In 85 patients, ECG1 was performed. QTc_{0+1} were prolonged in 2.3% (5/220) of women and 3.7% (5/136) of men. No clinically relevant prolongation ($\geq$500 ms) was registered. Higher QTc intervals were measured in the geriatric population. 28.5% (36/126) of all measured QTc ($450 \geq QTc_{0+1} \leq 500$ ms) occurred in the GPW versus 9.4% (22/233) in the other units. Significant difference in QTc changes was associated with sex (p=0.02246). There was no correlation between QTc prolongation and age, number of psychotropic drugs or a specific single psychotropic drug (p>0.05).

Conclusion In this study, QTc prolongation due to psychotropic drugs was less common than previously described.[3] [4] ECG monitoring may be unnecessary in the follow-up of patients without risk factors and could reduce hospital and community costs. However, considering the potential harm associated with TdP, QT prolongation should be avoided. We recommend recording an ECG before the start of a QT prolonging psychotropic drug in at risk patients: patients with chronic alcohol or drug addiction, cardiac history, on concomitant therapy with at least two QT prolonging psychotropic drugs, or in geriatric patients (>65 years).

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No conflict of interest

DI-022 USE AND CLINICAL EXPERIENCE OF DOLUTEGRAVIR/ABACAVIR/LAMIVUDINA IN A TERTIARY HOSPITAL

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Background The new co-formulated drugs for HIV have made great strides in treating the disease and have achieved excellent health outcomes in patients.

Purpose To analyse the use of dolutegravir/abacavir/lamivudine co-formulated (DTG/ABC/3TC) 50 mg/600 mg/300 mg in HIV infected patients and to evaluate short term effectiveness.

Material and methods A retrospective observational study was conducted in all patients who started DTG/ABC/3TC in our hospital. The variables included were: age, gender, number of previous antiretroviral regimens, patient type (naïve, pretreated), reason for prescription (treatment initiation, switch strategies and virological failure) and viral load (VL) pretreatment and after 4 and 12 weeks.

Results 33 patients started treatment with DTG/ABC/3TC, and in 3 it was discontinued it. Mean age of the patients was 51 (±13.4) years and 75.7% were men. 81.9% of patients had been previously treated with at least one antiretroviral regimen. Regarding reasons for prescription we found: treatment naïve patients in 18.1%, presence of virologic failure in 15.1% and switch strategies in 66.8%. The switch strategies included 39.5% of prescriptions in order to improve the toxicity and management of comorbidities, 21.3% to avoid drug–drug interactions (mainly with future treatment of hepatitis C), 3% to improve adherence and 3% to avoid enhancing the haematologic toxicity of chemotherapy. Regarding treatment effectiveness: in naïve patients, after 12 weeks of treatment, VL decreased in 3 patients to <20 copies/mL, and 3 achieved undetectable VL. In patients with virological failure, 1 patient achieved <50 copies/mL, 2 patients <20 copies/mL and 2 patients undetectable VL. In the rest of the patients, 11 had undetectable VL, 9 patients <20 copies/mL and only 2 patients had increased VL at week 12.

Conclusion DTG/ABC/3TC was used principally in pretreated patients, and switch strategies was the main reason for the prescriptions. In most patients, low or undetectable viral loads were obtained, thus achieving good disease control.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Clinic guide GESIDA 2016.

Data Sheet TRIUMEQ Spanish Medicines Agency.

No conflict of interest

DI-023 UTILISATION STUDY OF ORAL ANTICOAGULANTS (2008–2015) AND BLEEDING DUE TO ANTICOAGULANT TREATMENT (2012–2015)

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Background International guidelines have embraced the use of non-vitamin K oral anticoagulants (NOACs) for stroke prevention in atrial fibrillation. However, there is controversy regarding the risk of bleeding of NOACs compared with vitamin K antagonists.

Purpose To analyse the evolution of consumption of oral anticoagulants (OACs) (2008–2015) and the economic impact of the recently marketed NOACs. To study major bleedings (intracranial haemorrhage (ICH) and gastrointestinal (GI) bleeding) experienced by our patients (2012–2015).

Material and methods This was an observational descriptive study. Field of study: two tertiary hospitals and their reference areas. The target population consisted of 666 000 people. Patients with an acenocoumarol, warfarin, dabigatran, rivaroxaban or apixaban prescription, under the National Health System coverage, were studied. The unit of measure was defined daily doses (DDD) per 1000 inhabitants per day (DHD), using the ATC/DDD classification (2006). The number of patients who experienced ICH or GI bleeding associated with OACs prescriptions was studied.

Results 24 498 patients were included with a mean age of 76.7 years. During the study period, DHD increased by 88.9%; from 6.3 (2008) to 11.8 (2015). DHD values in 2015 were: 6.6 acenocoumarol; 0.6 warfarin; 2.7 dabigatran; 1.3 rivaroxaban; and 0.6 apixaban. In 2015, 91.4% of patients were treated with acenocoumarol (12 370) and warfarin (848); the other 8.6% were treated with NOACs (dabigatran 480, rivaroxaban 494 and apixaban 267). The number of patients treated with OACs increased by 44.6% during the study period, but the total expense increased by 573.8% from € 232 650 (2008) to € 1 567 675 (2015).

Between 2012 and 2015, the number of patients with major bleeding was, respectively, 146, 136, 128 and 121. Associated with NOACs: 2, 8, 10 and 12, respectively. In 2015, 0.7% of patients with NOACs experienced major bleeding versus 0.6% of patients treated with warfarin and acenocoumarol. The percentage for each treatment was: 0.6% acenocoumarol; 0.4% warfarin; 1.2% dabigatran; 0.5% rivaroxaban; and 0% apixaban.

Conclusion Consumption of OACs has increased notably. However, overall expenditure on oral anticoagulant medications has grown, particularly due to the introduction of NOACs into the market, even though our data did not show a favourable safety profile with respect to bleeding.

No conflict of interest

USE OF A NALOXONE TRIGGER TOOL AND MULTIDISCIPLINARY CAUSALITY ASSESSMENT TO IDENTIFY AND CONFIRM OPIOID RELATED ADVERSE DRUG EVENTS

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Background An adverse drug event (ADE) is a potentially harmful and unintended outcome of medicines use. In the UK, ADE trigger tools have been advocated for detecting ADEs associated with high risk drugs, including opioids. Naloxone is used to reverse opioid toxicity so is a useful indicator of potential opioid related ADEs.

Purpose We aimed to measure the sensitivity of naloxone as a trigger to detect opioid related ADEs in adult inpatients in an acute hospital. The objectives were to: assess the positive predictive value (PPV) of the naloxone trigger; and identify drugs most commonly associated with ADEs.

Material and methods We conducted a retrospective review of adult inpatients administered naloxone between October 2014 and September 2015. Naloxone doses recorded as administered on our electronic prescribing system (EPMA) were included. A&E, paediatrics and critical care units were excluded. Ethics approval was not required. Case review forms were completed for each patient and reviewed by a multidisciplinary panel who applied the WHO Uppsala Monitoring Centre Causality Assessment System (WHO-UMC CAS) to confirm opioid ADEs. The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) Index was applied to assign a severity of harm rating to confirmed ADEs.

Results 142 naloxone trigger events were identified; 17 were excluded. 125 ADEs were categorised by the multidisciplinary panel using the WHO-UMC CAS tool. 91 cases were considered certain (54), probable (13) or possible (24). 34 cases were considered unlikely (8), conditional (1) or unassessable (25). NCCMERP Index harm ratings were applied to the 91 confirmed ADEs: 90 were categorised as E and 1 event which resulted in escalation of care was categorised as F.

Conclusion The PPV of naloxone for opioid ADEs was 72.8% (91/125). This is higher than in other studies which have found rates of 57.6–68.3%, although methodologies vary. Morphine sulphate was most commonly associated with ADEs, accounting for 55/91 ADEs. Incomplete documentation of patients' clinical status before and after naloxone administration limited case note review. Although time consuming, our methodology could become the gold standard for confirming opioid related ADEs.

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No conflict of interest

INTRAVENOUS IMMUNOGLOBULIN INDUCED AGRANULOCYTOSIS

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Background Leukoneutropenia is described in most of the summaries of the characteristics of the products of human intravenous immunoglobulins (ivIg). This side effect is uncommon and not usually described in paediatric populations. Since 1998, less than 200 cases have been reported in the literature.

Purpose The objective was to analyse the causes of two neutropenia occurrences in the same patient successively treated with two ivIg.

Material and methods We based our study on bibliography, clinical findings and chronology. The case involved a 77-year-old woman with hypertension and substituted hypothyroidism,

who received ivIg and corticotherapy (1 mg/kg/day) for cardiac involvement complicating antisynthetase syndrome.

Results A haemogram before therapy was normal. The first treatment with ivIg was administrated as 0.4 g/kg/day for 5 days. Because of procurement difficulty, the patient received special treatment with ivIg (CLAIRYG) for 3 days and special treatment (TEGELINE) over the next 3 days. Clinical and renal tolerance were good but leukoneutropenia appeared after 6 days with leukocytes 2.88 G/L (4–10 G/L) and neutrophils 1.67 G/L (2–7.5 G/L). Leukocyte numbers then improved but without complete normalisation. A second treatment of ivIg (only TEGELINE) was started on day 17. We observed neutropenia (neutrophils 0.76 G/L) on the third perfusion day and agranulocytosis (neutrophils 0.42 G/L) on day 8 without fever but requiring a protector confinement and administration of granulocyte colony stimulating factor. Neutrophils normalised the next day. Vitamins B1, B9 and thyroid function were normal. A myelogram performed on the day of the agranulocytosis occurrence eliminated the central cause. Methotrexate (15 mg/week) introduced 6 days before the second treatment of ivIg was associated with folic acid supplementation, so its probable toxicity could be excluded. Methotrexate was stopped before the start of the second therapy and was reintroduced 13 days later without agranulocytosis.

Conclusion The mechanism of neutropenia was peripheral and it seems that neutrophil anticytoplasm antibodies contained in ivIg formulations could activate TNF-alpha stimulated neutrophils, inducing peroxide production and neutrophil destruction. It spontaneously reversed and did not complicate the infection. These leukoneutropenia are sometimes severe and observed with ivIg. Clinicians should strictly monitor haematological parameters during and after treatment.

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No conflict of interest

DI-026 | **E-LEARNING TO IMPROVE PAEDIATRIC PARENTERAL NUTRITION KNOWLEDGE? A PILOT STUDY IN TWO HOSPITALS**

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Background Education and training may improve prescription of paediatric parenteral nutrition. In hospitals, prescription of paediatric parenteral nutrition may be performed by physicians or clinical pharmacists. Differences in knowledge of prescribing and non-prescribing physicians may be expected.

Purpose To assess and compare the impact of a self-made E-learning module, focused on prescription of paediatric parenteral nutrition, on the ability of physicians to manage theoretical clinical cases in two hospitals.

Material and methods

Setting two university hospitals (HOSP1: prescribing physicians, HOSP2: non-prescribing physicians). Study design: physicians who agreed to participate were randomised into one of two groups in each hospital. All participants completed a pre-test to establish baseline knowledge. Intervention group:

E-learning module (45 min) followed by a post-test, 1 month after the pre-test. Satisfaction of the E-learning module was evaluated on a standardised questionnaire. Control group: post-test 1 month after the pre-test. Pre- and post-tests were developed on Survey Monkey and included 3 clinical cases (total score range 0 to 250). Outcome: E-learning impact was evaluated by comparing the difference in scores between the pre- and post-tests in the two groups, globally and in the two hospitals.

Results 65 physicians participated (36 in HOSP1 (mean years of experience±SD 4.0±2.8) and 29 in HOSP2 (3.1±2.6)). Initial knowledge scores were higher in HOSP1 (pre-test scores 180±29 vs 133±24, p<0.001). No significant E-learning impact was observed globally (mean difference +15.1 points, 95% CI −8.3 to 38.4, p>0.05) or in either hospital, even if the improvement of knowledge by the E-learning group was higher in HOSP2 (+24 points, 95% CI −10.3 to 59) than in HOSP1 (+8 points, 95% CI −21 to 37, p>0.05). Large variability was observed in both hospitals. Global E-learning satisfaction was very high. In both centres, 100% of participants estimated that the E-learning module met their needs and would recommend it to their colleagues.

Conclusion There was no impact of an E-learning module on the knowledge of physicians about paediatric parenteral nutrition in this pilot study. The high level of satisfaction with this new pedagogic tool is a sign to keep on assessing how to use it in medical education and to develop validated tools to evaluate its impact.

No conflict of interest

DI-027 | **ANALYSIS OF THE DURABILITY OF ANTIRETROVIRAL MONOTHERAPY IN HIV INFECTED PATIENTS**

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Background One of the main objectives in the adequacy of HIV antiretroviral treatment is to find the drug or set of drugs that allow the best results to be obtained for the patient and to try to support this medication over time. Since the introduction of antiretroviral monotherapy in HIV there have been many studies examining the efficacy and safety of treatment, but to date, few have studied duration of monotherapy.

Purpose To analyse survival after monotherapy (MT) in HIV patients and to perform a descriptive analysis for subgroups of factors associated with MT.

Material and methods An observational, retrospective, analytical study was conducted in HIV patients treated with MT during 2014. Selection of patients and analysis of their antiretroviral medication were reviewed with the platform Farmatools (MT type and possible change). Clinical and demographic data (age, sex, coinfection with HCV and HBV) were obtained from the electronic health record through Mambrino XXI. We performed an analysis of survival and defined the event as 'changing MT to double therapy (DT) or triple therapy (TT)'. We obtained data by subgroup mortality tables through the SPPS V.21 statistical programme.

Results 79 patients (70.9% men) were included, mean age 51 years (44–70). With respect to antiretroviral MT: 84.4% of patients (n=67) were taking darunavir/ritonavir (DRV/r) and

15.2% (n=12) were taking liponavir/ritonavir (LPN/r). No patient was coinfected with HBV but 30 patients were HCV coinfected. Statistical analysis showed that the median survival time was: 54 months in men and 48 months in women (p=0.750). 47.27 months in HCV coinfected patients and 54 months in non-coinfected patients (p=0.315). 54 months in patients who were treated with DRV/r and 51 months with LPN/r (p=0.071). In 19 patients (24.1%) the following event occurred: 16.45% (n=13) changed to TT and 7.59% (n=6) to DT. 76% of patients who were maintained on MT (n=60) switched to DRV/cobicistat.

Conclusion Median survival after MT was reasonably positive, with a tendency for better results in men not coinfected with HCV and in patients with DRV/r, although these result were not statistically significant. Further studies are required to justify the reason for change from MT to BT or TT and the benefit of a regimen against another to generalise the results.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Special thanks to Dr Martinez Sesmero.

No conflict of interest

DI-028 | **REASONS FOR CHANGING TREATMENT TO ORAL AGENTS IN MULTIPLE SCLEROSIS**

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Background People with multiple sclerosis (MS) now have oral drugs to choose from to treat the relapsing form of the disease. Aubagio (teriflunomide) is an oral compound that inhibits the function of specific immune cells that have been implicated in MS. It has been approved for patients with relapsing forms of MS.

Purpose The aim of this study was to analyse changes in relapsing forms of MS treatment from injectable drugs to the oral drug teriflunomide.

Material and methods This was an observational retrospective study. Data were obtained from 20 patients with MS treated with teriflunomide from January 2016 to June 2016. We reviewed the medical history to confirm the reason for changing to the new drug: lack of efficacy or adverse effects with the previous therapy, patient preferences for oral drug versus injectable drugs and risk of progressive multifocal leukoencephalopathy from natalizumab.

Data collected were: age, gender, previous treatment and reasons for changing.

Results We included 20 patients that started treatment with teriflunomide. 57% were women. Median age was 49±10 (SD) years. Previous therapies and number of patients that received it: Avonex 1; Betaferon 5; Copaxone 2; Tysabri 3; Rebif 1; Rebif and Tysabri 2; Tysabri and Betaferon 1; Betaferon and copaxone 1; Betaferon and avonex 1; Tysabri, Betaferon and Rebif 1; and azathioprine, Betaferon, Copaxone and Tysabri 1. 1 patient received therapy from a clinical trial.

Reasons for changing therapy: lack of efficacy 10 (50%), risk of progressive multifocal leukoencephalopathy from natalizumab 4 (20%), patient preferences for oral drug versus injectable drugs 2 (10%), adverse effects with the previous therapy 1 (5%) and unknown 3.

Conclusion The main reason for changing MS treatment was lack of efficacy of previous therapies followed by risk of progressive multifocal leukoencephalopathy from natalizumab. New oral agents are easier to administer for patients; this is an important advantage for these compounds. Emerging oral treatments are ushering in a new era in the treatment of MS, providing not only new treatment options but also new challenges.

No conflict of interest

DI-029 | **ANALYSIS OF THE MODIFICATIONS IN ANTIRETROVIRAL TREATMENT**

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Background There are several circumstances for changing antiretroviral therapy (ART), such as drug toxicities, new comorbidities, pharmacological interactions, virologic failure, suboptimal regimen, difficulty adhering to the regimen or simplifications of the regimen.

Purpose The object of the study was to describe the reasons of ART modifications during 2015 and 2016 and to determine whether treatment of hepatitis C virus (HCV) has had an influence.

Material and methods ART modifications during 2015 and from January to September 2016 were revised. Baseline treatments, causes of changes in treatment and new schemes were analysed.

Results During 2015, 113 ART modifications were detected. There were 32 changes (28.3%) because of drug toxicities; 18 (56.3%) were CNS toxicities (insomnia, abnormal dreams, dizziness, etc) and most were due to efavirenz. 16 ART changes (14.2%) were regimen simplifications and there were another 15 ART modifications (13.3%) due to virologic failure. 35 of the changes (31%) were because of interactions with prioritised direct antivirals in our hospital for the treatment of HCV. From January to September 2016, 56 changes were reported. 13 (23.2%) were because of a variety of drug toxicities, such as lipid abnormalities, CNS toxicity, gastrointestinal intolerance, hypophosphataemia and hyperbilirubinaemia, none of which were particularly prevalent. There were 8 simplifications of the ART (14.3%) and 4 changes because of virologic failure (7.1%). With respect to HCV, 23 changes (41.1%) were necessary owing to interactions with direct antivirals for HCV. In both periods, pregnancy, renal impairment, immunologic failure and other interactions were also documented as reasons for modifying ART.

Conclusion All changes were well documented in the literature. During 2015, Eviplera (emtricitabine/rilpivirine/tenofovir) was included as an option in our hospital which may be the reason why many patients with intolerance to Atripla (emtricitabine/efavirenz/tenofovir) or ART combinations, including efavirenz, were switched to Eviplera. This implies more changes due to CNS toxicity and overall due to toxicity during 2015, compared with 2016. Coinfection with HCV is another reason for ART modification, at least during HCV therapy.

No conflict of interest

DI-030 | ANALYSIS OF TREATMENT WITH VEMURAFENIB AND DABRAFENIB IN PATIENTS WITH METASTASIC MELANOMA IN A TERTIARY HOSPITAL

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Background In recent years, new drugs have been approved for metastatic melanoma. The BRAF gene is the most common mutation in cutaneous melanomas and is present in 50% of melanomas. Vemurafenib and dabrafenib are used for the treatment of adult patients with unresectable or metastatic melanoma who are BRAF V600 mutation positive.

Purpose To analyse the use of the targeted anti-BRAF therapies, vemurafenib or dabrafenib, alone or combined with the MEK inhibitor trametinib or cobimetinib in a tertiary hospital in patients diagnosed with metastatic melanoma.

Material and methods A retrospective observational study was conducted in all patients treated with vemurafenib or dabrafenib, alone or with trametinib or cobimetinib, from May 2014 to April 2016. SAP software was used for medical history, nursing and dispensation records.

Results 6 patients, 50% men, were evaluated, with an average age of 63 years (84–46). 1 received vemurafenib alone, 3 patients received vemurafenib associated with cobimetinib and the other 2 received trametinib with dabrafenib. 1 of the patients who received dabrafenib and trametinib (2 cycles, ECOG 2) and the patient who received vemurafenib alone (3 cycles, not reflected ECOG) died. The remaining patients continued on treatment: 17 cycles for the patient who received dabrafenib-trametinib, 5 cycles for 2 patients who received vemurafenib-cobimetinib and 4 cycles for the other, with ECOG 0. 1 patient had lung, lymph nodes and liver metastases, 1 lung metastases, 1 mediastinal metastases, 1 skin and peritoneal metastases and 2 patients had lymph node progression when they started anti-BRAF therapy. LDH levels were increased in 50% of patients.

Adverse reactions included fever in the patient who received dabrafenib-trametinib and acne, mild abdominal pain and asthenia in 1 patient who received dabrafenib-trametinib. In the case of vemurafenib, eritrodermia required discontinuation of treatment. In the cases of vemurafenib-cobimetinib, skin toxicity (sores) associated with vemurafenib reached grade III, forcing halving of the dose to both drugs, and the likely drug induced fever caused hospitalisation of this patient.

Conclusion It seems that the number and location of metastases, LDH values, ECOG 0 and combination of anti-BRAF drugs with the MEK inhibitor determines survival and tolerance to the drug, but further follow-up is needed to determine the evolution of patients.

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No conflict of interest

DI-031 | ADHERENCE TO CLINICAL PRACTICE GUIDELINES FOR OPIOID THERAPY IN A HOSPITAL SETTING

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Background Opioids can have serious risks and side effects. Improving the way opioids are prescribed through clinical practice guidelines can ensure patients have access to safer, more effective pain treatment.

Purpose To assess the level of adherence to standard treatment guidelines among clinicians prescribing opioid based therapy for admitted patients.

Material and methods This was a cross sectional study conducted on 23 May 2016 in a tertiary hospital. Electronic prescriptions were analysed. When therapy included opioids, the following data were collected: age, gender, opioid prescription and clinical service. Tramadol was excluded.

'Prescription adherence to standard treatment guidelines' was defined as follows: (1) firstline pain therapy should be based on non-opioid analgesics; (2) when prescribing an opioid, it should be checked if another opioid was prescribed to prevent overdose; (3) the first opioid prescribed should be a normal release opioid and at a minimum effective dose; (4) an appropriate rescue opioid should be used. If one of the above conditions was not met, the prescription was classified as 'non-adherent to standard treatment guidelines'.

Results From a cohort of 1014 admitted patients with electronic prescribing, 100 with opioids were screened. 51 (51%) were men. Median age was 74 (4–99) years. 30 (30%) patients were in the surgical unit, 22 (22%) in internal medicine, 10 (10%) in oncology, 8 (8%) in palliative care, 8 (8%) in geriatrics, 6 (6%) in pneumology and 16 (16%) in 'other units'. Patients had a mean of 1.35 (SD 0.64) opioids prescribed. As firstline therapy, most common opioids prescribed were parenteral morphine (40; 40%), transdermal fentanyl (32; 32%) and prolonged release oral morphine (13; 13%), and as secondline, parenteral morphine (12; 48%), normal release oral fentanyl (5; 20%) and normal release oral morphine (3; 12%).

20 (20%) opioid prescriptions did not follow standard treatment guidelines: 5/30 (17%) of surgical unit opioid prescriptions, 5/22 (23%) of internal medicine, 2/10 (20%) of oncology, 1/8 (13%) of palliative care, 0/8 of geriatrics, 2/6 (33%) of pneumology and 5/16 (31%) of 'other units'. Reasons for non-adherent prescriptions were: 'do not have an non-opioid analgesic therapy prescribed' (12/20), 'non appropriate rescue opioid'(1/20), 'prescription of two different rescue opioids'(4/20) and 'regular prescription of two different opioids' (3/20; 43%).

Conclusion Level of adherence to standard treatment guidelines could be considered adequate. Opioid prescriptions in the hospital setting could be improved facilitating access to clinical practice guidelines for opioid therapy to clinicians, especially in clinical services where opioid prescription is not a routine clinical practice.

No conflict of interest

DI-032 | IMPACT OF AN AWARENESS CAMPAIGN FOR OPTIMISATION OF ANTIBIOTIC USE IN A HOSPITAL SETTING

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Background In spite of increasing antibiotic resistance, current development of antibiotics is very limited. Therefore, it is important to treat patients with severe infectious soon and correctly, as well as to avoid antibiotic use in patients where it is not indicated.

Purpose To analyse the impact on antibiotic prescribing of an awareness campaign for optimisation of antibiotic use conducted in a hospital setting using the 'programme for antibiotic use optimisation' (PROA).

Material and methods The campaign was carried out in two working lines that were repeated over two periods: June 2015 and December 2015. Firstly, patients receiving antibiotic treatment were filtered at days 6 and 9 of their therapies using Unidosis-Farmatools (a tool for computerised order entry). In those treatments without specified ending dates, a 'post-it' visible to the clinician was created in the electronic prescription with the following message: 'Is it necessary to continue antibiotic treatment? If it is not necessary, stop. If it is still necessary, indicate ending date.' Critical care units and immunocompromised patients were excluded. In addition, attractive format posters were distributed around the hospital with this slogan: 'Is it necessary to continue antibiotic treatment? No less. No more. It is up to you.' To analyse the results of the PROA campaign, the following variables were collected: clinical service, number of messages ('post-it'), stopped therapies after 'post-it', treatments with specified ending dates after 'post-it', treatments without change after 'post-it' and days of therapy (DOT).

Results From a cohort of 930 antibiotic prescriptions filtered, 59 (6%) with a specified ending date, 545 (59%) antibiotic therapies were screened and included in the 'post-it' part of the campaign. 24 hours after writing the messages the results were analysed: 196 (36%) treatments were stopped, 104 (19%) specified an ending date and 245 (45%) continued treatment without modification. Moreover, the PROA campaign, through its two working lines, resulted in a significant decrease in DOT. DOT (mean per month): 6.1 (April 2015); 6.2 (May 2015); 5.5 (June 2015); 5.6 (July 2015); 5.6 (August 2015); 5.5 (September 2015); 5.6 (October 2015); 5.6 (November 2015); 5.2 (December 2015); 6.0 (January 2016); 5.4 (February 2016); 5.1 (March 2016).

Conclusion The antibiotic use awareness campaign obtained satisfactory results. PROA suggestions were highly accepted, considering that the only criteria for patient filtering was 'more than 6 days of antibiotic therapy'. The success of the campaign resulted in a decrease in DOT.

No conflict of interest

DI-033 | ASSESSMENT OF THE USE OF INHALED THERAPY IN A HOSPITAL SETTING

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Background Respiratory diseases are a worldwide major health problem, specially chronic obstructive pulmonary disease (COPD) and respiratory infections. Treatment usually involves inhaled drugs that are essential in asthma and COPD.

Purpose To analyse the indications for which inhaled drugs are prescribed in admitted patients and to determine the most prescribed active ingredients as well as the devices used for their administration.

Material and methods A cross sectional study designed to analyse how inhaled drugs are prescribed to admitted patients with respiratory diseases in a tertiary hospital was conducted. The following variables were collected: age, gender, clinical service, inhaled medication, device used for administration and indication. Data were obtained from medical records and treatment sheets. Adult patients with inhaled prescribed therapy on the day of the study were included. Critical care units and psychiatry were excluded.

Results From a total of 482 prescriptions analysed, 61 (12.65%) including inhaled therapy were screened. Patient median age was 74 (37–91) years and 39 (64%) were men. 15 (25%) therapies were prescribed by a surgical unit, 11 (18%) by pneumology, 10 (16%) by internal medicine, 8 (13%) by cardiology and 17 (28%) by 'other units'. 18 (30%) patients had a single inhaled drug prescribed, 33 (54%) had two and 10 (16%) had a combination of three inhaled drugs prescribed. Main indication for which inhaled therapy was prescribed was COPD (15 patients, 25%) followed by asthma (5.8%). In 15 (25%) patients the indication for which the drug was prescribed was not authorised. Most prevalent 'non-authorised' indication was 'dyspnoea without diagnosis' (5/15, 33%). Prescriptions without an authorised indication were mostly done by 'non-pneumology' units (12/15, 80%). The most prevalent active ingredients were ipratropium bromide (43%) and ambroxol (24%). Devices used for inhaled administration were: nebuliser (79%), pressurised cartridge (17%) and dry powder (5%).

Conclusion The use of inhaled drugs is common in the hospital setting. Ipratropium bromide is the most prevalent active ingredient prescribed. Inhaled-drugs are normally administered to admitted patients using a nebuliser. Inhaled drug prescriptions for unauthorised indications are common, especially when prescribed by a 'non-respiratory disease' clinician. Greater involvement of the hospital pharmacist in the supervision of the pharmacotherapy of respiratory patients is necessary.

No conflict of interest

| DI-034 | **PHARMACY INTERVENTION TO PROMOTE SAFER USE OF GLICLAZIDE** |

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Background Gliclazide is a sulfonylurea administrated as a single daily dose according to the data sheet. Intake of this drug several times a day could increase the occurrence of hypoglycaemia.

Purpose To evaluate the impact of an intervention developed by the pharmacy department to correct dosages of gliclazide that consisted of more than a single daily dose and therefore were not safe.

Material and methods A prospective study comparing the number of non-recommended dosages of gliclazide before and after our intervention was conducted. Field of study: two tertiary hospitals and their reference areas (the population consisted of 666 000 people). In August 2015, our department searched for patients with non-safe gliclazide prescriptions. These patients were included in lists which were sent as feedback to their corresponding physicians, along with a reminder of the correct dosage for this medical product. In December 2015, gliclazide prescriptions were studied in the same group of patients to analyse whether those non-recommended dosages had been corrected. Data were obtained from prescriptions under the National Health System coverage.

Results The average age of patients was 70.5 years and 51.7% were men. In the first time point (August 2015), the number of patients with gliclazide prescriptions were 7856. 18% (1412) of the prescriptions were unsafe. Dosages found were: every 3 hours (1); every 6 hours (20); every 8 hours (420); and every 12 hours (970). In the second time point (December 2015), from 1412 patients with inadequate dosages, 1256 (88.9%) continued with an active gliclazide prescription. The dosage was corrected in 730 of the initial 1256 patients (58.1%). The number of modified dosage regimens was 751, however 21 of these changes consisted of unsafe prescriptions (more than a single daily dose): every 6 hours (2); every 8 hours (9); and every 12 hours (10).

Conclusion Our intervention appeared to be an effective method to correct the lack of information that can foster incorrect prescriptions of gliclazide. However, we plan to perform another intervention to try to correct other unsafe prescriptions.

No conflict of interest

| DI-035 | **METASTATIC MELANOMA LONG SURVIVOR AFTER IMMUNOTHERAPY TREATMENT: A CASE REPORT** |

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Background Metastatic melanoma is an aggressive form of cancer. Largely ineffective, dacarbazine, temozolamide or fotemustine were the only agents used for a long time. The recent development of checkpoint inhibition immunotherapies has changed the treatment paradigm and improved outcomes although response rates still remain moderate. Despite that, subgroups of patients involved in clinical trials have presented significant responses maintained for long periods of time, defined as 'long survivors'.

Purpose Description of a case of melanoma metastatic long survivor after immunotherapy treatment

Material and methods A 55-year-old man was diagnosed in June 2005 with nodular melanoma IIB-IIC. He initially underwent surgical resection and subsequent adjuvant therapy with high doses of interferon-2αb. In December 2010, metastatic disease was confirmed by the presence of pulmonary nodules; BRAF mutation determination was negative. In this context, the patient was involved in a clinical trial receiving ipilimumab+dacarbazine (cycles 1–4) and dacarbazine monotherapy (cycles 5–8). The patient presented a partial response after the first four cycles, treatment was completed and then he remained under observation. In May 2013, disease progression was observed. After having undergone several extracranial stereotactic radiotherapy sessions, it was decided, in November 2014, to start treatment with pembrolizumab, within its compassionate use access programme.

Results After 4 months of treatment with pembrolizumab, one of the two pulmonary nodules no longer displayed (considered as a partial response). The disease remained stable until February 2016, when progression of disease was detected as growing of already known metastases (RECIST criteria). Evidence of progression led to early discontinuation of treatment. After pembrolizumab interruption, LDH levels increased abruptly, consistent with the rapid progression of the disease. Two more previously scheduled doses were administered and then pembrolizumab was stopped. 2 weeks after immunotherapy finalisation, LDH levels were significantly reduced. 6 months later the disease remains controlled under fotemustine therapy.

Conclusion RECIST criteria might underestimate the therapeutic benefit of immunotherapeutic agents, leading to treatment discontinuation due to pseudoprogression (an increase in total tumour burden later followed by tumour regression). The use of immune related response criteria potentially may prevent premature cessation of treatment and explain why patients with apparent progressive disease by RECIST criteria experience long term survival.

No conflict of interest

| DI-036 | **METRONOMIC CHEMOTHERAPY WITH ORAL VINORELBINE: EPIDEMIOLOGICAL ANALYSIS AND ECONOMIC EVALUATION** |

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Background Vinorelbine is an antineoplastic drug belonging to the family of vinca alkaloids. Initially it was marketed for intravenous use and then it was made available as an oral formulation, to improve access and adherence to treatment, and to reduce procedures and costs of hospitalisation. Metronomic chemotherapy, compared with traditional schedules, is based on more frequent administration of low dose drugs, with the aim of preventing tumour angiogenesis.

Purpose To investigate the use of metronomic chemotherapy with oral vinorelbine in our hospital; an epidemiological analysis and an economic evaluation were performed.

Material and methods We examined prescriptions of vinorelbine and discharge sheets of oncology outpatient visits in 2015. We analysed the costs of the treatment schedules.

Results 31 patients were treated with oral vinorelbine, 18 (58%) with the metronomic schedule (off-label) for metastatic breast cancer (15) and metastatic non-small cell lung cancer (3). Mean age was 69 years (range 43–85); almost all patients were women (30/31) and with a good performance status at the beginning of treatment (12 PS 0, 5 PS 1, 1 missing). 15 patients had progressive disease and 3 were partially responding. Mean length of this type of chemotherapy was 3 months, with good compliance and tolerance. In 2015, consumption of oral vinorelbine increased (+380% vs 2014), while consumption of the injectable formulation decreased (−44%). Direct costs of the oral formulation of vinorelbine (both metronomic and traditional schedule) were higher than the direct costs of the intravenous formulation; for the latter, we must however add the costs of hospitalisation and hospital staff for preparation and administration of the drug.

Conclusion We can explain the rise in consumption of the oral formulation with the use of metronomic therapy and with an increase in the number of patients. The metronomic schedule was used as maintenance therapy and the preferred candidate is the elderly patient, a unique setting where the risk/benefit ratio of any antineoplastic treatment should be carefully evaluated. Metronomic chemotherapy with oral vinorelbine is an appealing option for patients who express their preference for oral chemotherapy.

No conflict of interest

DI-037 | **IMPACT OF SPANISH PHARMACOVIGILANCE LEGISLATION ON SUSPECTED ADVERSE DRUG REACTIONS REPORTED BY THE HOSPITAL PHARMACY SERVICE**

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Background Spanish pharmacovigilance legislation of human medicines states that healthcare professionals are obliged to report suspected adverse drug reactions (ADRs), giving priority to serious ADRs, unexpected or related to drugs under additional monitoring.

Purpose To assess the impact of the Spanish Pharmacovigilance Legislation recommendations on ADR reporting by the hospital pharmacy service (HPS).

Material and methods This was a retrospective analysis of the severity of ADRs reported by the HPS and those involving medicinal products under additional monitoring. Study period: August 2013 to March2016. Data sources: database of ADRs reported to Regional Pharmacovigilance Centre, electronic medical records and European list of medicinal products under additional monitoring. Collected data: date of spontaneous ADR reports, medical record number, demographic dates, drugs involved and communication of ADRs and severity.

Results 319 suspected ADRs were reported by the HPS. Mean patient age was 58 years (range 9 days–92 years). 75.7% of reports corresponded to serious ADRs and/or drugs on the European list of medicinal products under additional monitoring. Therapeutic groups mainly involved were: antineoplastic–immunomodulating (43.9%), systemic anti-infectives (25.1%) and the nervous system (11.6%). Drugs mainly involved were: everolimus (14/319), adalimumab (12/319), linezolid (12/319) and boceprevir (8/319). 67.4% of ADRs reported were serious. 26.5% of ADRs caused hospitalisation and 9.8% prolonged hospital stay. ADRs were the cause of death in 1.4% of cases, endangered life in 12.1% of cases and caused persistent/severe disability in 3.7%. In 46.5% of cases, ADRs were considered serious because of their importance from a medical point of view. 17.9% of ADRs belonged to the European list of medicinal products under additional monitoring, among which 35.1% were abiraterone (7), boceprevir (8) and telaprevir (5); 47.4% were serious. In 11/319 ADRs in patients under 18 years of age, 8 were considered serious, including 2 cases related to Immunoglobulin against *Neisseria meningitidis* group B.

Conclusion A high percentage of ADRs reported by the HPS was consistent with the pharmacovigilance legislation, highlighting the number of serious ADRs. Reporting of ADRs by the HPS contributes to increased awareness of drug safety, especially those recently marketed.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

DI-038 | **ANTIBIOTIC CONSUMPTION IN NON-TEACHING LEBANESE HOSPITALS: A CROSS SECTIONAL STUDY**

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Background The rising threat of antibiotic resistance is linked to patterns of antibiotic use in hospital settings. Along the same lines, global efforts have been undertaken to encourage reporting and benchmarking antibiotic consumption in an attempt to decrease antibiotic resistance and improve antibiotic prescribing.

Purpose The objective of this study was to assess antibiotic consumption in Lebanese hospitals based on a retrospective study conducted during 2012 for a 12 month period using pharmacy department records from 27 non-teaching hospitals across Lebanon and to compare these results with those from 2013–2014.

Material and methods Data from each hospital were recorded based on the Anatomical, Therapeutic and Chemical classification system and defined daily dose (ATC/DDD), recommended by the WHO. Data included hospital demographic information and antibiotic consumptions by patient. Data were compiled and analysed using ABC Calc software V.3.1.

Results Collected data in 2013–2014 showed that average antibiotic consumption (excluding paediatric cases) was 77.5657 DDD per 100 bed days (DDD/100 BD) which did not vary significantly compared with the findings in 2012 where average antibiotic consumption was 72.56 (DDD/100 BD). The total broad spectrum antibiotic consumption was 12.14 DDD/

100 BD and there were no significant differences found between public and private hospitals (p>0.05l).

The most commonly used antibiotics via parenteral routes were amoxicillin/clavulanic acid, ceftriaxone, amoxicillin and cefuroxime. Consumption of beta-lactams, cephalosporins, carbapenems, monobactams and quinolones did not vary significantly by region, hospital occupancy rate or number of beds.

Conclusion Our data provide baseline information on patterns of antibiotic consumption in Lebanese hospitals. Efforts should be amplified to encourage data reporting at the national level to correlate the results in the future with antibiotic resistance patterns. Future projects should be aimed at evaluating tools needed to assess the public health consequences of antimicrobial misuse.

No conflict of interest

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Background Fosfomycin trometamol is a broad spectrum antibiotic used in uncomplicated, low urinary tract infections (UTI) in women.

Purpose To describe the use of fosfomycin trometamol in UTI in a third level hospital.

Material and methods Hospitalised patients receiving treatment with fosfomycin trometamol between May 2015 and September 2016 were investigated. Demographic and clinical records, microbial cultures and antibiotic use were collected retrospectively. Indication and treatment duration were evaluated according to the hospital's empirical antibiotic treatment guidelines.

Results 54 patients were included, 45 women (83.33%), mean age 68.29 years (range 22.85–91.59). 49 patients (90.74%) were hospitalised in medical units and 5 (9.26%) in surgical units. 14 patients (25.93%) had a urinary catheter, removed in 6 patients (not recorded in the others). 32 patients (59.26%) had a urinary culture requested, of which: 28 (87.5%) were positive (27 were sensitive to fosfomycin, 1 resistant) and 4 (14.29%) were negative. Bacterial isolates were: *E coli* in 64.29% (18/28) of cultures, of which 27.78% (5/18) were extended spectrum β-lactamase producing *E coli* (ESBL); *Klebsiella pneumoniae* in 10.71% (3/28); *Proteus mirabilis* in 7.14% (2/28); *Pseudomonas aeruginosa* in 3.57% (1/28); and 14.29% (4/28) were mixed cultures. In 34 patients (62.96%) were treated empirically, 20 (37.04%) were targeted treatments and none was used as prophylaxis. 25 patients (40.30%) received a single dose, 15 (27.78%) patients received 2 doses and 14 (25.93%) patients received from 3 to 10 doses. Fosfomycin trometamol was used in symptomatic bacteriuria in 38.89% (21/54) of patients, in low UTI in 59.26% (32/54) of patients and in urinary sepsis in 1.85% (1/54) of patients. According to the hospital's empirical antibiotic treatment guidelines, fosfomycin trometamol should be used as a 3 g single oral dose, or two doses 24–72 hours apart, for the treatment of UTI in women. Asymptomatic bacteriuria

should not be treated unless pregnancy, neutropenia and antimicrobial prophylaxis in specific procedures. Urinary catheter should always be replaced in ITU. According to the hospital's guide, fosfomycin trometamol was not indicated in 37.03% (20/54) of patients. Treatment duration was inadequate in 33.33% of patients (18/54). Only 6 patients had urinary catheter replacement.

Conclusion Fosfomycin trometamol is a broad spectrum antibiotic which was not adequately used in our hospital (in terms of indication and duration). It should be used according to our hospital's empirical antibiotic treatment guidelines. Clinical pharmacists can play an important role assessing antimicrobial use.

No conflict of interest

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Background Neck lymphangioma is the most common lymphatic malformation of the newborn, representing about 5% of benign tumours of infancy and childhood. Due to its action on angiogenesis and cellular growth, the use of sirolimus (m-Tor inhibitor) has been proposed for treatment, as it has produced satisfactory results in some studies in children and in a few cases in neonatology.

Purpose To describe the use of sirolimus as treatment for a left laterocervical lymphangioma in a newborn.

Material and methods We report the case of a term male newborn (3.3 kg, 51 cm, 0.22 m^2) with a left laterocervical mass (13 cm) diagnosed on a prenatal ultrasound. According to the neonatal cases in the literature, an oral solution of sirolimus 1 mg/mL was started at 0.8 mg/m^2/day (divided into 12 hourly doses) for 10 days of life. Sirolimus plasma levels were monitored (LC/MS/MS), with a desired target of 4–8 µg/L, as well as adverse effects and the evolution of the mass.

Results

Day	Dose	Levels (ng/mL)	Triglycerides (mg/dL)	Cholesterol-LDL (mg/dL)
1	0.08 mg bid		67	28
6	0.08 mg bid	23	89	94
10		18.5	319	99
12		8.7	382	
14	0.1 mg qd			
19	0.1 mg qd	8	103	123
40	0.1 mg qd	4.1	167	
47	0.15 mg qd			
55	0.15 mg qd	7.4	180	96

The first 2 months of treatment are described. On day 6, treatment was interrupted owing to high plasma levels. On day 14, sirolimus was reintroduced at a lower dose and once daily schedule (estimated elimination half-life of 33 hours, concordant with the neonatal literature). Posterior levels were correct and the dose was titrated according to them and the weight gain of the child. Regarding side effects, the patient

experienced hypertriglyceridaemia and hypercholesterolaemia, with unaltered hepatic and renal functions associated with high sirolimus levels. He also had occasional nausea and vomiting that were appropriately managed. Posterior controls showed normalisation of triglycerides and cholesterol levels. From the beginning of treatment, the cervical mass showed a progressive reduction in size and a marked reduction in consistency.

Conclusion Sirolimus can be a useful option for the treatment of lymphatic malformations with few short term side effects. More data are needed to characterise the pharmacokinetics of sirolimus in the neonatal population, in order to define optimal dosing.

No conflict of interest

DI-041 COLLABORATION BETWEEN HOSPITAL PHARMACISTS AND CLINICAL PHARMACOLOGISTS FOR IMPROVED QUALITY OF CLINICAL ANSWERS IN HOSPITAL CARE

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Background The Medicine Information Centre in the Capital Region of Denmark aims to promote the safe, effective and efficient use of medicines in order to improve quality of answers to inquiries from clinicians on drug related problems. A close knit group of highly experienced pharmacists and clinical pharmacologist work together on a daily basis.

Purpose To demonstrate the benefits of two healthcare professional groups contributing their specific knowledge and skills, exemplified by medical treatment related inquiries of a 4 month old infant with rickets.

Material and methods MedicinInfo received a question regarding dilution of ergocalficerol (vitamin D) injection 100 000 IE/mL for a 4 month old paediatric patient with normal kidney and liver function for the treatment of rickets. Oral administration was not an option in this case. In total, the patient is prescribed 3000 IE intramuscular ergocalciferol by the paediatrician. However, this was not possible unless the drug was diluted. Initially the pharmacist considered every opportunity for dilution of the drug, as well as possible alternative treatments. Then the clinical pharmacologist was consulted to assess which drug and route of administration would be the most appropriate.

Results Contribution from the pharmacist:

- ergocalciferol injection 100 000 IE/mL: administration intramuscular. Metabolised in the liver and kidney to calcitriol. Can only be diluted with medium chain triglyceride oil.
- alfacalcidol injection 2 µg/mL: administration intravenous. Metabolised in the liver to calcitriol. A disadvantage is that it contains propylene glycol which may cause side effects if elimination is reduced.
- calcitriol injection 1 µg/mL. Administration intravenous.

  Contribution from the clinical pharmacologist:

- intramuscular ergocalciferol is not recommended for a 4-month-old infant due to poor blood circulation in the muscle, as the drug is probably not absorbed and therefore has no

effect. Furthermore, the risk of developing muscle necrosis is high. Joint assessment: Decostriol or Etalpha would be preferable in this particular case, despite the fact that one must be careful not to overdose.

Conclusion The case illustrates that interdisciplinary collaboration between pharmacist and clinical pharmacologist increases the quality of answers to drug related inquiries from healthcare professionals, as both professions' professional competencies is utilised.

No conflict of interest

DI-042 TRAMETINIB SAFETY AND ACCEPTABILITY IN PAEDIATRIC ONCOLOGY PATIENTS: EXPERIENCE BASED ON A CASE SERIES

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Background The MAPK pathway is a signal transduction cascade involved in the uncontrolled proliferation of many human cancers. A number of studies have shown that this pathway is constitutively activated in a high proportion of paediatric low grade gliomas (LGGs). Trametinib is a selective inhibitor of the MAPK pathway enzymes MEK1 and MEK2 used for some adult cancers. Targeting the MAPK pathway with trametinib appears to have reduced tumour sizes in some cases of inoperable paediatric astrocytomas.

Purpose To describe our experience in terms of acceptability and safety on the use of an extemporaneous oral solution of trametinib in paediatric patients with inoperable LGGs and other solid tumours with activated MAPK pathway.

Material and methods Patients were enrolled in the trametinib compassionate use programme of Novartis. Trametinib powder for oral solution was provided by the laboratory. When reconstituted, every 1 mL contained 0.05 mg of trametinib (recommended dose: 0.025 mg/kg, maximum 1 mg). Adverse events (AEs) were collected from the patients' medical records. AEs were classified according to the Common Terminology Criteria for Adverse Events (CTCAE) (4.03 version) 2010 of the National Institutes of Health. Information about taste, palatability, suitability of the volume and issues on the preparation of the extemporaneous solution were obtained by interviewing the patient or the caregiver.

Results 10 patients (aged 3–21 years) were treated with a median follow-up of 11 weeks. AEs reported included: 9 skin disorders (dry skin, pruritus, acneiform dermatitis and rash), 4 gastrointestinal disorders (abdominal pain, diarrhoea and constipation), 4 epistaxis, 2 paronychia and 2 increased liver enzymes. All AEs were classified as grade 1 or 2 according to the CTCAE and responded to supportive treatment. 7 of 10 said the oral solution had good palatability. None experienced swallowing difficulties. There were no problems with dosing or preparation of the extemporaneous solution. (Interim results to August 2016.)

Conclusion Trametinib powder for oral solution was well tolerated and accepted. All AEs were mild and responded to treatment. No dose adjustment or interruption of treatment was required. Trametinib appears to have a good toxicity

profile. Safety and efficacy data from a larger population in a clinical trial is needed to confirm our results.

No conflict of interest

DI-043 AREAS OF STUDY OF CLINICAL TRIALS MANAGED IN A PHARMACY DEPARTMENT AND INVOLVEMENT OF THE CLINICAL PHARMACIST

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Background There is great diversity in cooperation of pharmacy departments depending on the clinical areas of study and the investigational product (IP). Identifying the most common diseases in which clinical trials (CT) are conducted could allow the pharmacist to improve their clinical skills and provide quality pharmaceutical care (PC).

Purpose To identify the main areas of study of CT managed in the pharmacy department (PD) of a tertiary hospital and to analyse the implication of pharmacists in the management of CT medication.

Material and methods A retrospective descriptive study of the activity of the CT unit was conducted. CT initiated between 1 January 2014 and 15 October 2015 were included. We collected pathologies under investigation, clinical units involved, implication of the pharmacist and PD regarding the management and traceability of CT medication (including receipt, storage, preparation and dispensing). Information was obtained from internal records of the CT unit (Gidec) and from source documents and documentation of each study.

Results 197 CT were initiated (98 in 2014/99 in 2015). The main pathologies studied were solid tumours 47.2% (lung cancer 12.7%, breast cancer 10.7%), haematological malignancies 16.8%, pneumopathies 5.1% (CODP/asthma/cystic fibrosis) and nephropathies 4.1%. Clinical units involved were: oncology 46.7%, haematology 16.8%, uro-nephrology 6.6%, neurology and pneumology 5.6%, internal medicine 5.1%, paediatrics 3.6%, cardiology, gastroenterology and infectious disease units 2.0% and others 4.0%. The total number of CT samples was 541 (median=2/CT, 0–15). The receipt of CT samples was performed through IWRS (Interactive Web Response System) in 59.2%, through email/fax to monitor in 24.5% and with both methods in 14.3%. 55.3% of trials had samples stored at room temperature (15–25°C), 23.9% refrigerated (2–8°C) and 18.2% both types of storage. For 5 CT, medication was supplied by the hospital. Preparing cytostatic drugs blends in the pharmacy was required for 36.5%. 3 CT involved other drug preparations in horizontal laminar flow hood. Non-cytostatic medication was dispensed directly to patients in the PC consultation in most cases. In 30.6%, we dispensed the medication to the investigator group, and 10.2% were dispensations block.

Conclusion Onco-haematological pathology is the more predominant area of research. PDs play a key role in the successful development of new CT and work closely on a wide variety of activities, highlighting the preparation of CT medication and the PC provided to patients included in CT.

No conflict of interest

DI-044 EFFECTIVENESS OF THE COMBINATION SOFOSBUVIR AND DACLATASVIR FOR THE TREATMENT OF HEPATITIS C VIRUS INFECTION

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Background New direct acting antivirals (DAAs) for chronic hepatitis C virus (HCV) infection achieve high rates of sustained virological response (SVR) which has changed the therapeutic strategy.

Purpose To assess the effectiveness of the combination sofosbuvir (SOF) and daclatasvir (DCV) in HCV patients.

Material and methods A retrospective observational study was conducted between September 2014 and September 2015. Inclusion criteria were: patients with HCV infection treated with SOF/DCV during the study period. Drug interactions with the usual patient medication were analysed through the Web (hep-druginteractions.org/interactions.aspx). Variables collected: demographics: age and sex. Clinical data: basal viral load (VL), SVR at week 12/24 (SVR12/24), defined as HCV RNA titres <15 IU/mL. METAVIR score: F0-F4. Liver transplant, HCV genotype (G), HIV coinfection, previous treatments for HCV and side effects. Data were collected from the medical records of patients.

Results 32 patients were included (43.75% women); mean age 57.9±7.8 years. According to METAVIR score: F4 (cirrhosis) (62.51%), F3 (15.62%), F2 (12.5%), F1 (3.12%) and F0 (6.25%). The HCV genotype was: 53.12% G1 and 46.88% G3. 3 patients (9.37%) were HIV coinfected; 28.12% had a liver transplant and 3.13% a kidney transplant; 43.75% (14/32) had failed prior treatment. 78.58% were treated with peginterferon/ribavirin (RBV) and 21.42% with RBV/peginterferon/protease inhibitor (IP). According to the basal VL, 46.87% had a VL >800 000 UI/mL. Patients with G1 (n=17): 6 patients were treated with SOF/DCV for 12 weeks and 11 patients with SOF/DCV for 24 weeks. 100% achieved SVR12 as in the AI444-040 study. Patients with G3 (n=15): 14 patients were treated for 12 weeks with SOF/DCV and 92.86% (n=13) achieved SVR12; 1 patient treated with SOF/DCV for 24 weeks achieved SVR24=100%. Our patients had rates of SVR12: naïve 100% (10/10) vs 90% (91/101) in the ALLY-3study; non-responders: SVR12: 80% (4/5) vs 86% (44/51) in the ALLY-3 study. The treatment was well tolerated. No drug interactions were found with the patients' usual medication.

Conclusion SVR12/24 rates achieved in our study confirmed the results obtained in the AI444-040 study in patients with G1: naïve and non-responders achieved SVR12 rates of 100%. However, we observed differences in response in patients with the G3 genotype compared with the ALLY-3 study. In our study, there was only 1 patient treated for 24 weeks, so it is not possible to draw reliable conclusions about SVR24 in patients with G3.

No conflict of interest

DI-045 ANALYSIS OF THE USE OF INTRAVENOUS INMUNOGLOBULINS

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Background The use of intravenous immunoglobulin (IVIg) may represent a therapeutic option with great economic impact in clinical situations where there might be other alternatives; it is therefore advisable to strictly follow the recommendations of available clinical guidelines.

Purpose To evaluate the use of IvIg and its adaptation to the licensed indications in a private hospital.

Material and methods A retrospective observational study was conducted from January 2014 to September 2016 of IvIg prescriptions. We reviewed medical records and analysed drug costs through the SAP management programme. To set the correct indication, product information from the AEMPS (Spanish Drugs Agency) website was revised and also the Immunoglobulin Clinical Guidelines for Use, 2nd Edition 2008, and 2nd Edition Update, 2011, from the British Department of Health. Statistical variables analysed were: prescribing service, indication, dose, age and drug cost.

Results During the study period, IVIg were used in 35 patients. Mean age was 44.3±29.47 years. Prescribing services were: neurology 48.6% of patients; haematology 20%; paediatrics 25.7%; and intensive care 5.7%. Among the indications that are approved in the technical specifications and/or recommended by the guidelines reviewed were: 25.7% of patients with Guillain–Barre syndrome, 14.3% Kawasaki disease, 8.57% secondary hypogammaglobulinaemia, 8.57% adult patients with idiopathic thrombocytopenic purpura (ITP), 5.7% children with ITP, 5.7% idiopathic demyelinating polyneuropathy chronic, 2.86% primary immunodeficiency patients, 2.86% myasthenia gravis and 2.86% multifocal motor polyneuropathy. Prescribing conditions based on weak evidence were, in most cases, rare diseases: 8.57% acute disseminated encephalomyelitis patients, 8.58% patients with other demyelinating diseases and 5.72% secondary thrombopenia. The prescribed doses were calculated based on the patient's weight and the associated costs were approximately € 177 814.

Conclusion Based on these results, IVIg have been prescribed in our hospital according to their license and/or recommended indications, except in some pathologies in which there are not enough evidence and where the prescribing doctor has studied each case and prioritised their use as the best care available. Although there are studies in which IVIg are prescribed on the ideal weight of patients as optimisation strategy and based on the drug pharmacokinetics, the latest edition of the British Guidelines shows that this recommendation has limited evidence.

No conflict of interest

DI-046 ANALYSIS OF TREATMENT DISCONTINUATION BY IATROGENESIS RELATED TO DOLUTEGRAVIR/ABACAVIR/LAMIVUDINE

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Background Dolutegravir/abacavir/lamivudine (Triumeq) is a new oral drug to treat human immunodeficiency virus (HIV) offering a single pill regimen. Treatment discontinuations due to adverse events occurred in our clinical experience raising concerns about drug safety.

Purpose To determine the proportion of patients who stopped Triumeq use due to adverse events (AEs) and to analyse its causality.

Material and methods This retrospective study included adult patients treated with Triumeq between June 2015 and June 2016. The following outcomes were collected: sex, age, HIV progression time, previous antiretroviral treatment, hepatitis C virus (HCV) or hepatitis B virus (HBV) coinfection, fibrosis stage, reasons for stopping treatment, risk factors, interventions required, results after stopping drug and length of treatment with Triumeq. Data were collected from clinical history and electronic prescribing software. The Karch–Lasagna algorithm was applied to evaluate AE causality.

Results 66 patients were treated with Triumeq during the study period. 12.1% of patients discontinued treatment due to AEs, representing 72.7% of the total suspensions (8/11). 75% were women and median age was 50 years. The median HIV progression time was 22.7 years and all had received previous HIV treatment. 7 patients were HCV coinfected (only one cirrhotic), and 1 had a liver transplant due to liver cancer related to HBV. AEs causing discontinuation of treatment were nausea and vomiting (3/8); daily headache (3/8); cutaneous reaction (3/8); muscle pain and sleepiness (2/8); disorientation and conduct disorder (1/8); and acute confusional syndrome (1/8). The last 2 cases occurred in patients with mental disorder secondary to illicit drug abuse and depression, respectively. Both required hospitalisation. AEs were resolved after changing antiretroviral treatment, although 3 cases required specific treatment and 1 biopsy of a cutaneous lesion was needed. Median length of treatment with Triumeq was 41 days. AEs were notified to the Pharmacovigilance Centre. The causal link between drug and the occurrence of adverse drug reaction was probable, according to the algorithm.

Conclusion More than 10% of patients suffered Triumeq related AEs which required discontinuation of treatment. Although all AEs were described in the Technical Data Sheet, serious psychiatric disorders occurred, recommending attention in patients with mental risk factors treated with Triumeq. Probable causal link strengths pharmaceutical collaboration, especially in medicines under additional monitoring.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

DI-047 | **IMPACT OF PILL BURDEN ON DURATION OF FIRSTLINE ANTIRETROVIRAL THERAPY IN REAL LIFE SETTING**

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Background The firstline antiretroviral treatment (ART) is often considered a long term therapy at treatment initiation. The complexity of ART could influence persistence, making it shorter.

Purpose To investigate the duration of firstline ART, the main reasons for switching the firstline ART and the association between daily antiretroviral pill burden and switching.

Material and methods This was a retrospective observational study. We included all naive adult HIV infected patients who started their firstline ART in a second level hospital from January 2012 to April 2015. Duration was the time from the start of the first ART until treatment modification for any reason or last follow-up visit. Demographics and pharmacotherapeutic data were collected from electronic medical and antiretroviral dispensing records and a specific database for HIV patients.

Results 42 patients started their first ART in this period, 86% men. Median age was 43 years (IQR 33–51). 14 patients (33%) started a once daily single tablet regimen (STR): Atripla in 9 patients (64%), Eviplera in 4 patients (29%) and Stribild in 1 patient. 28 patients started a triple tablet regimen (TTR): 22 (79%) had a protease inhibitor combined with two nucleoside reverse transcriptase inhibitors and 6 (21%) had raltegravir plus a tenofovir including backbone. 71% were maintained on STR, median duration 29 months (IQR 19–40), and 39% on TTR, median duration 32 months (IQR 20–43). Firstline ART was modified in 18 patients (43%). At the time of change all patients maintained virologic suppression. In the STR group, 3 patients (21%) switched to secondline ART. Changes were for safety reasons (2 patients) and due to difficulty in swallowing (1 patient). There were 15 patients (54%) who changed in the TTR group: 11 simplifications (73%), 3 toxicity preventions (20%) and 1 drug interaction. At the end of the follow-up period, 2 patients with TTR (1 transfer to another centre and 1 death) and 1 patient with STR (transfer to another centre) discontinued ART.

Conclusion TTR was preferred as firstline ART. Median duration of the different regimens was similar and independent of pill burden. More than half of the patients on TTR switched their first ART and the main reason for change was simplification.

No conflict of interest

DI-048 | **DEVELOPMENT AND VALIDATION OF A PHARMACIST TOOL KIT ON GLUCAGON USE**

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Background Lack of education and confidence on the appropriate use and administration of glucagon by non-trained carers can lead to medication errors and untreated hypoglycaemic episodes.

Purpose To validate the usefulness of a specifically developed educational tool kit intended for education of pharmacists on timely and appropriate use of glucagon.

Material and methods A Glucagon Tool Kit was created as part of continuous professional training intended for pharmacists. The Glucagon Tool Kit consisted of an online video, information sheet and informative chart. The video was available in both Maltese and English, lasted 1.5 min and explained how to reconstitute and administrate glucagon. The information sheet provided concise information on hypoglycaemia and briefly highlighted issues related to glucagon, such as storage, steps to reconstitute and dosage regimen. The informative chart depicted the reconstitution procedure with the help of images and short phrases. The Glucagon Tool Kit was validated by an expert panel and distributed to all pharmacists. A questionnaire was compiled to assess the knowledge and confidence of glucagon use by pharmacists. The questionnaire was run twice—namely prior to distribution of the Glucagon Tool Kit and again immediately after distribution of the kit.

Results 135 pharmacists completed the questionnaire of whom 44% were community pharmacists. The knowledge of pharmacists on the use of glucagon increased from 12.6% to 89.6% (paired sample t-test p<0.001) following the distribution of the educational Glucagon Tool Kit. The pharmacists' confidence on the use of glucagon increased from 11.1% to 76.3% (paired sample t-test p<0.001) following the use of the educational Glucagon Tool Kit. The majority of respondents (95%) found the video sufficiently concise, 91% thought that the Tool kit was very useful and 95% rated it as informative.

Conclusion The educational material had a significant impact on the knowledge and confidence the pharmacist had on the use and reconstitution of glucagon. Improving the knowledge and confidence of pharmacists on the appropriate use of glucagon will empower them to support patients and carers in the use of glucagon in emergencies.

No conflict of interest

DI-049 | **GOOD PRACTICE ON ANTIBIOTIC USE: TIGECYCLINE IN A MEDICAL INTENSIVE CARE UNIT**

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Background Tigecycline is an interesting therapeutic alternative in case of infections due to multidrug resistant bacteria and/or complex clinical situations. The Marketing Authorisation (MA) allows the use of tigecycline for skin and soft tissue infections and for complicated intra-abdominal infections. Its prescription must be rationalised in order to slow down the emergence of resistance. Therefore, our hospital has implemented an 'Antimicrobial Stewardship' (AS) programme since January 2015. It aims to organise the prescription of some precious antibiotics.

Purpose Our study aimed to judge the degree of conformity of tigecycline prescriptions with the MA criteria and to

evaluate the circumstances when this antibiotic was used before the implementation of the AS strategy.

Material and methods This was a 2 year retrospective study (from 1 January 2013 to 31 December 2014) carried out in the medical intensive care unit of our hospital. The only inclusion criterion was treatment with tigecycline during this period. There were no exclusion criteria. Data collection was performed using patients' medical files and prescriptions.

Results The total number of patients was 29. The majority were men (sex ratio (M/F)=2.22). Mean age was 52 years (range 22–82). 66% of prescriptions were outside the MA criteria and were mainly for septic shock and pneumonia (79% and 11% of total prescriptions, respectively). Tigecycline was prescribed as a firstline treatment in 15 cases (52%). High doses of this antibiotic (200 mg as a loading dose then 100 mg *2/day) were prescribed in 66% of cases. In 31% of patients, tigecycline was given for less than 72 hours and was replaced by another antibiotic based on culture and sensitivity results. 52% of infections were documented microbiologically, of which 40% were caused by *Acinetobacter baumanii*.

Conclusion Our results showed that tigecycline use was not appropriate in two-thirds of cases. This highlights the need to carry out more clinical trials to evaluate its effectiveness for new indications. Furthermore, usual dose of tigecycline was not respected in many cases and microbiological documentation was absent in half of the patients. Subsequent studies will show the impact of the AS strategy on antibiotic use and on the management of bacterial resistance in our institution.

No conflict of interest

DI-050 | **RELATIONSHIP BETWEEN CONSUMPTION OF PIPERACILLIN–TAZOBACTAM AND SUSCEPTIBILITY OF GRAM NEGATIVE MICROORGANISMS IN AN INTENSIVE CARE UNIT**

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Background Antimicrobial resistance is a growing problem worldwide. Excessive and inappropriate use of antibiotics constitutes an important risk factor in the development of bacterial resistance, so discriminating use of antimicrobial agents remains the key for minimising this problem.

Purpose To analyse the relationship between the evolution of consumption of piperacillin–tazobactam and the variation in susceptibility patterns of gram negative microorganisms and the number of isolates of pathogens with low prevalence, in the intensive care unit of a tertiary hospital.

Material and methods We calculated defined daily doses per 1000 patient days (DDD/1000 PD) of piperacillin–tazobactam for every year between 2011 and 2015, according to ATC/DDD-WHO Nordic Council methodology. Microbial susceptibility to this antibiotic was studied for *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and Enterobacter spp. We recorded the number isolates of extended spectrum beta lactamase (ESBL) producing both *E coli* and *K pneumoniae*, Enterobacter spp and Stenotrophomonas spp. Susceptibility was determined by Microscan automation system (Siemens Health Care Spain). These data were correlated with DDD/1000e of piperacillin–tazobactam through

the correlation coefficient r of Pearson (level of bilateral significance=0.05). Analysis of the results was performed using SPSS Statistics IBP-19 version.

Results DDD/1000 PD for piperacillin–tazobactam were 170.1/189.9/208.9/216.3/229.7 in 2011/2012/2013/2014/2015, respectively. Susceptibilities to piperacillin–tazobactam in these years were: 89.6%/82%/73%/81%/87% (for *E coli*); 75%/74%/83%/85%/77.8% (for *K pneumoniae*); 88.7%/70%/85%/75%/86% (for *P aeruginosa*) and 80%/78%/71%/74%/68.3% (for Enterobacter spp). The number of microorganisms of ESBL isolates were 24/52/38/29/20, the number of isolates of Stenotrophomonas spp 5/0/27/36/36 and Enterobacter spp 2/81/45/43/82 between 2011 and 2015. The correlation coefficients of the analysis were: r=−0.307 for *E coli* (p=0.616), r=0.804 for *K pneumoniae* (p=0.101), r=−0.043 for *P aeruginosa* (p=0.946); r=−0.932 for Enterobacter spp (p=0.021); r=−0.272 for ESBL microorganisms (p=0.658), r=0.895 for Stenotrophomonas spp (p=0.040) and r=0.618 for Enterobacter spp (p=0.267).

Conclusion The increased consumption of piperacillin–tazobactam was correlated with decreased susceptibility of Enterobacter spp to it and with a higher number of isolates of Stenotrophomonas spp. No influence on other microorganisms analysed was detected. This could be because of a delay in the impact of consumption on the ecological impact, which could be revised in subsequent studies.

REFERENCES AND/OR ACKNOWLEDGEMENTS

WHO Collaborating Centre for Drug Statistics Methodology. ATC-Index with DDDs.

No conflict of interest

DI-051 | **DEVELOPMENT OF LAY DESCRIPTIONS OF DIABETES RELATED COMPLICATIONS FOR PATIENT EDUCATION IN TAIWAN**

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Background Patient education is a key determinant of clinical outcomes in diabetes care. Concise and accurate descriptions of diabetes related complications that could be easily understood by patients are essential to successful patient education. Furthermore, descriptions could be used in utility/preference assessments to obtain important data for pharmacoeconomic research.

Purpose To develop descriptions of common diabetes related complications that patients with diabetes in Taiwan could understand and apply.

Material and methods This was a qualitative study that included interviews with diabetes health professionals and patient focus groups. 11 diabetes related complications were selected based on a literature review of recent pharmacoeconomic studies of oral diabetic agents. A description for each complication was drafted based on information collected from medical books, websites and literature searches. To then improve upon these descriptions, 2 physicians and 5 diabetes educators were interviewed individually. Each of the 7 health professionals had more than 12 years of experience in diabetes care. In addition, two focus group interviews involving a total of 8 patients with diabetes were conducted; each patient

had actually experienced at least 1 of the 11 complications examined.

Results Our initial descriptions consisted of information such as levels of mobility, pain, emotions, treatments needed and usual activities affected. Modifications were made after the interviews; for example, health professionals corrected the follow-up intervals from 6 months or annually to 3 months based on actual practice in Taiwan. In addition, it was found that diabetes educators provided more comments on emotional aspects (eg, fear and anxiety) of the complications whereas the physicians focused more on the symptoms and discomfort. During the focus group interviews, patients shared their personal experiences and helped identify difficult medical terms or statements that could be modified to make the descriptions more comprehensible to the general public. The final descriptions contained 4–8 sentences for each complication.

Conclusion In this study, we developed descriptions of 11 diabetes related complications by patient and health professional interviews. These descriptions could be useful for diabetes patient education and utility/preference measurement.

DI-052 **DEVELOPING AN INTERACTIVE TOOL TO EDUCATE PATIENTS ON GOOD MANAGEMENT OF DRUGS**

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Background Involving the patient in his drug therapy is essential and contributes to improving his empowerment. Currently, there are few reliable educational tools addressing general information on the good management of drugs by patients.

Purpose To develop and evaluate an interactive educational tool focusing on general information on drugs specifically for patients.

Material and methods
- Organisation of focus groups with patients and healthcare professionals to identify patient's needs regarding general information on drugs. Organisation of two sessions of 2 hours for each category of participants.
- Creation of the interactive educational tool into an e-Learning format (Software Articulate Storyline 1).
- Evaluation of the impact of the e-Learning on participants' knowledge (globally and divided into three age categories: 18–30; 31–65; >65 years) by comparing the number of good answers and the degree of certitude (scale 1 to 5) for each answer to multiple choice questions before and after e-Learning completion.
- Satisfaction evaluation through a standardised questionnaire.

Results
- Identification and selection of four topics to integrate into the e-Learning: patient treatment card, travelling with

medication, conservation and storage of drugs, and sources of information.
- 77 participants were enrolled. After e-Learning, the global percentage of good answers improved significantly: 53.7% before (pre-test) and 74.4% after e-Learning (post-test) (p<0.001). The degree of certitude improved significantly: 3.84 at the pre-test and 4.75 at the post-test (p<0.001).
- All participants (99.9%) were satisfied or very satisfied with this educational tool. 89.6% found the difficulty level of the course in accordance with their knowledge.
- The category of age had no significant impact on the improvement of knowledge or on satisfaction.

Conclusion This study allowed us to develop and evaluate a reliable interactive tool on general drug information for patients. The e-Learning improved significantly the knowledge and degree of certitude of participants. The vast majority were satisfied with this tool. In the future, it would be interesting to develop additional topics and to allow healthcare professionals to use this e-Learning to educate their patients.

No conflict of interest

DI-053 **ADHERENCE TO IMMUNOMODULATORY DRUGS IN PATIENTS WITH MULTIPLE MYELOMA**

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Background Thalidomide, lenalidomide and pomalidomide belong to the immunomodulatory drug family (IMIDs). Data on IMID adherence are lacking.

Purpose The purpose of the study was to evaluate adherence to IMIDs in patients with multiple myeloma.

Material and methods All patients managed in our teaching hospital for a multiple myeloma who had at least two successive dispensations of IMIDs were included in a prospective study between 1 March 2016 and 15 May 2016. We used a cancer specific questionnaire to measure patient adherence to IMIDs[1] (10 questions; 10 points). Non-adherence was defined as a score <8 points. The medication possession ratio (MPR) was also calculated to evaluate IMID adherence: MPR=number of days of medication supplied within the refill interval/number of days in refill interval. The threshold of 90% was used to define two patient categories: MPR < 90%, non-adherent patients; MPR ≥90% adherent patients.[1] Clinical and dispensation data were obtained from medical and pharmaceutical software in our hospital.

Results 63 adult patients were included. Mean patient age was 68.2±10.4 years; 67% were men. Patients received lenalidomide (54%), pomalidomide (25%) or thalidomide (21%). Median time since diagnosis was 2.8 years (range 0.2–17.1). More than half of the patients used tools to help them with their medication. The mean questionnaire score was 8.2±1.2 (range 4–10). Mean time to fulfil the questionnaire was 9.2 ±4.7 min. 41% of the patients had ever taken their medicine too late in comparison with usual time. 57% of patients thought they took too many medicines. 43% of patients did not know the name of their medicines. We observed a mean MPR of 0.95±0.10 (range 0.67–1.20). A total of 76% of

patients were considered as adherent using the questionnaire and 72% using the MPR.

Conclusion Adherence to IMIDs was not optimal in our population. The use of adherence questionnaire and/or MPR may help the pharmacist to detect non-adherent patients. In these patients, pharmaceutical interventions may be of major interest.

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No conflict of interest

ARE PATIENTS ADHERENT TO THALIDOMIDE?

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Background Thalidomide, a potent member of the immunomodulatory drug family, induces both direct myeloma cell death and indirect antimyeloma response through its impact on the microenvironment. The drug is approved in multiple myeloma, and also in other rare diseases, such as severe recurrent aphthous stomatitis. Thalidomide is considered an effective drug in all of its indications; it is also an expensive drug. In an area of limited resources, studies for assessing thalidomide adherence are needed for healthcare professionals and payers alike.

Purpose The purpose of the study was to evaluate adherence to thalidomide.

Material and methods Patients who had at least two successive dispensations of thalidomide, whatever the indication, between 12 July 2015 and 12 July 2016 in our teaching hospital were included in a retrospective study. The medication possession ratio (MPR) was used to evaluate thalidomide adherence. MPR was calculated according to the following formula: MPR=number of days of medication supplied within the refill interval/number of days in refill interval.[1] Clinical and dispensation data were obtained from medical and pharmaceutical software in our hospital. Based on the literature, the threshold of 90% was used to define two patient categories: MPR <90%, non-adherent patients; MPR ≥90%, adherent patients.

Results 51 adult patients were included: 40 with multiple myeloma (78%), 6 with cutaneous lupus erythematosus/Jessner–Kanof disease, 4 with serious aphthous/Behcet's disease and 1 with Miescher's granuloma. Mean patient age was 63.7 ±13.9 years; 51% were women. We observed a mean MPR of 0.90±0.16 (range 0.37–1.20). The mean MPR was 0.94 ±0.13 (range 0.61–1.20) in patients with multiple myeloma and 0.77±0.21 (range 0.37–0.99) in patients with other diseases. A total of 61% of patients were considered as adherents. The percentage of adherent patients was significantly higher in patients with multiple myeloma than in patients with other diseases (70% vs 27%, respectively; p=0.015).

Conclusion Data are lacking concerning thalidomide adherence. Optimising thalidomide adherence may increase the efficacy of thalidomide based regimens. Considering the high cost of thalidomide, efforts to increase thalidomide adherence may also reduce wasted money in dispensing pills that are not taken by patients.

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No conflict of interest

OPTIMISING INFORMATION ON MEDICATIONS BY TAKING ACCOUNT OF PATIENTS' EXPECTATIONS

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Background According to regulations, any patient taking medication should receive information from healthcare professionals. In this sense, we would like to propose pharmaceutical consultations to inpatients. The quality and relevance of the information are important. Patients' needs are also important in providing information.

Purpose To explore patients' expectations regarding the way of giving and transmitting medication information in order to optimise pharmaceutical consultation.

Material and methods Over 2 month, a self-administered questionnaire was given to rheumatology inpatients. It was divided into 3 parts: demographic data (6 items); information about medications already received (5 questions); and type of intervention desired (7 questions). Results are expressed in percentage of patients responding to each question.

Results 129 patients participated (M/F=48/81, mean age=55.3 years, mean number of chronic medications=6.8). 73.2% had already received information from a physician (51.9%), a pharmacist (25.0%; ratio community/hospital=2.46) and/or a nurse (18.9%), mainly during physician consultation (45.0%), hospitalisation (66.7%) or drug delivery (33.3%). Information was accompanied by written documentation in only 37.6% of cases. 62.3% of patients had searched for information on the website. 91.9% said they would like to receive targeted information, primarily on side effects and their management (74.6%), efficacy and toxicity monitoring (63.2%), drug interactions (58.8%), lifestyle and dietary advice (43.0%), and therapeutic regimen (28.9%). They expected that information to be disclosed individually (79.5%), collectively (5.4%), or both (11.6%), by a physician (71.1%), a pharmacist (66.7%) and/or a nurse (34.2%). 11.7% thought that oral information was sufficient; patients would also like to receive a written document (51.4%), a digital format (26.1%) or association of all three (10.8%).

Conclusion This study will allow us to propose a pharmaceutical consultation with effective tools suited to patients' expectations. Patients undoubtedly benefit from reliable information. It seems appropriate to develop individual interviews in which oral information would be supplemented by written documents or digital formats. Clinical pharmacists seem to be the relevant interlocutors for patients. They should play a leading role in improving patient knowledge on medication.

No conflict of interest

PHARMACEUTICAL INTERVENTION ASSESSMENTS TO IMPROVE PATIENT QUALITY OF CARE

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Background Pharmaceutical interventions (PIs) ensure proper drug prescription and the effectiveness and safety of any treatment.

Purpose To assess and describe PIs made on medical prescriptions and the acceptance rate by clinicians.

Material and methods A retrospective observational study of PIs was conducted between September 2015 and September 2016 in hospitalised patients of a 300 bed hospital. Intensive care unit and paediatric, resuscitation and emergency services were not included in the study. Number of PIs, drug treatment group and clinical service involved, and type of PI were collected, as well as the acceptance rate by clinicians. Data were obtained from the pharmaceutical managing programme, Farmatools.

Results 1134 PIs were reported, the main clinical services were: internal medicine (22.8%), traumatology (15.5%), psychiatry (9.6%), surgery (8.6%) and neurology (7.6%). The main drug treatment groups involved were: B04 hypolipemiants (14.5%), M01 anti-inflammatory/antirheumatic (6.7%), A02 antacids/anti-ulcers (6.1%) y N05 psycholeptics (6.0%) and y J01 systemic antibiotics (5.2%). IP types: 57.1% appropriate prescribing (subtypes: 25.9% associated text transcription and 24.1% improper drug selection), 25.3% medication error (subtypes: 26.8% stopping the drug, 18.5% change of proposed drug and 17.1% drug substitution), 11.6% change to a drug included in the hospital pharmacotherapeutic guide and 3.8% medication reconciliation. The acceptance ratio by clinicians was 98%. Not all IPs were communicated to prescribers as some were considered to be of direct acceptance.

Conclusion PIs contribute to improved safety and effectiveness of prescriptions, minimising the risk to the patient and increasing the quality of care. The percentage of rejected interventions was very low. The pharmacist plays an essential role in ensuring the quality of pharmacotherapy.

No conflict of interest

PATIENTS WITH CHRONIC INFLAMMATORY RHEUMATISM: EVALUATION OF THEIR KNOWLEDGE ON DISEASE MODIFYING ANTIRHEUMATIC DRUGS

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Background In chronic inflammatory rheumatism (CIR), preventing joint damage and function loss is based on regularly taking medication. Patients' involvements in their therapeutic management is essential and can be improved by information provided during pharmaceutical consultations.

Purpose To evaluate patients' knowledge of synthetic conventional and biologic disease modifying antirheumatic drugs (DMARDs) and to assess patients' satisfaction with the pharmaceutical consultation.

Material and methods A 3 month prospective study was carried out. Inclusion criteria: patients >18 years of age, diagnosed with CIR, attending rheumatology day hospitalisation, treated by biologic DMARDs and methotrexate (MTX). Two questionnaires were used to evaluate patients' knowledge: biologic DMARD (10 questions) and MTX (20 questions). Patient satisfaction was assessed using a self-administered questionnaire (7 questions).

Results 40 patients were included (M/F=14/26; mean age=51.6 years, treated by biotherapy for 4.7 years and MTX for 6.8 years). 80.0% received infliximab, 12.5% tocilizumab and 7.5% abatacept. Average per cent of correct answers related to biologic DMARD was 53.5%±28.5%. The necessity of blood test monitoring (80.0%), treatment goal (67.5%) and recommended vaccines (65.0%) were the best known items. Conversely, vaccine contraindications (35.0%), regular consultation with physician specialists (40.8%) and strategy in case of surgery or tooth extraction (50.0%) were lesser known items and patients required information supplements. Regarding MTX (77.5% oral form and 22.5% subcutaneously), percentage of correct answers was 39.5%±17.6%. The best known items were: storage rules (93.5%), non-concomitant administration of folic acid and MTX (85.0%) and necessity of blood test monitoring (60.0%). The lesser known items were: reason for use of folic acid (10.0%), management of side effects (16.7%) and side effects (19.2%). 100% of patients were 'very satisfied' or 'satisfied' by drug information provided during pharmaceutical consultations and. 97.0% thought they had gained knowledge. Finally, all thought that pharmaceutical consultations should be generalised.

Conclusion Our study design allowed us to evaluate patients' knowledge about their treatments, to identify areas for improvement and to issue individualised information. Thus pharmacists should particularly insist on the lesser known items. In order to generalise these pharmaceutical consultations and confirm their relevance, the impact of this intervention on improving patient knowledge will be assessed.

No conflict of interest

RISK OF DRUG–DRUG INTERACTIONS IN A PULMONARY ARTERIAL HYPERTENSION POPULATION

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Background Recent progress in pulmonary arterial hypertension (PAH) research has made possible the expansion of treatment options improving the prognosis of patients. Due to multimorbidity and increasing age, patients are much more likely to be exposed to polypharmacy. As a result, there is an increased risk of drug–drug interactions affecting efficacy as well as the toxicity of the treatment. In 2012, the pulmonary hypertension unit of our hospital was designated as a reference unit by regional health authorities.

Purpose To identify potential drug–drug interactions (PDDIs) between oral drugs (OD) for PAH and medications used to treat concomitant illnesses.

Material and methods A cross sectional study was conducted in April 2016 in a tertiary hospital. All outpatients on OD

for PAH with their chronic medication recorded in the regional electronic database were included. We collected demographic data, concomitant pharmacotherapy and PAH treatment. PDDIs were identified using the local Guide of Interactions in Pulmonary Hypertension.

Results 174 patients (224 OD) were included: 63.8% women, mean age 59 years (range 18–91). Most of the OD prescribed were bosentan and sildenafil (both 29%) followed by tadalafil (15.2%), ambrisentan (13.8%), riociguat (8.5%) and macitentan (4.5%). Approximately 30% of the patients received combined oral therapy. Median number of drugs per patient was 9 (range 2–19) and 83.9% were polymedicated ($\geq$ 5 drugs). We identified a total of 237 PDDIs (67% of patients had at least one and over 30% more than two): 83% were moderate and 16% contraindicated according to their possible clinical relevance; 62% were pharmacokinetic and 38% pharmacodynamic; 70% affected the co-medication, 27% the OD and 3% both; 68% resulted in an increase in toxicity, 29% in decreased of efficacy and 3% both. The main contraindicated PDDIs were: beta-blockers with bosentan (n=10) and sildenafil (n=8), and bosentan with immunosuppressants (n=7). Polymedicated patients were more likely to have PDDIs (p<0.05).

Conclusion PDDIs represent a significant issue among patients with PAH. Evaluation of these PDDIs could result in the establishment of a better treatment plan for these patients. However, more prospective studies are required to investigate the clinical relevance of PDDIs and their influence on therapeutic outcomes.

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No conflict of interest

DI-059   WITHDRAWN

DI-060   **WRITTEN PATIENT INFORMATION: ANALYSING ITS QUALITY**

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Background Health systems promote patient involvement in healthcare decisions. In order to achieve this, patients need information and often this is supplied as written material so that the readability of the text becomes a quality indicator.

Purpose To analyse the readability of patient information regarding hospital treatment provided by the pharmacy department, and to ensure that information is suitable for patients, regardless of their sociocultural level.

Material and methods All patient information sheets designed by the pharmacy service in 2015 to onco-haematological treatments (oral) were analysed and compared against the same number of oncological information sheets designed by the oncological group of the Spanish Society of Hospital Pharmacy (GEDEFO). Regarding analysis of readability, two 'readability indexes' validated for the Spanish language were used. The first one was the Fernández-Huerta index, with the formula: 206.84 – [(60 x (syllables/words)) + (1.02 x (words/phrases))]. The second index was the Flesch-Szigriszt, with the formula: 206.835 – [(62.3 x (syllables/words)) + (words/phrases))]. Regarding interpretation of the results, values below 60 were considered as unfit for sanitary material in the Fernández-Huerta index compared with values below 55 for the Flesch-Szigriszt index.

Results A total of 11 onco-haematological treatment information sheets were included and compared with 11 sheets of GEDEFO.

	Fernandez-Huerta	Flesch-Szigriszt		Fernandez-Huerta	Flesch-Szigriszt
Pharmacy service			GEDEFO		
Abiraterona	54.45	49.13	Capecitbina	75	70.1
Afatinib	59.5	55.15	Etoposido	67.87	62.72
Axitinib	60.32	57.59	Gefitinib	68.6	63.5
Bexaroteno	57.19	52	Imatinib	67.2	62.13
Crizotinib	60.21	55.04	Lapatinib	69.77	64.7
Dabrafenib	54.88	49.49	Lenalidomida	72.15	67.16
Enzalutamida	58.54	53.28	Nilotinib	74.07	69.17
Ibrutinib	60.58	55.38	Sorafenib	73.51	68.56
Pazopanib	61.28	56.13	Sunitinib	71.94	66.96
Regorafenib	61.45	56.36	Temozolamida	73.61	68.68
Vandetanib	58.08	52.88	Vinorelbina	70.9	65.87

For the pharmacy service, 6 of the 11 drug information sheets (55%) did not provide adequate information for patients, while for GEDEFO all of them provided adequate information.

Conclusion More than half of the information sheets did not have an adequate readability index. This will lead to a process of improvement in the performance of patient information sheets, to achieve adequate readability for patient focused medical supplies.

No conflict of interest

DI-061 | **CANCER ASSOCIATED THROMBOSIS: EVALUATION OF AN ANTICOAGULATION THERAPY APPROACH IN A MEDICAL ONCOLOGY SERVICE**

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Background Venous thromboembolism (VTE) is a frequent complication and leading cause of death in patients with cancer. The question of the optimal anticoagulation therapy for cancer patients suffering from VTE is an ongoing area of research and debate.

Purpose The aim of our study was to evaluate anticoagulation therapy in cancer associated thrombosis patients with reference to current guidelines in the field.

Material and methods We conducted a descriptive study including cancer patients who developed venous thrombosis between January 2015 and September 2016. Data collection was achieved using patients' medical files. Current international guidelines in the field, such as recommendations of the 'Groupe Francophone Thrombose et Cancer' were consulted and compared with our service approach.

Results In total, 25 patients were included. The majority were men (sex ratio (M/F)=1.27). Median age was 59 years (range 21–80). 19 cases of deep venous thrombosis, 4 of pulmonary embolisms and 3 of catheter associated thrombosis were diagnosed. As an initial treatment (first 5–10 days) of established VTE, 23 patients were treated with low molecular weight heparin (LMWH). Tinzaparin was prescribed in 22 cases. 2 patients received vitamin K antagonists (VKA). One of these 2 patients did not reach the target international normalised ratio

(INR) range. Therefore, LMWH was substituted for VKA. For early maintenance and long term treatment, LMWH was used in 23 patients. The 2 other patients suffered from heparin induced thrombocytopenia during the initial treatment. As a result, LMWH was replaced by VKA. Duration of anticoagulation therapy varied from 2 to 18 months. 6 patients had complications of their VTE during treatment: 3 cases of VTE extension, 2 relapses and 1 case of pulmonary embolism.

Conclusion According to our results, the therapeutic management of VTE in our service is globally comparable with current international recommendations. The optimal duration of treatment remains unclear. In our study, termination or continuation of anticoagulation was based on individual evaluation of the benefit–risk ratio, tolerability, patients' preferences and cancer activity.

No conflict of interest

DI-062 | **NEW DIRECT ACTING ANTIVIRAL BASED THERAPIES IN HIV/HCV COINFECTED PATIENTS: MANAGEMENT AND EFFECTIVENESS IN A STUDY POPULATION**

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Background Treatment of HIV/HCV coinfected patients requires attention to the complex drug interactions that can occur between new direct acting antivirals (DAAs) and antiretroviral drugs (ARVs).

Purpose To assess the effectiveness of new DAAs in a HIV-HCV coinfected population, and tTo review ARVs switches to allow compatibility of DAAs.

Material and methods This was an observational retrospective study. HIV/HCV coinfected patients treated with ledipasvir/sofosbuvir (LDV/SOF), ritonavir boosted paritaprevir/ombitasvir, dasabuvir (3D) or daclatasvir+sofosbuvir (DCV+SOF) were included from 1 April 2015 to 30 June 2016. Effectiveness was measured as rate of sustained viral response at 12 weeks after the end of therapy (SVR12). Collected data: age, gender, genotype, grade of fibrosis (METAVIR score), presence of cirrhosis, HCV RNA baseline and HCV treatment history.

Results A total of 71 subjects were studied, 79% (n=56) were men. Median age was 50 years (34–64). HCV genotypes (GT): GT1a (n=35), GT1b (n=16), GT3 (n=12) and GT4 (n=8). DAAs: 53 patients were treated with LDV/SOF (±RBV), 10 with DCV+SOF (±RBV) and 8 with 3D (±RBV). Fibrosis stage was F3–F4 in 58 (82%) patients and 43 (66%) had cirrhosis. Ribavirin was used in combination with DAAs in 32% of subjects; 51% (n=36) were naive, 48% had been previously treated with interferon+RBV and 1 patient with triple therapy. Mean HCV RNA baseline was 2.505.210 UI/mL. Overall, 66 patients (93%) achieved SVR12: including rates of 90% (GT1), 100% (GT3) and 100% (GT4). 5 patients did not achieve SVR12: adverse event (n=1), death (n=2) and relapse (n=2). In 9 (13%) patients at least one antiretroviral drug was switched and in all cases to an integrase inhibitor based regimen. Some interactions were found: tenofovir (with ritonavir boosted or efavirenz containing regimen) when given LDV/SOF (n=5), ritonavir boosted protease inhibitors with 3D or DCV (n=3) and etravirine with DCV (n=1). In 1 patient, the daily dose of DCV was reduced to half (30 mg/day).

Conclusion Effectiveness outcomes in the clinical setting were similar to clinical trials. New DAAs require few changes in antiretroviral therapy. LDV/SOF may be used with most ARVs, but renal function monitoring is required with tenofovir. The inhibitors of integrase might be a therapeutic of choice for the HIV/HCV coinfected population.

No conflict of interest

DI-063 | **EVOLUTION OF CONSUMPTION OF THREE ANTIBIOTICS CLASSES AND OF THE RESISTANCE OF KLEBSIELLA PNEUMONIAE TO THESE CLASSES**

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Background Bacterial resistance to antibiotics is one of the major challenges for hospitals worldwide. *Klebsiella pneumoniae* is a gram negative bacilli (GNB) which changed its sensitivity to different antibiotic classes remarkably in the past decades.

Purpose Our aim was to study the evolution of the consumption of three classes of antibiotics which are most prescribed in the treatment of infections with *K pneumoniae*: penicillins (amoxicillin/clavulanic acid), cephalosporins (ceftriaxone and ceftazimide) and quinolones (ciprofloxacin). In addition, we aimed to investigate the evolution of resistance to *K pneumoniae* of these three classes.

Material and methods We studied consumption of the three antibiotics classes over time using daily defined dose (DDD) per 1000 hospitalisation days (HD) between 2006 and 2015. Also, we followed *K pneumoniae* resistance to these three classes between 2009 and 2015 using the WHONET 5.3 (percentage of number of resistant strains with respect to all strains collected).

Results 1549 *K pneumoniae* strains were collected (25% of GNB). Consumption of the three antibiotic classes and *K pneumoniae* resistance to these molecules are described in the table.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Resistance to penicillins				58%	63%	70%	72%	64%	74%	61%
Resistance to cephalosporins				35%	47%	48%	44%	43%	47%	39%
Resistance to fluoroquinolones				31%	50%	41%	50%	35%	45%	35%
Penicillins consumption	415	440	404	401	334	338	358	338	389	384
Cephalosporin consumption	59	93	110	108	102	96	105	110	135	141
Fluoroquinolone consumption	130	124	143	196	162	167	153	177	179	201

Conclusion Resistance to *K pneumoniae* of the three antibiotic classes has increased over the years. One of the limits of our work that we did not study resistance to carbapenems. The increasing resistance of *K pneumoniae* to these classes has pushed consumption towards other classes, such as carbapenems (8 to 22 DDD/1000 HD between 2006 and 2015) and polymyxins. In 2015, the percentage resistance decreased as a result of the overall decrease in hospital acquired strains of *K pneumoniae* and implementation of a programme to control the manual transmission of bacterial strains in hospitals.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

DI-064 | **EVALUATION OF TAS-102 AS AN EXPANDED ACCESS IN REFRACTORY COLORECTAL CANCER**

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Background TAS-102 is an oral agent that combines trifluridine and tipiracil hydrochloride. Trifluridine is the active cytotoxic component with antitumour effects and tipiracil is an inhibitor that prevents the rapid degradation of trifluridine. The FDA authorised this drug in September 2015 for the treatment of patients diagnosed with colorectal cancer refractory to one or two previous chemotherapy regimens that contained fluoropyrimidine, platinum agents and taxanes or irinotecan, inhibitors of vascular endothelial growth factor and inhibitors of epidermal growth factor receptor in the case of wild RAS.

Purpose To evaluate the effectiveness and tolerability of TAS-102, based on overall survival (OS) and progression free survival (PFS) in the treatment of refractory colorectal cancer.

Material and methods A retrospective study was conducted including patients diagnosed with advanced colorectal cancer authorised to receive TAS-102. The request forms were applied and evaluated between March and July 2016 by an expanded access to the drug, and the patients were followed until 15 October. Clinical data were obtained from the electronic history CernerMillenium and the variables were: age, gender, progression date, death date and adverse effects.

Results Treatment was requested for 32 patients; 30 were authorised to receive TAS-102. Of them, only 24 patients started treatment. 5 patients did not start treatment due to worsening of disease during the process of authorisation, and another 1 because of supply problems.

There were 15 men and 9 women, and median age was 66.3 years. Most patients progressed, and only 6 continued receiving TAS-102. Median PFS was 2.25 months (range 0.47–6.47). During treatment, 6 patients died. Median OS was 3.27 months (range 0.70–6.47). The toxicity profile showed haematologic effects such as: neutropenia (70.3%), anaemia (50%), leukopenia (37.5%) and thrombopenia (25%). Other adverse effects were less frequent: diarrhoea (8.3%), asthenia (8.3%), vomiting (8.3%) and neuropathy (4.2%).

Conclusion Although treatments were approved and received for all patients, 20% never started TAS-102. OS was lower

than in the pivotal study because the study was not long enough to achieve better results. On the other hand, PFS was higher than in the pivotal study which was 2.0 months. Adverse effects confirmed haematologic toxicity.

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No conflict of interest

DI-065 | WHAT ARE THE OPINIONS OF THE PUBLIC IN WALES ON HOSPITAL PHARMACISTS HAVING ACCESS TO THEIR HOSPITAL DISCHARGE ADVICE LETTERS?

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Background The involvement of a multidisciplinary team in the management of a patient's transfer from hospital to hospital has been shown to improve patient outcomes and reduce readmissions. Hospital pharmacy discharge medicines review aims to improve patient compliance and comprehension. NHS Wales Informatics Service (NWIS) are considering whether hospital pharmacists should be sent a copy of the discharge advice letter (DAL).
Purpose The study aimed to evaluate and quantify the views of the public on hospital pharmacist's access to the patients' DAL.
Material and methods A pre-piloted questionnaire was sent to a total of 4000 participants across the whole of Wales. The participants' agreement was sought using a Likert scale, to share information related to hospital admission details, hospital discharge details, clinical information, medication information and recommendations. Sampling clusters were identified based on population size, and then categories were purposively assigned to local authorities to obtain a representative sample of the whole of Wales. Random sampling using Excel was used to select participants from the edited electoral roll. Quantitative data were analysed by SPSS 20 and qualitative free text comments were analysed via inductive thematic analysis.
Results 12.5% questionnaires were returned. The majority of respondents either agreed or strongly agreed to all types of hospital discharge information being shared with the hospital pharmacist to increase patient safety; 30% preferred this information to be shared electronically. Almost half of the public (49.7%) felt that consent should explicitly be provided for every hospital discharge. Five broad themes were identified, each containing a number of sub-themes. These included personal details, relationship with hospital pharmacy, sharing information with a hospital pharmacy, patient consent and opinions of hospital pharmacists having access to hospital discharge information. The study revealed a low usage of pharmacy services and further education about the role of the pharmacist should help to integrate the services with that of other health professionals.
Conclusion The results will be fed back to NWIS for review in the hope hospital pharmacists will gain access to DALs

which would be expected to improve patient care and potentially save costs.

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No conflict of interest

DI-066 | HERBAL MEDICINES IN CHILDREN: BETWEEN ADVICE GIVING AND SELF-MEDICATION

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Background Herbal medicines (HM) are those with active ingredients made from plant parts, such as leaves, roots or flowers. However, being 'natural' does not necessarily mean they are safe to take.[1] Taking HMs may not be suitable for children: as for all medicines. The NHS recommends that parents ask a paediatrician or pharmacist before giving a HM to their children.[1]
Purpose To investigate HM use in the paediatric population (0–18 years).
Material and methods We conducted a prospective study, using a questionnaire delivered to parents waiting in a paediatric practice office. Questions concerned: most used HMs, general opinion about HMs and practical experience (as to their efficacy and side effects).
Results 92 questionnaires have been collected to date. 90.2% of those interviewed were mothers. 78.3% affirmed the use of HMs for their children. HMs were mostly used for cough and cold syndromes. 76.9% of mothers bought HMs less than 5 times a year. HMs were mostly suggested by the paediatrician (49.2%) or pharmacist (47.7%), and less frequently by the seller in the herbalist's shop (10.8%) or by the natural health practitioner (6.2%). 63.6% considered HMs use as an alternative medicine, 50.6% as effective as conventional medicine and 44.4% affirmed that the efficacy HMs depends on the product. 83.8% considered HMs less dangerous than conventional drugs. 84% of parents said that children did not develop side effects after HM administration. The majority of parents reported HM use to the doctor in the case of drug prescription (45.1%); 68.4% were aware of interactions of HMs with other substances.
Conclusion Even if this subject is relevant and our data show that HMs are frequently used in children, overall information are lacking in the literature. Hence one of our purposes would be to implement our study, extending it to a more widespread population.

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No conflict of interest

DI-067 | RETROSPECTIVE STUDY OF ALFUZOSIN 10 MG PRESCRIPTIONS

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Background Alfuzosin is indicated for the treatment of the symptoms of benign prostatic hyperplasia (BPH) and as adjunctive therapy with ureteral catheterisation for acute urinary retention related to BPH. The alpha blocking properties on the urinary tract are used for various indications not mentioned in the marketing authorisation (MA) for men and women.

Purpose We carried out a retrospective study on alfuzosin 10 mg prescriptions over 1 year, in order to: identify the different off-label indications; quantify the proportion of off-label prescriptions; and determine if good prescribing practices are observed.

Material and methods We analysed 420 computerised prescriptions (software: Pharma) of medicine, geriatric and surgery units, via Excel. Analysed data included: unit; patient's age—indication for alfuzosin; time of drug intake; renal and hepatic functions; and drug interactions.

Results Our study showed 43% off-label prescriptions, including 17% concerning women. Various off-label indications were:

- 32% of acute urinary retention related to kidney stone, obstructive pyelonephritis, prostatitis, hypoactive bladder due to the use of a neuroleptic, etc.
- 6% of mictional disorders caused by prostate cancer—5% of mictional disorders caused by neurogenic bladder in connexion with stroke, Parkinson's disease, multiple sclerosis, etc.

More than 85% of prescriptions mentioned evening administration, including 100% in the geriatric service where a pharmacist works. 64% of prescriptions were affected by drug interactions (mostly antihypertensive drugs: amlodipine, bisoprolol, urapidil, and also levodopa, phenothiazine and tricyclic antidepressants). Among these, 85% concerned elderly people. In association with alfuzosin, the risk of severe orthostatic hypotension increased and therefore the risk of falling and rehospitalisation. 33 patients suffered from severe renal insufficiency and there were no cases of severe hepatic insufficiency which are considered contraindications according to the summary of characteristics product.

Conclusion Our study revealed various off-label indications, all developed in several scientific papers, and underlined the issue of medicine related illness among the elderly. The improvement process of medicinal treatment has led us to write a summary (for medical and pharmacy interns) of the indications mentioned in the MA and the recommendations linked to the prescription. Another analysis will be done in 1 year.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Summary of Characteristics Product: Alfuzosin 10 mg prolonged release tablets.

No conflict of interest

DI-068 | GENDER DIFFERENCE IN ADVERSE DRUG REACTIONS: ANALYSIS IN ITALIAN POPULATION

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Background Adverse drug reactions (ADRs) are a major burden in healthcare. The scientific literature indicates that women tend to have a higher risk of ADRs than men due to differences in pharmacokinetics, pharmacodynamics and drug use.

Purpose The aim of this study was to investigate the gender related differences in ADRs between the sexes in an Italian populations during a 15 year period of observation.

Material and methods Data were obtained from the Italian National Network of Pharmacovigilance and we focused our attention on ADRs in the period between 2001 and 2016. We identified the ATC (Anatomic, Therapeutic, Chemical Classification) most reported ADRs, seriousness of ADRs and sex.

Results During the observation period, we collected 341 599 ADRs: woman had a higher risk of ADRs, especially after the first 2 years (55.4%). Severe ADRs were more frequent in women than in men (54% versus 46%). In contrast, the frequency of death was higher in men than in women (54% versus 46%). Major toxicity was reported for this ATC: H03AA, thyroid hormones, women 80%-men 20%; J01CA, broad-spectrum penicillins, women 57%-men 43%; J01CR associations of penicillins, including beta-lactamase inhibitors, women 57%-men 43%; J05AE, protease inhibitors, women 26%-men 74%; J05AF reverse transcriptase inhibitors nucleoside, women 33%-men 67%; J07BB, flu vaccines, women 59%-men 41%; M01AB anti-inflammatory and antirheumatic drugs acetic acid derivatives and related substances, women 61%-men 39%; M01AC anti-inflammatory and antirheumatic drugs oxicam derivatives, women 64%-men 36%; M01AE anti-inflammatory and antirheumatic drugs propionic acid derivatives, women 58%-men 42%; M01AH anti-inflammatory and antirheumatic drugs coxibs, women 72%-men 28%; N05BA anxiolytic benzodiazepine derivatives, women 61%-men 39%; N06AB antidepressants selective serotonin reuptake inhibitors, women 64%-men 36%; P01BA antimalarials aminochinolines, women 58%-men 42%.

Conclusion Previous data suggested that ADRs are more frequent and severe in women than in men but death mainly occurred in men. These data indicate the need to include women in clinical studies and the importance of monitoring ADRs to ensure safer drug therapy.

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No conflict of interest

| DI-069 | CUTANEOUS TOLERANCE TO LONG TERM ANAKINRA THERAPY: REPORT OF A 9 YEAR EXPERIENCE AND REVIEW OF FRENCH PHARMACOVIGILANCE |

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Background Anakinra, a recombinant human interleukin-1 receptor antagonist, is commonly used in the treatment of rheumatoid arthritis and has also shown efficacy in some auto-inflammatory diseases. This drug is generally known for being well tolerated.

Purpose The aim of the study was to explore cutaneous tolerance in patients who received long term anakinra treatment in our hospital and investigate similar cases of adverse cutaneous reactions reported in the French pharmacovigilance database.

Material and methods A retrospective study between January 2007 and April 2016 was conducted, using the hospital's medical software and medical team collaboration. Patients with short course treatment (ie, mostly gout) were excluded. Data were collected through medical files and focused on: age, sex, anakinra indication, dose, cutaneous side effect, Naranjo score, latency time, evolution, withdrawal and reintroduction, and biopsy of skin lesions if performed. In a second investigation, French pharmacovigilance database requests with the terms 'anakinra' and 'skin and subcutaneous tissue disorders' was performed from 2003 (the date of anakinra approval in France) to April 2016.

Results We identified 13 patients treated with long term anakinra medication in our hospital. 9 patients (69%) developed mild to severe skin adverse reaction. 4 (31%) had to stop treatment without rechallenging. This percentage of withdrawal after this side effect increased to 70% (n=26/37) within the French pharmacovigilance database research. Clinically, skin adverse reactions ranged from a small inflammatory reaction at the injection site to severe erythematous and oedematous eruption, painful and pruriginous with panniculitis on the four limbs. The mean interval of appearance was about 7 days after initiation of anakinra. 2 patients developed an acute onset of erythematous and painful eruption localised at all injection sites at the same time which indicates a 'recall syndrome'.

Conclusion This study was the first to describe real life tolerance of anakinra over a 9 year period in a wide spectrum of diseases. Our series highlighted an important rate of major side effects (69%) leading to treatment discontinuation. This may be of major concern as anakinra is usually used as rescue treatment for autoinflammatory diseases.

No conflict of interest

| DI-070 | WITHDRAWN |

DI-071 | LINEZOLID USE EVALUATION, PHARMACY INTERVENTIONS AND STUDY OF NEW OPTIMISATION POINTS

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Background Linezolid is an antibiotic used for the treatment of serious infections caused by gram positive bacteria. Although first approved for skin infections, its use includes empiric treatment of infections usually caused by linezolid sensitive bacteria.

Purpose To describe, analyse and optimise the use of linezolid in a university hospital. To study new susceptible optimisation points.

Material and methods This was a retrospective observational study (February–March 2016). Patient demographics and treatment related data were obtained from electronic clinical records. All linezolid prescriptions were reviewed, carrying out and registering pharmacy interventions. The results were compared with evidence observed in published guidelines and the literature.

Results 53 patients treated with linezolid were found (66 years (30–95)), 60% were men. Average treatment duration was 10.4 days (median 8 days, treatments longer than 90 days excluded). Indications were: 30% skin infections, 22.6% peritonitis, 18.8% pneumonia, 7.5% prosthesis infections and 7.5% meningitis. 51% of cases were unlabelled indications. 26.4% were empiric treatments (<5 days), and 28.3% longer than 14 days (labelled treatment duration). Infectious diseases (32%) and critical care units (34%) were the most prescriber services. Microbiological samples were obtained in 90.6% of patients (39.5% Staphylococcus spp, 18.7% Enterococcus spp). Only gram negative bacteria were isolated in 6 patients (3 following treatment). 3 patients treated for more than 7 days had no samples. Adverse drug reactions did not lead to drug withdrawal in any patient. 7 patients (13%) developed thrombocytopenia (average 15.7 days of linezolid (5–35)), 2 anaemia and 1 liver enzyme elevations. 15 drug interactions were detected and followed clinically.

Conclusion Most uses of linezolid in our hospital were according to the hospital protocols and were highly supported by bibliography and clinical evidence, although they were not authorised by the drug data file or FDA. The issues identified for future pharmacy interventions were intravenous to oral switch (although not registered, it was considered too long), and treatment de-escalation (microorganisms sensitive to other drugs were isolated without antibiotic change). Pharmacists have contributed in a multidisciplinary team to optimise linezolid use, especially in the detection of drug interactions, drug adverse effects and validation of prescriptions of linezolid, in each case considering infection and causal microorganism.

No conflict of interest

DI-072 | RELATIONSHIP BETWEEN THE USE OF CARBAPENEMS AND THE INCIDENCE OF EXTENDED SPECTRUM BETA-LACTAMASE PRODUCING MICROORGANISMS IN A TERTIARY HOSPITAL

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Background Extended spectrum beta-lactamases (ESBL) are enzymes produced by gram negative bacilli pathogens (mainly *Escherichia coli* and *Klebsiella pneumoniae*) than confer resistance against penicillins, cephalosporins and aztreonam. Persistent exposure to a multitude of beta-lactams has induced dynamic and continuous production and mutation of beta-lactamases. The proper use of antibiotics can help minimise this problem and pharmacists are a key component for the appropriate use of drugs.

Purpose To analyse the relationship between the consumption of carbapenems over time and the incidence of ESBL producing pathogens among the total microbiological samples in a tertiary hospital.

Material and methods We calculated defined daily doses per 1000 patient days (DDD/1000 PD) for carbapenems (including meropenem, imipenem/cilastatin and ertapenem) for every year between 2009 and 2015, according to ATC/DDD-WHO Nordic Council methodology. We recorded the number of isolates of ESBL producing both *E coli* and *K pneumoniae*, according to data from the microbiology laboratory. These data were correlated with DDD/1000e of carbapenems through the correlation coefficient r of Pearson. Consistent with the analysis carried out, the level of bilateral statistical significance was 0.01. Analysis of the results was performed using SPSS Statistics IBP-19 version.

Results DDD/1000 PD for carbapenems were 53.4, 58.6, 69.5, 70.9, 59.9, 54.1 and 54.3 in 2009, 2010, 2011, 2012, 2013, 2014 and 2015, respectively. The number of isolates per year of ESBL producing *E coli* were 173/215/420/383/110/123/99 and the number of isolates per year of ESBL producing *K pneumoniae* were 23/43/92/140/82/61/47 between 2009 and 2015. The correlation coefficients of the analysis performed between use of carbapenems and the incidence of ESBL producing pathogens were: $r=-0.906$ for ESBL producing *E coli* (p=0.005), $r=0.880$ for ESBL producing *K pneumoniae* (p=0.009) and $r=0.959$ for the overall of ESBL producing microorganisms (p=0.001).

Conclusion These results demonstrated a strong positive correlation between antibiotic pressure due to carbapenems and the emergence of ESBL microorganisms. Therefore, it is essential to optimise the use of such broad spectrum antibiotics due to the clinical relevance associated with this type of resistance. An antibiotic prescription programme based on a multidisciplinary approach could improve antibiotic use, and clinical pharmacists have a determining role in this team.

REFERENCES AND/OR ACKNOWLEDGEMENTS
WHO Collaborating Centre for Drug Statistics Methodology. ATC-Index with DDDs.

No conflict of interest

DI-073 | MEDICINE INFORMATION CLINICAL PHARMACY SERVICES: QUANTIFICATION AND CHARACTERISATION OF ENQUIRIES FROM GPS AND INVESTIGATION OF THEIR AWARENESS, EXPERIENCES AND VIEWS

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Background The UK Medicines Information (UKMi) network is a 'critical NHS resource'. Innes *et al* concluded, 'the broadest cohort of healthcare professionals' should have access to MI services. MI Centres (MICs) in Scotland provide enquiry answering services to primary and secondary care. There is under utilisation by general practitioners (GPs) in primary care.

Purpose The aims were to quantify and characterise enquiries at the study MIC from GPs, to compare this with other Scottish MICs and to investigate the views of GPs to the MIC services.

Material and methods Firstly, the number and types of enquiries received from GPs, from January 2016 to June 2016, were obtained from the local MIC database using a standardised data collection tool. The lead pharmacists at five similarly sized Scottish MICs were contacted by email to request information from their databases using the same tool. Secondly, a postal questionnaire was developed from the literature and a rigorous process of consultation with relevant experts. The questionnaire contained items on awareness, experiences and views of the MIC. It was piloted and sent in August 2016, with return envelope, to all GPs within the MIC's catchment area (n=574), after excluding a pilot sample (n=64). A reminder questionnaire was posted 2 weeks later. Data were analysed using descriptive statistics. All appropriate ethical and NHS Research and Development approvals were obtained.

Results Of the total enquiries received to the MIC, 55 (4.5%) were from GPs. This was similar to GP usage of most other MICs in Scotland. 193 questionnaire responses (34.3%) were received from GPs. The majority (n=126, 65.3%) were unaware of the MIC. Of those who had contacted the MIC with an enquiry previously (n=35), all were satisfied with the response(s) received. Of the total number of respondents, the majority (n=172, 89.1%) thought access to the MIC would be useful when prescribing medicines.

Conclusion The low response rate limits generalisability but result are similar to previous studies in the rest of the UK. MICs should consider actively promoting enquiry answering service to GPs to ensure equity of care across sectors. Further work to consider this across Europe would be warranted.

No conflict of interest

DI-074 | EFFICACY AND SAFETY OF TRASTUZUMAB IN METASTATIC GASTRIC CANCER

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Background HER-2 protein is expressed in some metastatic gastric cancers (MGC), where targeted therapies such as trastuzumab can be used.

Purpose To evaluate the efficacy and safety of trastuzumab in the treatment of MGC and to compare the results with pivotal studies.

Material and methods A retrospective study was conducted including patients diagnosed with MGC and for which treatment with trastuzumab had been evaluated (loading dose of 8 mg/kg and maintenance dose of 6 mg/kg every 3 weeks) in combination with cisplatin and capecitabine or fluorouracil, initiated from April 2013 to October 2016. Data were obtained from the electronic health record (SIAS) and dispensation module (Farmis). Variables were: age, sex, Herceptest result, Karnofsky index (IK), previous treatments, adverse effect (AE), reductions in dose, progression free survival (PFS) and overall survival (OS). Data were compared with the results of the ToGA trial for MGC (PFS median 6.7 months and OS 13.8 months).

Results The treatment was requested for 9 patients; 3 dies before starting treatment and 6 began treatment. The distribution of patients starting treatment was: 1 women and 5 men, average age 62 years. 83% had triple positive Herceptest and 17% wee double positive. IK median was 90% (95% CI 60–90%). All patients who started treatment had previously received another line of therapy. The main treatments received were cisplatin–fluorouracil and capecitabine–oxaliplatin.

During treatment, all patients had AE. 67% of these patients had diarrhoea, 50% anorexia and 33% anaemia, fatigue and chest pain. 33% were admitted for febrile neutropenia. Other effects with a lower incidence were: alopecia, vertigo and dry mouth. These AE caused a reduction of 20% in the dose in 50% of patients. At the time of the study, treatment was suspended in 50% of patients. The cause of discontinuation for these patients was due to progression of disease. Median PFS was 6.2 months (95% CI 2.1–13.07) and median OS was 9 months (95% CI 2.8–28.23). 50% of patients died.

Conclusion Our results, compared with the ToGA trial, showed similar results in terms of PFS but a lower OS than that obtained in this study, but we must take into account the limited sample size (n=6). Regarding the safety profile, the reactions described in the data sheet as very frequent appeared.

REFERENCES AND/OR ACKNOWLEDGEMENTS

PHARMACY.

No conflict of interest

DI-075 | EVALUATION OF PATIENTS' NEEDS REGARDING INFORMATION ON ANTICANCER TREATMENTS DELIVERED TO OUR HEALTH INSTITUTION AS PART OF A THERAPEUTIC EDUCATION PROJECT

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Background Therapeutic patient education is essential in the cancer control strategy, which in our country is the second cause of death after cardiovascular diseases. This study established an inventory preparative phase to the development of an educational approach, the first of its kind in our institution.

Purpose To evaluate the knowledge of patients treated with anticancer agents and their information needs in our institution.

Material and methods This was a prospective observational study, conducted in the pharmacy unit of our hospital from 1 February to 23 March 2016, involving a population of 132 cancer patients receiving anticancer agents, using a questionnaire of 45 questions organised around 9 items. Data were analysed with SPSS statistics software V.13.0.

Results The interview, lasting an average of 25 min per patient, was conducted among 132 patients with a participation rate of 96.9%. Mean age was 55 ± 11.32 years. The sex ratio was 0.61 (men/women). 62 patients were diagnosed with breast cancer (48.4%). The study population was characterised by a low level of education, and particularly precarious socio-economic conditions as 53% of patients were unemployed. 92 patients (71.8%) did not know their treatment, 100% of this sample were unaware of potential interactions with other drugs, 42.9% (55 patients) did not know their associated treatments, 20.3% using herbal medicines, including Euphorbia officinalis, and 83.6% self-medicating. 128 patients (100%) wanted to receive an information sheet about their treatment and 96.9% would particularly like additional explanations of the side effects of their treatments.

Conclusion Following this study, a therapeutic education unit was set up to compensate for the increasing need for information expressed by patients. Currently, the goal is to re-evaluate those needs after the establishment of this unit.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

DI-076	CLINICAL EXPERIENCE WITH DARUNAVIR PLUS COBICISTAT COMBINATION IN HUMAN IMMUNODEFICIENCY VIRUS TREATMENT

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Background Darunavir/cobicistat (DRV/COBI) is an antiviral medicine recently approved in our hospital for simplifying the posology of patients previously treated with darunavir 800 mg and ritonavir 100 mg, in combination with other medicines.

Purpose To evaluate the short term efficacy and safety of DRV/COBI in the treatment of HIV-1 infection.

Material and methods A retrospective observational study was conducted in all patients who initiated therapy with DRV/COBI between November 2015 and July 2016. Data were collected from electronic clinical history and the hospital's electronic prescribing software. The following variables were collected: sex, age, viral load (VL), creatinine (Cr), transaminases (ALT, AST), and cholesterol (CHO) and triglyceride (TG) blood levels before starting treatment, and 4–8 weeks afterwards. Safety was measured from reported side effects and blood data. Effectiveness was measured by a reduction in VL to <50 copies/mL.

Results 38 patients started treatment (28 men and 10 women), median age 49 years (23–70). Except for 1 patient, all patients had undetectable VL before starting treatment. After 8 weeks, 4 patients had detectable VL (median value: 178 copies/mL (84–421)). After 20 weeks of treatment, 2 achieved undetectable VL. Cr, GOT, GPT, TG and CHO median values pretreatment and after 4–8 of treatment, were, respectively: 0.86 (0.57–1.44) vs 0.92 mg/dL (0.5–1.42); 18 (7–105) vs 24 U/L (6–104); 20 (12–140) vs 24 U/L (12–90); 134 (57–362) vs 119 mg/Dl (54–306); and 190 (98–296) vs 181 mg/dL (114–310). 4 patients reported gastrointestinal side effects and 1 patient felt sick (reported nausea). 5 patients discontinued treatment: 2 because of gastrointestinal side effects, 1 due to nausea and 2 because of potential drug interactions.

Conclusion DRV/COBI is a good strategy for simplifying treatment because 89.5% of patients had undetectable VL after 4–8 weeks of treatment, but these results are still preliminary. Regarding safety, the main adverse effect was gastrointestinal, but in general DRV/COBI was well tolerated.

No conflict of interest

DI-077	A PHARMACEUTICAL CARE PROGRAMME TO IMPROVE PAIN MANAGEMENT IN PATIENTS WITH ADVANCED PROSTATE CANCER

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Background Pain is a frequent symptom with many types of cancer. In 80–85% of patients with metastatic prostate cancer (MPC), the cancer spreads to the bone, which causes pain, pathologic fractures or spinal cord compression.

Purpose To develop a pharmaceutical care programme and to analyse the prevalence of pain in patients with MPC who attended the outpatient area of the hospital pharmacy.

Material and methods A literature search in several databases was conducted (Pubmed, Medline and Google Scholar) for a review of pain in patients with MPC. We also consulted the websites of the National Cancer Institute and other cancer organisations. The Wisconsin Brief Pain Questionnaire was selected for characterising the types and degree of pain that patients experienced. A diary to be distributed to patients to record their pain in terms of degree, duration and analgesic treatment, and an educational pamphlet about oncologic pain that included advice on how to deal with the pain and better understand its symptomatology, were developed. Follow-up of patients with MPC who began receiving treatment with abiraterone or enzalutamide from the hospital pharmacy from January to July 2016 was performed. They completed a questionnaire designed to evaluate the type of pain they were experiencing at their initial visit and at subsequent visits. They were given the diary and an informational pamphlet.

Results The programme began with 38 patients, of whom 56% presented with bone metastases. From the questionnaires they completed at each visit, it was observed that 35% reported pain. The most common analgesic treatment used was NSAIDs (36%) or NSAIDs plus opioids (29%). The

materials patients received improved characterisation of their pain and served as a psychological support, basically through understanding that pain was a frequent symptom of their illness and one that could be treated more effectively.

Conclusion A high prevalence of pain in patients with MPC was identified which indicates that analgesic treatment is often inadequate. Creating pharmaceutical care programmes may contribute to better pain evaluation and treatment, and better support for patients.

No conflict of interest

DI-078 | **COMPARISON OF THE SAFETY PROFILE BETWEEN TERIFLUNOMIDE AND DIMETHYL FUMARATE IN THE TREATMENT OF RELAPSING REMITTING MULTIPLE SCLEROSIS**

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Background Teriflunomide (TRF) and dimethyl fumarate (DMF) are oral drugs authorised in Spain to treat relapsing remitting multiple sclerosis (RRMS).

Purpose To compare the safety profile of both drugs in the treatment of RRMS in adults in a tertiary hospital.

Material and methods An observational retrospective study was conducted in patients who began treatment with TRF and DMF from January 2015 to March 2016. Collected variables: age, sex, previous treatment, safety profile (adverse reactions (AR), suspension, reduction of dose) and subsequent treatment in case of withdrawal. The information was obtained from the clinical history and RA record in the Farmatools programme when they came to collect their medication.

Results 53 patients were included, 12 men/41 women (mean age 40.59 years). 38 received DMF and 15 TRF. 15 were treated with firstline DMF and 4 with TRF. The main reasons for the change were: poor tolerance, AR at the site of injection and convenience of oral administration. 25 patients showed no AR (35% of patients with DMF and 73% of TRF), or were not mentioned. 26 patients treated with DMF presented AR: skin (redness/eczema), gastrointestinal (nausea/vomiting/burning), fatigue and others. 69.23% of patients (18) reported skin changes which appeared after taking medication and disappeared after 3–4 hours. 69.23% (18) had gastrointestinal disorders, and was the main reason for suspension/dose reduction. 19.23% (5) had fatigue/malaise, especially at the beginning of treatment.

5 patients had other AR, including changes in blood glucose (2), lymphopenia (1), palpitations (1) and possible urinary tract infection (1). 8 patients required dose reduction temporarily. Only 1 patient is continuing with reduced doses. Only 4 patients treated with TRF reported any AR: headache (1), gastrointestinal disorders (2) and alopecia (1). 3 of the 15 patients experienced moderate elevation of liver enzymes. 5 patients discontinued treatment, 3 due to intolerance (DMF) and 2 ineffectiveness (DMF+TRF). They are currently receiving treatment with natalizumab (1), teriflunomide (2) and PegIFN-B1a (2).

Conclusion The AR that patients manifested were mild and the majority disappeared with withdrawal of the drugs. However, analysing the percentage of patients who presented AR, we consider that TRF has a better profile for frequency and severity of AR compared with DMF. AR were in line with those described in the data sheet and other studies, although increased monitoring is necessary to assess effectiveness and long term safety.

No conflict of interest

DI-079 | **THERAPEUTIC MANAGEMENT OF LEAD POISONING: SATURNISM**

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Background Lead poisoning has been reported infrequently in recent years in developed countries due to the implementation of legislative measures aimed at reducing environmental lead. The few cases that appear correspond mainly to occupational exposure.

Purpose To describe the therapeutic management in a case of chronic lead poisoning.

Material and methods The case was a 53-year-old man, dedicated to the exploitation of lead in an abandoned mine. He attended the internal medicine unit for joint pain, dyspnoea with minimum–moderate effort, asthenia and dysthermia sensation and scarce cough. He also had dark urine, abdominal pain, nausea, vomiting and unquantified weight loss. Background: dyslipidaemia and 30 cigarettes/day. Analytical data included: haemoglobin (Hb) 8.2 g/dL, haematocrit (HCT) 25.1%, peripheral blood smear with anisocitosis, rounded red spherocyte-like cells, elements with basophilic stippling, plasma creatinine (Cr) 0.67 mg/dL, glomerular filtration 109.7 mL/min/m^2, urobilinogen in urine 8 mg/dL, blood lead 946 µg/dL and urinary lead excretion 2024 µg/24 hours. He was diagnosed with haemolytic anaemia for lead poisoning and the clinic contacted the pharmacy department for pharmacotherapy management. A conservative approach was adopted due to few cases with lead blood levels above 100 µg/dL in the literature, and the patient had no neurological symptoms despite levels higher than 900 µg/dL.

Results Hospitalisation for chelation therapy was decided, consisting of intramuscular dimercaprol 200 mg every 4 hours on day+1 and day+2, every 6 hours on day+3 and day+4 and every 12 hours on day+5, with EDTA calcium 1500 mg every 12 hours administered for 6 hours, with the first dose administered 4 hours after intramuscular administration of dimercaprol. As premedication, he was given 1 vial of dex-clorfeniramina every 8 hours and 500 mL bicarbonate 1/6 molar every 12 hours. Analytical results during treatment were: Cr 0.59, 0.84, 0.55, 0.71, 0.48, 0.54; Hb 7.6, 9.6, 10.9, 8, 9. 1, 8.6, 9; HCT 23.1, 29.1, 32.9, 24.5, 28.5, 25.3, 27.7. The clinical course was satisfactory, without deterioration of renal function and no complications due to chelation therapy. 1 month after the chelating treatment, lead

analytical results were: blood lead 70 µg/dL, urinary lead excretion 162 µg/24 hours.

Conclusion Chronic lead poisoning is unusual. The pharmacological management is generally little known and there is no clear consensus in the literature, requiring a multidisciplinary team to address the situation. Pharmacists play an essential role in the acquisition, management, dispensation and validation of the treatment, to achieve the therapeutic goal in the shortest time and with an optimum result.

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No conflict of interest

DI-080 | **STUDY OF THE USE OF CANAKINUMAB IN MUCKLE–WELLS SYNDROME IN A TERTIARY HOSPITAL**

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Background Canakinumab is a IgG1 anti-interleukin-1β monoclonal antibody indicated in the treatment of Muckle–Wells syndrome (MWS). It is an autosomal dominant congenital disease that is considered a rare disease. Hives, joint pains, conjunctivitis, deafness, amyloidosis and fever are its symptoms. For years, the only available treatments were non-steroidal anti-inflammatory drugs (NSAIDs) and systemic corticoids.

Purpose The objective of this study was to determine the effectiveness of canakinumab in the treatment of MWS in patients who have failed treatment with NSAIDs and systemic corticoids.

Material and methods An observational retrospective study was carried out in a tertiary care hospital from February 2011 to October 2016. Patients who were treated with canakinumab during this period were selected. The data was obtained from the electronic software used in the hospital (Landtools). Indication, posology, duration of treatment, previous therapy, adverse effects and C reactive protein (CRP) levels were collected from patients' digital history. Suspension of treatment with canakinumab was also registered. Remission was defined as clinical improvement plus normal CRP (<6 mg/L). Available treatments were NSAIDs and systemic corticoids.

Results 6 patients were selected; median age 52 years (36–66 years). The indication for treatment with canakinumab was MWS. Patients received canakinumab 150 mg subcutaneously every 8 weeks (n=5) or 12 weeks (n=1) for a median of 47 months (range 24–70). All patients had received corticoids and NSAIDs with no suitable response. Other previous therapies were antihistamines, methotrexate, colchicine, infliximab, etanercept and hydroxychloroquine. Canakinumab was well tolerated; 1 patient experienced an injection site reaction.

Treatment with canakinumab caused a significant reduction in clinical disease activity and CRP levels (average before treatment of 40.7 mg/L (3.7–81.2 mg/L) versus average after treatment of 19.27 mg/L (0.45–86.03 mg/L)). 50% (n=3) of canakinumab treated patients achieved remission. All patients are currently receiving treatment.

Conclusion Canakinumab is an effective therapeutic alternative for the treatment of MKS if poor effects have been achieved on other therapies. The observed evolution was favourable, being safe and well tolerated.

REFERENCES AND/OR ACKNOWLEDGEMENTS

ORPHANET GUIDE.

No conflict of interest

DI-081 | **A COOPERATION PROJECT BETWEEN THE HOSPITAL PHARMACIST AND GENERAL PRACTITIONERS ABOUT DRUG INTERACTIONS IN CLINICAL PRACTICE**

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Background Drug–drug interactions (DDIs) frequently occur in therapies and may generate adverse drug reactions (ADRs). One of the main causes is polypharmacy, especially in the elderly. Although not all DDIs give rise to dangerous ADRs, the majority are preventable, and so careful review should be taken when new drugs are prescribed to vulnerable subjects.

Purpose The purposes of our work were: (1) evaluation of DDI in general practitioner (GP) prescriptions; (2) establishment of a cooperation project between pharmacists and GPs to improve the culture of DDI management and patient care.

Material and methods In 2013, pharmacists from the local health district launched a cooperation project involving 48 GPs. As a first step, GPs were asked to select a list of 9 drug associations for which monitoring of interactions in their prescriptions could be recommended. Pharmacists' interventions were (1) analysis of 2012–2014 GP prescriptions according to the list of 9 DDIs chosen by GPs; (2) evaluation of solutions for DDI management, using the Micromedex DDI checker database and literature analysis; (3) dissemination of DDI information to GPs through training meetings; and (4) assessment of the efficacy of these actions through a questionnaire submitted to GPs in 2013.

Results (1) Prescriptions analysis: even if the number of prescriptions with DDI increased from 2012 to 2014 (+12%), we observed a reduction in DDI number (−14% in 2012–2013, −9% in 2012–2014), of which some were statistically significant (calcium carbonate+pronton pumps inhibitors—50%, p<0.0041, amoxicillin+lansoprazole—42%, p<0.0088). (2) Questionnaire: 75% of GPs completed the questionnaire. Literature analysis was considered interesting by 94% of respondents; solutions were adopted by 89% of GPs. Clinical improvement after application of the solutions was observed in 34%.

Conclusion The multidisciplinary approach was effective in increasing GP awareness of DDI and in reducing DDI prescriptions. The importance of GP training was evident from the feedback from the questionnaires. Pharmacists' contribution allowed for evident improvement in pharmacotherapy quality and resulted in benefit to the patients.

No conflict of interest

DI-082 | EFFICACY IN CLINICAL PRACTICE OF NEW DIRECT ACTING ANTIVIRALS FOR THE TREATMENT OF HEPATITIS C VIRUS

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Background Hepatitis C virus (HCV) infection is one of the main causes of chronic liver disease worldwide. New direct acting antivirals (DAAs) have been licensed in the EU since 2014 and represent an improvement in effectiveness and safety of HCV treatment.

Purpose To analyse the efficacy of DAAs and review possible factors, such as adherence and interactions, that may have been responsible in those patients where therapy was not effective. Compare sustained virological response (SVR) of our population with results from clinical trials.

Material and methods A prospective observational study (October 2014–September 2016) was conducted in HCV patients who had completed treatment with DAAs and had SVR12 data. Protocols were reviewed, collecting for each patient: demographic data, genotype, fibrosis, prior treatment, viral load, treatment prescribed, concomitant treatment and interactions, adherence and SVR12.

Results 203 patients were enrolled (mean age 58 years, 61.6% men, 22.2% coinfected) Baseline characteristics: genotype: 1b, 53.2%; 1a, 19.2%; 1a/b, 2.9%; 3, 11.3%; 4, 10.9%; and others, 2.5%. Cirrhosis: 56.6%. Treatment experienced: 38.4%.

SVR12 was 94.1% (91.6% in cirrhosis and 96.9% in non-cirrhosis). SVR12 was not 100%: genotype 1a non-cirrhotic (91.7% with ledipasvir/sofosbuvir); 1b non-cirrhotic (96.7% with ombitasvir/paritaprevir/ritonavir/dasabuvir) and cirrhotic (92.9% with ledipasvir/sofosbuvir and 97.2% with ombitasvir/paritaprevir/ritonavir/dasabuvir); 3 non-cirrhotic (69.2% with daclatasvir/sofosbuvir) and cirrhotic (90% with daclatasvir/sofosbuvir) and 4 cirrhotic (0% sofosbuvir/simeprevir/interferon and 92.8% with sofosbuvir/ledipasvir). 12 patients did not achieved SVR12 (41.6% coinfected, 75% naive). In 1 patient, adherence was <90% and 2 patients were taking drugs that could interact with DAAs (ledipasvir/sofosbuvir with omeprazole).

Conclusion DAAs have proved highly effective in our population although slightly lower than expected according to clinical trials (SVR12 94–98% ledipasvir/sofosbuvir in genotype 1 and 4; 99–100% ombitasvir/paritaprevir/ritonavir/dasabuvir in genotype 1b; 97% daclatasvir/sofosbuvir in non-cirrhotic genotype 3), especially in genotypes 3 and 4, although this could be explained by the low number of patients in both. Most patients without SVR12 were adherents. In general, there were no interactions, and in those cases where interactions were detected, we recommended a regimen of the drug to avoid it, but if patient did not follow our recommendation, it could have affected the efficacy of DAAs.

No conflict of interest

DI-083 | EFFICACY AND SAFETY OF LEDIPASVIR/SOFOSBUVIR WITH AND WITHOUT RIBAVIRIN IN PATIENTS WITH CHRONIC HEPATITIS C VIRUS INFECTION

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Background Treatment with a daily fixed dose combination of ledipasvir/sofosbuvir (LDV/SOF) in tablet form, with and without ribavirin (RBV), has exhibited promising results for the treatment of patients with hepatitis C virus (HCV).

Purpose To compare the efficacy and safety of LDV/SOF and LDV/SOF/RBV regimens for the treatment of HCV.

Material and methods A prospective observational study from April 2015 to January 2016 was carried out in all patients who had completed treatment for HCV with LDV/SOF or LDV/SOF/RBV. Data analysed were: sex, HCV genotype (GT), liver fibrosis, duration of treatment, adverse events, naïve patient, HIV/HCV coinfected patient and HCV-RNA in peripheral blood at 12 weeks after completion of treatment. Data were obtained from laboratory application, outpatient dispensing programme and medical record review. Assessment of effectiveness was based on achievement of a sustained virologic response (SVR), defined as the absence of HCV-RNA by polymerase chain reaction 12 weeks after stopping treatment (SVR12).

Results 38 patients, 27 (71.05%) men, completed treatment of HCV, 24 (63.15%) with LDV/SOF and 14 (36.85%) with LDV/SOF/RBV. 19 (50%) patients were naïve and 10 (26.31%) were coinfected HIV/HCV. Duration of treatment was 12 weeks for 26 (96.30%) patients who received LDV/SOF and 24 weeks for 1 patient. In the LDV/SOF/RBV group, duration of the treatment was 12 weeks for 14 (100%) patients. 22 (91.66%) patients with HCV-GT 1, and 2 patients with HCV-GT 4, received LDV/SOF. 11 (78.56%) patients with HCV-GT 1, 2 patients with GT 3 and 1 patient with GT 5 received LDV/SOF/RBV. Liver fibrosis for the group who received LDV/SOF was of F1 in 1 patient, F2 in 5 (20.83%), F3 in 8 (33.33%) and F4 in 10 (41.66%) patients. In the LDV/SOF/RBV group, 1 patient was F3 and 13 (92.85%) patients were F4.

SRV12 was undetectable in 22 (91.66%) patients in the group who received LDV/SOF and was undetectable for 14 (100%) patients in the LDV/SOF/RBV group. In the LDV/SOF group, 6 (18.2%) patients had adverse events, and 1 patient required immediate suspension of treatment for anaemia and bleeding. Further adverse reactions were tiredness in 3 patients, headache in 2 patients and insomnia in 1 patient. In the LDV/SOF/RBV group, 6 (37.6%) patients had adverse events: anaemia in 4 (25%) patients, ocular thrombosis in 1 patient and renal failure in 1 patient.

Conclusion Sofosbuvir/ledipasvir, administered with and without ribavirin for the treatment of HCV, was shown to be effective in 94.73% of the study population and was generally safe and well tolerated.

No conflict of interest

THE DIFFICULTY AND RISK OF PRESCRIPTION MEDICINES IN CHILDREN: ANALYSIS OF DRUGS LISTED IN THERAPEUTIC BOOKLET FOR PAEDIATRIC HOSPITAL

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Background Paediatric drugs are rare and are often presented with prescription limits. This means the paediatrician is responsible for prescribing medication to children which are reserved only for adults. Also, certain dosages, forms and routes of administration of these drugs are usually unsuitable for administration to children, sometimes even contraindicated.
Purpose The aim of this study was to analyse agreement between medicines (all galenic forms included) listed in the therapeutic booklet of our paediatric hospital and their prescription in children.
Material and methods We analysed the medicines listed in the therapeutic booklet of a paediatric hospital. The status of each medicine was searched by referring to the summaries of product characteristics. Five categories were defined: medicines indicated in children regardless of age; those with age limits; those not recommended in children in the absence of data; those reserved for adults; and those contraindicated in children. The share of each category in terms of drug substance and trademarks and their consumption were defined.
Results 165 medicines are listed in the therapeutic booklet of our paediatric hospital, representing 120 active ingredients. Of the 165 medicines, 81.2% are injectable and 6% are oral forms. 7 medicines are solid forms and are not suitable for children <6–7 years old. 20% of trademarks belong to the class specialties 'N' of the ATC codification (WHO) and 16.4% medicines to class 'J'. 51% of medicines were administered to children regardless of age, 31% were indicated with age limits, 3% were contraindicated and 3% were reserved for adults. 12% were not recommended in the absence of data. 113 100 units of antibiotics were consumed in 2015, of which 800 were contraindicated. 334 924 anaesthetic medicines were consumed, of which 2000 were not recommended in children.
Conclusion The percentage of molecules that do not have a paediatric license in our study was 18%. Other studies have shown a higher percentage (Combeau *et al*, Turner *et al* and Antier *et al*—56.3% 25% and 42%, respectively). This inconsistency should alert the prescriber and the pharmacist to limit the inherent risk.

No conflict of interest

TREATMENT SATISFACTION IN MULTIPLE SCLEROSIS

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Background The Treatment Satisfaction Questionnaire for Medication (TSQM) was designed to assess patient treatment satisfaction in chronic diseases. Its performance can be used in multiple sclerosis (MS).
Purpose To compare treatment satisfaction in four domains: effectiveness, side effects, convenience and global satisfaction in patients with MS who attended an outpatient pharmacy department.
Material and methods The study was conducted in a tertiary hospital in Madrid, Spain. Eligible patients were those who had received one of the following treatments for at least 4 months: subcutaneous interferon β-1a (SC IFNβ-1a) 125 μg, Plegridy; SC IFNβ-1a 22/44 μg, Rebif; SC IFNβ-1b 250 μg, Betaferon; glatiramer acetate (GA) 40 mg, Copaxone; oral (PO) teriflonomide, Aubagio; PO dimethyl fumarate (DMF), Tecfidera; or PO fingolimod, Gilenya. Patients were asked to complete the TSQM questionnaire. Furthermore, the pharmacist registered any adverse drug reactions the patients could have suffered during the last month.
Results 60 patients (41 women) with a median age of 44±11 years were included in the study. The most used treatments were SC IFNβ-1a (15 patients) and DMF (12). Treatment satisfaction scores were 71.4 (71.4–85.7) for effectiveness, 90.0 (75.0–96.3) for side effects, 78.6 (71.4–90.4) for convenience and 76.5 (70.6–88.2) for global satisfaction (out of a maximum of 100). There were statistically significant differences among the different patients´ treatment satisfaction scores in terms of side effects (p=0.0034) and convenience (p=0.0041). However, no differences were found for effectiveness (p=0.8339) or global satisfaction (p=0.8711). When comparing PO versus SC treatments, there were important differences in terms of sides effects (p=0.0027), but global satisfaction remained non-significant (p=0.6204). Most reported side effects were injection site reactions (71.1% of patients with SC treatment) and flu-like symptoms for IFN administrations (54.9%). Patients reported gastrointestinal adverse symptoms for DMF (83.3%). Fingolimod was the best tolerated treatment (all 5 patients reported no adverse effects).
Conclusion Patients with MS who attended our outpatient pharmacy department were satisfied in terms of effectiveness, side effects, convenience and global satisfaction. Differences in the profile of side effects were remarkable but these did not t affect effectiveness or global satisfaction.

No conflict of interest

INTERSTITIAL LUNG DISEASE INDUCED BY INFLIXIMAB: A CASE REPORT

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Background Anti-TNFα drugs are immunosuppressive therapies prescribed in autoimmune diseases. Several clinical cases reported interstitial lung disease (ILD) onset with anti-TNFα drugs.[1]
Purpose In this clinical case we report ILD onset induced by infliximab in a patient with psoriasis.

Material and methods A literature review and a pharmacovigilance notification were done. The accountability of infliximab in ILD onset was estimated by the Naranjo adverse drug reaction probability scale.

Results The patient was a 57-year-old-man, treated for extensive psoriasis diagnosed in 1970. Our patient received eight medication therapies for psoriasis from 1987 to July 2014. He started therapy with infliximab 5 mg/kg in September 2015, on the following weeks: week 0, week 2, week 6, and then every 8 weeks (no pulmonary contraindication for infliximab for our patient). A significant improvement in skin condition was observed and the last injection of infliximab was in December 2015. In January 2016, our patient had a progressive dyspnoea onset (stage III according to the NYHA classification) 2 weeks after the last infliximab injection, leading to hospitalisation (decrease in vital capacity (VC) from 80% to 50–60%). ILD was shown on imaging, and bronchoalveolar fluid culture and immunological tests were negative. Cytology examinations found lymphocytic alveolitis (40%), supporting the hypothesis of hypersensitivity ILD. Lung function improved 1 month after infliximab cessation, without any medication (antibiotics or corticosteroids). The accountability of infliximab in ILD onset was probable according to Naranjo's score (score=7/13) In March 2016, VC was 77%, and in May 2016, there was a complete regression of pulmonary infiltration. Today, psoriasis is treated by secukinumab.

Conclusion Our case report suggests a role for infliximab in ILD onset. The link between ILD onset and anti-TNFα drugs remains unclear. Further research has to be conducted to elucidate the role of anti-TNFα agents in ILD onset or in worsening of pre-existing ILD, taking into account patients' interindividual variability.

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No conflict of interest

DI-087 | RESTRICTIVE ALLOGRAFT SYNDROME IN LUNG TRANSPLANTATION: NINTEDANIB AS A NEW THERAPEUTIC STRATEGY?

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Background Lung transplantation is hampered by some complications, particularly acute rejection and chronic lung allograft dysfunction (CLAD), the latter including bronchiolitis obliterans syndrome (BOS) and restrictive allograft syndrome (RAS) with fibrotic process. RAS therapeutic strategy is not clearly defined, but several cases reported the use of antifibrotic agents, indicated in idiopathic pulmonary fibrosis (IPF), to treat RAS, such as pirfenidone.[1]

Purpose In this case report we relate the use of nintedanib, a new antifibrotic agent, for RAS treatment in a lung transplanted patient.

Material and methods

Case report

Results A 71-year-old-man received a right lung transplant in 2009 because of IPF. In 2010, BOS stage 0-p was found, evolving to stage 1 in 2011 and leading to the introduction of montelukast and azithromycin, and extracorporeal photopheresis. Despite these therapies, the forced expiratory volume 1 (FEV1) per cent predicted decreased to 43% and dyspnoea worsened, suggesting evolution of BOS towards RAS, whose prognosis is worse. Oxygen therapy was introduced in January 2016 (1.5 L/min during exercise). In February 2016, CT showed IPF large lesions in the left lung and worse RAS fibrotic lesions in the right lung. A multidisciplinary team decided to start nintedanib 150 mg twice a day. The patient's immunosuppressive therapies (tacrolimus and everolimus) were monitored every 15 days because of potential cytochrome 3A4 induction of nintedanib. During nintedanib treatment, oxygen debit was 1 L/min during exercise and FEV1% predicted was 47%, suggesting clinical improvement. Nintedanib was stopped in August 2016 because of persistence of digestive intolerance.

Conclusion Our clinical case suggests a potential clinical benefit of nintedanib in the treatment of RAS. To our knowledge, this is the first case reporting the use of nintedanib, a tyrosine kinase inhibitor targeting platelet derived growth factor receptors and fibroblast growth factor receptor, to treat RAS. Further studies have to be conducted to assess the place of antifibrotic agents in RAS therapeutic management.

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No conflict of interest

DI-088 | THE SWITCH FROM ORIGINATOR TO BIOSIMILAR GROWTH HORMONE: PATIENTS' EXPERIENCES

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Background After introduction of biosimilar growth hormone (BGH), the departments of pharmacy and endocrinology discussed this introduction in our hospital. Due to the large difference in costs between the originator and the BGH, it was decided to start all new patients on BGH and switch existing patients to BGH.

Purpose To investigate patients' experiences in the switch from originator to BGH via a survey.

Material and methods The questionnaire, used in this survey, was distributed to all 207 adult patients who were switched in the period after introduction of the biosimilar in our hospital. All participating patients had over 1 year of experience in the use of BGH. The following issues were addressed: difficulties in switching from originator to BGH; patient education before, during and after the switch; effect of BGH; adverse effects of BGH; and use of the new injection system for BGH.

Results The questionnaire was completed by 79 patients (38.1%). 72% of patients concluded that there was no problem in switching to the biosimilar. Remarks were made on safety of the injection system (n=13), adverse effects (n=13)

and safety of the biosimilar in general (n=11). 93% of patients were satisfied with the introduction of BGH. 95% of patients indicated that individual training on the new injection system had been conducted and 98% were confident in using the system. Regarding the efficacy of BGH, 81% of patients indicated that there was no difference with the originator. Differences were described in loss of energy, fatigue and increased transpiration. 16% of patients indicated that adverse effects differed from their former product, with muscle stiffness (n=6), joint pain (n=4) and tingling (n=4). In comparison with the formerly used injection systems, 90% of users indicated that the new system was easy to use. Patients scored the transition to BGH in the Radboudumc with 7.8 (range 1–10).

Conclusion Patients were satisfied with the switch to BGH. There were few side effects and problems were solved in terms of care for the patient. Good preparation and good explanation for patients can help ease the introduction of biosimilars.

No conflict of interest

DI-089   WITHDRAWN

DI-090 | COMPASSIONATE USE OF NIVOLUMAB IN NON-SMALL CELL LUNG CANCER

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Background Patients diagnosed with stage 4 non-small cell lung cancer (NSCLC) have poor survival (median 9–12 months). A platinum based regimen is generally preferred, usually with limited results. Secondline therapies have not shown long lasting responses. Nivolumab is an anti-programmed cell death 1 (PD-1) monoclonal antibody that works as a checkpoint inhibitor by improving the immune response. It is administered every 14 days in a 3 mg/kg dose. Nivolumab is the first drug that has demonstrated superior response versus docetaxel, the standard treatment for disease progression.

Purpose To evaluate survival rates and tolerability of nivolumab in NSCLC.

Material and methods A retrospective observational study was carried out from June 2015 to September 2016. Electronic medical records were reviewed and analysed using SPSS Statistics programme. Variables collected were age, sex, stage, Eastern Cooperative Oncology Group (ECOG) performance status score, subtype of NSCLC, sites of metastasis, previous lines of treatment, adverse events, progression free survival (PFS) and overall survival (OS).

Results 22 stage 4 patients were included (14 men, 8 women) with a median age of 64 years (51–82). ECOG0: 1 patient, ECOG1: 16 patients, ECOG2: 5 patients. Histology: 15 patients adenocarcinoma, 5 squamous cell carcinoma and 2 unknown. The most frequent metastatic sites were: liver (6), kidney (6), peritoneum (5), bone (5) and nervous system (4). Nivolumab was mostly used as a fourthline therapy (2nd–6th). Firstline was a platinum based therapy (with pemetrexed, gemcitabine or vinorelbine) in 18 patients, erlotinib in 2, and 2 patients had monotherapy with paclitaxel and gemcitabine. Docetaxel was most frequent secondline treatment. Median PFS was 1.8 months (95% CI 0.53–3.06) and median OS was 5.9 months (95% CI 0.24–11.56; 40.9% censored). The most common adverse effect was asthenia in 12 patients, followed by shortness of breath in 7. Related to immune mediated

events, 2 patients had thyroid dysfunction. Grade 3–4 reactions were not detected.

Conclusion The PFS and OS results were worse than in a pivotal study (squamous cell indication, only 23% of our cases). Nevertheless, we had a small number of patients with ECOG2 (23%), and 77% used nivolumab as thirdline or more treatment, where the evidence is limited. Nivolumab was well tolerated and there was no need for treatment discontinuation.

No conflict of interest

DI-091 | **COLISTIMETHATE SODIUM PRESCRIPTION IN THE ELDERLY: A RETROSPECTIVE STUDY IN ONE ACADEMIC MEDICAL CENTRE**

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Background According to the assessment report of the European Medicines Agency (EMA, 2014), colistimethate sodium is considered a crucial therapeutic option in the context of infections caused by multiresistant gram negative pathogens. This report presents guidelines on dosage regimens: a daily dose of 9 MIU is suggested for adult patients and reduced doses are indicated when creatinine clearance (CrCL) is <50 mL/min. No special recommendations are given for elderly patients although it is known that renal function decreases with age and loss of muscular mass influences this biomarker.

Purpose To evaluate prescription patterns for colistimethate sodium and dosage adjustments in our hospital, particularly concerning the elderly. To analyse the accomplishment of EMA indications and the need for dosage adjustments in the elderly.

Material and methods Prescriptions over 1 year (1 August 2015 to 1 August 2016) were studied. Inclusion criteria were: patients >65 years, admitted to medicine and pulmonology services, prescribed with intravenous colistimethate sodium. Exclusion criteria were: death and transfer to another hospital during the treatment period.

Results The study population consisted of 27 patients, 62.96% being older than 80 years. From all of the studied patients, 21 presented normal (or below) creatinine (CrCL >50 mL/min). Of these 21 patients only 6 (28.57%) began treatment with 9 MUI (2 were <70 years old; the others were >80 years) and for 2 of the older group, dose reduction occurred within treatment. The remaining 15 patients (aged >70 years) had other therapeutic regimens: 12 patients were prescribed 6 MIU/day, 8 older than 80 years, and 2 needed further dose reduction. For the 6 patients with renal impairment before treatment, a reduced dose of antibiotic was prescribed. However, only 2 were prescribed the daily dose in accordance with the guidelines.

Conclusion These data call attention to the need to consider the limitations of creatinine as a sole biomarker of renal function in the elderly. Further studies in large populations could provide useful data to enrich the guidelines on dosage adjustment of colisthimetate sodium in this population.

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No conflict of interest

DI-092 | **WARFARIN TOXICITY: IMPACT ON HOSPITAL ADMISSION—THE REALITY OF A PORTUGUESE HOSPITAL**

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Background Adverse drug reactions are the main cause of 2–8% of hospital admissions in Europe. Of all drug classes with important adverse reactions described, oral anticoagulants (OAC) are one of the most prevalent. From all available OACs, warfarin remains a drug of choice due to its low cost and demonstrated efficacy (reduces the risk of stroke by two-thirds and mortality by a quarter compared with controls, aspirin or no therapy). One of the main difficulties in the safe use of warfarin is to maintain the international normalised ratio (INR) between the reference ranges, with the elderly being more susceptible due to their comorbidities, polypharmacy and ageing per se.

Purpose To analyse the percentage of hospital admissions due to bleeding events associated with the intake of warfarin and the impact of these events on patients.

Material and methods Retrospective analysis of prescriptions for phytomenadione in the emergence department. All patients that received phytomenadione for treating bleeding associated with warfarin were included. The information was cross checked with patient files and laboratory results (INR). The sample analysed included 98 patients (55 men; 43 women), aged between 60 and 90 years (67% of sample). The follow-up period was from January 2016 to the end of August 2016.

Results 1.24% of all hospital admissions were due to bleeding events related to warfarin. 55 registered cases corresponding to 44 patients, of whom 21 were symptomatic. At the time of admission, 45% presented an INR >6.0. Major causes responsible for an increase in INR were acute kidney injury (27%) and infections (22%). 17 patients remained hospitalised and there were two therapeutic switches, 1 to dabigatran and 1 to rivaroxaban.

Conclusion There is a need for a closer link between primary health care services and secondary care organisms in order to guarantee better support to populations likely to suffer an adverse drug reaction.

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No conflict of interest

DI-093 | **OFF-LABEL DRUG USE IN ONCO-HAEMATOLOGY SETTING**

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Background Off-label treatments are characterised as those that do not correspond to the labelled indications. They are intended to respond to the unmet medical needs of poorly studied populations or not studied at all in trials. Off-label treatments are steadily increasing in the onco-haematology area.

Purpose The aim of this study was to describe off-label treatments prescribed in the oncology-haematology area of a third level hospital.

Material and methods This was an observational retrospective study including all off-label drugs prescribed from March 2015 to September 2016. Analysed data were: demographic (age, sex) and treatment related (drug involved, off-label indication, treatment duration and economic impact). Data were collected from the pharmacy electronic prescription programme and multidisciplinary oncology–haematology commission database.

Results 63 off-label drug uses were approved out of 67 requested during the study period (6% rejected due to lack of evidence); oncology was the area that solicited the highest quantity of off-label medications, 53/67 (79.1%); haematology requested 14/67 (20.9%). Patient median age was 55 years (range: 25–85); 27 men (demographic data lacking in 7/63). The top four off-label drugs prescribed were: (i) bevacizumab (n=25), (ii) crizotinib (n=5), (iii) paclitaxel–albumina (n=5) and (iv) nivolumab (n=6). The most frequent off-label indications solicited were: (i) treatment of glioblastoma for bevacizumab (18/25); (ii) NROS mutated non-small cell lung cancer for crizotinib (3/5); (iii) neoadjuvant treatment of breast cancer for paclitaxel–albumina (3/5); (iv) Hodgkin refractory lymphoma for nivolumab (2/6). Median treatment duration was: 4.2 months (range 0.3–16.1), 3.6 months (range 1.6–11.0), 2.8 months (range 1.5–7.3) and 2.8 months (range 0.3–3.1), respectively. Median cost per patient and drug was: € 18 819.80 (range € 5790.70–€ 72 384) for bevacizumab; € 18 705.60 (range € 9352.80–€ 56 116.80) for crizotinib; € 3469.76 (range € 1301.20–€ 4770.90) for paclitaxel–albumina; € 8192 (range € 2048–€ 12 288.80) for nivolumab.

Conclusion Off-label drug use is a common practice in the onco-haematology area. It is very important to analyse the clinical outcomes of off-label drug uses in order to improve decision making, protocol generation and to estimate the economic impact on our healthcare system.

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No conflict of interest

BOTULINUM TOXIN TYPE A FOR THE TREATMENT OF NEUROLOGICAL DISEASES: DRUG UTILISATION REVIEW

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Background Neurology is one of the medical specialities in which botulinum toxin (BT) provides greater therapeutic benefits due to its ability to produce muscle paralysis, which can be used to treat certain neurological diseases involving muscle hyperactivity.

Purpose To analyse the prescription profile of BT type A in neurological diseases and prescription suitability based on the data sheet, comparing the frequency of administration between the different approved indications.

Material and methods A retrospective observational study of the prescription profile and frequency of administration of BT was conducted in the neurology department of a third level hospital. All patients with at least two administrations of BT were included during the period January and September 2016. Prescription suitability was determined based on the approved indications in the drug data sheet of the three BT type A available in the hospital: Botox, Dysport and Xeomin. Data were collected from clinical histories and outpatient dispensing software Farmatools. ANOVA test (SPSS) was used to compare differences between the frequency of administration of each approved indication.

Results 83 patients were included. 79% received BT for one approved indication. Hemifacial spasm was the most common authorised diagnosis (31%), followed by blepharospasm (13%), different types of spasticity (13%), migraine (12%) and cervical dystonia (10%). The average frequency of administration in patients with hemifacial spasm, cervical dystonia, spasticity (stroke or cerebral palsy origin) and blepharospasm were 6.1 months (95% CI 5.1–7.0); 5.0 months (95% CI 4.1–5.9); 4.6 months (95% CI 3.5–5.7); and 4.6 months (95% CI 3.9–5.7), respectively (p=0.332). The frequency of injection in patients with migraine was 3.8 months (95% CI 2.9–3.9), existing differences that were statistically significant with the hemifacial spasm indication (p=0.009). In 17 patients, BT was used in off-label indications: dystonia (generalised, cranial and oropharyngeal) (n=9); writer's cramp (n=5); bruxism (n=2); and facial pain (n=1).

Conclusion BT was used in a high percentage for approved indications (79%), hemifacial spasm being the most prevalent. Significant differences in the frequency of administration between migraine and hemifacial spasm were observed. The more common off-label indications were dystonia and writer's cramp.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Botox, Xeomin and Dysport data sheet (available at https://www.aemps.gob.es/cima).

No conflict of interest

POSSIBLE SEVERE EOSINOPHILIA INDUCED BY DIMETHYL FUMARATE IN RELAPSING REMITTING MULTIPLE SCLEROSIS

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Background Dimethyl fumarate (DMF) is prescribed for the treatment of adult patients with relapsing remitting multiple sclerosis (RRMS). Although mild to moderate adverse reactions such as flushing and gastrointestinal events are common, haematologic abnormalities may also occur. Haematologic abnormalities are usually of limited clinical relevance. Particularly, transient eosinophilia has been reported within 2 months of DMF treatment, which could lead to significant damage to tissues, skin, airway, gastrointestinal tract, and the cardiac and nervous system.

Purpose This research aimed to clarify the relationship between DMF treatment and the development of severe eosinophilia in RMSS patients.

Material and methods A 25-year-old male RRMS patient, diagnosed in 2007, was treated with interferon beta-1b, natalizumab and glatiramer acetate. In October 2015, the patient switched to DMF treatment due to lesions on MRI. DMF was administered 120 mg once a day for 7 days, followed by 120 mg twice a day for 7 days, 120 mg in the morning and 240 mg in the afternoon for 14 days, and finally the recommended dose of 240 mg twice a day. The patient suffered flushing and gastrointestinal events, commonly associated with DMF treatment, and omeprazole 20 mg twice a day was administered. After 1 month under the recommended dose, laboratory tests showed severe leukocytosis (19420/μL) and eosinophilia (5950/μL). DMF and omeprazole were removed, prednisone 1 mg/kg was administered for 13 days in decreasing doses and laboratory tests were repeated. The relationship between DMF treatment and the appearance of eosinophilia was evaluated using a modified Karch–Lasagna algorithm.

Results The second laboratory tests showed normal levels of eosinophils and the patient did not suffer any tissue damage. According to the modified Karch–Lasagna algorithm, the present case corresponds to a possible adverse reaction (score 4). This reaction was reported to the Regional Pharmacovigilance Centre.

Conclusion In this case, severe eosinophilia could have been caused by DMF, omeprazole or both drugs as omeprazole may also be associated with eosinophilia. Patients treated with DMF and omeprazole could require pharmacovigilance in order to prevent the development of severe eosinophilia.

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No conflict of interest

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Background Lance–Adams syndrome (LAS) is a chronic post-hypoxic myoclonus that may appear after a period of cerebral hypoxia. Many different antiepileptic drugs (AED) have been used for the symptomatic control of LAS. In the absence of response to classic AED, it is necessary to consider new off-label therapeutic options which may cause unpredictable adverse events.

Purpose To present the pharmacotherapy approach to a case of refractory LAS, describing treatment related adverse events and its management.

Material and methods We describe the case of a 35-year-old active male smoker with antecedents of three consecutive cardiac arrests that led to the development of LAS. The clinical information was collected from the electronic medical records (Cerner Millennium). A literature review was conducted looking for evidence of the use of perampanel, 5-hydroxytryptophan (5-HT) and sodium oxybate in LAS. Adverse events information was obtained from the drugs' EPAR.

Results At admission, the patient was treated with levetiracetam, sodium valproate and then sedated with propofol and sodium thiopental. As myoclonus was not controlled, piracetam, zonisamide (to reduce the use of sedative drugs) and clonidine were added to the previous treatment, without obtaining improvement. Sodium oxybate was added, but it was discontinued early due to the risk of respiratory arrest. 5-HT also was added with no significant outcome and severe diarrhoea as an adverse event. Finally, perampanel (24 mg/day—maximum daily dose doubled) was added to the treatment, achieving myoclonus improvement. Simultaneously, the patient had behavioural disorders that were linked with perampanel treatment, needing addition of risperidone. Finally, LAS control was achieved and the patient was discharged with levetiracetam, gabapentin, perampanel and risperidone treatment.

Conclusion The refractory nature of LAS forced the medical team to use off-label drugs and supratherapeutic doses, with increased frequency of adverse events. The drug related events were identified and properly managed, allowing treatment continuation and ensuring patient improvement.

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No conflict of interest

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Background Fampridine is indicated to improve walking in adult patients with multiple sclerosis (MS) and an expanded disability status scale (EDSS) score of 4–7. In order to evaluate continuation of treatment, there should be at least an improvement of 20% in their timed 25 foot walk test (T25FW) after taking the drug for 2 weeks.

Purpose To evaluate effectiveness and safety of fampridine after 2 weeks of treatment in patients with MS in clinical practice comparing our results with those observed in the MS-F203 and MS-F204 pivotal trials.

Material and methods An observational retrospective study was carried out in a cohort of patients (n=55) with MS and EDSS (4–7), treated with fampridine from September 2015 to March 2016. Digitised medical records were obtained (Diraya). Variables were age, type of MS, EDSS, T25FW result at baseline and at 2 weeks, and adverse effects (safety). The response criteria were defined as ≥20% improvement in T25FW.

Results 55 patients were included in the study. Median age was 48 years (34–66), and 71% were women. 44% of patients had relapsing remitting MS, 31% had secondary progressive MS and 25% had primary progressive MS. Median EDSS was 6. The average speed of T25FW at baseline was

39.6 cm/s (0.2 to 108.8) and 62.0 cm/s (15.4 to 148.5) after 14 days of treatment, representing a mean difference of 22.47 cm/s. 80% of patients had an improvement >20% after 2 weeks. 11 patients discontinued after the trial period due to lack of improvement. 20% of patients experienced some sort of adverse effect: instability and lack of coordination (5.4%), headache (3.6%), gastrointestinal disorders (3.6%), dizziness (3.6%), skin injuries (3.6%), insomnia (1.8%), aggression (1.8%) and dizziness (1.8%).

Conclusion Fampridine is proving to be an effective way to increase walking speed with a low incidence of adverse effects. In our study, compared with clinical trials, the results were superior (response rate 80% versus 34.8% and 42.9%), the difference observed between the results leading us to reconsider the objectivity used to assess effectiveness of this drug.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Technical sheet fampridine.

No conflict of interest

CONSOLIDATION OF RADIPHARMACEUTICAL 99MTC-EDDA/HYNIC-TOC IN IMAGING TESTS FOR DIAGNOSIS OF NEUROENDOCRINE TUMOURS

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Background Neuroendocrine tumours (NET) overexpress somatostatin receptors on cell membranes. Imaging tests with somatostatin analogue tracers (SAT) are used for diagnosis and follow-up of NET and their metastases. Current guidelines recommend [111]In(DTPA)-octreotide for this use but new alternatives are available, such as 99mTc-labelled SAT.

Purpose To study the consolidation of 99mTc-EDDA/HYNIC-TOC (99mTc-Tektrotyd) as SAT for the diagnose of NET in our centre.

Material and methods We analysed the requests for 99mTc-Tektrotyd received from the nuclear medicine service from November 2015 to September 2016. This tracer was not commercialised in our country until September 2016, so it was necessary to justify its use to obtain National Medicines Agency approval. We created a database which included: age, diagnose and reasons to justify 99mTc-Tektrotyd use, instead of ^{111}In-labelled SAT in imaging tests. Data were retrieved from electronic health records, including clinical history and nuclear medicine service requests.

Results 32 requests were analysed: 28.125% of patients were <50 years old, 28.125% 50–70 years and 43.75% were older than 70 years. All patients had a NET diagnosis. The reasons for using the 99mTc-Tektroyd contrast were:

- 100% of patients had demonstrated mobility issues, specifically: home away from our centre (37.5%), advanced age (25%), poor health state (18.75%), patient's comfort (6.25%), social issues (3.125%), mental health issues (3.125%) and family issues (3.125%). This was due to the fact that the imaging protocol of 111In is 2 days, 1 day longer than 99mTc-Tektroyd (1 day protocol).
- In 62.5% of cases, clinicians highlighted the importance of the ALARA principle (As Low As Reasonably Achievable) to reduce to a minimum exposure of patients to radioactive

substances. The lower radiation dose associated with 99mTc-Tektrotyd imaging was particularly desirable for patients undergoing repeated scanning, such as cancer patients.

- In 31.25% of cases it was remarked that there was a higher resolution with the 99mTc-Tektroyd contrast, especially depending on the location of the tumour.

Conclusion A 1 day imaging protocol, lower radiation and high resolution are the main reasons that justify the use of 99mTc-Tektrotyd in imaging tests for NET patients. The pharmacy and therapeutics committee will propose including 99mTc-Tektrotyd in our therapeutic arsenal for diagnose of NET in our centre.

No conflict of interest

SIMILARITY ASSESSMENT OF REFERENCE REMICADE (INFLIXIMAB) AND ITS MARKETED BIOSIMILAR INFLECTRA BY MEANS OF AGGREGATES PROFILE OVER TIME AND FREEZE/THAW STRESS

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Background The Inflectra (infliximab) product monograph indicates slightly higher aggregate proportions than the reference product Remicade.

Purpose To evaluate the similarity between the reference Remicade and its marketed biosimilar Inflectra by means of tracking the aggregate contained in several solutions prepared in conditions for hospital use, in a stability study over time stored at 4°C. Similarity of reconstituted medicines regarding aggregate content when subjected to freeze/thaw cycles was also assessed.

Material and methods Two vials of Remicade and Inflectra were used. Three concentrations (10 mg/mL reconstituted with water, and 5 mg/mL and 2 mg/mL in NaCl 0.9%) were analysed. The aggregates profile was obtained by size exclusion high performed liquid chromatography with diode array detection (SE-HPLC-DAD). Samples were analysed immediately after the solutions were prepared and the chromatographic aggregate profiles recorded were compared with those obtained periodically in the samples stored at 4°C for up to 15 days and in the samples which underwent several freeze (−20°C)/thaw cycles.

Results Aggregate chromatographic profiles clearly indicated the presence of aggregates in reconstituted (10 mg/mL) and diluted 5 mg/mL Inflectra samples as natural infliximab aggregates. No aggregates were detected in the 2 mg/mL dilution. These profiles were unchanged over time, and for the freeze/thaw cycles of the reconstituted samples. For Remicade, no aggregates were detected in the chromatographic profiles until day 15; and no aggregates were detected for the reconstituted samples after the freeze/thaw cycles.

Conclusion Remicade and its biosimilar Inflectra showed slight differences regarding aggregates, with natural aggregates in Inflectra that persisted in dilutions up to 5 mg/mL and over time when stored at 4°C. Inflectra seemed to be more stable regarding the aggregation process, since the aggregation profiles remained unchanged over the time period. Remicade

suffered some degradation that led to the formation of aggregates on day 15 day after preparation of the solutions. No new aggregation was induced in both medicines after five cycles of freeze/thaw. Therefore, and despite the initial slightly higher content of aggregates in Inflectra, in use stabilities of the biosimilar and the reference medicine were similar.

No conflict of interest

General management

GM-001 | **PRACTICAL IMPLICATIONS IN SHELF-LIFE EXTENSION OF ANTICANCER ADMIXTURES**

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Background Compounding units assigned a restrictive shelf-life for anticancer admixtures results in economic loss due to wastage of partially used vials. Novel approaches in the preparation of doses are continually sought which ensure maximal drug utilisation without compromising patient safety.
Purpose To perform cost analyses of captured and retrospective cytotoxic waste data and delineate the risks and benefits associated with shelf-life extension.
Material and methods For the observational model, fieldwork was conducted over 2 months in a cross sectional study at two public hospitals which have cytotoxic units, covering haematology and oncology care. Data were recorded by means of a validated data collection sheet. Retrospectively, 22 796 doses were evaluated from logbook databases for the same year. Three distinct preparation scenarios, comprising individualised, same day grouping and weekly grouping of doses, were constructed for the agent established as the top contributor to the overall wastage sum. The economic impact for each scenario was computed. Volumetric and dosage values were translated to costs for all phases. Quality assurance pharmacists and literature were consulted to assess the feasibility of extending stability time frames.
Results Retrospectively, 36 prescribed agents, including cytotoxic (n=34) and biological (n=2) therapies, satisfied the inclusion criteria. Logged wastage for both institutions amounted to € 10 380, with an annual extrapolation of € 220 000. Retrospective waste costs (€ 301 138) exceeded the projected figure by 36.8%. This sum represents approximately 7.2% of the annual expenditure on anticancer parenterals (€ 4.2M). Bortezomib (43%, € 77 314) at the haematology section and trastuzumab (58%, € 70 176) at the oncology unit were the predominant accountable agents. Over 70% of the total waste expense was attributed to six agents, namely bortezomib, trastuzumab, fludarabine, pegasparaginase, pemetrexed and rituximab. For bortezomib doses, the advanced weekly preparation yielded annual savings of more than € 40 000 compared with the current same day grouping sessions. Advanced preparation offers the additional advantages of streamlined workflow, diminished cytotoxic errors and

reduced treatment delays. Reported barriers were mostly related to concerns on stability and sterility.
Conclusion The percentage waste cost from global budget surpassed those determined by other studies. Shelf-life extension facilitates grouping of antineoplastic doses, leading to significant recovery of waste. Measures must regard economic considerations in light of logistical and patient factors.

No conflict of interest

GM-002 | **TRAINING OF HEALTH PROFESSIONALS IN THE GOOD USE OF INSULIN: SATISFACTION SURVEY**

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Background Insulin is one of the high risk drugs. In hospitals, low level of information of nursing staff is identified as a risk factor for poor glycaemic control and more severe iatrogenic events. Therefore, practical training conducted by a diabetologist and a pharmacy resident was proposed for nurses. This training concerns the management of poor glycaemic control and the appropriate use of insulin in acute situations.
Purpose The aim of this study was to assess the usefulness of this training for nurses.
Material and methods A questionnaire was developed to evaluate the satisfaction of nurses participating in the training. It contained 7 questions on training documents, content and themes that nurses would like to see improved.
Results 17 nurses from 7 different care units replied to the questionnaire. This training was considered as 'very useful' by 11 nurses (65%) and 'indispensable' by 6 nurses (35%). 14 nurses (82%) 'fully agreed' that this training had allowed expansion of their knowledge and 3 nurses (18%) 'rather agreed'. All said they had acquired new knowledge, especially about insulin administration, transport and storage modalities (6 nurses, 35%) or management of poor glycaemic control (9 nurses, 53%). 15 nurses (88%) had no need to address other topics. 2 nurses thought that some matters could have been explored more, such as actions to be taken in case of emergency, different types of insulin and handling of insulin pumps. All affirmed that this training will lead to a change in their practices.
Conclusion This training was considered necessary and satisfying by all nurses. Some areas need to be explained more. Training sessions will be established regularly, and their impact may be assessed by a practice audit. Finally, collaboration between diabetologists and other care units will be considered to develop protocols for management of emergency situations.

No conflict of interest

GM-003 | WITHDRAWN

citalopram or escitalopram 10 mg doses. A letter to primary care physicians was sent informing patients exceeding the recommended dose to have a re-evaluation of their treatment. In January 2016, patients were reviewed to assess whether there had been a change in dosage and to check if the recommendations of the pharmacist had been accepted. Acceptance of pharmacist recommendation was considered when the dose exceeding the maximum recommended was decreased. The reasons for discontinuation of treatment were suspension or death.

Results The public health centres provide services to 255 000 inhabitants. Patients receiving higher than recommended doses: 292 (180 citalopram, escitalopram 112); patients treated with citalopram: 2 patients received 60 mg, 14 patients received 45 mg, 3 patients received 40 mg and 161 received patients 30 mg; for escitalopram: 2 patients received 30 mg, 53 patients received20 mg and 57 patients received 15 mg. In January 2015: patients were treated with doses that exceeded the recommended: 292 (180 citalopram, escitalopram 112); patients treated with citalopram: 2 patients with 60 mg, 14 patients with 45 mg , 3 patients with 40 mg and 161 patients with 30 mg; for escitalopram: 2 patients with 30 mg, 53 patients with 20 mg and 57 patients with 15 mg. After the recommendation: 109/292 (37%) had the recommended dose. Patients receiving higher than recommended doses: 132/292 (45%) of which 75/180 (42%) patients were receiving citalopram and 57/112 (51%) escitalopram. 3/292 (1%) had their dose increased and 13/292 (4%) their dose decreased but the dose was still above the maximum recommended. In 35/292 (12%) patients treatment was suspended and 16/292 (6%) patients died.

Conclusion Work in multidisciplinary teams promotes the proper use of medicines, thus increasing patient safety. Therefore, it would be appropriate to enhance the joint efforts between pharmacists and physicians.

No conflict of interest

GM-004 | **THE USE OF SELECTIVE SEROTONIN REUPTAKE INHIBITOR CLASS IN HELTH CENTRES. A PROSPECTIVE ANALYSIS**

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Background The use of citalopram and escitalopram has been associated with QT interval prolongation. Therefore, AEMPS published an alert in October 2011, recommending that the highest dose used in patients with liver dysfunction and patients >65 years should be 20 mg/day and 10 mg/day, respectively.

Purpose To evaluate if this recommendation was accomplished in our public health centres and the effect of pharmaceutical intervention.

Material and methods In January 2015, we searched MicroStrategy software in the area of the health centres to analyse patients over 65 years receiving more than 20 mg of

GM-005 | WITHDRAWN

were 5.2 (SD 0.7), 3.03 (SD 2.3) and 3.5 (SD 1.7) points, respectively. Overall, 66% of pharmacists provided recommendations about the use of aspirin (19, 38%) and Crestor (14, 28%). Only 1 pharmacist performed a CVD risk calculation. Lack of support and lack of resources were the two main barriers for the provision of CVD risk assessment.

Conclusion Many pharmacists are missing the opportunity to provide CVD prevention services, such as CVD risk assessment, cardiovascular health advice and appropriate referrals to other healthcare providers to initiate appropriate risk factor management strategies. The results suggest the need for developing a training programme for improving community pharmacists' knowledge and skills associated with CVD screening strategies and risk factor management.

Conflict of interest:

GM-007 | AN ECONOMIC ANALYSIS OF THE INTRODUCTION OF A WARD BASED 'DISPENSING FOR DISCHARGE' PHARMACY TECHNICIAN MEDICINES MANAGEMENT SERVICE

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Background Most hospitals throughout the UK now use a 'dispensing for discharge' model for issuing medication to inpatients. There is significant evidence of substantial improvements in productivity and service delivery, but little evidence of financial savings currently exists. The data presented here aim to address the lack of financial evidence for this model.

Purpose To elucidate the drug cost benefit of introducing a pharmacy technician led 'dispensing for discharge' service. To prove that the service was cost beneficial after accounting for all associated staffing costs.

Material and methods Admission data derived from the hospital patient administration system were combined with pharmacy drug expenditure data. The data were then analysed to establish the drugs costs for all admissions to the two acute respiratory wards which had implemented the 'dispensing for discharge' service, versus two acute respiratory wards not running the ward based technician service. Data were reviewed for a period of 6 months from April 2015 to September 2015.

Results The results showed that the two 'dispensing for discharge' intervention wards had lower drug expenditure compared with the same months from the previous financial year: ward 1 had spent £9045 less and ward 2 had spent £12 743 less, for a combined total of £21 788 less. The non-intervention wards had higher drug expenditure compared with the same months from the previous financial year: ward 3 had spent £7972 more and ward 4 had spent £ 2225 more, for a combined total of £10 196 more. This resulted in a cumulative saving of £31 984 for the 6 months studied. This would equate to an estimated total year saving of £63 968. This was sufficient to offset all staffing costs associated with

GM-006 | EVALUATION OF COMMUNITY PHARMACISTS' PREPAREDNESS FOR THE PROVISION OF CARDIOVASCULAR DISEASE RISK ASSESSMENT AND MANAGEMENT SERVICES: A SIMULATED PATIENT STUDY IN QATAR

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Background A significant proportion of individuals who suffer from major cardiovascular events every year have one or more risk factors. Cardiovascular disease (CVD) risk assessment is an important strategy for the early identification of modifiable risk factors and their management. Shifting the focus from treatment to primary prevention is shown to reduce the burden associated with CVD.

Purpose To evaluate the overall preparedness of community pharmacists in (country X) for the provision of CVD risk assessment and management. Primary outcome measures: pharmacists' competencies and preparedness (readiness to assess CVD risk). Secondary outcome measures: (i) pharmacists' engagement (willingness to engage in a discussion about CVD risk factors); (ii) community pharmacy setting suitability; and (iii) pharmacists' opinions on the barriers for provision of such services in community pharmacies.

Material and methods A cross sectional study of pharmacists working in community pharmacies was conducted. Simulated patients approached pharmacists, using a standardised scenario, for consultation on two medicines used for managing specific CVD risk factors. Scores for each outcome were obtained based on the number of predefined statements addressed by the pharmacist during the consultation (maximum scores; for engagement (7), for risk assessment (16), for management (8) and total score (31) points).

Results The mean total score was 11.68 points (SD 3.7). The mean for engagement, risk factor assessment and preparedness

implementing the service and resulted in a small financial gain. This analysis does not take into account the wider financial impact, or quality improvements gained from increased patient service provision, safety and efficiency delivered by the ward based service.

Conclusion This analysis shows that the drug cost savings associated with the ward based technician service was sufficient to fully fund all associated staffing and setup costs, resulting in significant patient service improvements with no financial burden to the organisation.

No conflict of interest

BUILDING A REALISTIC AND CHALLENGING CONTINUOUS PROFESSIONAL DEVELOPMENT PROGRAMME IN ONCOLOGY FOR HOSPITAL PHARMACY TECHNICIANS

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Background Continuous professional development (CPD) has been mandatory for hospital pharmacy technicians (HPT) since 2009 in France. Its implementation is complex and faces many challenges: limited budgets and resources, expectations of adult learners, complexity of the continuing education system, limited number of programmes, tight schedules and heterogeneity of the continuing education system.

Purpose Our work focused on building a CPD programme in oncology that is realistic and challenging for HPT.

Material and methods For this project we used the model of educational engineering recommended by the High Authority of Health called 'ADDIE' (5 stages: analysis, design, development, implementation (setting-up) and evaluation (assessing)).

Results Conducting a survey among HPT highlighted two priorities: pharmacology of anticancer agents and risk management, and problems with non-compliance. The selected pedagogy is 'blended learning', which combines e-learning (24 e-courses with e-tests of 15 min), workshops and simulations (5 of 45 min each). The study of basic neuroscience led us to choose varied, short and repeated educational contents. The development of the pedagogical tools in seeking to minimise cost was € 100/year. The A proposed schedule was as follows: September 2016, training and platform test; October 2016, finalisation of the programme; January 2017, CPD label application filing and launch after completion. The test platform has been well received and no major issues were raised. This method creates a custom programme tailored to the needs and expectations for a low financial cost. This still requires monitoring, animation, minimal funding and obtaining the CPD label.

Conclusion The first results of a satisfaction survey on one of the test modules are encouraging, but continuation of this project requires maintenance of the training programme over time as well as coupling to its CPD certification with the allocation of minimum maintenance funding. One could imagine the creation of a national platform on this model, open to all health professionals to pool resources and promote training.

No conflict of interest

ROLE AND IMPACT OF HOSPITAL PHARMACY TECHNICIAN: A LITERATURE REVIEW

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Background Pharmacy practice is based on collaboration between pharmacists and pharmacy technicians. Better knowledge of the roles and impacts of the pharmacy technicians can involve better organisation of pharmaceutical activities and improved patient care. There are numerous studies and literature reviews published about the roles and the impact of pharmacists. What about pharmacy technicians?

Purpose This literature review aimed to describe and assess the roles and impact of hospital pharmacy technicians.

Material and methods A literature search was conducted on PubMed ('pharmacy technician (all fields) OR pharmacy technicians (all fields)') from 1 January 1996 to 29 April 2016. French and English articles describing the roles and impact of hospital pharmacy technicians were considered. The selection of articles was based on title followed by abstracts and then entire articles. Data extraction (ie, country, journal, type of study, activities, indicators and impact) was performed by two authors and supervised by one reviewer. For each article included in the analysis, all relevant activities were identified. Key indicators that document the impact of the pharmacy technician with statistical analysis or with only quantitative or qualitative metrics were identified and categorised as mortality, morbidity, adverse effects, adherence, medication errors, costs, satisfaction and others. No statistical analysis was conducted.

Results A total of 36 articles were included. The majority of articles were published in the USA (58%, 21/36). Articles were classified into eight pharmacy technician activities: technical support to specific clinical pharmacists activities evaluated in 22 articles with 21 indicators, medication reconciliation activities (n=19 articles/n=12 indicators), support to patient counselling activities (n=9/n=10), drug procurement (n=8/n=9), tech-check-tech activities (n=4/n=6), drug dispensing activities (n=3/n=4) and other activities (drug administration, follow-up phone call, etc) (n=7/n=11). 17 articles included a positive impact of pharmacy technicians for a total of 31 indicators. These indicators were related to medication errors (n=10), morbidity (n=3), costs (n=2), adherence (n=1), satisfaction (n=1) and others (number of patients, time spend, etc) (n=14). No included article reported a negative impact of pharmacy technicians.

Conclusion There is an emerging literature about the roles and impact of pharmacy technician and they can have a positive impact in the drug use process.

No conflict of interest

GM-010 THE IDIOPATHIC PULMONARY FIBROSIS PATIENT ITINERARY: A COOPERATIVE WORKING METHOD BETWEEN HOSPITAL PHARMACISTS AND PULMONOLOGISTS IN SPAIN

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Background Idiopathic pulmonary fibrosis (IPF) is a rare, progressive and severe disease characterised by a progressive decline in lung function, with a dismal median survival of 3 years. Despite the recent introduction of antifibrotic agents, there was no standardised collaborative disease management pathway for IPF that described the IPF clinical pathway from the therapeutic decision to drug delivery and patient follow-up for both hospital pharmacists and pulmonologists.

Purpose The objective of the project was to propose a cooperative working method between pulmonologists and hospital pharmacists, share experiences to stimulate cooperation and establish, for the first time, a disease management pathway for IPF patients.

Material and methods Six workshops involving 34 hospital pharmacists and 14 pulmonologists were organised between November and December 2015 across Spain to discuss and share views on the IPF patient pathway and depict the involvement of the hospital pharmacist throughout the patient journey in terms of objectives, tasks and recommendations. The project was supported by the Spanish Society of Hospital Pharmacy and the Spanish Society of Pulmonology and Thorax Surgery.

Results A consensual IPF patient pathway was established and divided into four phases: (1) detection of IPF cases; (2) diagnosis and treatment selection; (3) initiation of pharmaceutical treatment; and (4) patient follow-up. A number of activity checklists were established for each phase and for each healthcare professional. Direct involvement of hospital pharmacist was described for 29 activities. 4 (14%) were related to inhospital interdisciplinary contributions while 25 (86%) were directly related to interactions with patients. In 17 cases (58%) information generated from the hospital pharmacist could be shared with the pulmonologist to take therapeutic or educational decisions.

Conclusion The elaboration of activity checklists will facilitate the implementation of the consensus document. A closer collaboration between hospital pharmacists and pulmonologists will result in helping choose the most adequate treatment, speeding up treatment initiation, optimising the treatment, better accompanying the patient and fostering an effective communication between professionals. In the future, it will be important to quantitatively assess the importance of pharmaceutical care in IPF patients.

Conflict of interest:

GM-011 CONTAMINATION WITH CYTOSTATICS IN PHARMACIES AND HOSPITALS IN OUR COUNTRY

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Background Monitoring of contamination with cytostatics has been required by law in our country for several years. However, it was put into practice thanks to the CYTO project that was managed by our pharmacy in 2006–2010.

Purpose The use of cytostatic drugs has been rising in our country. While in 2010 our pharmacy compounded 23 000 bags and syringes, this amounted to 38 000 in 2015. Therefore, regular monitoring of contamination at all work sites involved in compounding or administration is important. The level of contamination should be monitored both in the pharmacy and in the wards. Since 2007, measurement of cyclophosphamide (CP) and platinum cytostatic (Pt) contamination has been available. Since 2015, measurement of 5-fluorouracil (FU) has been also possible. These drugs belong to the most frequently used cytostatics (together they represent 49.0% of compounded units).

Material and methods Sampling of surfaces is performed with unwoven textile moistened by acetate buffer. CP and FU were analysed by high performance liquid chromatography (Waters UPLC Aquity with Xevo TQ-S Agilent mass detector), and Pt were analysed by mass spectrometry with inductively coupled plasma (Agilent I CP-MS 7500).

Results Higher contamination was generally found in hospital wards and compounding units. Maximal detected levels of FU on floors: hospitals, 775 pg/cm^2 (median 189.7 pg/cm^2); pharmacies, compounding units, 564 pg/cm^2 (median 3.6 pg/cm^2); and pharmacies, storage rooms, 25 pg/cm^2 (median <7 pg/cm^2). Maximal detected levels of CP on floors: hospitals, 3244 pg/cm^2 (median 101.9 pg/cm^2); pharmacies, compounding units, 638 pg/cm^2 (median 5.8 pg/cm^2); and pharmacies, storage rooms, 235 pg/cm^2 (median <1 pg/cm^2). Maximal detected levels of Pt on floors: hospitals, 5390 pg/cm^2 (median 47 pg/cm^2); pharmacies, compounding units, 84 pg/cm^2 (median 0.9 pg/cm^2); and pharmacies, storage rooms, 57 $pg/cm2$ (median <0.2 pg/cm^2).

Conclusion Measurement of contamination raised information about the level of health risk of healthcare personnel handling cytostatics (pharmacists and nurses). Hospital pharmacists can reduce contamination on their work sites and they should cooperate with wards. Preventive measures that are able to decrease contamination in wards include branched infusion lines, wall connected infusion poles instead of stands, and self-cleaning toilet seats.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

GM-012 PHARMACOECONOMICS EVALUATION OF IMPLEMENTATION OF SELECTIVE DIGESTIVE TRACT DECONTAMINATION FOR PREVENTION OF VENTILATOR ASSOCIATED PNEUMONIA IN A CRITICAL CARE UNIT

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Background Selective decontamination of the digestive tract has been proven to be the best measure to prevent ventilator associated pneumonia (VAP) and the only one that has demonstrated modest reductions in mortality. The preparations are typically non-absorbable, topical admixtures of antibiotics with broad spectrum activity administered either orally and/or enterally applied as an oropharyngeal paste (OP), or as a suspension (decontamination of the digestive tract suspension, DDS).

Purpose The purpose of this study was to analyse the composition, costs of acquisition or elaboration at the pharmacy department (PD) of these preparations to determine the most cost effective option and the annual economic impact of the implementation of this new measure at the anaesthesia critical care unit (ACCU).

Material and methods We conducted a literature research and analysed if the preparations could be acquired through a regular provider (A) or had to be made at the PD (B). To determine the costs if the preparations were made at the PD, we considered the total costs of raw materials, packaging materials, consumables and staff time.

Results We found that antibiotics commonly used were tobramycin, colistin and anfoterincin B (or nystatin instead), and vancomycin was added in the case of methicillin resistant *Staphylococcus aureus*. We agreed with the ACCU for the PD to provide tobramycin, colistin and nystatin. Preparation costs/acquisition were: OP: € 1.43/g A; € 0.12/g B; and for DDS: € 4.42/10 mL A; € 0.70/10 mL B. Regarding the annual consumption, estimating the average of intubated patients per day and the dosage (10 mL DDS every 8 hours and 5 mL orally every 8 hours, equating to 4.58 g B and 1.6g A), we estimated the costs on: € 1.556 if we made it and € 36.234 if we acquired it. We agreed with the ACCU for the PD to provide these preparations as it may result in estimated annual saving of € 24 678.

Conclusion After analysing the composition, costs of acquisition or elaboration at the PD, we concluded that the elaboration of OP and DDS at the PD significantly saved costs compared with the acquisition of both preparations already commercialised. This implies optimisation of resources, one of the main objectives of healthcare management.

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No conflict of interest

GM-013 PHARMACEUTICAL SUPPORT ROLE OF HOSPITAL PHARMACY DEPARTMENT IN CENTRAL ITALY EARTHQUAKE

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Background An earthquake, measuring 6.2 on the moment magnitude scale, hit central Italy on 24 August 2016 at 3.36am. Its epicentre was close to Accumoli, in the central Apennines. The intrahospital emergency plan for massive inflow of injured patients was activated and at least 365 wounded had to be treated, mainly in Ascoli Piceno and less in Rieti, while people with less serious injuries were treated in place.

Purpose The aim of this study was to determinate the pharmaceutical response level to the disaster and its accuracy. The rationality of drug use needs to be discussed to determine if it was functional. Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements (WHO, May 2010).

Material and methods The study analysed the pharmacy's role and its work shifts, including the main types of drugs used in the hospital, which was the nearest to the epicentre of the earthquake. This was based on analysis of informatic records of drug transfer during the first week after the earthquake. Furthermore, through the management software, the rapidity of emergency drug purchase and delivery was determined.

Results Ascoli Piceno's pharmaceutical department staff had been working at 6am in order to satisfy the needs of the emergency units, during a continuous 60 hour work shift. For analyse of urgent needs, several inspections at the earthquake site had been carried out by pharmacists. They had supported every medical unit in the Marchigian territory that had requested pharmaceutical care, suggesting and supplying drugs such as metronidazole, levofloxacin and clindamycin, the most frequently asked for antibiotics. Other drugs used were volume expanders, tranexamic acid, furosemide, dexamethasone, atropine, adrenaline, dopamine, tetanus antitoxin, lidocaine and nitroglycerine. These data suggest that the use of drugs was consistent with the recommendations of WHO. The pharmacy quickly made several emergency purchases, informing the supply companies immediately. The materials arrived in 24 hours from order.

Conclusion There is no doubt that pharmacists played an important role in promoting rational drug use and in satisfying the need of the emergency units in a professional way in the medical response to the earthquake. Pharmacists also provided drug information.

No conflict of interest

GM-014 INITIATING DRUG MANAGEMENT AT SOCIO-SANITARY CENTRES FROM A HOSPITAL PHARMACY SERVICE

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Background New regulations about residential social-sanitary centres (SSC) state that more those with more than 50 beds should be linked to the Andalusian Health System Hospital Pharmacy Service that corresponds to their health district.

Purpose To analyse the requirements for initiating drug management at SSC from a hospital based pharmacy service.

Material and methods A descriptive cross sectional study was initiated in September 2016 to analyse how best to organise the management of drugs in a new work setting. This new activity was created to adapt to the 512/2015 decree on pharmaceutical provision at SSC in Andalusia, to comply with the 16/2012 real decree (20 April) on emergency measures to guarantee sustainability in the National Health Service and to improve quality and safety in drug provision.

Results An SSC was chosen to pilot this activity is a public health centre with 150 beds of which 50.6% were occupied. Of those occupying beds, 48% were residents requiring assistance and the rest were autonomous. Staff at the centre consisted of 1 doctor, 18 nursing assistants and 3 SSC staff personnel. The activities that the hospital pharmacy service had to undertake on behalf of this new work setting were: (1) procedures for the supply, storing, distribution, availability and administration of drugs; (2) instructions for the conservation, access, availability and relocation of drugs (including narcotics, psychotropic drugs and other drugs requiring strict control); (3) preparation of drugs in single doses; (4) pharmaceutical care protocols for the detection and monitoring of drug related problems; (5) a data system for the management of prescriptions, dispensing and monitoring of pharmaceutical interventions; and (6) a contingency plan for emergency situations. We have held two meetings since the start of October, with centre managers and clinical practitioners, with more meetings scheduled as the process continues.

Conclusion Pharmaceutical care at the SSC is fundamental for compliance with decree 512/2015, as well as a more efficient management of drug related resources. On initiation, it is vital to analyse and itemise all aspects of implementation in order to study the critical points of this new activity. For hospital pharmacists in Andalusia, this is a new field of professional activity.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Decree 512/2015. Real decree 16/2012.

No conflict of interest

GM-015 ASSESSING SATISFACTION OF INTERNAL AND EXTERNAL CUSTOMERS OF A THIRD LEVEL HOSPITAL PHARMACY SERVICE

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Purpose To assess the satisfaction level with our service's internal and external customers in order to make improvements and compare current results with those from 2013.

Material and methods Following our hospital pharmacy quality standards procedures, a series of anonymous, voluntary satisfaction surveys were carried out. The survey for internal customers (doctors and nurses) measured their global opinion, organisation, accessibility and ability of response via 9 questions, with 5 options each, scaled from highly satisfactory to fully unsatisfactory. The external customers' survey contained 11 questions about accessibility, waiting times, quality of information given and ease of contact. Data were compiled between 26 October and 3 December 2015.

Results 54 completed surveys were available from doctors (27%), 48 from nurses (24%) and 67 from outpatients (44.7%). 76.3% of doctors gave a high satisfaction level (satisfactory or highly satisfactory, scores 4 and 5), a higher proportion compared with 2013 (65.0%). The top rated item was the global opinion on the service, and the lowest items were those related to knowledge offered and the current state of prescription (dispensation–administration circuit). In consequence, we proposed actions such as computer provided order entry (CPOE) implementation and information circuit improvements. Nurses also reported being satisfied with our service (56.7% scores 4 and 5, slightly higher than the results in 2013 (54.8%)). Personal care and response ability were the top rated items, response time being the one that received the worst scores. We propose increasing the number of dispensing time slots, to improve our information circuits, and to request a new watchman to improve medication intrahospital logistics. Regarding patients, most gave high satisfaction scores for all items, higher than those in 2013. We decided to implement a patient citation system to shorten waiting times. In all three surveys we observed a growing trend in satisfaction.

Conclusion Surveying satisfaction levels allows us to identify improvement areas, to assess if previously taken measures had increased customer satisfaction about our service. Actions taken after this series of surveys need to be followed-up to make sure they are properly applied and give the expected results.

No conflict of interest

GM-016 ECONOMIC IMPACT OF IMPLEMENTING ELECTRONIC PRESCRIPTION OF ENTERAL NUTRITION AND DIETOTHERAPEUTIC TREATMENTS

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Background Electronic prescription was traditionally used in our country by primary health centres but it has also been progressively introduced into hospitals. This has had an economic impact on some products, such as those used in artificial home nutrition.

Purpose To assess the economic impact arising from electronic prescription of diet products at a specialty hospital.

To establish effective measures to compensate for the economic impact resulting from the transfer of responsibilities from primary health care to hospital care.

Material and methods Retrospective observational study of the increase in spending and number of prescriptions for diet products in outpatient clinics and on hospital discharge. The period from November 2014 to October 2015 was compared with an equivalent period from the previous year. These data were then correlated with percentage of implementations of the electronic prescription module. Prescription details, number of prescriptions and costs were retrieved from the Microstrategy assistance application. The data were broken down by medical service, prescriber and product.

Results After analysing the data, an increase in home prescriptions for diet products was found: the number of prescriptions rose by 45.24%, which caused a total increase in costs of 55.14%. These data are explained by a higher degree of implementation of the electronic prescription module (88% in 2014 vs 98.28% in 2015), as well as greater flexibility in computer based procedures for visa issuance. The endocrinology department was responsible for 66.9% of diet product spending. We observed a greater increase in prescription of complete formulae for diabetics (99.08%); polymeric, normoproteic, normocaloric, fibre-free formulae (538.46%), and hypercaloric, fibre-rich formulae (149.36%). A project was developed to incorporate the pharmacist into the visa circuit, in order to ensure efficient management of diet products in compliance with national legislation. To accomplish this goal, the unit of clinical management of pharmacy undertakes the management of visa approval for diet products.

Conclusion Prescribing via electronic prescription has involved an increase in spending on artificial home diet at our centre. Incorporating a hospital pharmacist into the visa circuit might optimise usage of dietary therapeutic products, thereby ensuring compliance with safety and efficacy criteria, as well as appropriateness of treatment and patient follow-up.

No conflict of interest

GM-017 | **THE ANNUAL COSTS OF PREPARING THE TOP 10 MOST COMMONLY USED INJECTABLE DRUGS AS PREFILLED SYRINGES IN A HOSPITAL PHARMACY**

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Background In The Central Region we are now in the process of building a new hospital. The hospital intends to supply the wards with ready to use drugs and our primary task is to design a facility with sufficient capacity to meet their future demands. The hospital pharmacy made a business case investigating the costs/benefits of buying and operating a syringe filler at the pharmacy, focusing on the top 10 most commonly used injectable drugs.

Purpose The primary purpose of the business case was to estimate the requirements for capacity needed at the pharmacy regarding personnel, equipment and production facilities. The secondary purpose was to estimate the running costs of production, following regulations of EU-GMP rules concerning production, batch release and stability testing.

Material and methods We had four inputs to take into account: (1) baseline data from the wards; (2) fluctuation in daily use; (3) economy regarding production with longer shelf-life; and (4) new technology (equipment, usable syringes). On the basis of the first two inputs, knowledge about production time of prefilled syringes, need for facilities, personnel, equipment and stability data were calculated as an initial investment and running costs per year.

Results We calculated an annual production requirement of 120 000 prefilled syringes using a semi-automated machine to transfer it into syringes. This amount of syringes demands 9 full years' work for 1 person. The initial investment cost amounts to € 540 000 and the running costs to € 975 000 a year.

Conclusion Based on the results, the hospital board has found the concept very interesting, but cannot currently meet the monetary requirement for investment.

No conflict of interest

GM-018 | **SHARING DRUG INFORMATION TO OPTIMISE PRESCRIBING AND ADMINISTRATION OF MEDICINES FOR HOSPITALISED PATIENTS: FROM THEORY TO DAILY PRACTICE**

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Background 49% of adverse drug events are due to ordering and prescribing errors. Pharmacists play a key role in providing drug information to other caregivers to reduce adverse events and improve patient safety.

Purpose Analysis of pharmacists' interventions during drug order validation after implementation of standardised drug information in a computerised physician order entry system (CPOE). To evaluate its added value and further information needs.

Material and methods Integration of structured and standardised drug information in a CPOE system and on the hospital's intranet was performed in a 500 bed regional hospital. Implementation of systematic drug order validation prior to dispensing by trained hospital pharmacists was studied in a retrospective analysis of pharmacists' interventions.

Results To guide prescribing, we translated existing predefined drug orders in our CPOE as part of a preliminary clinical decision support system. These schemes comprised multiple drugs in relation to specific procedures or diagnosis (eg, postoperative pain protocols) and schemes for intravenous (IV) drug administration (including correct infusion bag and duration of administration). In addition, drug specific information concerning crushing of oral dosage forms, schemes for IV drugs, antibiotic monographs and leaflets for new formulary drugs were made available on the hospital's intranet. Prior to drug dispensing, the pharmacist performs a systematic drug order validation, with the aid of the integrated drug information. The pharmacist checks, among other items, correct drug dosing and administration modalities, drug therapy in relation to known drug allergies and contraindicated drug interactions (eg, meropenem–valproate, low molecular weight heparin (LMWH) at the same time as novel anticoagulants (NOAC)).

Over a 4 month period, 119 pharmacists' interventions were registered. Most common reasons for intervention were adjustment of drug dose or frequency (31%), drug prescribed for which an allergy was documented in the medical record (21%), adjustment of IV drug administration (16%), duplicate therapy (16%) and LMWH–NOAC interaction (8%). Overall acceptance rate of pharmacist advice was 88%.

Conclusion Integration of standardised drug information in existing computerised systems in combination with patient tailored advice by the hospital pharmacist improves the quality and safety of drug orders and administrations for hospitalised patients. Analysis of pharmacists' interventions provides valuable information to continuously improve our drug information service.

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No conflict of interest

GM-019 | ANALYSIS OF THE CATEGORIES OF CLINICAL TRIALS IN AN ONCOLOGICAL INSTITUTE: GLIMPSE INTO THE FUTURE

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Background Clinical trials represent the future scenario of new therapeutic opportunities and treatments and may be used to implement good governance and to formulate prospective budget impacting on the health sector. In this case, an analysis of clinical trials and trend treatments can represent a useful instrument for drug governance and definitions of budget provisions.

Purpose The aim of this work was to create a database to identify trends in future treatments using clinical trial data. The database will be used in prospective budget analysis.

Material and methods We used 4D software to extract clinical trial records of studies proposed to our Institute from 2013. After this we compiled an ex novo database containing all studies subdivided into: disease, drug type, association trials and/or comparison studies, phases of clinical trial and other information. Observational, surgical, diagnostic and non-pharmacological clinical trials were excluded. We analysed and summarised the data with Excel.

Results The sponsors proposed 495 pharmacological interventional studies to our institute. The most represented disease was lung cancer (n=98), followed by breast cancer (n=92), gynaecological cancers (n=40) and haematological cancers (n=38). The types of drugs were distributed according to the following percentages: small molecules 31.9%, chemotherapy 27.7%, immunotherapy (including checkpoint inhibitors) 18.6%, antibodies 11.7%, hormonal therapy 6.4%, radiopharmaceuticals 1.0%, biosimilar drugs 1.4% and others 1.3%. 12.5% of the total studies were phase I and I/II (of which 43.6% were small molecules, 27.3% were immunotherapy). 29.5% of all clinical trials dealt with drug association, while 25.5% were comparison studies.

Conclusion From this analysis we infer that there is evidence of a huge trend towards immunotherapy clinical trials with checkpoint inhibitor drugs. Most of the studies proposed were early phases and dealt with comparison of different treatments. The database created had been referenced in terms of budgets for different units of our institute. From this analysis we identified critical elements impacting future budgets. Through this work we are able to highlight some innovative spending indicators based on clinical trial analysis.

No conflict of interest

GM-020 | OPTIMISING THE SUPPLY CHAIN OF MEDICAL DEVICES: PHARMACEUTICAL CLASSIFICATION AND QUALITY MANAGEMENT

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Background The hospital pharmacy is in charge of providing pharmaceutical products for 1200 hospital beds dispatched across more than 46 care units. It covers a large rank of references arranged arbitrarily. This lack of standardisation in the medical devices classification can cause sudden shortages and disturbances in space management.

Purpose The aim was to implement progressively a quality management system by building storage mapping related to both risk based classification of medical devices and their medical specialty panels.

Material and methods The superficies of storage stores were calculated through development plans. To classify and organise medical devices, two programmes were used: Microsoft Excel 2010 and ARCHICAD19. The dimensions of the secondary and tertiary packaging of each medical device, shelves and storage pallets were measured. Other parameters were also calculated: packaging volume, average monthly consumption, volume of average monthly storage and number of average monthly consumption in 1 year, and the effective storage capacity (ESC) of each storage store.

Results The ESC of storage store were, respectively, 552.20 m^3 for fungible, 227.68 m^3 for products accessories for medicine and pharmacy (PAMP) and 38.80 m^3 for surgical sutures. 14 medical specialty panels composed fungible storage store. Their distribution was as follows:

- Fungible 79%:
  - Surgical panel 63%, including the following surgeries: general, thoracic, cardiovascular, surgical drainage, visceral, orthopaedic and traumatology and neurosurgery.
  - Respiratory panel 16%
  - Urogenital panel 6%
  - Gastric panel 5%
  - Parenteral panel 4%
  - Spinal panel 1%
  - Other accessories 5% (eg, review and monitoring–operating kits–accessories infusion and transfusion divers)
- PAMP 8%
- Surgical sutures 13%.

These statistics are also converted in space occupancy percentage.

Conclusion The new classification has helped to build storage mapping of medical devices, which has provided better product visual identification, has improved space management and will have a positive impact on performance indicators of the quality management system, such as decreased shortages.

No conflict of interest

GM-021 ZOLEDRONIC ACID VERSUS DENOSUMAB: A BUDGET IMPACT ANALYSIS

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Background Patients with advanced solid tumours commonly develop bone metastases. Development of skeletal related events (SREs) is associated with higher mortality and increased treatment costs. Incidence and time to onset of SREs are widely used as composite endpoints in clinical trials. Intravenous bisphosphonates, predominantly zoledronic acid (ZA), and denosumab, are effective in preventing SREs. ZA is associated with renal failure, and dose reductions are requested based on creatinine clearance.
Purpose The aim of the study was to define the most cost effective treatment between ZA and denosumab by a budget impact analysis with a 3 year horizon.
Material and methods A database was created using data extracted from electronic medical records and all prescriptions filed during the period January 2015 to September 2016 (2638 prescriptions). Variations in drug prices were analysed. A pharmaceutical and budget impact analysis were conducted. Potential budget impact was assessed based on drug purchase prices, drug administration costs, and SREs incidence (Lipton 2012) and management (Cavallo 2014). Previous clinical trials showed that denosumab was superior to ZA in preventing SREs in patients with bones metastases (-17%).
Results ZA was more frequently prescribed than denosumab (21.5%). Denosumab related costs were superior to the savings associated with a lower incidence of SREs. The analysis estimated a target price for denosumab to be economically competitive with ZA (-47.7%). In several cases, ZA was not indicated. Limiting the use of denosumab to patients who are not eligible for ZA (ie, those with serious renal failure (6%)) would result in a saving of € 51 632,55 over 3 years. Considering also those patients with moderate renal failure (12.5%) who are eligible for denosumab, the saving would be € 186 7136 over 3 years. This is negligible compared with the costs related to possible renal complications and a greater incidence of SREs. A sensitivity analysis was also performed that confirmed these results.
Conclusion Based on our hospital purchase prices, ZA offers superior cost effectiveness compared with denosumab, even considering SRE related savings. Treatment with Denosumab has to be limited to patients with serious and moderate renal failure.

No conflict of interest

GM-022 USING AN INTEGRATED INFORMATION SYSTEM TO REDUCE INTERRUPTIONS AND THE NUMBER OF NON-RELEVANT CONTACTS IN THE INPATIENT PHARMACY AT A TERTIARY HOSPITAL

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Background Patient care is provided by a multidisciplinary team of healthcare professionals for high quality and safe patient care. The this to be successful, the team must work synergistically and efficiently communicate. In many hospitals, communication between nursing and pharmacy relies mainly on telephone calls. Telephone calls can be a source of interruptions within the pharmacy nursing operations, and as a result workload increases and the chance of errors raises.
Purpose The aim of this paper was to report the development and implementation of an integrated information system that may reduced non-relevant telephone calls.
Material and methods The research design was based on a quasi-experiment with pre–post testing using the continuous improvement approach. The improvement project was performed using a 6 step method. A survey was conducted in a tertiary hospital to measure the volume and types of telephone calls before and after implementation of the system to evaluate the impact of the new system. In addition, 300 calls were analysed prior and post implementation to measure the impact of the system on call types.
Results In the 2 week measurement period before implementation, pharmacies received 4466 calls. Follow-up calls were the majority. After roll out of the integrated system, there was a significant reduction in the volume of telephone calls. The number of received calls was 2630 calls ($p > 0.001$). Analysis of the 300 calls prior and post implementation showed that the type were as follows: confirmation 40, 20; follow-up 112, 56; IV discontinuations, 1, 6; missing dose 14, 19; PRN medications 13, 19; professional inquiries 21, 116; other 79, 62; and blank 16, 13 calls, respectively. The system reduced unnecessary interruptions and workload.
Conclusion By implementation of an integrated information system, the number of telephone calls was reduced and types of calls were changed to more professional inquiries.

No conflict of interest

GM-023 | **PERFORMANCE INDICATORS IN HOSPITAL PHARMACY: EXPERIENCE OF A TEACHING HOSPITAL WITH A DOCUMENTATION TOOL**

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Background Most professional pharmacy associations recognise the importance of documenting pharmaceutical activities. Such documentation is usually a hospital based decision and relies on local consensus of indicators and tools. Pharmacy practice includes pharmaceutical services, pharmaceutical care, teaching, research and management.

Purpose To describe the pharmacy indicators collected and used by a teaching hospital.

Material and methods This was a descriptive retrospective study. A documentation tool was used by pharmacists to collect and describe their workload since 1998. The tool is available on the hospital intranet and is completed by each pharmacist at the end of the day. Data were extracted from the SQL database for all 27 indicators for 2 fiscal years from 1 April 2014 to 31 March 2016. Only descriptive statistics were performed.

Results Data extracted represented a total of 125 520 hours worked. The proportion of pharmacist time per axis was: pharmaceutical care (43.1%), pharmacy services (35.8%), management (10.5%), teaching (6.7%) and research (3.9%). A total of 253 532 pharmaceutical interventions were found. The proportion of pharmaceutical activities were, in decreasing order: drug therapy adjustment (54.2%), medication reconciliation at admission (10.0%), continuity of care (9.3%), patient counselling (5.4%), medical rounds (4.1%), other interventions (3.9%), laboratory orders (2.9%), medication error management (2.7%), pharmacovigilance (2.6%), pharmacokinetics (1.9%), medication reconciliation at discharge (1.6%), drug interactions (1.1%) and medication reconciliation at the point of transition of care (0.3%). 21.7% of pharmaceutical interventions were written in the patient's file. Ratios of interventions per patient days were calculated per clientele. Decentralised pharmacists at the bedside or in outpatient clinics provided a total of 136 676 patient follow-ups. A total of 94 865 information requests were addressed to pharmacists (71.5% from other clinicians and 28.5% from external stakeholders). Pharmacists supervised pharmacy students for a total of 5545 student days. These data were used to benchmark current practice between years and with other hospitals. Data were shared with pharmacists and administrators to describe and evaluate the current contribution of pharmacists within the hospital.

Conclusion This study has described the activity of pharmacists within a teaching hospital. The use of a documentation tool is feasible and useful to support the evaluation and benchmarking of pharmacists in the healthcare sector.

No conflict of interest

GM-024 | **IMPLEMENTATION OF CHANGE CONTROL IN HOSPITAL PHARMACY**

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Background Change controls are part of good manufacturing practice (GMP) requirements in industry. The new version of management standard, ISO 9001: 2015, also introduces this concept from organisational aspects; nevertheless, its implementation could be critical in the complex and changing environment of a hospital pharmacy.

Purpose The aim of this work was to design a methodology to implement change controls within our organisation.

Material and methods We first defined what a change is. Then, we set up a group of key resource persons to rank each change and its management. This ranking was rated with a score based on two criteria: impact level for the organisation (maximum score 12) and potential risk caused by the change (maximum score 64). The combination of these scores allowed us to define the level of follow-up needed for each change. If a threshold was met by the combined score, the change was integrated in a centralised monitoring matrix and tracked by the quality officer. If not, the change was considered as minor and was simply tracked internally by each pharmacy unit. The centralised threshold point was set at 17/76 (22% of maximum score).

Results 58 different changes were identified as recurrent throughout the 16 processes of our organisation. 29 types of changes (50%) were already addressed in our quality system: The average total score was 15 (11.25–18.75) for an average impact of 5.7 (4.97–6.43) and an average risk of 9.24 (6.23–12.25). 15 (26%) exceeded the centralised follow-up threshold.

Conclusion These changes monitored centrally were focused on GMP aspects and not all of them were supported by our quality system. Thus this work allowed us to systematise our practice and formalised it through a quantitative indicator. This typology will serve as a reference system for the different units of our hospital pharmacy, helping to harmonise the process of change controls.

No conflict of interest

GM-025 | **EVIDENCE ABOUT THE ROLES AND IMPACT OF PHARMACISTS: AN ACTION PLAN OF INTERVENTIONS TO INCREASE PHARMACIST AWARENESS ABOUT THESE EVIDENCES**

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Background Pharmacy practice is challenged by governments and authorities regarding the costs of pharmaceutical services and available public funding. There is a growing body of evidences on the roles and impact of pharmacists. There are a limited number of pharmacists that are aware of the evidence.

Purpose To describe an action plan of interventions that should increase pharmacists' awareness about evidence on the roles and impact of pharmacists.

Material and methods This was a descriptive study. A literature search was conducted on Pubmed with the following terms: interventions, professional behaviour and evaluation. Only systematic reviews on the effectiveness of interventions to change

healthcare professional behaviour were included. Based on the literature and using a mind mapping technique, we developed a map of the characteristics of interventions that can change professional behaviours. Using the map, we discussed and identified the potential interventions that could be implemented to increase pharmacists' awareness about evidence on the roles and impact of pharmacists. The action plan was discussed between research team members and interventions were selected by consensus.

Results A total of 15 interventions were identified. The interventions were meant to target different audiences (eg, regulatory authority, professional associations, pharmacists, physicians, nurses, pharmacy students, healthcare decision makers, general public). Intervention characteristics were identified, including face to face or at distance, oral or written, at school, at work, at home or in public areas, performed once or repeated many times, with or without feedback. To increase pharmacists' awareness, we identified 20 key messages based on Impact Pharmacie platform. Interventions included in the action plan were: dedicated courses and short internship within the pharmacy curriculum, specific conferences at key events, booths, quiz at professional meetings, surveys/audits for targeted groups, educational outreach in retail and hospital pharmacies using key documents, pyramidal dissemination through ambassadors, weekly blogs and social medias, formal support from different professional organisations, research projects with published abstracts and articles, videos, etc. Based on the literature review, multifaceted interventions should be prioritised whenever possible.

Conclusion This study described the 15 interventions of an action plan that should increase pharmacists' awareness about evidence on the roles and impact of pharmacists.

No conflict of interest

GM-026 | **QUALITY MANAGEMENT SYSTEM IN CYTOTOXIC DRUGS LABORATORY: MONITORING ACTIVITY AND IMPROVEMENT ACTIONS**

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Background The Quality Management System (QMS), present in hospital pharmacy certified according to UNI EN ISO 9001:2008, has been implemented in the antineoplastic drugs laboratory.

Purpose The purpose of this study was to present tools and evaluation methods for work activity to improve both quality and safety of therapies.

Material and methods Several specific performance indicators, with related reference values, were identified for critical activities: number of non-compliant preparations/number of controls executed (3%); number of sterility checks with negative results/number of checks executed; number of environmental negative controls/number of environmental controls (both 100%). In addition, a questionnaire was submitted to internal users concerning the main aspects of our service: quality, packaging of the preparations, clarity of the labels and administration form, and delivery time. Finally, we analysed the non-conformities recorded and then we implemented corrective/preventive actions.

Results The indicators were verified and provided values in line with the reference values: non-compliant preparations 1–2%; product and surfaces sterility 100% negative reports. The questionnaire of internal user satisfaction confirmed that the overall quality of the service was good and packaging was in line with the indications in the data sheet. Delivery time was judged as not always on time and the labels, included in photo-shielding envelopes, as not clear. Given that the validation phase has been optimised, giving priority in parallel to monotherapy set ups and to first therapies for multiple patients, the delivery frequency to the department was increased; a packaging update improved the visibility of the labels. The registered non-conformities were 5 and led to the opening of four corrective and two preventive actions: it was decided to optimise staff training regarding the risk of cytotoxic drugs and the need for double controls during work in the hood was reiterated.

Conclusion QMS support has helped us to create condition for effective management of the laboratory since its activation, to provide appropriate instruments for activity evaluation and to identify critical issues that can be resolved through concerted and shared measures.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Thanks to the pharmacy service.

No conflict of interest

GM-027 | **ATRIOVENTRICULAR BLOCK IN A HIV POSITIVE PATIENT ON PROTEASE INHIBITORS: A CASE REPORT**

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Background We describe a 47-year-old women diagnosed with C3 category HIV infection in 1996. After other drug combinations, she started on LPV/r (a protease inhibitor (PI)) in 2007 and in 2013 she had a DDD pacemaker implanted.

Purpose To explore whether the cardiac event was related to PI treatment.

Material and methods The medical history was obtained from the digital clinical history (DCH) and the refill records from the pharmacy department (Farmatools). A bibliographic research was conducted to find similar cases or if it was a common–uncommon adverse effect (AE). The LPV/r data sheet as well as other PI data sheets was revised. Naranjo's algorithm (NA) was applied to assess the relationship between the atrioventricular block (AB) and PI. This algorithm establishes a positive or negative relation of the drug event based on a final assessment.

Results The patient was followed in 2010 as she was suffering from syncope whose cause was uncertain. As was recorded in her DCH, neither the neurologist nor the cardiologist was certain if the main cause was pharmacological or neurological, as the patient was also developing a progressive multifocal leukoencephalopathy. A pacemaker was implanted in 2013 to correct the cardiac dysfunction. She was started on LPV/r in 2007 but stopped when the pacemaker was implanted. After that, she was started on TDF/FTC. As described in the literature, PI can potentially provoke either second or third grade AB or Qt wave prolongation. This could unmask heart conditions that would not show up in other scenarios. According

to NA, the final assessment was 4, giving a drug event relation as 'possible'. Since the pacemaker was implanted, she has not returned to PI or had any more cardiac events.

Conclusion As we described in this case, there is a possibility that the AB was provoked by PI. This situation highlights the importance of being familiar with all AE to quickly modify a patient's treatments to avoid future complications. Hospital pharmacists also play an important role in checking for possible drug interactions.

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No conflict of interest

GM-028 | **CONTRIBUTION OF HOSPITAL PHARMACY ISO CERTIFICATION 9001 V 2008 ON IMPROVING PERFORMANCE INDICATORS: EXPERIENCE OF PHARMACY OF A PAEDIATRIC HOSPITAL**

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Background Quality is a tool for clarification of the missions and relationships within the hospital pharmacy and units of care. It is a tool for standardisation of customer–supplier relationships within the institution by contracting; it is also a guarantee of continuous improvement of services provided to patients.

Purpose Our goal was to present the experience of our hospital pharmacy in the implementation of a quality management system which received ISO 9001 v 2008 certification.

Material and methods After implementation of the quality management system in the pharmacy, the effectiveness of internal and external processes was evaluated through several indicators.

Results The results of the key indicators before and after certification are summarised in the table.

Indicator	Before (%)	After (%)
The shortage rate of drugs	7	1
The shortage rate of medical devices	24	2
The pre-emption rate of drugs	0.6	0.01
The pre-emption rate of medical devices	0.08	0
The drug and medical devices deterioration rate	0	0
The effectiveness rate for immediate action	40	75
The response rate to patient complaints	40	100
The drug needs satisfaction	62	97
The medical devices needs satisfaction	45	95
The rate of compliance of commitments to purchase drugs	81	98
The rate of compliance of commitments to purchase medical devices	53	89
Rate of satisfaction with training requests	100	100
Rate of satisfaction with recruitment requests	67	80

Conclusion The pharmacy certification process has improved several indicators of performance (drug and medical devices needs satisfaction, rate of compliance of commitments to purchase drugs and medical devices, etc) and has maintained a high level for other indicators (drug and medical devices deterioration rate and rate of satisfaction with training requests). Improving these indicators has allowed repositioning of the pharmacy in other hospital units and a significant improvement in the quality of pharmaceutical services within the hospital. The success was the result of the involvement of management and hospital staff. The aim is to respond positively to the growing needs of a population of vulnerable children.

No conflict of interest

GM-029 | **CHARACTERISTICS OF WORK INTERRUPTIONS DURING MEDICATION ADMINISTRATION**

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Background Work interruptions is a significant contributor to medication administration errors.

Purpose To document the characteristics of nurses' work interruptions (WIs) during medication administration.

Material and methods A descriptive observational study design was used along with a sample of 110 medication administration rounds. Data were collected on 11 medical units using a unit dose distribution system during February 2016. Data collection on WIs relied on direct structured observation. The following WI characteristics were recorded: source, secondary task, location, management strategies and duration.

Results 79 WIs were observed over 25 hours 2 2 min of medication administration time (3.16 WI/hour). During the preparation phase, nurse colleagues (n=22; 27%) followed by system failures such as missing medication or equipment (n=18; 22.8%) were the most frequent source of WIs. Nurses were interrupted during the preparation phase mostly to solve system failures (n=19; 24%) or for care coordination (n=15; 19%). During the administration phase, the most frequent sources of WIs were self-initiation (n=14; 17.7%) and patients (n=20; 25.3%). The most frequent secondary task undertaken during the administration phase was direct patient care (n=45; 56.9%). WIs lasted 2 min 52 s on average, and were mostly handled immediately (n=75; 94.9%).

Conclusion The process of medication administration is not protected against WIs, which poses significant risks.

Interventions to reduce WIs during the medication administration process should target nurses and system failures to maximise medication administration safety.

No conflict of interest

GM-030 | OUT OF DATA SHEET USE OF BIOLOGICAL THERAPIES IN A REFERENCE HOSPITAL

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Background Off-label prescription is legal and common, but often not supported by strong evidence.

Purpose To analyse off-label treatments with biological therapies, its indications and to determine its economic impact within the total cost of these drugs.

Material and methods This observational descriptive study was conducted in a reference hospital from October 2015 to March 2016. Treatments codified in the dispensation system (Savac) according to the diagnosis 'Treatments not included in data sheet' and those who had a defined diagnosis but were not reflected in the data sheet were included.

Drug, diagnosis and clinical service prescriber were collected from the electronic clinical record (Selene) and request reports sent to the pharmacy. The number of dispensations and spending (both off-label and total spending on biological therapy in the study period) was recorded from Savac.

Results During the study period 34 off-label treatments were prescribed to 32 patients. Applicant services were: internal medicine (35.3%), allergology (26.5%), digestive (12.7%), dermatology (11.8%), ophthalmology (8.8%) and rheumatology (2.9%). 11 drugs were used in 18 different indications. The most employed was omalizumab with 26.5% (33.33% food allergy, 33.33% anaphylaxis and the rest for atopic dermatitis, allergic rhinitis and urticaria acute recurrent) followed by adalimumab with 14.7% (uveitis non-infectious), ustekinumab with 11.8% (75% Crohn's disease and 25% atopic dermatitis), tocilizumab with 11.8% (spondyloarthritis, papilophlebitis, thyroid associated orbitopathy and uveitis), and the rest had low values. In terms of economic impact, off-label use represented 4.73% (€ 122 482.7) of total expenditure on biological therapies during the study period; 1.19% at the cost of omalizumab. Regarding the total cost of each drug, off-label use was 57.34% of total expenditure for tocilizumab; 11.55% for rituximab, 10.85% for omalizumab, 8.91% for ustekinumab and less than 5% for the rest.

Conclusion Our study results showed that off-label use of biological agents has important economic and healthcare impact; some biologicals represented >50% of expenditure (eg, tocilizumab). A monitoring mechanism should be set up to evaluate the efficacy and safety of these treatments due to insufficient clinical experience with them.

No conflict of interest

GM-031 | IMPLEMENTATION OF A STANDARD OPERATIVE PROCEDURE FOR THE CLINICAL PHARMACOKINETIC MONITORING OF VANCOMYCIN

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Background Although antibiotics use should be based on fighting hospital infection rates and not primarily on economics, the important decrease in hospital funding means that economic savings is one of our main concerns. Vancomycin is one of the antibiotic drugs with a better cost effective ratio.

Purpose To carry out an economic evaluation of the implementation of a standard operative procedure (SOP) for clinical pharmacokinetic (CPK) monitoring of vancomycin and to evaluate the economic results achieved after inclusion of this service at a tertiary referral hospital.

Material and methods An economic expenditure study of vancomycin was conducted during the period January 2015 to December 2015. Subsequently, our economic data were compared with those from another tertiary referral hospital with a similar healthcare population which had an operative CPK service. Afterwards, a bibliographic search was done for the SOP development. After its implementation in January 2016, the results of monitored patients over the next 2 months (February 2016 to April/2016) were gathered.

Results

Global vancomycin expenditure (€)	Usage percentage	
8817	28%	Our hospital
19 385	67%	Hospital with CPK service

The main difference between the two hospitals was the presence of a CPK service. Once implementation of the SOP was concluded, defined daily doses (DDD) during the study period were compared to those from the same period the year before for the same drug form/brand: vancomycin 1g DDD: 532 vs 359 (2015 vs 2016), vancomycin 500 mg DDD: 48.75 vs 111.75.

From February 2016 to April 2016, 26 adults and 3 children receiving vancomycin were monitored. After the first PK monitoring, 34.62% of adult patients showed plasma concentration levels within the therapeutic range (62.96% showed plasma levels out of the therapeutic range). None of the paediatric patients had appropriate plasma levels at the first PK monitoring. Economic expenditure in this period was compared with that from February 2015 to April 2015: vancomycin € 1842.08 vs € 1520.62 (2015 vs 2016, respectively; € 321.46 saving).

Conclusion The principal inconvenience for higher vancomycin prescriptions was the absence of a CPK service in our hospital, encouraging the development and implementation of the CPK SOP. PK monitoring allows us to optimise the efficacy/safety of vancomycin and to reduce the outbreak of bacterial resistances as well as providing important economic savings.

No conflict of interest

GM-032 | ECONOMIC IMPACT OF ADALIMUMAB MONITORING THROUGH ALGORITHM USE IN PATIENTS WITH INFLAMMATORY BOWEL DISEASE

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Background Monitoring of anti-drug antibodies (ATAS) or serum concentrations of adalimumab (ADA) in the treatment

of inflammatory bowel disease (IBD) could provide an explanation for loss of efficacy and help optimise treatment and reduce healthcare costs.

Purpose To assess the cost savings by applying a decision algorithm based on measurement of ADA trough levels and ATAS in patients with IBD.

Material and methods A retrospective observational study of all IBD patients treated with ADA at the department of gastroenterology in a tertiary hospital in the past year was conducted. Plasma levels of ADA and ATAS by sandwich ELISA immunoassays were assessed, always immediately prior to the inclusion of the drug (Cmin). Variables included: pathology, treatment time, concentration of ADA and ATAS, clinical situation and concurrent medication. A clinical algorithm was used for reactive ADA concentration and antibody status to guide therapy decisions:

- **ADA:**
  - Subtherapeutic levels: < 5 µg/mL and ATAS negative –>require dose escalation;
  - < 5 µg/mL and ATAS positive–>switch;
  - Therapeutic levels: ≥5–8 µg/mL –> no dose change (independently of ATAS);
  - Supratherapeutic levels: >8 µg/mL –>require increase the dosing interval (independently of ATAS).
- **ATAS:**
  - Negative: <5 AU/mL.
  - Positive: >5 AU/mL.

Results Our recommendation applying the algorithm is the following: of these 66 patients, 14 patients required dose escalation (cost € 169,302), 29 patients required increase in the dosing interval (cost saving € 181 714), 14 patients required no dose change and 9 switched to another TNF inhibitor (cost saving € 34,638). The cost per sample for the ELISA plate kit was € 3600 and the total cost saving after applying the algorithm was € 43 446.

Conclusion This study indicates that routine monitoring of drug levels and ATAS is cost-beneficial in clinical practice and thereby improves the personalisation of the decision making process.

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No conflict of interest

GM-033 | DELPHI STUDY: ADHERENCE TO TREATMENT AND QUALITY OF LIFE IN CANCER ASSOCIATED THROMBOSIS

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Background Venous thromboembolism (VTE) is a common complication in cancer patients. Non-adherence to anticoagulation therapy can lead to unsatisfactory health outcomes, and increase overall healthcare costs.

Purpose To assess the Delphi technique as a method for achieving convergence of opinion concerning adherence to anticoagulation therapy and quality of life in cancer patients with VTE.

Material and methods The Delphi technique was used to collect data from a panel of selected healthcare professionals, a multidisciplinary team of 27 experts (oncologists, haematologists, internal medicine experts, pulmonologists, emergency room physicians and hospital pharmacists). All were invited to answer an electronic questionnaire of 31 questions using a Likert scale (1, strongly disagree—4, strongly agree) in two rounds. A consensus was considered to have been reached when at least 70% of the panellists answered strongly agree/disagree on a recommendation. Any recommendation that did not obtain ≥70% agreement/disagreement was regarded.

Results According to the experts' opinions based on clinical daily practice, a positive Delphi consensus was reached on the following statements: a VTE diagnosis has an impact on quality of life (75%), adherence to anticoagulant treatment of VTE in cancer patients is critical (96%) and lack of adherence increases the recurrence of VTE (89%). A majority agreement was achieved for two statements: no instruments to measure quality of life in cancer patients with VTE are used (67%) and adherence to anticoagulant treatment of cancer patients with VTE is evaluated in clinical practice (56%). The experts agreed that low molecular weight heparin (LMWH) offered better compliance (33%).

Conclusion Expert consensus was reached about a VTE diagnosis having a negative impact on quality of life, adherence to treatment is important (because lack of adherence increases recurrence of VTE in cancer patients) and treatment with LMWH could increase adherence to treatment in patients with cancer associated thrombosis.

No conflict of interest

GM-034 | OPTIMISATION OF THE BLOOD DERIVED MEDICINES CIRCUIT BY COLLECTING AND ANALYSING NON-COMPLIANCES

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Background Blood derived medicines (BDM) require close monitoring because of their theoretical infectious risk. However, clinical teams experience difficulties applying regulations and numerous dysfunctions are identified daily.

Purpose We wished to identify recurrent non-compliances in the circuit of BDM to set up specific and efficient actions to improve this circuit.

Material and methods Non-compliances were identified and collected at each stage of the BDM circuit (from prescription to administration traceability) over an 8 month period (March 2015 to November 2015).

Results Over the study period, 2242 BDM were dispensed and 46 non-compliances were noted. 48% of these non-compliances related to traceability (obligatory elements were

missing in 50% of cases, traceability was lost or missing in 32% of cases, and returned too late in 18%). 20% of non-compliances were orders which did not conform to procedures. 19% affected prescriptions (including 55% of redundant prescriptions, 22% dosing error and 22% patient non-identification). 7% of non-compliances were about pharmacy distribution mistakes. 4% related to lost products in care units and 2% of non-compliances were about stock shortage in the pharmacy.

Each time a corrective measure was immediately introduced after contacting the care unit (we searched for the missing information and the administration traceability in the transfusion record, we delivered information documents, and planned visits in the unit to train the clinical team). This process allowed a reduction in the number of non-compliances identified.

Conclusion This work allowed us to identify critical points in the BDM circuit and to set up specific corrective actions. Most of non-compliances affected traceability of the BDM, an essential step in the circuit. Training actions about circuit and management of BDM from prescription to administration have been affected in care services. Information documents have been created to secure each step of the circuit. These improvement measures are currently evaluated.

No conflict of interest

| GM-035 | CAN ADMINISTRATION TRACEABILITY OF BLOOD DERIVED MEDICINES BY PARAMEDICAL TEAM BE OPTIMAL WITHOUT INTERVENTION OF THE PHARMACEUTICAL TEAM? |

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Background Blood derived medicines (BDM) need, as a result of their status, strict and obligatory traceability at each step of their circuit. Administration traceability for BDM has to be kept for 40 years at the pharmacy. However, care teams do not always spontaneously send traceability to the pharmacy, which makes this aspect of the regulatory obligation difficult.
Purpose We wished to evaluate the pharmaceutical team's interventions in recovering BDM traceability by analysing claims made to paramedical teams.
Material and methods We prospectively collected traceability requests to hospital wards over a -months period (March 2016 to September 2016).
Results Over the study period, 3361 BDM were distributed. Products were always delivered to the hospital wards with a specific traceability label, traceability sheets and a leaf reminding them to send back the traceability sheet with the specific label to the pharmacy after every BDM administration. Despite this, 123 claims were made to return the traceability sheet for 367 products, more than 10% of distributions. In 84% of cases, a request made 8 days after distribution on average, by mail or phone call, was enough to get the traceability back. In 11% of cases a second demand was necessary, done on average 13 days after distribution. In 3% of cases a third claim was made on average 24 days after distribution. Lastly, in 3% of cases a fourth request was made on average 35 days after distribution. After at least one demand, we

obtained traceability 14 days on average after the distribution. Hence implementation of regulatory administration's traceability is still difficult for some care teams and needs the pharmacy's intervention.
Conclusion This work highlights the importance of the pharmacy's intervention to obtain an exhaustive collection of administration traceability of BDM. Training actions for paramedical teams about the importance of traceability and the circuit of BDM are being set up via competency workshops. These workshops are currently created by pharmaceutical and paramedical teams jointly.

No conflict of interest

International posters

| INT-001 | SERUM AND CEREBROSPINAL FLUID CONCENTRATIONS OF MEROPENEM IN NEUROCRITICAL CARE PATIENTS WITH CENTRAL NERVOUS SYSTEM INFECTIONS |

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Background Meropenem plus vancomycin is recommended for hospital acquired CNS infections. The limited penetration of meropenem into the CSF is well known. However, data regarding the disposition of meropenem in CSF in these patients are lacking.
Purpose The aim of this study was to describe concentrations of meropenem in serum and CSF in neurocritical care patients with intraventricular drains and hospital acquired CNS infections.
Material and methods This was an observational study in neurocritical care patients with CNS infections receiving meropenem. Multiple blood and CSF samples were taken and analysed by a validated high performance liquid chromatography assay. The primary pharmacokinetic/pharmacodynamic targets were concentrations above the minimum inhibitory concentration (MIC) of suspected pathogens at 50% (50% $T>_{4xMIC}$) of the dosing interval in serum and concentrations above the MIC throughout the entire dosing interval (100% $T_{>MIC}$) in serum and CSF. Variables are described with median values (range).
Results 9 patients (mean age 57 ± 8 years, mean weight 76 ± 12 kg) were enrolled. A total of 74 serum samples and 70 CSF samples were analysed. The median peak and trough concentrations in serum were 29.00 (10.70–69.00) mg/L and 4.60 (0.00–31.40) mg/L, respectively. The median corresponding peak and trough concentrations in CSF were 1.45 (0.27–6.20) mg/L and 1.35 (0.00–4.10) mg/L, respectively. Assuming an MIC of 2 mg/L, all patients achieved 50% $T>_{4xMIC}$ in serum and 75.7% of all measured dosing intervals achieved 100% $T_{>MIC}$. In CSF, 42.9% of all concentrations reached 2 mg/L.
Conclusion Meropenem demonstrated adequate CSF concentrations for high susceptible pathogens. CSF concentrations for pathogens with reduced susceptibility such as *Pseudomonas aeruginosa* are not assured. With the high interindividual pharmacokinetic variability observed, therapeutic drug monitoring

in serum and CSF should be considered to individualise meropenem dosing in neurocritical care patients with CNS infections.

INT-002 | **MEASURING PERFORMANCE OF MANAGEMENT: RELEVANCY OF CREATING A SCORE FROM INTERNAL SATISFACTION SURVEY**

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Background A new version of the management standard ISO 9001:2015 has introduced the concept of interested parties (person or organisation) that can affect, be affected by or perceive itself to be affected by a decision or activity. Among these interested parties, staff satisfaction with management appeared relevant to follow during the management review.

Purpose As there is no performance indicator about management, we created a score built on our 3 year satisfaction survey.

Material and methods This survey was carried out in the second quarter of 2014 and included 91 questions on satisfaction of the collaborators. 78 closed questions (5 point Likert scale) were combined and used to calculate a score under the headings of management (such as perception of their unit situation and its development over time), feeling properly informed, quality of working conditions, professional training access and sense of well being. The score was calculated by creating variables with Sphinx IQ software. The results were expressed as a percentage of the maximum obtainable score.

Results Management score consisted of questions from the following thematic: 'organisational strategy–management' and 'communication'. The average satisfaction for the survey was 63% (6.3/10) with a participation rate of 54% (48/88). Thematic analysis awarded a global score of 70% for management (=75.9/109 of maximum score). The score was consistent with other thematics with the exception of professional training access (65%=10.4/16). These results were stratified by seniority, age and job in order to study biases.

Conclusion Building a score by thematic allowed easier and concise reading of results for this type of survey. Studying this thematic of management was highly instructive and completed the analysis of general satisfaction. Therefore, this score integrated our annual management review as a performance indicator and will be followed every 3 years. To supplement this follow-up, we also created a simplified index that each collaborator fills during the individual annual evaluation.

INT-003 | **EMPLOYEE ENGAGEMENT IN THE HEALTHCARE SECTOR: WHERE DO PHARMACISTS STAND?**

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Background Employee engagement refers to a positive satisfying attitude at the place of work characterised by three components—namely, vigour, dedication and absorption within the job.[1]

Purpose To determine the overall level of employee engagement at Malta's acute public hospital, with special attention to pharmacists.

Material and methods Data were collected through a self-administered validated online questionnaire consisting of two sections. Engagement levels were measured using the Utrecht Work Engagement Scale (UWES-17). The impact of organisational factors on employee engagement was assessed in the second section of the questionnaire. Data were coded and analysed using Microsoft Excel and the Data Analysis ToolPak. Engagement scores obtained were compared with standard UWES-17 international scores as no local reference was available. The higher the score obtained the better the engagement.

Results A total of 247 complete questionnaires were collected over 8 weeks. The majority of respondents (55%) were healthcare professionals of whom 20% were pharmacists. A final engagement score of 4.16 (range 0 to 6) was obtained for the total population, whereas that for the pharmacists was a score of 4. The total population scored lowest within the vigour dimension (3.91) preceded by absorption (4) and dedication (4.57). Pharmacists obtained lower scores for all three dimensions with a score of 3.75 for vigour, 3.93 for absorption and 4.33 for dedication. The main drivers for staff engagement within hospital were found to be the quality of the organisation's social environment followed by recognition and appreciation received by staff. The main barriers identified were large workload and the perceived sense of unfairness. The same results were obtained for pharmacists.

Conclusion For an environment to foster employee engagement in healthcare, management has to ensure that the workload is sustainable for the current staff compliment, promote a good social environment at work, implement transparent procedures for all and ensure due recognition is given to employees for their work and efforts.

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No conflict of interest

INT-004 | **CHRONIC HEPATITIS C: INFORMATION BROCHURE FOR PATIENTS UNDER NEW DIRECT ACTING ANTIVIRALS**

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Background Clinical research for the treatment of chronic hepatitis C has evolved greatly with the introduction on the European pharmaceutical market of new oral direct acting antivirals (DAAs). Despite the fact that new DAA agents have fewer side effects, it is important to provide appropriate information to patients at initiation of treatment.

Purpose To develop and implement a therapeutic education tool for patients with chronic hepatitis C, and to provide accurate information during the pharmaceutical consultations organised at the hospital.

Material and methods The following steps were followed.

Design viral hepatitis C brochure after review of:

- Scientific literature on chronic hepatitis C and new oral DAA agents.
- Recommendations on treatment of hepatitis C 2015 of several associations involved in the study of the liver (EASL and AASLD).

Write new information sections for DAAs for the following drugs: siméprévir–sofosbuvir–ombitasvir+dasabuvir+paritaprevir/ritonavir–ledipasvir+sofosbuvir. Validate the therapeutic education tool by hospital pharmacists and gastroenterologists involved in the treatment of chronic hepatitis C.

Results The edition of the final patient information brochure (format A6) contained several sections, such as:

- General information
- Chronic hepatitis C
- Introduction
  - Viral hepatitis C and virus
  - Viral hepatitis C and treatment
  - Viral hepatitis C and drug information
- Depending on the patient's medication

Conclusion Implementation of this information brochure allowed the hospital pharmacist to provide well summarised information on hepatitis C virus treatment. It is a useful tool during pharmaceutical consultations with chronic hepatitis C patients. The personalised information booklet provided to the patients can also be shared at home with the family, allowing them to have more details on hepatitis C disease and on the patient's drug regimen.

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Summary of DAAs characteristics 2015.

No conflict of interest

DEVELOPMENT AND STABILITY TESTING OF ORAL CLONIDINE HYDROCHLORIDE SOLUTIONS FOR USE IN NEONATAL PATIENTS

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Background Clonidine, a partial α_2-adrenergic receptor agonist, has proven to be an effective substance for the therapy of neonatal abstinence syndrome.[1][2] The recommended therapeutic dosage is much smaller than the commercially available tablets. Previously published oral liquid preparations contain additives such as parabens, flavourings or substances, which increase viscosity.[3][4]

Purpose Our purpose was the development and stability testing of oral clonidine hydrochloride solutions with a simple composition for paediatric use, especially for neonatal patients.

Material and methods We developed a stock solution with 200 µg/mL and two ready to use oral solutions containing 20 µg/mL and 10 µg/mL clonidine hydrochloride, preserved with 0.14% potassium sorbate and 0.07% citric acid for pH adjustment. Several batches were stored for 6 months at 25°C; 60% RH, at 40°C; 75% RH; and in a refrigerator at 2–8°C. Samples were taken after preparation and on days 14, 28, 49, 70, 91 and 161, and stability tests, including a newly validated HPLC method for assay and determination of degradation products, were performed.

Results After 91 days, all refrigerated solutions contained more than 95% clonidine hydrochloride. The stock solution at these storage conditions was stable over at least 161 days with a mean content of 95.5%. At 25°C, 60% RH, the preparations were stable for 28 days. After storage for longer than this period, the content declined below the lower limit of 90% clonidine hydrochloride accompanied by an increase in degradation products. A similar pattern was observed at the higher temperature; the oral solutions were stable for only 14 days.

Conclusion In conclusion, we successfully developed oral clonidine hydrochloride solutions 20 µg/mL and 10 µg/mL for use in neonatal patients, which have proven to be stable for 3 months if stored at 2–8°C in a refrigerator. In addition, we applied a stock solution with a stability of at least 6 months under these storage conditions to simplify the preparation process.

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No conflict of interest

INVESTIGATION AND IDENTIFICATON OF DRUG SUPPLEMENT INTERACTIONS IN A POPULATION WITH UNIPOLAR DEPRESSION

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Background Due to the increasing number of supplementary products and patients taking supplements (dietary supplements, herb drugs, vitamins, etc) and OTC medications during their therapy, healthcare professionals have to take up the challenge of getting to know these products and identify any unwanted effects and drug–supplement interactions.

Purpose In association with the department of psychiatry and psychotherapy we purposed to identify patients' motivation for supplement use, and evaluate and analyse potential interactions between drugs and supplement products in a patient group with unipolar major depression. We also aimed to estimate patient adherence to medical treatment.

Material and methods In our study, we involved 54 inpatients and outpatients (men 16, women 38) in a point of care survey of 40–50 min. After voluntary interviews with a pharmacist, we checked the medical records of the patients. To identify interactions, we used four English language interaction checker databases (Micromedex Interaction Checker, Lexi-Interact, Medscape Interaction Checker and Drugs.com). Regarding the heterogenous nomenclature of the active ingredients of supplements and the fact that a few medicines were only available in our country and in central Europe, we had to standardise our screening methods. For pharmacokinetic and pharmacodynamic properties, and chemical structure of the drugs, we substituted these active ingredients with others presented in the databases above. To estimate adherence, we asked patients to complete the Morisky Medication Adherence Scale-4 survey.

Results The average number of products taken by patients were 8.7 prescribed medicines and 4.7 supplements. 90.8% of the patients took at least 1 supplement during 1 month prior to the survey. We identified in these 49 patients 68 supplement ingredients, 123 interactions and, in case of 5 patients (9.3%), we analysed potential severe interactions related to the use of supplements. By screening for adherence, we found a rate of 25.5% of non-adherent patients.

Conclusion Pharmacists should consider that a significant number of patients are taking supplements without any control of healthcare professionals, so they are exposed to the risk of severe interactions. We should aim to educate patients and improve interaction checker databases regarding supplement screening.

No conflict of interest

INT-007 | **ADMINISTRATION OF SOLID DOSAGE FORMS TO PATIENTS WITH DYSPHAGIA OR VIA FEEDING TUBES**

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Background Drug administration to patients with dysphagia/via feeding tubes is known to be very complicated. Modifying oral dosage forms may alter drug stability, pharmacokinetics and bioavailability, and harm patients. Manipulation of drug dosage forms may also influence the health of healthcare workers or caretakers.

Purpose The aim of the study was to obtain an overview of problems with modifying solid dosage forms and administration to patients with dysphagia or feeding tubes in different hospital wards.

Material and methods The data were collected over 3 weeks in February and March 2015. All patients with a nasogastric or gastrostomy tube or with dysphagia were included in the study once. Extraction of nursing records as well as interviews with nurses were used for data collection.

Results Administration of medications to 21 patients from 7 different wards was studied. 96 preparations of 64 different medications or dosages, which involved crushing or dissolving solid dosages, were identified. 77/96 administrated

preparations should not have been modified. Preparation modification was documented by the nurses for 42/96 preparations. 6 of the 14 interviewed nurses decided on drug modification themselves and 8 nurses had involved the physician in the decision making. 13/14 nurses found that they had not faced any practical problems during drug administration. Regarding possible health risk of dosage form modification, 1 nurse admitted knowing that drug crushing/dissolving may be a potential health hazard, 11 nurses denied this possibility and 2 nurses had not thought about it before.

Conclusion Administration of a solid drug dosage form to patients with a nasogastric tube, gastrostomy tube or patients with dysphagia has many problems: 80% of all preparations were administrated incorrectly, only 44% of preparation modifications were documented and less than half of the nurses involved the physician in the decision making process. There is a need for implementation of local guidelines for drug administration via feeding tubes, to patients with dysphagia and for personnel training.

INT-008 | **EFFICACY OF HYDROXYCHLOROQUINE IN PRIMARY HAND OSTEOARTHRITIS: A RANDOMISED, DOUBLE BLIND, PLACEBO CONTROLLED TRIAL**

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Background Pharmacological treatment options for hand osteoarthritis (OA) are limited. Hydroxychloroquine (HCQ) has been used successfully in the treatment of mild rheumatoid arthritis for many years and is believed to be beneficial in hand OA also.

Purpose In this trial we studied the symptom modifying effect of HCQ in primary hand OA.

Methods We conducted a randomised, double blind, placebo controlled, multicentre trial in patients with primary hand OA. Patients received either hydroxychloroquine 400 mg once a day or placebo during a treatment period of 24 weeks. The primary outcome was decrease in hand pain in the previous 24 hours on a 100 mm visual analogue scale (VAS). Secondary outcomes included change in total score of the Australian Canadian Hand Osteoarthritis Index (AUSCAN) and the Arthritis Impact Measurement Scale 2 SF (AIMS2-SF).

Results 196 patients were included (placebo n=98, HCQ n=98). Mean (SD) age was 57 (7.4) years; 86% were women. Baseline median (IQR) pain VAS was 50.0 (24.5–62.5) mm in the placebo group and 45.0 (26.0–60.3) mm in the HCQ group. At 24 weeks, change in pain VAS was not significantly different between the two groups. There were also no statistically significant differences in pain VAS at weeks 6 and 12. Changes in AUSCAN total score and AIMS2-SF total score in both groups were similar.

Conclusions This study shows that 24 weeks of treatment with HCQ in symptomatic hand OA did not reduce pain compared with placebo. Also, no difference was observed in the change in AUSCAN or AIMS2-SF scores between the two treatment groups. These results suggest that HCQ should not be prescribed in patients with primary hand OA with mild to moderate pain symptoms.

INT-009 | CLINICAL AND ECONOMIC IMPACT OF A MULTIDISCIPLINARY INTERVENTION TO REDUCE BLEEDING RISK IN PATIENTS WITH ACUTE CORONARY SYNDROME

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Background and purpose We evaluated the clinical and economic impact of a multidisciplinary programme to reduce bleeding events in patients with acute coronary syndrome (ACS) through optimisation of antithrombotic therapy.

Material and Methods We designed a pre–post quasi-experimental intervention study using a retrospective analysis in two cohorts. The first cohort was analysed to detect correctable measures contributing to bleeding (PRE, January–July 2010). Secondly, a bundle of interventions was implemented and thirdly, a second cohort of patients was evaluated to investigate the impact of our measures on bleeding reduction (POST: September 2011–February 2012). The impact on health outcomes was evaluated through comparison of the percentage of inhospital bleedings and 30 day readmissions between the two cohorts. The economic analysis took into account the costs associated with implementation of the programme and the cost savings associated with the prevention of bleedings.

Results A total of 677 patients were included (377 in PRE and 300 in POST). The bundle of interventions consisted of:

- Overdose avoidance measures: the percentage of patients overdosed was reduced by 66.3% (p<0.001).
- Prescription of antithrombotic drugs with a more favourable bleeding profile: the percentage of patients treated with fondaparinux increased (2.4% vs 50.7%; p<0.001).
- Avoidance of combinations of antithrombotic agents with an increased risk of bleeding: only 1 patient in POST received abciximab plus bivalirudin (p=0.016).
- Mandatory measurement of body weight: the percentage of patients weighed was increased (67.4% vs 88.7%; p<0.001).

The total bleeding rate was reduced after implementation of the interventions by 29.2% (31.6% vs 22.3%; OR 0.62; 95% CI 0.44–0.88) while 30 day readmission rates were 7.7% in PRE and 5% in POST (p=0.20). The estimated avoided cost was €95 113.6 per year, meaning that €10.1 would be obtained in return for each €1 invested during the first year and €36.3 during the following years.

Conclusions This multidisciplinary programme has proven to be effective in reducing bleeding events and is economically attractive.

INT-010 | IMPACT OF DRUGS ON HYPOGLYCAEMIA IN HOSPITALISED PATIENTS

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Background Hypoglycaemia is a life threatening condition that can be encountered during hospitalisation. Several risk factors have been identified, such as critical illness or general anaesthesia. Drug induced hypoglycaemia is classically related to several antidiabetic drugs. However, a growing number of reports associating hypoglycaemia with non-antidiabetic drugs have been published recently. Clinical pharmacists are often faced with hypoglycaemia in patients with multiple medications.

Purpose The aim of this study was to investigate the potential risk between prescribed drugs and hypoglycaemia episodes during hospitalisation.

Material and methods Patients from a regional hospital admitted between 2013 and 2015 were analysed. Point of care blood glucose values and prescribed drugs were extracted from electronic records. Hypoglycaemia cases were defined as having at least one hypoglycaemic event (random glucose value ≤3.9 mmol/L), and normoglycaemic cases as those with random glucose concentrations within the range of 4.5–5.8 mmol/L during hospitalisation. Patients who did not meet these criteria were excluded from analysis. Statistical analysis was carried out using multivariate logistic regressions and Cox proportional hazard models.

Results A total of 373 patients (53% men; median age 74 years) were included in the analysis and of these, 64 (17%) had at least one hypoglycaemic event. Patients who experienced a hypoglycaemic event had a longer duration of hospitalisation (median=10 vs 7 days, p<0.01) and a higher rate of antidiabetic drugs prescription (83% vs 37%, p<0.01). After adjusting for available confounders (age, gender, insulin and/or insulin secretagogues use), prescription of heparin (OR=2.8, 95% CI 1.7–7, p=0.02) and/or pantoprazole (OR=1.9, 95% CI 1–3.7, p=0.04) were associated with hypoglycaemia. Patients with more than eight administered non-diabetic drugs per day were at risk of hypoglycaemia during hospitalisation (hazard ratio=2.3, 95% CI 1.4–4, p<0.01).

Conclusions Heparin and pantoprazole were found to be associated with hypoglycaemia events. These results require confirmation in further studies. The relationship between hypoglycaemia and polypharmacy supports the demand to limit polypharmacy as much as possible, especially in elderly patients. This result underlines the potential involvement of clinical pharmacists with the aim of reducing the risk of hypoglycaemia during hospitalisation.

INT-011 | ADR AND INTERACTIONS OF NEW DIRECT ANTIVIRAL AGENTS FOR HEPATITIS C TREATMENT

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Background The new treatment regimens for hepatitis C virus infection have radically changed the care of patients. Recently introduced commercial products are subjected to intensive monitoring by the AIFA with the aim of evaluating both the effectiveness and safety in clinical practice. The purpose of this retrospective observational study was analysis of the incidence and severity of adverse reactions (ADRs) reported in the region of Calabria with regimens containing direct antiviral agents (DAAs), as well as evaluation of their effectiveness.

Material and Methods All ADR reporting forms for the new DAAs present in the Pharmacovigilance National Network of the Calabria region were extracted and analysed from March 2015 to May 2016. From the AIFA monitoring register data were extrapolated on treatment started and the sociodemographic characteristics of the patients. For polypharmacy patients, we analysed possible interactions.

Results 1457 new DAA regimens were started in Calabria. Patients were mostly men (52%). The most represented age group was 70–79 years (34%). 59.2% of the analysed treatments were successfully completed second therapeutic programme. In 1.1% of treatments ADRs were recorded and the report forms forwarded. Analysis of the forms showed: mean age 64.86 years (range 35–77), 60% men, associated with RBV treatment regimen (50%). Sovaldi + Olysio, Harvoni, Daklinza, Sovaldi and Viekirax regimens were associated with ADRs in 37.5%, 31.2%, 12.5%, 6.5% and 6.25% of cases. Comparing ADRs with the respective treatments started showed that they had an equally important place in treatments with Sovaldi + Olysio (1.46%) and Harvoni (0.90%). 12.5% of reported ADRs against Harvoni were considered serious for the occurrence of urosepsis and pneumonia. 87.5% were considered not serious. In other regimens ADRs reported were: fatigue, insomnia, hives, cough and dermatitis. Anaemia was the ADR reported more for therapeutic regimens associated with the use of RBV (58%). 25% of ADR cases occurred in patients who were administered polypharmacy; the analysis did not detect any possible interaction to account for the ADR.

Conclusions Our data provide an overview of the safety of new DAAs. The presence of ADRs in the elderly and those receiving polypharmacy requires activation of careful monitoring of the appropriateness of the prescriptions and interactions of therapies. This can only be implemented by management by a multidisciplinary team.

INT-012 PHARMACY BASED DOSING OF DARBEPOETIN: A RANDOMISED CONTROLLED TRIAL IN HAEMODIALYSIS PATIENTS

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Background Renal anaemia is treated with erythropoietin analogues. For erythropoietin analogues to be most effective, adequate iron levels are required. Treatment guidelines suggest a target range for haemoglobin levels in haemodialysis patients of 6.8–7.4 mmol/l. Values above 8.1 mmol/l are associated with increased cardiovascular mortality. Previously, only 23% of all haemodialysis patients in our hospital had haemoglobin levels within this target range.

Purpose In this randomised, controlled trial, we developed a treatment algorithm for darbepoetin and intravenous iron sucrose, with the intention of improving the percentage of haemodialysis patients who were within the haemoglobin target range. Secondary endpoints were percentage of patients with haemoglobin levels above 8.1 mmol/l and percentage of patients with adequate iron levels.

Materials and methods 200 patients were randomised (n=100 for the intervention and control groups). Study duration was 13 months. Adequate iron levels were defined as transferrin

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saturation of at least 20% combined with serum ferritin levels between 200 and 500 μg/l. In the control group, darbepoetin and iron sucrose dosages were adjusted by the treating nephrologist as normal. In the intervention group, dosages of darbepoetin and iron sucrose were adjusted by the pharmacist, based on a treatment algorithm developed by three of the authors (FJO, CFMH and YCS). In this algorithm, previous and actual dosages of darbepoetin and iron, and serum levels of haemoglobin, transferrin saturation and ferritin were included. Statistical analysis was performed with SPSS. Median and non-parametric tests (Mann–Whitney U test) were used, as data were not distributed normally. As defined in the protocol, 15 patients were excluded from analysis due to missing data (n=6 in the intervention group, n=9 in the control group).

Results In the intervention group, 38.5% of patients had haemoglobin levels within the target range compared with 23.1% in the control group (p=0.001). Haemoglobin levels above 8.1 nmol/l were more frequent in the control group versus the intervention group (7.7 vs 0.0%, p=0.034). Adequate iron status was 21.1% in the intervention group compared with 8.3% in the control group (p=0.003).

Conclusions In haemodialysis patients, darbepoetin and iron sucrose dosing by treatment algorithm increased the percentage of patients within the target range for haemoglobin levels as well as those with adequate iron storage.

INT-013 THE ANNUAL COSTS OF PREPARING THE TOP 10 MOST COMMONLY USED INJECTABLE DRUGS AS PREFILLED SYRINGES IN A HOSPITAL IN HERNING, DENMARK

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Background In the Central Region of Denmark, we are now in the process of building a new hospital in Herning. The hospital intends to supply the wards with ready to use drugs and our primary task was to design a facility with sufficient capacity to meet their future demands. The Hospital Pharmacy made a business case investigating the costs–benefits of buying and operating a syringe filler at the pharmacy, focusing on the top 10 most commonly used injectable drugs.

Purpose The primary purpose of the business case was to estimate the requirements for capacity needed at the pharmacy regarding personnel, equipment and production facilities. The secondary purpose was to estimate the running costs of production, following regulations in the EU-GMP rules concerning production, batch release and stability testing.

Material and methods We had 4 inputs to take into account:

- Baseline data from the wards
- Fluctuation in the daily use
- Economy regarding production with longer shelf life
- New technology (Equipment, usable syringes)

On the basis of the first two inputs, knowledge about production time of prefilled syringes, need for facilities, personnel, equipment and stability data was calculated into an initial investment and running costs per year.

Results We calculated an annual production requirement of 120 000 prefilled syringes using a semi-automated machine to transfer it into syringes. This amount of syringes demands 9

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full years work for one person. The initial investment cost amounted to € 540 000 and the running costs were € 975 000 a year.

Conclusion Based on the results, the hospital board has found the concept very interesting, but cannot currently meet the monetary requirement for investment.

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Niels Linde Laursen A MGROS I/S.

Other hospital pharmacy topics

OHP-001 HOSPITAL PHARMACY TECHNICIANS IN FRANCE AND QUEBEC: DIFFERENCES IN TRAINING AND PRACTICE

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Background Different studies conclude that pharmaceutical care and clinical pharmacy are more advanced in Quebec than in France. Are there any differences between the training and practice of hospital pharmacy technicians in France and Quebec?

Purpose The main objective was to describe and compare the training of hospital pharmacy technicians in France and Quebec. The secondary objective was to describe and compare the activity of hospital pharmacy technicians in France and Quebec.

Material and methods This was a descriptive comparative study. A list of relevant themes was established by consensus after a review of key websites and literature. A panel of a French hospital pharmacy resident, a French hospital pharmacist, a French pharmacy technician and 1 Quebec teaching hospital pharmacist was organised. Similarities and differences for each theme were identified and discussed.

Results 35 themes were selected (ie, 25 themes related to training and 10 to hospital pharmacy practice) with 5 similarities and 30 differences between France and Quebec. In both countries, training programmes are established by the Ministry of Education and the pharmacy technicians contribute to the drug supply chain activities, from procurement to compounding and dispensation. Among the differences identified, there was a mandatory specific diploma in France, French training lasts 3 years versus 1 year in Quebec, French annual scholar fees are lower (€ 0/year vs € 195 minimum per year in Quebec), knowledge was more fundamental in France and there was compulsory continuing education in France. Among the activities, differences identified were staff per department were lower in France, there was some management of specific activities in France (eg, medical devices, sterilisation), more activities to support clinical pharmacists in Quebec and delegation of tasks in Quebec was regulated.

Conclusion This comparative descriptive study highlighted more differences regarding training and more similarities regarding activities of hospital pharmacy technicians between France and Quebec. A better understanding of theses similitudes and differences may contribute to reciprocal improvement of these programmes and favour exchanges between the two countries.

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No conflict of interest

OHP-002 COST OF TREATMENT ANALYSIS OF BIOSIMILAR AND INNOVATOR INFLIXIMAB IN A TERTIARY LEVEL HOSPITAL

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Background The availability of biosimilar infliximab (IFX) has been postulated to offer cost savings compared with innovator IFX, which could lead to patients being switched between drugs.

Purpose To analyse demographic characteristics and pathologies of patients treated with IFX and to evaluate the cost effectiveness of switching from innovator to biosimilar drug.

Material and methods This was an observational, retrospective, 6 month study. Sample: 100% adult patients treated with IFX, which was prepared in the pharmacy service. Data sources: electronic medical records (IANUS), pharmaceutical application (SIMON) and management application (SINFHOS). Analysed data: number of intravenous mixtures prepared, number of patients, age, sex, weight, diagnosis, treatment received, dosage and cost of treatment.

Results 616 intravenous mixtures were prepared during the 6 months for 189 patients included in the study (70.5% innovator IFX and 29.5% biosimilar IFX). 131 patients received innovator IFX. Average age: 47.3 years (12–83), average weight 71.7 kg (48–132 kg), 68 women (51.9%). Diagnoses: A. Crohn's disease, 31; B. ulcerative colitis, 27; C: psoriatic arthritis, 25; D. rheumatoid arthritis, 23; E. ankylosing spondylitis, 18; F. psoriasis. 2; other, 5. 81 patients were treated with doses of 5 mg/kg and 50 patients with 3 mg/kg. 58 patients received biosimilar IFX. Average age: 42.5 years (8–72), average weight 65.8 kg (23–160 kg), 32 women (55.2%). Diagnoses: A. ulcerative colitis, 14; B. psoriatic arthritis, 11; C. Crohn's disease, 11; D. rheumatoid arthritis, 7; E. ankylosing spondylitis, 6; F. psoriasis, 1; other, 8. 36 patients were treated with doses of 5 mg/kg and 22 patients with 3 mg/kg. In the 6 month study, innovative drug consumption cost € 508 297.20 while consumption of biosimilar drug was € 177 923.20 (total expenditure: € 686 505.4). If all patients were treated with the biosimilar drug, the total expenditure would be € 609 190.4, assuming an estimated annual saving of € 144 024.

Conclusion Biosimilar drugs are a good alternative compared with innovator drugs due to the saving which can be obtained with their use. A close follow-up of patients treated with biosimilar IFX would be very important to evaluate long term efficacy and safety of the treatment.

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No conflict of interest

OHP-003 | COST ANALYSIS OF THERAPY FOR PATIENTS WITH MULTIPLE SCLEROSIS THREE YEARS AGO AND NOW

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Background Multiple sclerosis (MS) is the most common disabling neurologic condition in young adults and imposes high financial and quality of life costs on patients, their families and society. During the past years, developments in the battle against MS include new treatments to slow its progression.
Purpose To evaluate the financial impact of approving new drugs for the treatment of MS in the pharmacy department of a tertiary hospital.
Material and methods An observational retrospective study was conducted comparing data from April 2012 to March 2013 with data from April 2015 to March 2016. We analysed prescriptions of disease modifying therapies. The data collected were: number of patients, age, gender, total expenditure (TE) and percentage of expenditure per drug (%EPD). The data were analysed by statistical descriptions.
Results We reviewed the treatment of 735 patients in the period 2012–2013 and 774 patients in the period 2015–2016.

In the study, there were no differences between the two periods in terms of gender or age. The table shows that the total number of treated patients has increased. The variety of available therapies has grown. Consumption has escalated € 970 413 (14.65%) in 3 years. It is remarkable that new drugs such as teriflunomide, dimethyl fumarate, peginterferon beta 1a and alemtuzumab have resulted in an expenditure of € 766 686 (10.78%).

2012–2013	No of patients	TE (€)	%EPD
Glatiramer 18 mg	146	1 050 550.00	17.1
Interferon beta-1a/1b	393	2 484 601.00	40.4
Fingolimod	81	862 391.00	14.0
Natalizumab	115	1 741 563.00	28.4
Total	**735**	**6 139 105.00**	**100**
2015–2016			
Glatiramer 36 mg	155	973 997.00	13.7
Interferon beta-1a/1b	303	2 324 817.00	32.7
Fingolimod	120	1 733 909.00	24.4
Natalizumab	98	1 310 109.00	18.4
Teriflunomide	27	193 762.00	2.7
Dimethyl fumarate	55	374 887.00	5.3
Peginterferon beta-1a	5	23 551.00	0.3
Alemtuzumab	11	174 486.00	2.5
Total	**774**	**7 109 518.00**	**100.0**

Conclusion The high cost of new therapies available and the increase in the number of patients can explain why consumption has increased by € 970 413 (14.65%) in 3 years. Therefore, it is very important to use drugs in a rational way so that our health system is sustainable.

No conflict of interest

OHP-004 | EVALUATION OF PROPER USE AND EFFECTIVENESS OF CEFTAROLINE IN OUR CLINICAL PRACTICE

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Background Ceftaroline is a broad spectrum antibiotic used to treat complicated skin and soft tissues infections and community acquired pneumonia. To prevent emergence of resistant strains and conserve its effectiveness, ceftaroline prescription should be limited to specific recommended cases.
Purpose The aim of this study was to evaluate proper use and effectiveness of ceftaroline in our establishment.
Material and methods This was a retrospective study performed between January 2014 and December 2015. Patients who received ceftaroline and their biological and clinical data were collected by extraction from our prescription software (DXCARE and CLINISOFT). Seven items analysed the 'correct use' of ceftaroline: clinical setting, indication, referred germ, sensibility to other antibiotics, dosage, advice from an infectious disease and type of treatment (empiric, prophylactic or reassessed). Four items evaluated the 'effectiveness': treatment time, time for negative culture result, minimum inhibitory concentration (MIC) and healing of the infection.
Results During the period, 13 patients received ceftaroline; 1 patient's record was unusable. Prescriptions for ceftaroline were off-label in 83.3% (10/12, in the majority for osteo-articular infection), and 83.3% (10/12) of prescriptions were documented with identification of a methicillin resistant staphylococcal (once associated with *Escherichia coli* and another with *Haemophilus parainfluenza*). Each time, germs were resistant to glycopeptides. Dosage was adapted to renal function for 83.3% of cases and the last 2 cases benefited from pharmaceutical intervention to obtain adequate posology. Advice from an infectiologist was given for each treatment initiation. Average and median treatment time were, respectively, 15.5 days and 10 days. Average time to culture negative result was 9.2 days, but was assessed for osteo-articular and not documented infections (7/12). Ceftaroline MIC was measured in 6 cases and was strictly below 1 mg/mL. All patients were cured of their infection, with a minimum step back 6 months. No adverse reactions were observed during the study.
Conclusion This study showed important off-label use for ceftaroline but specialist advice was systematically requested due to the complexity of the patients. In all cases, patients were cured of their infection. Despite the off-label prescriptions, ceftaroline was used properly, with good therapeutic efficacy in our institution. A multicentre study should be performed to compare practices between several hospitals.

No conflict of interest

OHP-005 WITHDRAWN

independence as soon as possible after traumatic or vascular incidents. Such therapies use mainly orthoses. Nevertheless, most French rehabilitation medicine units do not have an orthotist due to the limited bed number (<100). In France, only pharmacists with additional training can perform orthotic activities. In addition, French pharmacist are in charge of handling and delivering medical devices for hospitalised patients. Thus pharmacists could be an interesting alternative to perform orthotic activity in rehabilitation medicine units without an orthotist.

Purpose Evaluation of orthotic activities performed by pharmacists in a French rehabilitation medicine unit of 25 beds.

Material and methods We describe 6 months of patient's orthotic care after implementation of orthotic activities performed by hospital pharmacists.

Results After implementation of orthotic activity by hospital pharmacists, all patients were wearing their correct orthoses allowing full efficiency of such medical devices. This was possible due to several factors, leading to reactive and personalised caring:

- Regular evaluations of patient needs with physical therapists and physiatrists inducing:
  - clear therapy objectives and prescriptions;
  - potential orthosis changes or adjustments.
- Prevention of errors during patient measurements.
- Patient follow-up a few days after orthoses delivery to prevent potential misuse or difficulties using the orthosis.
- Creation of an orthoses allocation allowing immediate treatment and eventually to allow the design by the pharmacist of a personalised orthosis.

Conclusion The development of an orthotic activity is essential to optimise the efficiency of therapies in rehabilitation medicine units. Indeed, such therapies required rapid and personalised delivering of well fitted devices to increase patient compliance, orthosis efficiency, thereby preventing potential sequelae or patient aggravation. The manufacture of personalised orthoses in thermoformable plastic is also interesting from a hygienic angle. Also, these activities, comparable with pharmaceutical consultations with both pharmacologic and orthotic patient caring, enable quicker pharmaceutical integration in the medical units. In additions, these consultations allow patient recognition of pharmacists as health agents by direct contact with them.

No conflict of interest

OHP-006 FEEDBACK OF AN ORTHOTIC ACTIVITY PERFORMED BY HOSPITAL PHARMACISTS IN FRENCH REHABILITATION MEDICINE UNIT

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Background The rehabilitation medicine unit provides individualised care and therapy that allows for a return to maximum

OHP-007 PRESCRIPTION OF ORAL SUPPLEMENTS DURING A HOSPITALISATION PERIOD

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Background The early diagnosis of malnutrition brings clinical and economic benefits in hospitalised patients, especially in the elderly. However, the prevalence of malnutrition remains high.

Purpose To analyse the use of electronic prescription of oral supplements for nutritional support in a third level hospital.

Material and methods A retrospective observational study was conducted over a 4 month data collection period (February to May 2016). We collected data from patients who were

prescribed oral supplements. We obtained information about the types of supplements, age of patients, starting date (with respect to hospital admission) and total number of days those supplements were administrated. We calculated the risk of malnutrition using a nutrition control table (CONUT) in patients who had available nutritional parameters at the time of prescription (serum albumin, total cholesterol and total number of lymphocytes).

Results We collected 338 registers, representing 0.8% of the total number of hospitalised patients. 84.5 was the average number of patients/month who were prescribed oral supplements. Services with the most numbers of prescriptions were general surgery and digestive (24.63%), followed by oncological (21.36%) and respiratory (11.57%) services. 51.49% of patients received protein and calorie rich shakes (1.5 kcal/mL). Most patients (34.72%) were in the range 76–85 years of age. 54.9% of patients received supplements in the first 5 days after hospital admission. The average number of days of prescribed supplements was 8.9. After collecting CONUT data from 52.7% of the registered patients, we concluded that 32.2% of patients were at a low risk of malnutrition, 44.1% had a moderated risk and 23.7% were in the high risk range.

Conclusion Prescription of supplements in our hospital was justified when used. We believe that the low percentage of patients studied related to the total was not representative and we conclude that a large number of patients could benefit from this type of nutrition. Therefore, patients are not being selected correctly. We recommend implementation of screening methods that will allow early detection of malnutrition. This will drive complete analysis tests, comprising nutritional parameters. We plan to implement a nutritional screening method that will allow us to evaluate the risk of malnutrition in the rest of our patients.

No conflict of interest

OHP-008 | **WASTE IN BIOMEDICAL RESEARCH DUE TO INFORMED CONSENT FORM DEFICIENCIES**

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Background According to international consensus, an institutional review board (IRB) report is required prior to starting a clinical trial. The majority of clinical trial applications are rejected following initial IRB review. Modifications are needed to these applications prior to receiving IRB approval.

Purpose To evaluate the extent to which the onset of clinical trials are delayed due to IRB rejection during their initial review because of informed consent form (ICF) deficiencies, and to evaluate the types of objections to the ICFs.

Material and methods A retrospective observational study was performed following initial reviews of clinical trials conducted by the La Paz Hospital IRB (2012–2015). The primary endpoint was the number of clinical trials evaluated and rejected by the IRB following their initial review due to deficiencies observed in the trials' ICFs and the type of objections appealed. Data were obtained from IRB meeting min during the study period.

Results Over the study period, 1858 clinical studies were evaluated. Of these, 1181 (63.5%) were rejected after the initial review. The objections leading to IRB rejection of a clinical study were due to defects in the ICFs (53.1%), design defects (27.4%) and other issues (30.5%). 1558 required a signed informed consent for subject participation (83.9%), of which 987 were not approved at first review because of objections to the informed consent documents (63.3%). The reasons for objections to the ICFs were primarily unreadability (11.7%) followed by inadequate information provided in accordance with Spain's Data Protection Law, specifically regarding the rights that the data owner has to access his personal information, rectify it, cancel it or decline its use in the clinical study (9.2%), and biological sample management according to Spanish regulations (7.8%).

Conclusion Rejection of clinical studies by the IRB following their initial review was frequent and delayed the onset of these studies. Deficiencies found in studies' ICFs were the main reason for research protocol rejections. There were two fundamental weaknesses in these documents: unreadability and discordance with different countries' regulations, mainly concerning personal data protection and management of biological materials. Healthcare systems should promote integration and coordinate regulations to reduce diversity in legislation between countries to reduce waste in biomedical research.

No conflict of interest

OHP-009 | **HOSPITAL PHARMACIST'S INTERVENTION IN THE CONTROL OF ENDOSCOPY EQUIPMENT DISINFECTION AND DETECTION OF NON-CONFORMITY CAUSING EQUIPMENT DAMAGE**

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Background All endoscopes and accessories must be rigorously decontaminated after each endoscopic operation. Although there are few prospective studies on the incidence of pathogen transmission during gastrointestinal endoscopy, it was reported that in developing countries, the disinfection procedures are not well respected in accordance with recommended standards.

Purpose As part of a continuous improvement process of our quality practices, the hospital pharmacist has to be engaged in the evaluation of endoscope disinfection of the gastroenterology department of our hospital.

Material and methods The study was conducted on six endoscopes and two lots of disinfectant, in order to achieve the following:

- Check the efficiency of endoscopic equipment disinfection procedures of the gastroenterology service compared with the CLIN protocol.
- Analyse the microbiological samples from the endoscopes to detect possible contamination and infection risk.
- Control quality and conformity of the disinfecting product acquired by the CHU by dosing its active principles.

Results Procedures for cleaning and disinfecting endoscopes were applied in up to 60%.

- Microbiological analyses of endoscopes disinfected according to internal disinfection procedures were positive for the presence of pathogen colonies.
- Microbiological analyses of endoscopes disinfected according to the protocol (CLIN) revealed absence of germs.
- The quality control of disinfectants revealed non-conformity of one of the batches.Conclusion This modest work done by the hospital pharmacist shows his catalytic role in the detection of non-compliance, having led to the deterioration of a newly installed endoscope.

No conflict of interest

PREOPERATIVE SERUM CARCINOEMBRYONIC ANTIGEN LEVELS ARE ASSOCIATED WITH HISTOLOGIC SUBTYPE, EGFR MUTATIONS AND ALK FUSION GENE IN COMPLETELY RESECTED LUNG ADENOCARCINOMA PATIENTS

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Background Serum carcinoembryonic antigen (CEA) is usually elevated in lung adenocarcinoma patients, but not in all patients. Lung adenocarcinoma subtypes have been defined by the new International Association for the Study of Lung Cancer/American Thoracic Society/European Respiratory Society international histological classification. Both epidermal growth factor receptor (EGFR) mutation and anaplastic lymphoma kinase (ALK) fusion are the main genes in lung adenocarcinoma. However, the relationship between CEA levels and histologic subtype, EGFR mutations and ALK fusion is still unclear.
Purpose To investigate the relationship between CEA levels and histologic subtype, EGFR mutations as well as ALK fusion, to provide treatment clues for patients with unidentified and undetected EGFR mutations or ALK fusion for clinicians.
Material and methods Preoperative serum CEA levels, postoperative histologic subtype, status of EGFR mutations and ALK fusion protein in 442 completely resected lung adenocarcinoma patients were retrospectively collected and analysed by clinical pharmacists of thoracic medical oncology from January 2014 to December 2015.
Results EGFR mutations were found in 69.9% (309/442) of lung adenocarcinoma patients, and ALK fusion protein in 4.5% (20/442). The EGFR mutation occurred more frequently in non-smokers and lepidic subtype (p=0.001; p=0.001). Higher preoperative serum CEA levels (CEA≥20 ng/mL) were independently associated with EGFR mutations (p<0.001), and lower preoperative serum CEA levels (CEA <20 ng/mL) were independently associated with ALK fusion (p<0.001). Moreover, in patients with CEA level of 20–49 ng/mL, the EGFR mutation rate was 88.2%, which was the highest, compared with CEA level <5 ng/mL, 5–19 ng/mL and ≥50 ng/mL. In addition, all specimens were invasive adenocarcinoma, and were lepidic (18.6%), papillary (15.4%), acinar (52.7%), solid (9.7%), micropapillary (3.2%) or other (0.4%), and levels of CEA in patients with the solid subtype were higher than in other histologic subtypes (p=0.001).

Conclusion Serum CEA levels before operation can be a reference marker to identify histologic subtype, EGFR mutation or ALK fusion in lung adenocarcinoma patients. For the lepidic subtype of lung adenocarcinoma with high serum CEA levels (≥20 ng/mL), EGFR-TKI treatment could be considered, to achieve better clinical efficacy.

No conflict of interest

LIPID EMULSION BASED EXCLUSIVELY ON OMEGA-3 FATTY ACIDS FOR ABNORMAL LIVER FUNCTIONING ASSOCCIATED WITH TOTAL PARENTERAL NUTRITION AT HOME

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Background Abnormal liver functioning is associated with long term treatment with total parenteral nutrition (TPN).
Purpose To assess the influence of a lipid emulsion based exclusively on omega-3 fatty acids on the progress of abnormal liver functioning in a patient receiving long term TPN.
Material and methods This was a descriptive retrospective study regarding a case of parenteral nutrition. The case was a 52-year-old woman with cyclic TPN at home due to intestinal obstruction secondary to a recurrent appendix tumour. The patient had external gallbladder flush and oral intake was impossible. Lipid input was founded on a solution based exclusively on omega-3 fatty acids. Clinical, analytical and nutritional variables were gathered.
Results The patient was initially administered a lipid formulation made up of medium chain triglycerides, soy oil and AG-omega3 (1 g/kg/day), ratio of carbohydrates–lipids 60:40 and 15 g nitrogen/day. Liver function parameters: ALP 150 U/L, TB 0.32 mg/dL, GGT 92 U/L, AST 26 U/L and ALT 28 U/L.

After the worsening of cholestasis pattern ALP was 499 U/L, TB 0.89 mg/dL, GGT 608 U/L, AST 354 U/L and ALT 280 U/L. The composition of TPN was modified, replacing the lipid emulsion with another one containing medium chain triglycerides, soy oil, olive oil and omega-3 fatty acids. The nitrogenated solution was also replaced with a taurine enriched solution. As liver function did not normalise, the lipid input was reduced, and its administration was eventually suspended.

Due to a sudden worsening of cholestasis (ALP 1619 U/L, TB 0.7 mg/dL, GGT 1324 U/L, AST 77 U/L, ALT 247 U/L and marked jaundice), the lipid formulation was replaced with another formulation based exclusively on omega-3 fatty acids (1g/kg/day). After 6 weeks, an improvement in the cholestasis pattern was observed, with a decrease in ALP and GGT by 68.5% and 67%, respectively: ALP 510 U/L, TB 0.4 mg/dL, GGT 435 U/L, AST 33 U/L and ALT 47U/L. The patient tolerated the treatment and no adverse effects were observed in relation to fish oil, such as thrombocytopenia or INR increases. The deficit in essential fatty acids was monitored, and values were found to be within normal limits. The clinical and analytical parameters remained stable until the patient died due to progression of her condition.

Conclusion Administration of this formulation for 7 months as the only lipid formulation was well tolerated by the patient and no deficit in essential fatty acids was detected.

No conflict of interest

OHP-012 **TECHNOLOGY AT THE SERVICE OF THE PHARMACIST: IDEA OF SOFTWARE TO SUPPORT THE 'AGENZIA ITALIANA DEL FARMACO' REGISTERS**

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Background Potential loss of economic resources to recover from public health.
Purpose The aim of this work was to present a software project that should support the pharmacist during the control of the correct management of the 'Agenzia Italiana del Farmaco' (AIFA) registers.
Material and methods Starting from the AIFA platform, we took a census of patients, specialist physicians, drugs with the relevant therapy forms and managed entry agreements (MEAs). All data, reported in the tables, were linked in order that the software would be able to calculate, for each drug, the relevant therapy form and pathology, correct timing between drug request (DR) and drug administration (DA), and the presence of possible 'suspended' treatments. Several ALERTS were set up:

- exceeded the maximum timing for the next administration;
- administration of the last box, useful for reimbursement, that was automatically cancelled at the next DR;
- 'suspended' treatments.

The timing was calculated for relative MEAs.
Results Since July 2015, the experimental phase has begun and, at present, data are inputted manually. At present, 837 treatments have been inserted. Thanks to a prototype of the software, we detected 340 suspended treatments in 2015, suspended by physicians following solicitations on the part of the pharmacists. Among them, 82 had the right to reimbursement, but only 54 (66%) have received reimbursement (€ 200 000). In the first 6 months of 2016, 174 treatments have already been suspended following the intervention of the pharmacist, among them 37 with the right to reimbursement; for all of them, requests have already been forwarded.
Conclusion In this initial phase, the software has optimised our work, allowing recovery of financial resources. As the project phase will be ended, we will try to connect our software to the AIFA register, in order to import directly useful data, and we will implement its use in all of our pharmacies. In the third phase of the project, the software will be put at physicians' disposal to guide them in the correct timings of filling of the forms.

No conflict of interest

OHP-013 **ASSESSMENT OF MEDICAL DEVICES INTENDED TO ADMINISTER ANTINEOPLASTIC DRUGS COMPOUNDED IN SYRINGES: METHODOLOGY PROPOSAL**

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Background The use of a post-administration rinsing process for intravenous antineoplastic drugs is very common to help to control occupational exposure to them. In paediatric haemato-oncology, drugs are often compounded in syringes to reduce the volume to be infused. In this case, extension sets with low deadspace volume are used but the required volume to rinse is not clearly specified.
Purpose The aims of this study were to propose a simple methodology to assess the rinsing volume of syringe extension sets and to compare several marketed devices.
Material and methods A UV spectrophotometry assay using quinine hydrochloride as drug substitute was developed. Quinine concentration ranged from 20 to 200 µg/mL. The assay was validated with the accuracy profile method and tested on 5 different assemblies (device+extension sets) with different deadspace volumes (1.28–2.80 mL) and at two different quinine concentrations (0.3 and 8.0 mg/mL). Rinsing was performed stepwise with water for injection until reaching an undetectable quinine concentration. After fitting the data with a Weibull model, assemblies were compared with an ANOVA performed on ranks (GraphPad, La Jolla, USA).
Results The within day and between day precision ranges were 0.39–0.81% and 0.48–0.84%, respectively. The lower limit of quantification was 4.26 µg/mL. The volume required to completely rinse the infusion line was different according to the initial drug concentration and to the device assessed: from 6 to 10 mL for a low quinine concentration and from 7 to 17 mL for a high quinine concentration.
Conclusion This study shows that a simple, cheap and easy to use methodology may be used to assess the rinsing volume of syringe extension sets. The rinsing volume is different according to the tested device.

No conflict of interest

OHP-014 **HOSPITAL BASED HEALTH TECHNOLOGY ASSESSMENT OF INTRAFIX SAFESET**

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Background Due to a shortage of an infusion set used at the hospital which lasted for several months, an evaluation was needed to substitute the medical device (MD). Different alternatives were available on the market with the same quality as the original MD but at a greater cost. The only option which had more quality benefits was the Intrafix Safeset; therefore, an analysis was necessary to evaluate quality and costs compared with the existing MD. The device was evaluated by a multidisciplinary committee (CTA), including pharmacists and

nurses, created to decide on the introduction of new MDs to the hospital formulary.

Purpose The objective of the work was a technical–economic analysis of the Intrafix Safeset infusion set for hospital formulary inclusion.

Material and methods The CTA multidisciplinary committee evaluated the MD Intrafix Safeset comparing it with the previous infusion set in terms of: declared quality (data sheet and literature data), usability and management impact (practical tests in 3 different wards) and economic impact (consumption analysis and costs of infusion sets, infusion pumps, flow controllers and costs for disposal over a 4 month period).

Results Declared advantages (quality and safety) of the Intrafix Safeset were confirmed by literature data; practical tests showed higher safety and saving time perceptions associated with the Intrafix Safaset due to the closed system and the presence of 'Airstop' and 'Primestop' systems as well. However, safety perception was present only after training courses. Consumption analysis showed reduction of the use of infusion sets (6%), infusion pumps (8.8%) and flow controllers (7.5%) when Intrafix Safeset was used. These reductions were associated with: lower consumption of flow controllers, lower replacement of infusion sets and more therapy switches from infusion pumps to infusion sets. The total costs during the 4 month period that Intrafix Safeset was used resulted in +4% which became −2% when stretched over 1 year.

Conclusion The hospital based health technology assessment through a multidisciplinary team demonstrated the economic sustainability of the Intrafix Safeset MD and enabled hospital formulary inclusion of a higher quality and safer device.

No conflict of interest

OHP-015 **ELECTRONIC HEALTH RECORD: DOES WEIGHT MATTER?**

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Background The electronic health record (EHR) includes all of the documents relating to healthcare processes for each patient, identifying doctors and other professionals who have participated in their care in order to obtain the maximum possible integration of clinical documentation. The main purpose is to provide healthcare, recording all data related to medical judgments, allowing accurate and updated knowledge of the patient's health status.

Purpose To analyse anthropometric data required for clinical monitoring of the patient and establishment of drug doses, as well as influencing the calculation of clinical values (renal clearance, BMI or body surface).

Material and methods This was a cross sectional study in which all patients admitted to the hospital in a day were checked to see if they had their weight recorded in the EHR. We also checked if they were receiving drugs where it is recommended that doses are adjusted depending on weight.

Results Of 481 patients admitted in a day to our hospital, 112 did not have their weight recorded (23.28%). Of these, 70.6% had treatments which required dose adjustment based on weight, such as enoxaparin or other antibiotics.

Services with the highest percentage of weight recorded in the EHR were onco-haematology (96.3%), general surgery and digestive (92.59%), internal medicine (95%) and paediatrics (92.31%). Geriatrics had the least records of the weight of their patients (31.82%). It is particularly important in the geriatric population to record weight, to detect possible losses of unintentional or involuntary weight, and assess states of malnutrition. Onco-haematology had the highest recordings of patients' weight as most chemotherapy treatments require dose adjustments depending on weight, in addition to the software used for prescription and validation of these treatments, which also requires that weight is indicated.

Conclusion The hospital has established a protocol for when a patient is admitted to hospital that nursing staff must collect weight and size when performing the physical examination. It is true that the patient's circumstances may hinder assessment of weight, especially in elderly populations, but this is not usual. Many drugs are adjusted depending on weight, so that should affect the performance of a complete physical examination, allowing the clinician to undertake good prescription and validation.

OHP-016 WITHDRAWN

OHP-017 WITHDRAWN

OHP-018 SINGLE USE CANISTER FREE NEGATIVE PRESSURE WOUND THERAPY (NPWT): AN ECONOMICAL ALTERNATIVE

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Background Single use negative pressure wound therapy (NPWT) is as effective as traditional NPWT in most indications for wound treatment. Portable NPWT systems exist but they require canisters and consumables and they are still fairly bulky. A single use canister free system allows more comfort for patients, and it is as effective as other devices.

Purpose We wished to estimate the economic impact of single use canister free NPWT for our hospitalised patients, usually equipped with portable NPWT devices.

Material and methods We identified all NPWT prescriptions from January 2013 to December 2015 in our hospital and calculated the costs of device rental and purchase of consumables. We estimated the cost of single use NPWT if it had been used. We compared two devices from the same supplier (RENASYS GO and PICO, Smith&Nephew). We examined whether the single use device could be used in these patients. The cost of single use was estimated from the costs of medical devices (the dressing have to be changed twice a week). We did not consider nursing time (it is shorter for single use NPWT).

Results 43 patients were treated by NPWT since 2013, 37 with traditional portable NPWT. All would have been eligible for single use NPWT. Total cost of traditional NPWT was € 22 912 and represents 477 days of treatment. It comprised rental cost and average cost of consumables. We estimated the cost of NPWT with a single use device at € 15 192 for these patients (−34%). The daily cost was € 40.28 for traditional NPWT versus € 22.21 for single use NPWT. From a clinical point of view, single use NPWT was as effective as traditional NPWT in most indications. For the patient, it seems to be more comfortable than traditional NPWT because it permits easier movement, is less painful and less noisy. Canister use is not necessary. It would reduce length of stay. It seems to be an interesting alternative to portable devices of NPWT. However, this system can present some limits for very exudative wounds (>500 mL/week) or very large wounds.

Conclusion When it can be used, single use canister free NPWT is more economical than traditional NPWT at hospitals, without affecting the effectiveness of wound therapy.

No conflict of interest

OHP-019 ASSESSMENT OF FOUR MANUAL INFUSION DEVICES OF [18F]-FLUORODEOXYGLUCOSE IN A NUCLEAR MEDICINE DEPARTMENT

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Background In nuclear medicine, [18F]-fluorodeoxyglucose (18-FDG) is usually administered in unit doses partitioned from multi-dose vials in radiopharmacy. Administration can be

performed manually or automatically. In a nuclear medicine department where the dispensing system used is the Unidose by TRASIS, administrations have to be performed manually. The infusion sets selected should reduce radiation exposure to the staff involved, improve administration accuracy and mitigate contamination.

Purpose To assess four infusion devices. There is no guideline for the 18-FDG infusion device.

Material and methods The evaluation focused on five criteria:

- The feasibility of infusion device by in vitro assessment of a dye path into the tubing.
- The ergonomics of use by staff evaluated with a satisfaction scale.
- The skin exposure of staff hands measured by thermoluminiscent dosimeters placed on three staff fingers during infusion.
- The 18-FDG adsorption in the tubing by measuring residual radioactivity after infusion and rinsing.
- The devices costs.

   The four devices tested were:

   (1) a conventional infusion device with a 3 way stopcock (n=10), (2) a device with a 3 way stopcock and 2 non-return valves (n=9), (3) an infusion device marketed by DORAN with a 3 way stopcock and two non-return valves (n=8) and (4) a device marketed by TRASIS without a 3 way stopcock but with 2 non-return valves (n=6).

Results

- The feasibility study revealed that device (4) showed a slight dye path in the opposite direction of the infusion.
- The ergonomics study revealed that the luer-lock movable extremities for devices (1) and (4) and the length of devices (3) and (4) were appreciated.
- The staff hands skin's exposure indicated relative improvement in radioprotection with devices (3) and (4) (respectively, 4.61 and 521.10^{-5} mgy/MBq and 9.24 and 643.10^{-5} mgy/MBq for devices (1) and (2), respectively) if we focus on the most exposed finger.
- The 18-FDG adsorption showed no significant difference between devices (< 0.01% of initial radioactivity, $p < 0.05$).

The price gradually increased between devices (1) and (4) (from € 0.4 to € 4.97 TTC/device).

Conclusion The results suggest staff choices as device (3) or (4). Nevertheless, staff training is necessary for optimal use of these devices.

No conflict of interest

OHP-020 | **A SINGLE USE KIT FOR CATARACT SURGERY: WHY NOT?**

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Background In 2015, approximately 1500 cataract surgeries were performed in our teaching hospital. Currently, surgeons use single use (SU) medical devices (MD) and multiple use (MU) instruments for cataract operation without vitrectomy. In the context of development of ambulatory care, optimisation is key. Several pharmaceutical laboratories offer an 'SU cataract kit' with all MD including instrumentation.

Purpose To perform a medicoeconomic analysis comparing current practices versus practices with the 'SU cataract kit'.

Material and methods A cost minimisation study was conducted during the summer of 2016 in the ophthalmic surgical unit. Firstly, practical observations were performed by a pharmacy resident to describe the kit contents. Then, this listing was approved by surgeons. Several pharmaceutical laboratories were contacted to offer a price for this kit. In a second investigation, the cost of this kit was compared with the unit price of each SU-MD and the cost of instrument sterilisation. The preparation time by nurses and pre-disinfection time by care assistants were also measured.

Results Currently, surgeons used 15 SU-MD in unitary bag and 4 MD-MU in sterilised boxes. All 15 SU-MD cost € 20.03. The mean cost per sterilised box, for 4 instruments (speculum, bonn clip, capsulorhexis clip, micromanipulator) was € 17. Therefore, MD used for one cataract operation cost € 37€ . The cataract kit should contain 19 MD. 3 pharmaceutical laboratories responded to our request and the best kit selected cost € 52.5. The preparation time by nurses and pre-disinfection time by care assistants were, respectively, 30 min and 5 min per operation. Using the kit, preparation time would be reduced to 5 min and no pre-disinfection would be required. Thus time savings of 30 min would mean operation on more than 4 patients per day. In France, the diagnosis related group (02C05J) tariff for cataract surgery is € 1265.74. Therefore, our hospital could hope to obtain more revenues.

Conclusion The SU kit had a higher purchase cost than the SU-MD and MU instruments currently used. However, the use of the SU kit would provide gains due to an increase in the number of operated patients. Furthermore, the use of the SU kit could facilitate ambulatory care.

No conflict of interest

OHP-021 | **UTILISATION ANALISYS OF LENALIDOMIDE IN MULTIPLE MYELOMA**

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Background Lenalidomide is one of the main drugs for the treatment of multiple myeloma, which has a high cost per patient.

Purpose To describe and analyse the use of lenalidomide in multiple myeloma.

Material and methods This retrospective study covered the period from January 2013 to December 2015. All patients with a diagnosis of multiple myeloma who started treatment with lenalidomide from January 2013 to June 2015 were included. The collected parameters were: number of patients, age, sex, progression free survival (PFS), economic spending (€) and dose used. Data were obtained through the prescription and validation programme SAVAC, its complementary exploitation of data programme Discoverer and collected in an Excel base designed for that purpose.

Results A total of 44 patients (54% women) were identified, with a median age of 75 years (mean 72±11; range 37–97). Median PFS to the cut-off date was 12 months. 34% of

patients exceeded 18 months of PFS and 23% achieved a PFS higher than 24 months. In contrast, 9% of patients had less than 3 months of PFS. The annual cost was €1 046 963, with an average cost per patient/year of €32 718, representing 3% of the total budget of the pharmacy service. Regarding safety, 42% received at least one dose reduction, and 17% more than one dose reduction. These data are consistent with consumption of the various presentations, where more than 50% of consumption corresponds to the dose of lenalidomide 25 mg, the 10 and 5 mg doses being consumed less (<10% and 5%, respectively).

Conclusion The results of effectiveness of PFS matched the effectiveness of the pivotal studies MM-009 and MM-010 that showed a median PFS of 48.1 weeks (12 months). Almost half of patients with more than 12 months of PFS had reached 24 months of PFS. This represents a cost per patient of approximately €30 000/year, and an incremental cost per life year gained of €56 410 compared with placebo.

No conflict of interest

EVALUATION OF EFFICACY AND SAFETY OF HEPATITIS C VIRUS TREATMENT WITH THE NEW DIRECT ACTING ANTIVIRALS IN THE CLINICAL PRACTICE OF A REGIONAL HOSPITAL

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Background Hepatitis C virus (HCV) infection is one of the main causes of chronic liver disease worldwide. Clinical care for patients with HCV related liver disease has progressed considerably over the past years, thanks to improvements in pharmacological treatment, especially with the new direct acting antivirals (DAAs).

Purpose To evaluate the efficacy and safety of treatment of HCV with the new DAAs in clinical practice.

Material and methods This was a prospective, descriptive and observational study carried out in a regional hospital from May 2015 to July 2016 in HCV patients. In this area, there are approximately 447 cases of positive HCV. Treatment with DAAs included sofosbuvir, simeprevir±ribavirina; ledipasvir+sofosbuvir±ribavirina; daclastavir+sofosbuvir±ribavirina; ombitasvir+paritaprevir+ritonavir+dasabuvir±ribavirina and sofosbuvir±ribavirina. Variables studied were age, sex, hepatic fibrosis stage, HCV genotype, treatment duration, HCV-RNA level at weeks 4, 12, post-12 (sustained virological response, SVR) and adverse events.

Results The study included 50 patients with HCV treated with DAAs, 36 (72%) men with a mean age of 58.3 (43–78) years. Only 4 (8%) were HIV coinfected. 35 (70%) patients had grade 4 fibrosis (F4) with compensated cirrhosis and 11 (22%) had grade F3. Genotype distribution was genotype 1b (50%), 1a (16%), 4 (10%), 3 (12%), 1ab (6%), 1 (2%), 1ac (2%) and 2 (2%). 22 (44%) patients were treated with the combination sofosbuvir+simeprevir±ribavirin (2 HIV coinfected); 12 (24%) with ledipasvir+sofosbuvir±ribavirina (1 HIV coinfected); 6 (12%) with daclastavir+sofosbuvir±ribavirrina (1 HIV coinfected), 9 (18%) with ombitasvir+paritaprevir+ritonavir+dasabuvir±ribavirina and 1 (2%) with sofosbuvir±ribavirina. 28 (56%) patients achieved undetectable HVC-RNA at week 4. At the end of the treatment, 96% of patients reached SVR. The only adverse event detected was a case of photosensitivity skin reaction that was attributed to simeprevir. No patient had to stop treatment because of adverse effects.

Conclusion Treatment of patients with HCV with new DAAs is considered a highly effective and safe therapy, obtaining SVR of 96%. Only one adverse event was observed. Although the endpoint of therapy is undetectable HCV-RNA 12 weeks post-treatment, in this study 28 (56%) patients reached SVR at week 4.

No conflict of interest

VEDOLIZUMAB TREATMENT FOR INFLAMMATORY BOWEL DISEASE: CLINICAL PRACTICE

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Background Vedolizumab is an IgG$_1$ humanised monoclonal antibody directed against $\alpha_4\beta_7$ integrin, approved for moderate–severe ulcerative colitis (UC) and Crohn's disease (CD) in adults with inadequate/lack of response or intolerance to conventional therapies or to a tumour necrosis factor α (TNFα) antagonist.

Purpose To evaluate the effectiveness and safety of vedolizumab in clinical practice in a medium sized hospital.

Material and methods A retrospective observational study was carried out, which included all patients treated with intravenous vedolizumab from October 2015 to date. Data on demographic and clinical characteristics, indications, posology and duration of treatment, previous and concomitant therapies, adverse events and clinical evolution were collected from the electronic health record and the assisted electronic prescription programme. Effectiveness was defined as clinical improvement, and ineffectiveness as treatment suspension due to lack of response or clinical worsening.

Results 10 patients were included (mean age 47.7 years, 60% women). Indications for use were UC in 7/10 patients (70%) and CD in 3/10 patients (30%). The drug was administered according to the officially approved scheme. The mean number of administered doses was 3.4 (2–5). All patients had previously received infliximab, adalimumab, golimumab or ustekinumab with inadequate response, which placed vedolizumab in the second–fourth line of biological treatment. Concomitant therapies were oral corticosteroids, azathioprine, mesalazine and methotrexate. With regard to adverse events, 1 patient experienced nausea and stomach discomfort, not requiring suspension or modification of therapy. Another patient (who had been splenectomised and suffered from immune thrombocytopenic purpura) experienced septic shock, followed by *C difficile* infection and disease exacerbation, which led to treatment suspension due to lack of effectiveness. 2 more patients suffered disease exacerbations. Currently, 7 patients continue receiving vedolizumab, showing clinical remission.

Conclusion Vedolizumab is a therapeutic approach for treatment of inflammatory bowel disease in clinical practice in patients with poor response or intolerance to other therapies. It has shown modest effectiveness and a safety profile apparently similar to that of other biological drugs. Available data

OHP-024 | **CONTROVERSY BETWEEN CYCLIC PARENTERAL NUTRITION AND TOTAL PARENTERAL NUTRITION**

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Background Patients receiving long term total parenteral nutrition (TPN) often present some complications such as liver and biliary disorders. The most common hepatic markers are elevated bilirubin, alkaline phosphatase (AP), gamma glutamyl transpeptidase (GGT) and transaminases (ALT/AST). Strategies to overcome these complications include setting the caloric intake of TPN and cyclic infusions.
Purpose To analyse the variation in liver enzymes in changing from a continuous infusion of 24 hours to cyclic PN.
Material and methods A retrospective study was conducted between July and September 2016. 23 patients who received TPN for more than 7 days and that had changed the infusion time were included. The following data were collected: starting day of PN, start day and end day of cyclic PN, and variations in bilirubin, GGT, ALT/AST and AP.
Results 65% were men with a mean age of 56 years and 35% were women with a mean of 51 years. Mean time taken to start cycling was 9.3 days, with a mean of 20.39 days with TPN and a mean of 11.09 days of cyclic PN. When starting cyclic PN, no data were available for 47.82% of patients regarding AP, 52.17% for bilirubin, 8.69% for AST and 4.35% for both GGT and ALT. After PN, 83.33% had increased levels of AP and only 16.67% had decreased levels. 54.55% had increased levels of bilirubin, 36.6% decreased levels and 9.09% had no change. 63.64% had increased levels of GGT and 36.36% decreased levels. 66.67% had decreased AST levels compared with 33.33% with increased levels. 50% had increased levels of ALT versus 45.45% with decreased levels and 4.55% with no change.
Conclusion Based on the results obtained from our sample, our population did not benefit from cyclic PN. We found increased levels of enzyme markers of cholestasis. We should consider whether the selection of patients to cycle the PN was correct; in several patients, data for enzyme levels of cholestasis were not available or were previously raised at the beginning of TPN, which could be indicative of intrahepatic cholestasis.

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OHP-025 | **COMBINED EFFECT OF A CLOSED SYSTEM TRANSFER DEVICE AND DECONTAMINATION IN THE REDUCTION OF OCCUPATIONAL EXPOSURE IN COMPOUNDING UNIT**

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Background Closed system drug transfer devices (CSTD) may significantly reduce the contamination of isolators to antineoplastic drugs,[1] but persisting contamination remains. To date, no data are available to determine which of the CSTD or the cleaning process is mostly involved in contamination reduction.
Purpose To describe the relative contribution of CSTD and the cleaning process in the control of occupational exposure inside isolators.
Material and methods A comparative and prospective study was performed over 6 months in a new compounding unit equipped with two new isolators. Spikes and needles were used in one isolator and a CSTD (BD-Phaseal, Becton-Dickinson) was used in the other one. A standard biocide (Surfa'safe, Anios, Lezennes, France) was used daily in both isolators. 10 drugs (cyclophosphamide, cytarabine, dacarbazine, doxorubicin, fluorouracil, ganciclovir, gemcitabine, ifosfamide, irinotecan and methotrexate) were monitored on three locations inside each isolator: gloves, workbench and window. Drugs were alternatively compounded in one or the other isolator between even and odd days. Sampling was performed before and after the daily cleaning on 24 sampling days progressively spaced over 6 months during the study. Monitoring was performed by a validated LC-MS/MS method. Probability of contamination for each drug was analysed using logistic models with repeated measures (PROC GLIMMIX, SAS version 9.4, SAS Institute Inc., Cary, NC, USA).
Results Since dacarbazine, doxorubicin, irinotecan and methotrexate were never or very rarely retrieved, our analysis included 6 drugs. For cyclophosphamide, cytarabine, ganciclovir and ifosfamide, the use of a CSTD was significantly associated with a risk reduction of contamination, either independently of other predictors or in interaction with time, leading to a risk reduction from about 70% for cytarabine to 98% for ganciclovir. For all drugs, except cyclophosphamide, the cleaning process alone or in interaction with time and/or localisation was significantly associated with a reduction in contamination by about 30% for gemcitabine to 80% for ifosfamide.
Conclusion This study shows that the CSTD plays a major role for most drugs in controlling the occupational exposure inside isolators. Combining a CSTD and an improved decontamination process is required to remove the residual contamination by antineoplastic drugs.

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OHP-026 PROPHYLACTIC TREATMENT OF CHRONIC MIGRAINE WITH BOTULINUM TOXIN: STUDY POPULATION

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Background In different clinical studies, the use of botulinum toxin has shown a reduction in health spending, reducing the number of drugs used for patients and decreasing the number of doctor visits and the frequency of episodes.

Purpose To analyse the demographic characteristics of the population diagnosed with chronic migraine and treated with botulinum toxin, to make a database for a future study.

Material and methods This was a retrospective observational study. The neurology department reported on all patients who had been administered botulinum toxin for chronic migraine. We created a database, where the mid-point was the first administration of toxin; we registered data 1 year before and 1 year after the first administration of toxin. The variables studied were patient age, sex, obesity, toxic habits, hypertension, primary physician visits, specialist visits, emergency visits and frequency of migraine attacks.

Results 26 patients were included in the study. Mean age of the patients was 49 years, 3 men and 23 women. 2 patients were obese, 2 had toxic habits and 7 patients had hypertension. In the year previous to the first administration, average family doctor visits was 1.69, average visits to the neurologist was 2.46 with 1.15 emergency visits for migraine headaches. The average number of drugs prescribed per patient was 10, 3 from the family of triptans. The average expenditure on healthcare was € 386 and on medicines was € 602. The frequency of migraine episodes that year was daily.

Conclusion The demographic characteristics of the patients in our study were similar to other published studies: 88% were women compared with 12% of men. With reference to the risk factors studied, 7% were obese, 7% had toxic habits and 26% had high blood pressure. Once the results from the previous year are analysed, we will use the same protocol for the year after the first administration of toxin, with the goal of comparing the data and checking the reduction in expenditure that botulinum toxin has shown in published studies.

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No conflict of interest

OHP-027 ANTICHOLINERGIC BURDEN WEB TOOL CALCULATOR

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Background Anticholinergic drugs may increase the risk of cognitive and functional disorders in older patients. Anticholinergic exposure quantified by anticholinergic scales (AS) can detect patients with a high risk of adverse events.

Purpose Design, development and validation of a tool that calculates the anticholinergic burden.

Material and methods A tool was designed which calculates the anticholinergic burden based on different AS described in a systematic review. The main aim of the review was to identify all AS described in the literature and to evaluate them in polypathological patients (PP), a subpopulation of patients with chronic diseases and increasing frailty, or with similar characteristics. For its development, a database was created with all drugs included in the scales and specific scores given to each. In the case of DBI, the effective minimum dose of each drug adapted from the National Drug Formulary Spain was added. Once the software was created, it was validated for accuracy. Medication data were collected from PP, included in the IMPACTO project. The anticholinergic burden was calculated twice: manually and with the web calculator.

Results The tool was named Anticholinergic Burden Calculator (http://www.anticholinergicscales.es/). It generates reports on 10 AS, elaborated to older patients in general according to the review. The report offers final anticholinergic risk scores in three groups: low, medium and high, according to the risk categorisation made by the authors or developers of each scale. It also describes the score of each drug by scale. Subsequently, it analysed medication from 35 patients and a total of 310 drugs. It calculated anticholinergic burden based on 10 AS. The results showed 100% agreement between both manual and automated calculations from the software.

Conclusion The tool facilitates calculation of the total load using 10 scales in a single step. Moreover, doctors and pharmacists obtained very valuable information on treatment. They can identify which patients are at risk and can easily and quickly focus on them when reviewing medicines taken by elderly patients.

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No conflict of interest

OHP-028 RATIONALISATION SCHEME FOR APPROPRIATE CONSUMPTION OF MEDICAL GLOVES IN A GENERAL HOSPITAL

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Background Regarding the possibility of double certification of medical gloves (MG) as a medical device (MD) and as an individual protection device (IPD) in this country, and the need for cost containment, optimising hospital usage of MG is fundamental for appropriate consumption.

Purpose The aim was to prepare scheme for all hospital units on the correct usage indications of MG, based on internal hospital guidelines, prevention–protection service procedures, and indications from provider companies compared with revision of the literature evidence.

Material and methods The scheme divided MG based on material type (MT) and usage indication (UI). Each MT (6 typologies: nitrile, vinyl-elasticised, latex, synthetic, kevlar, polyethylene), corresponded to 2 types of operation (on the patient and/or on ambient), sterile/non-sterile type and disposable/non-disposable type. For each type of operation, the UI, warnings and commercial name of the MG used were specified. All MG were powder free.

Results For 2 typologies, patient operations were divided into 2 subcategories:

- Nitrile non-sterile in assisted diagnostic procedures and chemotherapy administration.
- Latex sterile in invasive surgical operations (single MG) and invasive surgical operations in potentially infected patients (double MG).

For 1 typology (vinyl-elasticised), both the patient and ambient operations resulted in the same MG being used.

For 2 typologies, only the patient operations were specified:

- Synthetic sterile, only in the case of latex hypersensitivity for surgical operations (it resulted in costs 3–10 times higher than latex)
- Polyethylene sterile, in non-surgical operations (possibility to use over the nitrile non-sterile).

For 1 typology (kevlar), only the ambient operation as under-glove cut-resistant was described.

Usage of the nitrile was recommended only in the situation of high manipulative stress, while the vinyl use could be increased for: patient operations without the risk of biological contamination and reorganisation and cleaning of materials (moderate manipulative stress). Vinyl resulted in costs 3 times lower than nitrile and was less likely to develop contact allergy.

Conclusion With the same safety level, adequate biocompatibility and appropriate performance, the MG with the lower cost is preferred and its usage is required only in cases of patient and hospital personnel protection.

No conflict of interest

OHP-029 **LEUKOCYTE RADIOLABELLING SETTINGS ASSESSMENT ACCORDING TO THE MEDICAL INDICATION**

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Background Radiolabelled leukocytes are one of the most specific scintigraphy examinations to diagnose deep tissue infection. White blood cells are isolated by sedimentation and centrifugation and then labelled with radioactive drugs. A few checks are performed to evaluate the quality of the labelling before injection. One of these controls consists of determination of labelling yield. The sedimentation volume is another parameter easily measurable and can influence the labelling yield.

Purpose The purpose of the study was to evaluate the correlation between leukocyte radiolabelling settings and the medical scintigraphy indication.

Material and methods An analysis of the radiolabelling settings performed in a nuclear medicine department from December 2013 was completed with XLSTAT 2016. We analysed two major settings: sedimentation volume and radiolabelling yield. Five indications were compared: pacemaker endocarditis (n=15), deep tissue infection (n=40), vascular prosthesis infection (n=23), osteitis and osteoarthritis (n=71) and bone and joint infection on device (n=173). Two studied variables did not follow the normal distribution, and a non-parametric test was performed to compare the two settings according to the indication.

Results A statistically significant difference was found for the radiolabelling yield: bone and joint infection on device was the indication which had the worst labelling yield (52%) compared with the other indications (pacemaker endocarditis (60.2%), deep tissue infection (57%), osteitis and osteoarthritis (56.5%) ($p < 0.02$ except vascular prosthesis infection (56.3%)). There were statistically significant differences for sedimentation volume between the five indications but no indication stood out. The lower labelling yield observed on bone and joint infection on device indication may be explained by the chronic nature of infection. In this indication, antibiotics are often used which cause a decrease in leukocytes in blood.

Conclusion Even if radiolabelling yield differences exist according to the indication, radiolabelling leukocytes is still a specific examination to diagnose infection of deep tissues. Work on optimisation of the sedimentation step and on the labelling temperature are in progress in this department.

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No conflict of interest

OHP-030 **USER SATISFACTION AFTER REPLACING THE COMPUTER PROGRAMME FOR ASSISTED ELECTRONIC PRESCRIPTION**

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Background According to various studies, the quality of a software application greatly influences overall user satisfaction and thus the successful integration of assisted electronic prescribing (AEP).

Purpose To assess the degree of satisfaction of doctors and nurses in a palliative care unit after implementation of a new computer application for the AEP.

Material and methods This was an observational, cross sectional study by the pharmacy. After implementation of the APD-Athos software, doctors and nurses were given an anonymous satisfaction questionnaire with 13 Likert questions (from 1=insufficient to 5=excellent) related to: characteristics of the software, infrastructure, utility of AEP and assessment of the work done by the pharmacy department. A section for comments was also included.

Results 26 surveys (6 doctors, 20 nurses) of the 35 questionnaires distributed were analysed (74.3%). All respondents had previously used another programme for AEP. The infrastructure available for implantation obtained a score <2.5 in both groups. Regarding whether the EAP contributed to improvement in coordination between professionals, 100% of doctors assigned to this question a value >4; however, nurses graded it with an average of 1.3 points. All issues related to

accessibility, clarity and agility in managing the software obtained a score <3 in both groups, except for 'ease to indicate/read instructions for administration or other observations' (medical mark=3.17). The support offered by the pharmacy department received the highest rating (5 doctors and 4 nurses). The most frequent comments were: confusing management sheet, excessive alerts, and difficulty in prescribing fluid therapy and in the visualisation of the therapy.

Conclusion The valuation of the new software was unsatisfactory and most users preferred the previous programme. However, implementation of the work done by the pharmacy department received a good score. The results identified some opportunities for improvement that will be future intervention measures. It would be advisable to create a new survey after making these interventions.

No conflict of interest

OHP-031 | EVOLUTION IN TREATMENT OF MULTIPLE SCLEROSIS IN A MEDIUM SIZED HOSPITAL

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Background The introduction of oral drugs in the treatment of multiple sclerosis (MS) has changed the treatment possibilities in which only parenteral treatments were available until recently.

Purpose To analyse the evolution of MS treatment prescriptions.

Material and methods An observational retrospective study was carried out in a medium sized hospital between January 2015 and September 2016 that included MS patients. Through the programme Farmatools, we obtained the list of patients in whom treatments for MS were dispensed from the hospital pharmacy.

Results During the study, 114 patients collected medication, with an average age of 42 years (72.81% women). The treatments provided most often were: glatiramer acetate 35.96%, interferon β 1-A 27.19%, teriflunomide 10.53% and dimethyl fumarate (DMF) 9.65%. There was 26 treatment changes (34.62% to DMF, 34.62% to teriflunomide, 15.38% to glatiramer acetate, 7.69% to peginterferon, 3.85% to interferon β 1-A and 3.85% to interferon β 1-B), 14 starts (interferon β 1-A 35.71%, glatiramer acetate 28.57%, teriflumonide 21.43% and DMF 14.29%) and 11 treatments discontinued. 46.83% of patients continued with their usual treatment. Cause of treatment changes was: inefficacy (61.54%), patient request (19.23%) and adverse events (19.23%).

Conclusion Although the main cause of treatment change was lack of efficacy, a significant proportion was at the request of the patient, which is then determined by the prescribing physician. The emergence of new oral agents has been a change in the prescription treatment of MS, which is mainly reflected in the large number of cases which have been changed from parenteral to oral administration, and treatment decisions that are largely based on patient preference and efficacy.

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No conflict of interest

OHP-032 | INVOLVEMENT OF PHARMACISTS FROM THE ALPES-MARITIMES FIRE AND RESCUE SERVICES (SDIS06) DURING THE TERRORIST ATTACK OF 14 JULY 2016 IN NICE, FRANCE

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Background On the evening of 14 July 2016, a truck was deliberately driven into a crowd celebrating Bastille Day on the Promenade des Anglais in Nice, France, resulting in 86 deaths and 434 injuries. The SDIS06 rescuers, including physicians (18), nurses (36), pharmacists (3) and psychologists were immediately engaged. A field hospital (FH) was set up next to the incident zone.

Purpose To analyse the added value of the pharmacists during the rescue operation to optimise the quality of patient care.

Material and methods Feedback collected from each responder involved were analysed in order to identify the strengths, weaknesses and possible improvements.

Results 45 min after the first alert, the FH was fully operational at the scene of the terrorist attack. Additional backup teams were on hold ready for action. On the scene, emergency actions were medical triage. Victims categorised as 'extreme emergencies' (20) were directly evacuated to the trauma centre. Those categorised as 'absolute emergencies' (15) and 'relative emergencies' (55) were transported to the FH. Most victims had polytraumas with internal and/or external injuries. 1 pharmacist was at the FH to deliver drugs and medical devices to physicians and nurses. Another pharmacist, at the central pharmacy, prepared additional deliveries of drugs, medical devices needed by the FH and organised the reception of 30 additional oxygen bottles. 1 pharmacist was helping by telephone and 1 more was on standby. Drips, splints and wound dressings were the main requested items to be delivered . The FH contents were adequate. The number of pharmacists involved was high enough to respond to additional needs

Conclusion The involvement of the SDIS 06 pharmaceutical team was found to be effective and helpful in the victims' care management to respond to the breadth of the disaster. Pharmacists are essential for drugs and medical dispensation and for anticipating needs. The pharmacists' team mobilisation system is efficient. A taskforce group analyses pharmaceutical feedback. Three axes of improvement were established: the usefulness of preparing ready to use kits for intubation and infusion, regular training of pharmacists with physicians and nurses to improve the efficiency of drug delivery during mass casualties events and a good knowledge of the use of medical devices.

No conflict of interest

OHP-033 | BUILDING A CLINICAL PATHWAY FOR DIAGNOSIS AND TREATMENT OF PRESSURE ULCERS

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Background Pressure ulcers (PUs) are a major health issue. As their poor management can cause serious problems related to quality of healthcare, increase in secondary costs, longer hospitalisation, infections and heavier nurses' workload, an improvement project in quality assistance was implemented. A multidisciplinary workgroup was set up with the pharmacist as the coordinator of the team.
Purpose The objective was to develop and implement a clinical pathway for prevention and treatment of PUs.
Material and methods The workgroup was formed in 2009 including pharmacists, nurses, legal doctors, specialist nurses, epidemiologist and risk manager. The clinical pathway, identified as the internal procedure PRAO85, was published with specific modules that have since been revised. Training courses for healthcare workers have taken place and clinical and procedural audits for surveillance tools have carried out.
Results The clinical pathway provided indications for PU management in the hospital including: identification methods, prevention, diagnosis and treatment. During 2010, 6 training courses were held for all healthcare workers. To verify the procedure application, a continuous surveillance plan was implemented through clinical and procedural audits and every 3 months PU incidence rates were sent from each ward. Due to the complexity of the problem and the need to spread knowledge about prevention, training courses were organised in the ward with practical meetings. From the data obtained, an increase in the number of PUs was observed. This was probably caused by better awareness of nurses to the problem. After the increase in 2010, the number of PUs in the ward reduced by 2% between 2012 and 2013. Between 2013 and 2014, a 4% increase was observed so in 2015 the clinical pathway was revised with wound dressing management flow-charts and simplified modules. Formulary restriction was applied in order to obtain a more efficient and responsible use of wound dressings.
Conclusion Multidisciplinary team work for the development and implementation of protocols and guidelines is fundamental to improve the quality of care. Continuous collaboration between healthcare workers has allowed hospital based standardised criteria to prevent and treat PUs.

No conflict of interest

OHP-034 | IMPACT OF NEW TECHNOLOGIES ON THE PERCEPTION OF PROFESSIONALS' QUALITY OF LIFE IN A HOSPITAL PHARMACY DEPARTMENT

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Background New technologies are introduced frequently in healthcare and change professionals' perceptions of quality of life.

Purpose To assess the impact on professionals' quality of life in a hospital pharmacy department, 2 years after transfer to a new hospital which involved a functional and structural reorganisation with the introduction of new technologies in the medication use process.
Material and methods This was a descriptive cross sectional study. Internal mail was used to send all professionals in the hospital pharmacy department the CVP35 self-administered questionnaires, which measured perceived professional quality of life, understood as the balance between work demands and the capacity to cope with them. This questionnaire was validated in different settings related to health professionals in Spain. The instrument consists of 35 items that evaluate three dimensions: perception of demands, emotional support received from superiors and intrinsic motivation. Each item was scored on a quantitative scale (1–10). 2013 results were compared with those obtained in 2016, 2 years after the transfer.
Results The number of completed questionnaires was 35 in 2016 and 42 in 2013. In 2016, the item with the highest score was 'amount of work' (9.2 ± 1.0), in 2013 it was 'pressure to perform the work' (8.9 ± 2). In 2016, the lowest scored item was 'my employer tries to improve the quality of life for my position' (2.9 ± 2.19) and in 2013 it was 'opportunities to be creative' (3.2 ± 1.8). In 2016, the group most satisfied was administrative staff and in 2013 it was nursing assistants. The group with the highest pressure to carry out their work were nursing assistants. In 2016, 38% were quite satisfied with the work developed, which was the same value as in 2013. In 2016, 40% considered that they had no recognition of their work compared with 52% in 2013. In 2013, 50% were very motivated and in 2016 only 14%.
Conclusion CVP35 questionnaire application has allowed the assessment of the impact of organisational changes in professionals' quality of life. The introduction of new technologies did not reduce the perception of workload but the satisfaction level of the work done was maintained although motivation had decreased. Professionals perceive greater recognition of the work done.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

Pharmacokinetics and pharmacodynamics

PKP-001 | VANCOMYCIN INTRAPERITONEAL IN PAEDIATRIC PATIENTS: NEED TO MONITOR PLASMA LEVELS

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Background Peritonitis is a frequent complication in peritoneal dialysis. Intraperitoneal administration of antibiotics appears to improve the response to intravenous treatment.
Purpose To describe a case of intraperitoneal administration of vancomycin in a paediatric patient and evolution of plasma levels.

Material and methods Prospective case tracking and collaboration in the identification and interpretation of plasma levels of vancomycin.

Results The case was a 3-month-old girl (4.2 kg) that after cardiac surgery presented with acute tubular necrosis and needed continuous venovenous haemodiafiltration (CVVHDF). After 16 days of CVVHDF, this was changed to peritoneal dialysis. 6 days after initiation of peritoneal dialysis, peritonitis developed, and ceftazidime and vancomycin intraperitoneally were prescribed. Vancomycin was prescribed at a dose of 15 mg/L of dialysate (37.5 mg in each bag of 2.5 L). The first determination of plasma levels of vancomycin (at 24 hours) was 14.63 µg/mL and it was recommended to continue with the same dose. Treatment with intraperitoneal vancomycin continued for 21 days. During that time 11 determinations of plasma levels of vancomycin were made (range 8.19–32.93 µg/mL). A level of 32.93 µg/mL on day 10 of treatment indicated an error in the preparation of the dialysis fluid (presentation of dialysate was modified from 2.5 L to 2 L and the same vancomycin amount was added). Intraperitoneal administration of vancomycin (15 mg/L of dialysis fluid) was effective (negativisation crop) and safe (serum creatinine levels maintained).

Conclusion Intraperitoneal administration of vancomycin is an effective alternative in methicillin resistant microorganism infections in patients undergoing peritoneal dialysis. In paediatric patients, the percentage of absorbed vancomycin is unknown. Monitoring plasma levels allows safe dosage and avoids nephrotoxicity associated with high plasma concentrations of vancomycin.

No conflict of interest

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Background Administration of continuous infusion of vancomycin is an alternative to administration of this drug.

Purpose To evaluate the clinical efficacy and incidence of adverse effects with a regimen of vancomycin as a continuous infusion.

Material and methods This was an observational retrospective study of the use of vancomycin in a child diagnosed with ganglioneuroblastoma L2. The information was obtained from the electronic clinical history (SELENE) and the pharmacy service managing software (FARMATOOLS). The programme used for monitoring the pharmacokinetics of drugs is PKS.

Results The patient was a 4-year-old admitted to the paediatric ward of a hospital with febrile neutropenia after receiving the second cycle of chemotherapy (cyclophosphamide+vincristine +adriamycin). Empirical antibiotic therapy was started: vancomycin (15 mg/kg/6 hours) and amikacin (15 mg/kg/24 hours). Vancomycin trough levels obtained during the first 3 days of treatment were very low (2 µg/mL) so a continuous infusion of vancomycin was started. With 60 mg/kg/24 hours of vancomycin, steady state plasma concentration (Css) of 12.1 µg/mL were obtained. Optimal Css levels for vancomycin for prophylaxis treatment are 15–20 µg/mL. Because of persistent fever and worsening of clinical status, the dose was increased to vancomycin 70 mg/kg/day and optimal plasma levels were obtained (17.5 µg/mL). The dose of amikacin was maintained at 15 mg/kg/24 hours, obtaining optimal plasma levels (trough level <1 µg/mL and peak level 30–40 µg/mL). Antibiotic treatment was continued for 7 days and the child had a good response.

Conclusion Administration of continuous infusion vancomycin reached therapeutic levels with good clinical efficacy and no evidence of renal injury, so it is a therapeutic strategy for patients with low levels of drugs in plasma. Moreover, it is a more comfortable administration, with decreased nursing workloads and less manipulation of intravascular catheters. We need more paediatric studies to evaluate the efficacy and safety of these patients using this type of administration.

No conflict of interest

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Background Cytarabine is considered the most effective chemotherapeutic agent in the treatment of acute myeloid leukaemia (AML).

Purpose Several studies suggest that single nucleotide polymorphisms (SNPs) in genes involving the metabolic pathway of cytarabine could influence treatment outcomes, although their clinical relevance remains undetermined.

Material and methods The SNPs of cytarabine pathway (DCK: rs2306744, rs11544786, rs4694362; CDA:rs2072671, rs3215400, rs532545, rs602950; NT5C2:rs11598702; RRM1: rs9937; NME1:rs2302254) were evaluated in 225 adult patients at initial diagnosis of AML using a mass spectrometry based multiplex genotyping assay (Sequenom). All patients received induction chemotherapy consisting of idarubicin plus cytarabine (PETHEMA 99, 2007 and 2010 trials). The

efficacy of the first induction cycle was evaluated comparing complete remission (CR) versus partial remission (PR) or resistance (patients dying during induction excluded), and overall survival (OS), event free survival (EFS), disease free survival (DFS) and relapse free survival (RFS) at 5 years. Genotypes were studied with the co-dominant model. Association between variables was assessed using logistic regression adjusting for age, gender, cytogenetic risk, ECOG, leukocyte and platelet count, haemoglobin, creatinine, bilirubin, albumin and LDH level at diagnosis (R V.3.1.2). The Kaplan–Meier method and Cox proportional were used for survival estimates.

Results Median age of patients was 51.1 years (16–78). The variant allele of DCK SNP rs2306744, the enzyme that catalyses the limiting first phosphorylation in the activation of cytarabine, showed higher CR (OR 6.2; 95% CI 1.3–30.2; p=0.024). CDA is the main inactivating enzyme of cytarabine. The variant allele of rs602950 was related to higher CR (OR 3.0; 95% CI 1.02–8.8; p=0.045), OS (HR 1.7; 95% CI 1.03–2.6; p=0.039) and EFS (HR 0.4; 95% CI 0.2–0.7; p=0.014). However, the heterozygous genotype of CDA rs2072671 was associated with lower OS (HR 2.2; 95% CI 1.2–4.1; p=0.015), EFS (HR 1.9; 95% CI 1.01–3.4; p=0.045), DFS (HR 3.8; 95% CI 1.2–12.4; p=0.027) and RFS (HR 9.1; 95% CI 1.2–68.6; p=0.032), and heterozygous genotype of CDA rs3215400 with lower DFS (HR 2.9; 95% CI 1.4–6.3; p=0.006) and RFS (HR 3.3; 95% CI 1.1–9.9; p=0.033). The variant allele of RRM1 (rs9937), the enzyme directly associated with cytarabine sensitivity, was associated with lower OS (HR 2.0; 95% CI 1.1–3.5; p=0.021) and RFS (HR 3.8; 95% CI 1.02–14.3; p=0.047).

Conclusion This study revealed the influence on cytarabine efficacy of DCK, CDA and RRM1 polymorphisms in AML adult patients, previously suggested in other studies. Further studies with a larger population are needed to validate these associations.

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No conflict of interest

PKP-004 | **GENETIC POLYMORPHISMS ASSOCIATED WITH COLORECTAL CANCER RISK**

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Background Colorectal cancer (CRC) is currently the most frequent malignant gastrointestinal disease. Some recent publications have proposed that genetic polymorphisms (single nucleotide polymorphism (SNP)) in different genes may be potential markers of CRC risk.

Purpose This study aimed to determine the association of SNP in KIF9, PLCE1, MLH1, CYP2E1, TP53 and SMAD7 genes with susceptibility to the development of CRC.

Material and methods A retrospective case control study was performed where 126 cases and 169 control CRC patients of Caucasian ethnicity were included. The genotypes of the selected polymorphisms from KIF9 (rs1076394), PLCE1 (rs11187842), MLH1 (rs1800734), CYP2E1 (rs1329149), TP53 (rs1042522) and SMAD7 (rs4464148) genes were

determined in different individuals using real time PCR with TaqMan probes. The results were then analysed under different genetic models (additive, genotypic, allelic, dominant and recessive) to look for an association between with CRC risk.

Results The G allele from SNP MLH1 rs1800734 was found to be a protective marker for CRC in the genotypic model (ORAG vs AA: 0.17; 95% CI 0.05–0.49; p=0.0015; ORGG vs AA: 0.31; 95% CI 0.10–0.80; p=0.0217), besides gender and BMI in the multivariate statistical model. The rest of the polymorphisms were not found to be associated with CRC risk.

Conclusion AA genotype from SNP MLH1 rs1800734 is a marker of CRC risk.

No conflict of interest

PKP-005 | **DETERMINATION OF GENETIC POLYMORPHISMS AFFECTING METABOLISM OF THIOPURINES**

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Background Thiopurines are widely used in different treatments. However, exposure to this drug can cause toxicity in the patient due to polymorphisms in the gene coding NUDT15, an enzyme involved in the metabolic activity of thiopurines. Carriers of defective alleles of NUDT15 accumulate large amounts of active metabolites which can cause serious damage to DNA.

Purpose To develop a methodology to identify mutations that abrogate or reduce the activity of NUDT15. In this way a more personalised therapy to the patient can be applied with associated low cost.

Material and methods Genetic variants of NUDT15 that cause a decrease or absence of total enzyme activity were identified: rs116855232 (called *6), rs147390019 (*7), rs186364861 (*8) and rs554405994 (*9). Determination of polymorphisms was performed by PCR and subsequent sequencing. For this purpose, pairs of primers that flank the region of interest were designed. Given the proximity of the polymorphisms on the chromosome, each primer pair amplified a region containing two of the four polymorphisms, so only two pairs of amplification primers were designed: F:GCA TCA CTA TGA GTT TAT TAG TAG C/R:CAC CAG ATG GTT CAG ATC TTC for *6 and *7 and F:ACG CAT TAC GCA CCG C/R:GCT CAC CCG AAC TCC AGA T for *8 and *9 polymorphisms. A primer was also designed within each amplified region for sequencing: CAC TAT GAG TTT ATT AGT AGC AAG (*6 and *7) and CGC TAT GAC GGC CAG (*8 and *9) .

Primer design was performed with the GeneRunner programme and with the online analysis tool Primer-Blast, to confirm the specificity of pairs of primers. Reading the chromatograms was carried out with the programme Mega. DNA extraction was performed from a drop of blood deposited on paper Whatman 9031.[1]

Results Regions encompassing the four polymorphisms were amplified using only two primer pairs. The yield of the reaction was optimum, allowing its subsequent sequencing. The

direct costs associated with determination of four markers was € 27 (€ 6.75 for each polymorphism).

Conclusion Genotyping NUDT15 allowed individualised treatment doses, as a carrier for any of these mutations. Future studies will determine the initial dose of the drug. We wished to show a simple and economical method, accessible to any laboratory with basic equipment in molecular biology, which allows detection of mutations in patients that adversely affect the metabolism of thiopurines.

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No conflict of interest

PKP-006 | **PHARMACIST'S ROLE IN CLINICAL PHARMACOKINETIC MONITORING OF DIGOXIN: MINIMISING TOXIC EFFECTS**

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Background The digoxin range conventionally used (0.8–2.0 ng/mL) may be suitable for patients with atrial fibrillation (AF), although a lower range is preferable for patients with congestive heart failure (CHF) (0.5–1.0 ng/mL).
Purpose To study if digoxin is monitored correctly and according to recent evidence.
Material and methods A retrospective study was conducted between January and June 2016. Field of study: two tertiary hospitals and their reference areas (the population consisted of 666 000 people). Adult patients with analytical determinations of digoxin during the study period were included. Digoxin concentrations were studied in blood samples of patients with CHF and/or AF. The percentage of patients with inappropriate levels of digoxin according to recent evidence was detected. Results were statistically interpreted. A descriptive analysis was conducted, followed by a χ^2 test to calculate the differences between all variables. The possible influence of age (younger or older than 75 years) and sex were also analysed.
Results A total of 102 analytical determinations in 95 patients were studied. 50% of the determinations in blood (51) showed inappropriate levels of digoxin. The number of inappropriate levels of digoxin was significantly higher in the group of patients >75 years of age (p=0.0481). However, no significant differences were found according to sex (p=0.903). 21.6% (22) of the analytical determinations showed blood digoxin levels above the range (>2 ng/mL for AF and >1 ng/mL for CHF). 28.4% (29) of patients had blood digoxin levels below the range (<0.8 ng/mL for AF and <0.5 ng/mL for CHF).
Conclusion The high number of determinations not within the range may indicate that in many cases healthcare professionals are not aware of the appropriate range of digoxin for each pathology. The elderly population had higher percentages of inappropriate blood digoxin concentrations, being more likely to have digoxin levels above the range. Thus therapeutic drug monitoring of digoxin in blood is not being used as often as it should, implying poor control of patients treated with digoxin.

No conflict of interest

PKP-007 | **DPYD SNPS AND DISEASE FREE SURVIVAL AFTER CAPECITABINE BASED ADJUVANT TREATMENT IN COLORECTAL CANCER**

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Background DPYD has a key role in fluoropyrimidines metabolism. The relationship between enzyme activity and drug efficacy and toxicity has been widely studied, but the predictive value of the most accepted variants is still poor. Hence the search for new biomarkers is needed.
Purpose To analyse if single nucleotide polymorphisms (SNPs) in the DPYD exon regions have an influence on disease free survival (DFS) in colorectal cancer patients treated with capecitabine based adjuvant chemotherapy.
Material and methods The study design was observational, ambispective and multicentric. The study population included 138 adult patients with stages II and III colorectal cancer that received capecitabine based adjuvant chemotherapy. DNA was isolated from peripheral blood samples and seven polymorphisms (rs12119882, rs1801158, rs1801159, rs291592, rs291593, rs44221623, rs6668296) in the DPYD exon regions were genotyped through OpenArray technology. DFS was estimated by the Kaplan–Meier method. The relationship between polymorphisms and DFS was explored using the Cox regression model with tumour stage, treatment and hospital as co-variables.
Results 76.8% of patients received capecitabine in combination with oxaliplatin (XELOX regimen), and the remaining 23.2% monotherapy. Median follow-up time was 30.1 months (range 7–171.9). At the cut-off date, 35 patients had relapsed (25.4%). Patients harbouring the DPYD rs291593 GG genotype had a worse DFS than those carriers of the GA/AA variants (HR 2.15; 95% CI 1.10–4.23; p=0.026). Patients with the TT homozygous genotype in DPYD rs1801159 also showed a trend to shorter DFS than heterozygous or homozygous carriers of the C allele when analysed by Kaplan–Meier (p=0.019). In multivariate analysis, differences remained in the limit of the statistical significance (HR 2.16; 95% CI 1.00–4.67; p=0.051). No statistically significant association was found between DFS and the other polymorphisms that were studied.
Conclusion Genotyping of exonic genetic variants in DPYD are related to DFS after capecitabine based adjuvant chemotherapy in CRC patients and could be a successful approach to find new pharmacogenetic predictors of tumour relapse. However, more studies in larger cohorts with a longer follow-up are needed.

No conflict of interest

PKP-008 | IMPLEMENTATION OF A MONITORING PROTOCOL FOR DIGOXIN

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Background The lack of standardisation in digoxin impregnation prompted us to analyse plasma levels (Cp) of digoxin during the previous 5 months. There only were 16 patients monitored (56.2% men), aged 77.4 ± 10.8 years, with a glomerular filtration rate (FG) of 47.2 ± 23 mL/min. Of these, only 18.7% were performed after the first dose and only 12.5% took into account FG when dosing. The average Cp for digoxin was 1.43 ± 1.0 ng/mL, with variability of 69.9%.

Purpose The development of a protocol of digoxin impregnation was proposed. A simple explanatory table was developed indicating the loading dose administered according to FG and recommended times for pharmacokinetic monitoring and the second dose.

Material and methods The protocol was agreed with some medical services (internal medicine, cardiology, emergencies, intensive care medicine and neurology) through clinical sessions given by the pharmacist. The pharmacists insisted on dose adjustment according to FG and monitoring plasma levels of digoxin after the first loading dose for a Bayesian estimation. The project started in November 2015 and pharmacokinetic monitoring carried out over 5 months was analysed prospectively. Data (age, sex, FG, service, Cp, protocol compliance and pharmacokinetic recommendations) were obtained from the unit of clinical pharmacokinetics through the computer application Gestlab.

Results A total of 32 patients (28.1% men), aged 81 ± 7.6 years, with FG 56.3 ± 22.9 mL/min were included in the analysis of protocol compliance. The distribution of requests for clinical service was: 37.5% internal medicine, 21.8% neurology, 21.8% cardiology and 6.2% emergencies. 84.4% of monitoring was performed after the first dose. In 62.5% of patients the dose was adjusted according to FG. The average level of digoxin Cp was 1.07 ± 0.28 ng/mL.

Conclusion Favourable changes generated after application of the new protocol were better coordination among prescribers, an increase of 50% in the number of patients monitored, reducing the average Cp of digoxin in the first pharmacokinetic monitoring period, with less interindividual variability (26%).

No conflict of interest

PKP-009 | RELATION BETWEEN CLINICAL REMISSION AND TROUGH INFLIXIMAB LEVELS IN CHILDREN WITH INFLAMMATORY BOWEL DISEASE

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Background Depending on individual therapeutic response, infliximab (IFX) dosage and infusion interval may be adjusted. Despite this therapeutic optimisation, loss of efficacy can be observed, such as a decrease in trough IFX levels. Few paediatric studies have been performed to determine a threshold value that correlates with better clinical status.

Purpose To correlate trough IFX concentrations with clinical remission in paediatric patients with inflammatory bowel disease (IBD) and to determine an IFX threshold associated with clinical remission.

Material and methods The study was performed with 2.5 years of retrospective records of IBD patients <18 years of age (Crohn's disease (CD), ulcerative colitis (UC), indeterminate colitis (IC)) treated with more than three IFX perfusions (maintenance phase). Two scores were calculated to determine the clinical activity of the disease: Harvey Bradshow Index for CD and the Paediatric Ulcerative Colitis Activity Index for UC and IC. ANOVA test for repeated measures and logistic regression were used for analysis and equations.

Results 67 patients were included in the study. There were 553 active/non-active disease observations for 55 CD patients and 169 for 12 UC and IC patients. Analysing the concentration every 6 weeks (best predictive target) between responders and non-responders, the rates were, respectively, 5.5 and 3.1 mg/L for CD and 5.2 and 3.7 mg/L for UC/IC ($p<10^{-4}$). From two equations, the probability of clinical remission was nearly 100% when the threshold was 5.5 µg/mL. The study showed that a pharmacokinetic target can be reached. Moreover, a flowchart of therapeutic decisions based on IFX rate was established. The level was a little higher than in other studies. Indeed, a 2014 paediatric study conducted at week 14 (different from our study design) in responders and non-responders showed, respectively, a concentration for median trough IFX levels of 4.7 µg/mL and 2.6 µg/mL (p=0.03).

Conclusion IFX threshold was correlated with clinical remission in IBD children. The trough concentration was 5.5 mg/L at 6 weeks post-infusion and was found to be a 'maker' related to disease activity. This rate is particularly useful for paediatric gastroenterology departments that perform these assays. A prospective study should be performed to confirm our research.

No conflict of interest

PKP-010 | LEVETIRACETAM CLINICAL PHARMACOKINETICS IN ELDERLY PATIENTS WITH EPILEPSY

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Background Levetiracetam (LEV) is increasingly used in the elderly due to a favourable pharmacokinetic profile, good tolerability and no significant drug–drug interactions. LEV is renally excreted, and its clearance is expected to decrease during old age because of the physiological reduction in glomerular filtration rate.

Purpose To compare apparent steady state oral clearance of levetiracetam (LEV CL/F) in elderly versus non-elderly patients with epilepsy.

Material and methods This was a retrospective study from 2009 to 2013 in 380 adult patients with epilepsy treated with LEV. Inclusion criteria: age ≥ 16 years; treatment with LEV for at least 1 month; and venous blood sampling before the first morning dose of LEV. Variables collected were dose, serum concentration, age, sex, body weight and anticonvulsant comedications prescribed. They were obtained from the

therapeutic drug monitoring register and the medical records. Patients were grouped according to age: group A (16–30 years, n=93), group B (31–50 years, n=131), group C (51–65 years, n=90) and group D (>65 years, n=66). In group D, 15.15% of patients had impaired renal function (creatinine clearance <50 mL/min). Serum concentrations of LEV were measured by high performance liquid chromatography with spectrophotometric detection. Stata version 12 software was used for statistical analysis.

Results Mean basal LEV serum concentrations (µg/mL) significantly increased with age. We compared group A (13.32 ±4.54) versus B (14.01±6.43) (NS); group A vs C (17.54 ±5.45) (p<0.0001) and group A vs D (20.21±8.34) (p<0.0001). Hence we compared younger patients (groups A and B; 13.66±5.48) versus group C (p<0.0001) and group D (p<0.0001). Mean weight normalised LEV CL/F (mL/min/kg) progressively decreased with age. We compared group A (1.45 ±0.76) versus B (1.41±0.85) (NS); group A versus C (1.18 ±0.83) (p<0.0001) and group A versus D (0.95±0.68) (p<0.0001). We also compared group A versus D without patients with impaired renal function (0.98±0.58) (p<0.0001). Finally, we compared non-elderly patients (groups A and B; 1.43±0.81) versus group C (p<0.0001) and group D (p<0.0001).

Conclusion LEV CL/F significantly declined with ageing, with a reduction in median values ranging from 20% in patients aged 50–65 years to 35% in those over 65 years compared with non-elderly patients. To achieve a given serum drug concentration, LEV dose should be reduced by around 30% in elderly patients compared with younger subjects.

No conflict of interest

PKP-011 **DRUG INTERACTIONS AND SAFETY PROFILE IN PATIENTS TREATED WITH RIOCIGUAT**

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Background Riociguat is a relatively new drug that has been on the market for a short time. Most of the information available on the drug comes from clinical trials that led to its commercialisation.

Purpose Results based on clinical practice often differ from results obtained in clinical trials. The purpose of this study was to evaluate the safety profile of riociguat in clinical practice as well as to analyse possible interactions riociguat may have when administered with other medicines used by HAP patients.

Material and methods A retrospective observational study was conducted in all patients treated with riociguat from September 2015 to 2016. Interactions were identified and classified according to their clinical relevance. The reason for suspension–interruption of treatment and clinical variability associated with adverse effects were also analysed

Results 43 patients were included, mean age 66±16.09 years, 65.12% women. 140 potential interactions with riociguat were recorded, belonging to 26 different drugs. 97.67% of patients had at least one interaction and the median number of interactions per patient was 3 (range 0–7). The most frequently involved drugs in these interactions were: furosemide (24.29%), omeprazole (20%) and spironolactone (18.57%).

Depending on their relevance, potential interaction distribution was: 24 moderate (92.31%) and 2 severe (7.69%). In the registered interactions, the primary mechanism involved was based on the risk of hypotension (61.54%). The two most serious potential interactions were with phenytoin, which can decrease levels of riociguat, and calcium+cholecalciferol carbonate, which can modify the solubility of riociguat

Regarding the safety profile, 39.53% of patients suffered any adverse reaction associated with riociguat: nervous system (30.95%), digestive (26.19%) and vascular (19.05%). 2 patients had dose reduction, 1 due to congestive heart failure, associated with the drug. A case of syncope forced suspension of the treatment.

Conclusion Most of the patients included in the study had at least one potential interaction between their own medication and riociguat. Only 3 patients had dose reduction or suspension due to adverse effects related to riociguat. According to the results, it can be assumed that riociguat may be a safe drug despite the high number of potential interactions found in patients with polypharmacy.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

PKP-012 **METHOTREXATE LEVELS IN CEREBROSPINAL FLUID IN CHILDREN TREATED WITH HIGH DOSE METHOTREXATE**

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Background The use of intrathecal (IT) methotrexate (MTX) in combination with systemic high dose MTX (HDMTX) is an established procedure for CNS prophylaxis in patients with acute lymphoblastic leukaemia (ALL), but the evidence for the necessity of this combination is not conclusive. An MTX concentration of 1 µM is assumed to be the lowest concentration for an antileukaemic effect.

Purpose To determine the rate of sufficient CSF MTX concentrations (1 µM) in paediatric patients with ALL who received HDMTX, to evaluate the suitability of IT MTX and to correlate MTX plasma and CSF concentrations.

Material and methods A retrospective observational study was conducted between April 2015 and September 2016. We included children up to 18 years with ALL who received 5000 mg/m² over 24 hours in accordance with LAL-SEHOP-PETHEMA-2013 protocols. CSF samples were obtained 18 hours (16–20 hours) after starting the HDMTX infusion and immediately before IT administration of MTX. Plasma samples were obtained at 2, 12, 23, 36, 42 and 60 hours after the start of infusion. CFS samples and plasma MTX at 12 hours were correlated by Spearman's correlation. MTX was measured by architect chemiluminescence immunoassay.[1]

Results We included 12 children, aged 2–16 years (7±3.6) who received 36 cycles of MTX. Patients received 5000 mg/m² over 24 hours; one child received 3000 mg/m² was included. MTX plasma levels at 12 hours and CSF concentrations were highly variable, ranging from 48.8 to 179.0 µM (median 72.2µM) and from 0.85 to 2.9 µM (median 1.4 µM), respectively. An MTX concentration above 1µM was

found in 33 of 36 CSF samples (91.7%). The patient who received 3000 mg/m² (2 cycles) showed a lower CSF MTX concentration (0.83 and 1.08μM), corresponding to a lower plasma MTX concentration (54.37 and 60.88 μM). The correlation between plasma levels at 12 hours and CSF MTX concentrations was moderate–high (Spearman rank order correlation, r=0.71; p<0.01).

Conclusion A potentially antileukaemic MTX concentration of 1 μM was obtained in CSF during the majority of MTX infusions (5000 mg/m² over 24 hours).

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No conflict of interest

PKP-013 | **NEPHROTOCIXITY ASSOCIATED WITH CONTINOUS VANCOMYCIN INFUSION**

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Background Continuous vancomycin infusion (CVI) is frequently used to achieve therapeutic levels (15–25 mg/L) in patients in whom, related to their physiological characteristics (young, obese or critical patient), intermittent infusion (II) would need higher doses than those recommended (>4 g/day). Latest guidelines suggest a target of 15–20 mg/L but there is controversy over vancomycin associated nephrotoxicity in CVI.

Purpose To determine the frequency of nephrotoxicity associated with CVI and to identify risk factors.

Material and methods A retrospective cohort study was performed in a 400 bed tertiary university hospital from January 2013 to August 2016. Patients included adults treated with CVI. Dose recommended to achieve steady state concentration (Css) was 15–20 μg/mL. Data collected: demographics, body mass index (BMI), type of infection, treatment duration, vancomycin Css and AUC, dose recommended, initial and final renal function (SCr) and glomerular filtration rate (GFR) using CKD-EPI, nephrotoxicity defined by RIFLE criteria (risk, injury, failure, loss and end stage renal disease), nephrotoxic drugs and others causes of nephrotoxicity. Pharmacokinetic analysis: Bayesian estimation compartmental model (PKS System Abbott). Data are shown as median (Q1–Q3). Statistical analysis: SPSS Statistics Base 22.0.

Results 38 patients were included: 25 (65.8%) men, 55 (43–64) years, 78 (70–89) kg, BMI 26 (24–32) kg/m², critically ill 7 (18.4%). Type of infection: bone 22 (57.9%), diabetic foot 4 (10.5%), bacteraemia 4 (10.5%), CNS 4 (10.5%), abdominal 2 (5.3%) and others 2 (5.3%). Treatment duration: 9 (6–13) days. Css: 23.4 (19.6–28.1) μg/mL. AUC: 506 (435–575) μg×h/mL. Recommended dose: 3.2 (2.8–3.5) g/day. Renal function: Scr initial 0.53 (0.41–0.73) mg/dL, final 0.58 (0.47–0.78) mg/dL. GFR initial 113 (102–129) mL/min, final 107 (98–121) mL/min. Nephrotoxicity: 1 (3.8%). RIFLE 1-0-0-0-0. Risk factor: leg amputation. Nephrotoxicity was reversible. Adverse effects: phlebitis 1 (3.8%) with dropout due to adverse effect.

Conclusion CVI allows therapeutic levels (15–20 mg/L) to be to achieved, especially in bone infections. Despite an increased steady state concentration, nephrotoxicity was negligible with

therapeutic drug monitoring. Phlebitis can make it difficult to administrate CVI.

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No conflict of interest

PKP-014 | **PROTON PUMP INHIBITOR INDUCED MALABSORPTION OF TRANSITION METALS WITH CO-FACTOR FUNCTION: SIMULATION OF THE IMPACT OF RAISING GASTROINTESTINAL PH**

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Background Proton pump inhibitors (PPI) raise gastric fasting pH from 2.2 (men) or 2.5 (women) to >4.0 for up to 16 hours/day. Suppressed gastric function may lead to malabsorption of 3d block ions. As metal aqua complexes are weak acids, their absorption kinetics and bioavailability are likely to be modified by a pH shift.

Purpose The objective of this contribution was to assess the relevance of changing gastric pH on absorption of 3d block ions with co-factor function.

Material and methods Amounts corresponding to the daily allowances of a selection of co-factor relevant oligo-elements were assayed using an in vitro simulated digestive system (modified from Kopf-Bolanz 2012). The elements were tested visually and by turbidimetric UV/Vis absorption spectrometry.

Results Oligo-elements were mainly actively absorbed from the upper duodenal part of the GI tube. There, the luminal pH gradient sharply rises within 10 cm at the duodenojejunal junction. Acidity passes at this site from pH=2 to pH=5 (fasting state) and from pH=1.7 to pH=4.3 (postprandial). Ferric, cupric and cuprous, but neither ferrous, cobalt, manganese nor zinc aqua complexes precipitated at pH<6. [$Fe(H_2O)_6$]$^{3+}$ formed amorphous red–brown [$Fe(H_2O)_3(OH)_3$]^0 due to pK_a=2.2, 3.5 and 6.0. [$Cu(H_2O)_6$]$^{2+}$ formed uncharged [$Cu(H_2O)_4(OH)_2$]^0 due to pK_a=6.3 and 8.5. [$Cu(H_2O)_6$]$^+$ formed uncharged [$Cu(H_2O)_5(OH)$]^0 in one step due to pK_a=3.9.

Deprotonations of [$Fe(H_2O)_6$]$^{2+}$ occurred due to pK_a=6.74 and 9.5, [$Co(H_2O)_6$]$^{2+}$ due to pK_a=8.8 and 12.4, [$Mn(H_2O)_6$]$^{2+}$ due to pK_a=10.7 and 12.0, and [$Zn(H_2O)_6$]$^{2+}$ due to pK_a=10.1. Neither one of these aqua complexes has pK_a <6 and neither one was relevant for malabsorption.

Conclusion Apart from iron (III), copper is also likely to be significantly malabsorbed by pH shifts in the GI tube. Neither ferrous, cobalt, manganese nor zinc aqua complexes were relevant for malabsorption due to PPI treatment. A different absorption behaviour at altered pH conditions must also be anticipated for weak acids with functional groups, such as carboxylic acids, vinylogous carboxylic acids, acid halides, –I-mono- or disubstituted phenols, or sulfonic acids (eg, many non-steroidal anti-inflammatory drugs and ascorbic acid). On the other hand, weak bases may be more bioavailable as a result of a higher fraction of the diffusible undissociated molecules.

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No conflict of interest

REVIEW OF SAFETY OUTCOMES OF MULTIPLE DAILY DOSING OF AMIKACIN IN PAEDIATRIC FEBRILE NEUTROPENIC PATIENTS WITH CANCER

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Background Paediatric oncology patients with febrile neutropenia (FN) are at high risk of developing life threatening infections. In our institution, they are empirically treated with multiple daily dosing (MDD) of amikacin if persistently febrile after treatment with piperacillin–tazobactam.

Purpose With the aim of optimising dosing strategies, we evaluated the safety of MDD amikacin in the paediatric oncology FN population.

Material and methods Design: a retrospective medical record review. Setting: haematology–oncology service of a children's hospital. Patients: aged 1–18 years with a diagnosis of malignancy or undergoing haematopoietic stem cell transplantation who received amikacin for the treatment of FN between January 2013 and December 2014, with plasma amikacin concentrations determined after the first dose. Measurements: demographic data, amikacin dosing information, plasma amikacin concentrations, development of nephrotoxicity and ototoxicity, clinical outcomes and mortality were collected and analysed.

Results Of the 40 FN episodes evaluated, all patients achieved amikacin trough levels within the desired range of <10 μg/mL after the first dose. There was no documented nephrotoxicity or ototoxicity. The first dose was not effective in achieving target peak levels of 30–40 μg/mL. Within 3 days of initiating amikacin, 72.5% achieved target peak levels and 82.5% achieved defervescence. The median number of days of therapy was 4 (range 2–9 days). No infection related mortality was observed for 30 days following the onset of FN.

Conclusion The use of multiple daily dosing of amikacin, in combination with piperacillin–tazobactam, is a safe management strategy for paediatric oncology patients with febrile neutropenia. Further studies are needed to optimise the dosing of amikacin so as to achieve clinical outcomes more rapidly.

No conflict of interest

EVALUATION OF VANCOMICIN DOSAGE IN A TERTIARY HOSPITAL

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Background Manufacturers of vancomycin recommend initial dose adjustment based on actual body weight (30–50 mg/kg/day) in patients with normal renal function. Most consensus guidelines recommend 15–20 mg/kg c/8–12 hours, doses that have been associated with plasma concentrations of 15–20 μg/mL, which is the goal in most patients.

Purpose This study evaluated if initial doses were adapted to dosage recommendations, and correlated them with trough concentrations after administrating four doses.

Material and methods A retrospective observational study was conducted from 2 February 2016 to 15 April 2016. The study variables were demographics (sex, age, weight and height), clinical (diagnostic, creatinine clearance), pharmacokinetics (plasma concentration of vancomycin) and pharmacological (regimen). The databases used were the electronic prescribing programme and clinical hospital station.

Results We recruited 38 patients (39.5% men, 60.5% women) with a mean age of 63 years, weight 73 kg and height 165 cm. The percentage of patients who belonged to traumatology was 54.08%, to neurosurgery 27.33%, to haematology 10.52%, to infectious 2.7%, to neurology 2.7% and to pneumology 2.7%. 21% of patients had a creatinine clearance (calculated using the Cockcroft–Gault and edited by body surface area) of >120 mL/min/1.73m^2, 76.3% of 120–60 mL/min/1.73m^2 and 2.7% of 59–30 mL/min/1.73m$_2$. 42.1% of patients began treatment with targeted therapy and 57.9% with empirical. 72% of patients started with 1000 mg/12 hours, 15.6% with 1000 mg/8 hours, 2.7% with 1400 mg/12 hours, 2.7% with 500 mg/8 hours and 7% with 1250 mg/12 hours. 60.5% of patients received an initial dose below 30 mg/kg/day (mean 22.25 mg/kg/day) and 39.5% received an initial dose above 30 mg/kg/day (mean 36.52 mg/kg/day). None of the patients received more than 50 mg/kg/day. 50% of patients had a plasma concentration after 4 doses below 10 μg/mL (mean 7.25 μg/mL), 23.7% obtained concentrations between 10 to 14.9 μg/mL (mean 12.33 μg/mL), 15.8% obtained concentrations between 15 and 20 μg/mL (mean 16.57 μg/mL) and 10.5% had a higher concentration of 20 μg/mL (mean 28.1 μg/mL).

Conclusion Most patients received a lower dose than the actual weight based recommendations and therefore these patients could not reach the concentrations indicated. In conclusion, this would require hospital pharmacists suggesting the appropriate dose for each patient based on their actual weight.

No conflict of interest

DOXORUBICIN PLASMA DETERMINATION BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

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Background Doxorubicin (DXR) is used in the treatment of hepatocarcinoma. Transarterial chemoembolisation is a drug delivery technique that allows reduction of its concentration in plasma, increases the quality of life for patients and improves their response to treatment.

Purpose To assess and validate the chromatographic conditions for determining plasma DXR. Linearity, accuracy, precision and reproducibility inter- and intra-assay were studied.

Material and methods

The test products used were daunorubicin (internal standard) and DXR (standard substance). The reagents used were potassium dihydrogen phosphate, acetonitrile, water and isopropanol. Free human plasma drug was provided by the hospital laboratory analysis. Equipment used in the study: a modular

system of high performance liquid chromatography (HPLC) Merck-Hitachi composed of a pump, autoinjector system, fluorescence detector, integrating software and a computer. A centrifuge and a vortex were also used. The stationary phase used was a 5.mu.m C18 chromatographic column 150 mm × 4 mm, and the selected mobile phase was 0.05 M potassium dihydrogen phosphate (pH=3.55) and acetonitrile 70:30 (v/v). The flow rate chosen was 0.6 mL/min and the wavelengths of excitation and emission were 548 nm and 470 nm.

Results The equation of the calibration curve (peak area and plasma DXR) was: y=−256.34 + 1231.27 x. The analytical technique had good linearity. With 95% confidence it can be said that the intercept was between 162.4 and 350.3 area/C. With a probability of 99.5% the value obtained and the actual value were not statistically different, therefore the method has the necessary accuracy. The requirements of precision (repeatability and reproducibility) were also met. The coefficients of variation of plasma concentrations did not exceed 10% for either intra or inter studies (repeatability and reproducibility).

Conclusion The chromatographic technique developed to determine plasma DXR is a quick and simple technique that meets all of the requirements of specificity, linearity, accuracy and precision required for validation.

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No conflict of interest

PKP-018 | COMPARISON BETWEEN ASSAYS ON THE THERAPEUTIC DRUG MONITORIN OF EVEROLIMUS

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Background The strong degree of structural similarity between everolimus and sirolimus (SRL) causes cross reactivity between them. The underestimation observed with the everolimus quantitative microsphere system (QMS) led many centres to opt for the sirolimus chemiluminescence magnetic microparticle immunoassay (CMIA) for therapeutic drug monitoring of everolimus.

Purpose The aim of this study was to compare the QMS assay with both CMIA and HPLC/MS assays (reference method).

Material and methods Blood samples of patients treated with everolimus from November 2014 to March 2015 were used in a correlation study between QMS and CMIA. Correlation between QMS and HPLC/MS, and CMIA and HPLC/MS was carried out using data reported by the external quality control programme, NEKAS, international proficiency testing scheme (St George's University of London), from October 2010 to March 2015, testing target samples (blood to which a known amount of everolimus was added) and pooled samples (blood from patients). Passing–Bablock regression method, Bland–Altman plot and concordance correlation coefficient (CCC) were used in the statistical analysis.

Results The Bland–Altman plot showed that in target samples (n=60) there was underestimation of the real value, Target QMS=2.8 ng/mL (SD 1.96; −0.1 to 5.6), different from that observed in the two other assays: target-CMIA=−0.08 (SD 1.96; −1.41 to 1.24) and target HPLC/MS=0.12 (SD 1.96S: −0.92 to 1.17). In the pooled samples (n=20) results by QMS were closer to those reported by HPLC-MS than CMIA; HPLC/MS-QMS=0.06 (SD1.71; −1.6 to 1.96) and HPLC/MS-CMIA=−1.9 (SD 0.5; −4.3 to 1.96). Correlation between the two methods in 75 patient samples showed that both were equivalent: QMS=−0.32 + 0.94 CMIA, r=0.9054, CCC=0.8726 (95% CI 0.8095 to 0.9158).

Conclusion QMS tended to underestimate the real value and CMIA tended to overestimate it. It is possible that changing analytical method generates a significant decrease from the previous values but CMIA determined target samples with better accuracy than QMS, and therefore it is preferable to use CMIA to determine everolimus.

No conflict of interest

PKP-019 | EXPERIENCE OF ONCE DAILY TACROLIMUS INDIVIDUALISED DOSING THROUGH A BAYESIAN APPROACH IN DE NOVO LIVER TRANSPLANT RECIPIENTS

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Background A triple regimen with tacrolimus constitutes the basis of immunosuppressive protocols after orthotopic liver transplantation (OLT).

Purpose The aim was to analyse the efficacy and safety of once daily tacrolimus (TAC-OD) (Advagraf) individualised dosing through a Bayesian approach in de novo OLT patients.

Material and methods This was a retrospective study (September 2012–April 2016). Inclusion criteria: adult OLT patients with a minimum follow-up of 7 days. Immunosuppressive protocol: TAC-OD (first dose: 0.15 mg/kg/day), mycophenolate mofetil (1 g/24 hours orally) and steroids within the first 24 hours after OLT. Patients with renal dysfunction were treated with interleukin-2 receptor antagonists and tacrolimus was delayed. Blood trough levels of tacrolimus were monitored every 24 hours during hospitalisation and every outpatient visit. Dose adjustments were performed with every blood withdrawn through calculation of the empirical Bayesian estimates of the pharmacokinetic parameters. Population pharmacokinetics models were implemented in NONMEM V.7.3. Tacrolimus target trough levels were 8–10 ng/mL during the first month, reducing progressively to 5–8 ng/mL. Efficacy variables: tacrolimus trough levels, hospital stay and survival. Safety variables: serum creatinine (SCr).

Results 2515 concentrations were collected from 99 patients (83 men/16 women). Mean age was 57.0 years (95% CI 53.9–60.14), IMC 16.07±4.7 kg/m^2 and MELD 15 (95% CI

12–18). Median (p25–p75) trough concentrations (ng/mL) of tacrolimus were 8.9 (5.3–11.6), 7.5 (5.4–9.7), 8.78 (6.9–10.65) and 9.7 (8.17–11.9) at 2, 7, 15 and 30 days, and 8.43 (7.38–10.02), 7.9 (6.45–9.04), 7.53 (6–9.17), 7.22 (6–8.7), 6.37 (5–7.25), 6.1 (5.2–7.48), 4.4 (3.8–6.35) and 4.5 (4–5.3) at 2, 3, 6, 12, 18, 24, 36 and 42 months after transplantation (statistically significant decrease after the second month, p<0.05). Basal mean SCr was 1.11 mg/dL (95% CI 1.17–1.45) and it remained stable after 7 days of OLT (SCr 0.98 mg/dL; 95% CI 0.8–1.36) until 4 years (1.11 mg/dL; 95% CI 0.99–1.24) (p>0.05). Median hospital stay after transplantation was 4 days (p25–p75: 3–6). Patient survival at 1, 3 and 4 years was 85%, 83.4% and 79.6%, respectively. Mean time of survival was 41 months (95% CI 37.6–44.4).

Conclusion Our dosing protocol of TAC-OD based on Bayesian methodology was feasible in routine clinical practice, the target concentration was achieved at 48 hours in 75% of patients and it showed favourable outcomes in terms of survival and safety.

No conflict of interest

min. Those capsules containing hypromellose released only 70% active ingredient within 2 hours. Within this period the release was almost linear. At a calculated release rate of 0.12 mg/min, it can be estimated that in 150 min it will be fully released.

Conclusion Hypromellose had an marked effect on the liberation characteristics of a gelatine capsule when used as an excipient. It swells in aqueous solutions and prolonged the liberation of ketamine out of the matrix and contributed to very a consistent release. Hypromellose is therefore a promising excipient for individual pharmaceutical preparations with prolonged release.

No conflict of interest

PP-002 WITHDRAWN

Production and preparation

PP-001 **HYPROMELLOSE PROLONGS THE DISSOLUTION OF KETAMINE OUT OF GELATINE CAPSULES**

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Background The prolonged release of active pharmaceutical ingredients is widely used to achieve long lasting therapeutic effects and has the advantage that patients can take their medication less often and so possible risks of adverse effects are reduced. Most methods for retardation used in industrially manufactured dosage forms cannot be applied in the case of individual preparations manufactured in pharmacies. The addition of a gelling agent, such as hypromellose in capsule production, could serve as a promising possibility for small scale production.

Purpose To compare the dissolution characteristics of capsules containing 20 mg ketamine hydrochloride and either a mixture of lactose and hypromellose or lactose alone. As there is no clear recommendation for the optimal lactose–hypromellose ratio, one established formulation was investigated.

Material and methods Capsule composition: 20 mg ketamine hydrochloride, 85 mg lactose monohydrate and 200 mg hypromellose versus gelatine capsules filled with 20 mg ketamine hydrochloride and 330 mg lactose monohydrate. Placebo capsules with hypromellose and lactose and with lactose alone were used as a reference for quantification. Dissolution was simulated in an experimental setup with 200 mL 0.1 M hydrochloric acid with stirring at a controlled temperature of 37±1°C. Depending on the capsule type and its dissolution, velocity samples were taken at defined intervals. Quantification was performed by UV/VIS spectrophotometry at 268 nm. Dissolved placebo capsules containing lactose or lactose/hypromellose alone were used as reference. The method was validated regarding linearity, accuracy, precision and repeatability.

Results 5 dissolution tests on each capsule type were conducted. Capsules containing ketamine and lactose dissolved rapidly and liberated 100% ketamine within approximately 7

PP-003 | **STABILITY STUDY OF BORTEZOMIB (VELCADE) WITH LIMIT TEST FOR ALL DEGRADATION PRODUCTS**

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Background Bortezomib (Velcade) is a cytostatic drug used for the treatment of several cancer types. The drug must be reconstituted before administration and the reconstituted solution is stable for 8 hours according to the manufacturer. Left-overs therefore cannot be used on subsequent days. Since one vial of Velcade costs approximately € 1000, this imposes a significant economic loss for hospital budgets. Several studies have shown that the reconstituted drug is stable for > 24 hours, but none of these have contained identification and quantification of the degradation products (DPs) formed during storage.

Purpose To conduct a stability study of reconstituted Velcade in the manufacturer's vial with quantification and identification of all DPs.

Material and methods The analytical method was based on the work of Srinivasulu and colleagues,[1] and validated according to ICH regulations. The storage conditions were 5°C±3°C, protected from light, and the study consisted of the following measurements: assay, DPs and visual inspection. Measurements were conducted at 0, 1, 3, 7, 10 and 14 days. The acceptance criteria for the study were: assay 95–105% of initial value, bortezomib impurity E <3.0%, other impurities <0.5%, summarised other impurities <2.0% and a clear liquid.

Results The solution was clear and colourless throughout the study. Only low amounts of DPs were observed, and no change during the study. However, due to a large SD related to the low sampling volume and viscosity of the solution, the 95% CI of the assay measurement exceeded 105% after 13 days, thus limiting the stability of the solution to 12 days. The increased shelf-life has since been implemented at our hospital pharmacy and led to a cost reduction of approximately € 135 000.

Conclusion The stability of reconstituted Velcade in the manufacturer vial was at least 12 days at 5°C±3 °C, protected from light.

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No conflict of interest

PP-004 | **CHEMICAL CONTAMINATIONS: UNDERSTAND TO PREVENT**

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Background To prevent the exposure of cytostatic drugs, trained and authorised technicians prepare the antineoplastic treatments in a unit of centralised drugs preparation (UCDP). Preservation of the safety of healthcare workers requires evaluating chemical contaminations.

Purpose The aim of this study was to quantify the impact of implementation of pharmaceutical procedures to minimise chemical contaminations.

Material and methods Different surfaces inside and outside of the isolator have been analysed every year since 2014 in our UCDP where technicians work under an overpressure isolator. 18 cytostatic drugs distributed in 4 groups were tested. The results of contamination were classified as low, medium and high. On 10 sampling points, 2 positive points of the isolator were selected to take appropriate corrective measures and to follow their efficacy: exit gate of the preparations (point 1) and neoprene glove (point 2). The first action was an annual re-evaluation of the manipulation competence by simulating the technique (fluorescein). The second action was decontamination with sterile water once a week for the point 1, every day after activity for point 2.

Results The results of this study showed a decrease in contamination with cytostatic on the 2 points. For point 1, 4 drugs were positives in 2014 (3 low, 1 medium), 2 in 2015 (1 low, 1 medium) and 1 low positive in 2016. The point 2 since 2015 has demonstrated 6 positives drugs in 2015 (3 low, 2 medium and 1 high) compared with 2 low positive drugs in 2016.

Conclusion We implemented an additional step in the maintenance of our isolator borne by the technicians and in their re-evaluation checklist. The decrease in contamination allows good acceptance of the procedures because their interest is measurable. Measuring the cytostatic contamination of surfaces every year could help in face to face prevention initiatives related to the risk of cytostatic drug reconstitution. It is important that working practices are continuously followed.

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No conflict of interest

PP-005 | **IMPROVING SAFE PREPARATION OF INJECTABLE MEDICINES: THE EFFECTS OF INTRODUCING A SPORICIDAL AGENT**

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Background Due to recent fatalities from the use of aseptically prepared injectable medicines, the EU Good Manufacturing Practice (EU GMP) regulator recommended the introduction of a sporicidal agent (by January 2016) in the first stage of a two step decontamination process. Our licensed aseptics unit produces chemotherapy, intravenous additives, parenteral nutrition and radiopharmacy batches, using non-gassing isolator (grade A) technology in a grade C room environment. Traditional GMP environmental monitoring methods are employed, and historical monthly trending revealed a microbial recovery rate of 1.6% across grade A.

Purpose This project outlines our strategy for and results since the introduction of a sporicidal agent to enhance the sanitisation process for aseptic preparation, as recommended by the EU GMP regulator.

Material and methods Our sanitisation process was reviewed, in order to identify opportunities for improvement, and criteria for assessing an ideal sporicidal agent were developed. Our old sanitisation practice involved spraying products and consumables with sterile 70% alcohol in the grade D preparation room and transferring into the isolator room (grade C), where any extra packaging (if double wrapped) was removed, and the materials sprayed again with alcohol, and wiped with alcohol impregnated wipes, before being transferred into the isolator. Using the assessment criteria, a chlorine based sporicidal agent was selected, and introduced, after staff training and a pilot phase, in combination with a change in the sanitisation process to wipe then spray (with sporicide, and 2 min contact time) in the preparation room, followed by spray (with alcohol) then wipe in the isolator room. Traditional environmental monitoring was carried out.

Results 7 months after introduction, the microbiology results consistently showed a 20% reduction in overall contamination (recoveries) and 100% elimination of mould recoveries in grade A isolators (representing a 3% reduction in the ratio of spore formers to vegetative organisms). The microbial air quality improved by 70% in the preparation rooms, and by 50% in the isolator rooms.

Conclusion A simple change in the sanitisation practice to a more robust wipe–spray–spray–wipe process, using a chlorine based sporicidal agent for the first 'spray' step, significantly improved the background environmental conditions, reducing the risk of contamination, and ensuring that injectable medicines are prepared safely for the benefit of patients.

REFERENCES AND/OR ACKNOWLEDGEMENTS

Reference added to poster

No conflict of interest

| PP-006 | GALENIC PROPERTIES OF PLASMA RICH IN GROWTH FACTORS EYE DROPS |

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Background Plasma rich in growth factors (PRGF-Endoret) is an autologous platelet enriched plasma that has been standardised for ophthalmic application. In the past years, PRGF-Endoret has been successfully used like an eye drop for the treatment of a wide range of ocular surface diseases, including dry eye, persistent corneal epithelial defects and ulcers. Current classification of autologous plasma derivatives such as human medicines imply that it has to meet all the requirements of ophthalmic preparations.

Purpose To assess the galenic properties of the PRGF eye drops and its compliance with European Pharmacopoeia requirements.

Material and methods Eye drops were obtained using the PRGF-Endoret ophthalmology kit. Briefly, blood was collected into 9 mL tubes, centrifuged at 580 g, plasma column was drawn off avoiding the buffy coat and incubated at 37°C with $CaCl_2$. Supernatants were collected, filtered and aliquoted in single dose containers. Eye drops were kept fresh or stored at −20°C for 3 months. Aseptic process simulations (Media Fill) were performed using tryptic soy broth (TSB) to 6 batches. The samples were incubated for 14 days and inspected for microbial growth. A growth promotion test was done. Deliverable volume test was applied to 5 single dose containers. Oat-Water tightness test was done in two batches in duplicate with a toluidine solution and applying a vacuum for 10 min. pH and osmolarity were assessed in fresh samples and after freezing for 3 months.

Results In the media fill all units were negative for growth. In the growth promotion test, growth of all the microorganisms was clearly seen. The volume of each container was within the range of 95–110%. In the first batch, no toluidine was detected inside the vials or the caps. In the second batch, only one vial had a shadow of toluidine inside the cap. pH and osmolarity values were slightly modified after freezing. Eye drops were clear and free from particles.

Conclusion

The PRGF-Endoret method was aseptic The water tightness of the vials was correct, and the deliverable volume corresponded with the nominal volume. pH and osmolarity remained constant during the whole period. We can affirm that PRGF-Endoret meets the European Pharmacopoeia requirements and their galenic properties.

Conflict of interest:

Corporate sponsored research or other substantive relationships: EA is the scientific director of BTI, and GO and FM are scientists at BTI.

| PP-007 | DEVELOPMENT AND CHARACTERISATION OF A PLASMA RICH IN GROWTH FACTORS MEMBRANE TO TREAT OCULAR SURFACE DISEASES |

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Background Plasma rich in growth factors (PRGF-Endoret) technology is an autologous platelet enriched plasma obtained from patient's own blood, that allows the release of a pool of biologically active proteins that influence and promote a range of biological processes involved in tissue regeneration, including cell recruitment, growth and differentiation. In the past few years, PRGF-Endoret has been successfully used as an eye drop for the treatment of a wide range of ocular surface diseases, including dry eye, persistent corneal epithelial defects

and ulcers. In ocular surgery, the amniotic membrane has been used with regenerative purposes for many years. But it has some disadvantages, including its allogeneic origin and high cost. Having an autologous membrane, obtained from the patient´s blood, would be a breakthrough in availability, patient safety and cost efficiency.

Purpose To develop and characterise a PRGF-Endoret fibrin membrane suitable for surgical application in ophthalmology.

Material and methods Blood was collected from healthy donors into 9 mL tubes containing anticoagulant. Blood was centrifuged; plasma column was drawn off avoiding the buffy coat, activated with $CaCl_2$ and incubated at 37°C until membrane coagulation. Once the gel was formed, membranes were flattened using a 100 μm former. The mechanical tensile strength of 5 PRGF-Endoret membranes was evaluated using Instron5848. The ultrastructure was observed under scanning electron microscopy (SEM). The membranes obtained were applied in 17 patients for the treatment of different ocular surface pathologies.

Results The PRGF membranes obtained were manageable, the maximum load that could be withstood was 0.1±0.03N, the maximum deformation 1.1±0.38 and Young's modulus was 0.085±0.055. SEM images showed that the membrane had a complex three-dimensional fibrillar structure. All the surgeries were successfully performed for the treatment of neurotropic keratitis, persistent epithelial defects and corneal ulcers, and all patient outcomes were satisfactory.

Conclusion It was possible to obtain a PRGF-Endoret membrane in ophthalmic surgery from the patient´s own blood. The PRGF-Endoret membrane had adequate mechanical characteristics and manageability for its surgical use in the treatment of ocular surface pathologies.

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Conflict of interest:

Corporate sponsored research or other substantive relationships: EA is the scientific director of BTI, and GO and FM are scientists at BTI.

PP-008 | **STABILITY AND STERILITY OF AUTOLOGOUS SERUM EYE-DROPS AFTER LONG TERM STORAGE**

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Background Autologous serum can be compounded into eye drops that are used to reduce symptoms of severe dry eye syndrome. In the case of appropriate stability and sterility, frequency of blood drawings from patients might be reduced and clinical logistics simplified.

Purpose To assess the sterility and stability of serum under different storage conditions and prolonged storage time up to 6 months.

Material and methods After obtaining whole blood and preparing unit dose autologous serum eye drops 100% and 50%, samples were stored at 4°C and −20°C for up to 6 months. Concentrations of albumin, immunoglobulin G and C4 (C4c) were used as surrogate stability biomarkers and measured on storage days 1, 8, 15, 30, 60, 90 and 180. Sterility according

to European Pharmacopoeia (2.6.1) was evaluated on storage days 1, 15, 30, 60, 90 and 180.

Results The concentrations of albumin and immunoglobulin G remained stable under both temperature conditions over the entire period of 6 months. The C4c concentration increased by about 30% at storage temperature of 4°C. This was not the case for samples stored at −20°C. No difference in C4c concentrations was seen between undiluted and diluted serum. Sterility was maintained in the 4°C and −20°C samples throughout the period tested.

Conclusion The present results show that serum parameters albumin, immunoglobulin G and C4c are stable at −20°C for 6 months. As C4c is a breakdown product of C4b, the increase in C4c at 4°C may be indicative for some instability of C4b. However, this increase is considered mild and values remained within the normal range, and hence this change may have no clinical significance. At both temperatures tested, sterility of serum eye drops was not impacted, including the longest storage duration tested. In summary, the results support using aseptic preparation techniques and storage temperature at −20°C. A 6 month supply of autologous serum eye drops can be offered to patients, allowing better access to this therapy through a less frequent blood donation schedule.

No conflict of interest

PP-009 | **STABILITY OF INTRAVEOUS INJECTION OF DECITABINE STORED IN POLYETHYLENE SYRINGES**

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Background Decitabine is indicated for the treatment of adult patients with newly diagnosed acute myeloid leukaemia (AML) de novo or secondary, according to the classification of the WHO, who are not candidates for conventional induction chemotherapy. There is a general recommendation about the maximum refrigerated (2–8°C) storage time for decitabine of 3 hours, but studies designed to explore stability beyond this period have not been conducted to date.

Purpose To evaluate the physical and chemical stability of decitabine stored in polyethylene syringes over a 24 hour period using proton nuclear magnetic resonance (^{1}H-NMR) spectroscopy.

Material and methods Commercial solutions of decitabine (Dacogen) 5 mg/mL (50 mg in 10 mL of sterile water for injection) were packaged in polyethylene syringes. The syringe was stored in a refrigerator at 4°C±2°C for 24 hours in a digitalised temperature controlled chamber. The following physical parameters were monitored: turbidity and colour. Chemical stability was assessed by means of ^{1}H-NMR spectroscopy. The ^{1}H-NMR spectrum of a reference molecule was acquired. Spectroscopic signals were interpreted and assigned to the chemical structure of decitabine, and then consecutive spectra were acquired every hour during the 24 hour period. Signals obtained in these experiments were compared with those of the reference compound. All spectra were acquired using a Bruker Avance DRX 300 MHz spectrometer equipped

with a 5 mm single axis z gradient quattro nucleus probe (Bruker Biospin GmbH, Rheinstetten, Germany).

Results Physical parameters monitored remained unchanged over the 24 hour period. During 7 hours, the chemical structure of the molecule was maintained unaltered, as demonstrated by ^{1}H-NMR spectra identical to those of the reference compound. However, several signals corresponding to byproducts appeared in the sample stored at 4°C after 7 hours, proving that decitabine had suffered a degradation pathway.

Conclusion Decitabine preserved its physical and chemical properties when stored packaged in polyethylene syringes for up to 7 hours at 4°C±2°C. This study comes into conflict with the information data sheet provided with decitabine, which recommends a maximum time of refrigerated (2–8°C) storage of 3 hours.

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Background Infants will likely encounter a diaper rash (DR) in the first years of life. There are common ointments used in the topical treatment of ulcerative skin lesions such as DR in neonates—namely, hydrocortisone cream (1%), zinc oxide and eosin. The roles of zinc in dermatology are important. Zinc salts such as zinc oxide have been applied topically to facilitate wound healing and produce fast relief of skin rash. No physical or chemical stability studies have been conducted to date to check the conditions and maximum storage time in which a combination of eosin and zinc oxide could be safely kept.

Purpose To evaluate the physical and chemical stability of a mixture of eosin and zinc oxide used in the treatment of DR in neonates by proton nuclear magnetic resonance (^{1}H-NMR) spectroscopy.

Material and methods A mixture of 2% aqueous eosin and zinc acetate was prepared. The mixture was packed and stored in opaque glass bottles. Bottles were stored at 23°C for a total period of 30 days in a digitally controlled temperature chamber. The physical parameters monitored were clearness, colour and the formation of particulate matter. The pH variation was also determined. Chemical stability was determined by ^{1}H-NMR spectroscopy. The NMR spectrum of the reference eosin was acquired. Spectroscopic signals were interpreted and assigned to the chemical structure of eosin, and then consecutive spectra were acquired at days 1, 14 and 30. Signals obtained in these experiments were compared with those of the reference compound. All spectra were acquired using a Bruker Avance DRX 300 MHz spectrometer.

Results Over the 30 days, the clear and colourless solution remained. No precipitate was formed and the pH did not change over time. The NMR signals remained unaltered

during the 30 day period at the selected temperature of storage. No additional new peaks due to degradation byproducts were found.

Conclusion An aqueous 2% eosin and zinc acetate mixture preserved in opaque glass bottles remains stable for up to 30 days at room temperature. Therefore, this mixture could be a therapeutic alternative for the treatment of DR.

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Background The use of topical 2% aqueous eosin in the treatment of periostomal dermatitis with varying degrees of injury has recently been reported in the literature, but the presence of periostomal ulcer is difficult to cure with eosin. Allantoin has several beneficial effects as an active agent, promoting cell proliferation and wound healing. No physical or chemical stability study has been conducted to date in order to check the conditions and maximum storage time in which a mixture of eosin and allantoin could be safely kept.

Purpose To evaluate the stability of an eosin and allantoin mixture used in the treatment of periostomal ulcer patients by proton nuclear magnetic resonance (^{1}H-NMR) spectroscopy.

Material and methods Aqueous eosin and allantoin were prepared to a final concentration of 2%. The mixtures were packed and stored in opaque glass bottles. Bottles were stored at 23°C for a total period of 14 days in a chamber with a digitally controlled temperature. The physical parameters monitored were clearness, colour and the formation of particulate matter. The pH variation was also determined. Chemical stability was determined by ^{1}H-NMR spectroscopy. The NMR spectra of the reference compounds were acquired. Spectroscopic signals were interpreted and assigned to the chemical structure of eosin and allantoin, and then consecutive spectra were acquired on days 1 and 14. Signals obtained in these experiments were compared with those of the reference compound. All spectra were acquired using a Bruker Avance DRX 300 MHz spectrometer equipped with a 5 mm single axis z-gradient quattro nucleus probe (Bruker Biospin GmbH, Rheinstetten, Germany).

Results On day 1, the clear and colourless solution remained, a precipitate was formed and the pH varied from 7.2 to 6.5. ^{1}H-NMR signals identical to those of the reference compounds were observed. However, some byproduct signals were observed in the next check on day 2.

Conclusion An aqueous 2% eosin and allantoin mixture preserved in opaque glass bottles under the described conditions was not stable for a period of time greater than 1 day. This observations makes this mixture unsuitable as a therapeutic alternative for the treatment of periostomal ulcer patients.

No conflict of interest

PP-012 | CONSERVING COLD CHAIN COMPLIANCE IN THE RECONSTITUTION OF VIDAZA IN ISOLATORS

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Background Vidaza (azacitidine), comes in vials of sterile lyophilised powder for reconstitution with water for injections in a controlled environment. After reconstitution, chemical and physical in-use stability of the finished product has been demonstrated at 25°C for 45 min; at 2–8°C for 8 hours; and at 2–8°C for 22 hours when Vidaza is reconstituted using refrigerated (2–8°C) water for injections. Our centralised reconstitution unit prepares chemotherapy for a public hospital which is located 47 km away.
Purpose The objective of our study was the conservation of the cold chain for the reconstitution of Vidaza using refrigerated water in order to assess the feasibility of preparing Vidaza off-site.
Material and methods We created an organisational chart that illustrated the reconstitution of Vidaza to target critical points. Average temperature measurements of each step of the Vidaza reconstitution were obtained using a digital thermometer probe. Cold chain compliance was obtained when the temperatures recorded were between 2°C and 8°C.
Results The results showed that refrigerated water for injection introduced into the isolator through the sterilisation chamber reached an average temperature of 10.7°C. The same experiment with frozen water for injection led to an average temperature of 9.6°C. Refrigerated, sterile water for injection once in the isolator can be placed in the rapid transfer port (RTP) system. This removable system stored in a freezer and then reconnected to the isolator provides refrigerated water for injections at an average temperature of 3.4°C after complete thawing. After reconstitution, the finished products are immediately stored in the refrigerator and transported to oncology units in coolers with time/temperature recordings to monitor the temperature. Syringes are received at an average temperature of 6°C at the public hospital located 47 km away. Therefore, syringes of Vidaza can be prepared using the RTP system and should be sent to oncology units or transported to the external public hospital in coolers.
Conclusion This study confirms the feasibility of cold chain conservation in the reconstitution of Vidaza in isolators and the feasibility of the subcontracting activity. It also strengthens collaboration between hospitals in the same catchment area and encourages the development of haematology activities in the subcontracting hospital.

No conflict of interest

PP-013 | LONG TERM STABILITY OF 5-FLUOROURACIL AT STANDARDISED ROUNDED DOSES IN SODIUM CHLORIDE INFUSION POLYOLEFIN BAGS, STORED AT ROOM TEMPERATURE

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Background 5-Fluorouracil (5-FU) is a chemotherapeutic agent commonly used by oncologists as the standard therapy for advanced colorectal cancer. The centralised intra-venous admixture service (CIVAS) of the hospital started to produce 5-FU at standardised rounded doses (SRD) in 2015 to implement dose banding.
Purpose To assess the long term stability of 5-FU at selected standardised rounded doses.
Material and methods 10 polyolefin bags, 5 containing 700 mg and 5 containing 800 mg of 5-FU in sodium chloride solution (614 mg/100 mL and 689.7 mg/100mL respectively) were prepared under aseptic conditions and stored at room temperature for 24 days. At days 0, 2, 4, 7, 9, 11, 15, 17, 22 and 24, two aliquots were withdrawn from each solution. One aliquot was frozen for HPLC (Alliance, model 2695, Waters Association, Milford Massachusetts) analyses; the other aliquot went through physical stability tests, including pH (inoLab, WTW GmbH, Weilheim, Germany), spectrophotometric measurements (Genesys 10 UV, Spectronic Unican) at 350, 410 and 550 nm to detect turbidity, and visual and microscopic inspection at 10 fold magnification after centrifugation. On day 24, the frozen aliquots were defrosted and analysed by HPLC. Degradation tests were performed to evaluate the specificity of the analyses.
Results Degradation tests proved that there were no interfering peaks with 5-FU. The concentration of the solution was considered stable for at least 24 days because the lower limit of the 95% unilateral CI on the mean remained >90% of the theoretical concentration. There were no colour changes, opacity or turbidity observed in the solutions over time. Microscopic observations did not show any crystals. The pH remained stable during the study and there were no changes in absorbance.
Conclusion Within the limits of this study, 5-FU can be considered stable for 24 days at room temperature in polyolefin bags and at selected SRD of 700 mg and 800 mg/bag. These results allow us to use it in this way for dose banding.

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No conflict of interest

PP-014 | STABILITY STUDY OF 10 MG/ML PAEDIATRIC CYCLOSPORINE SOLUTION IN OLIVE OIL

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Background Cyclosporine is an immunosuppressive drug known for its narrow therapeutic range. The only formulation available on the market offers a concentration of 100 mg/mL. However, in our hospital, the paediatric department regularly requires dosages as low as 4 mg that are difficult to prepare from the pharmaceutical specialty. This may lead to inaccurate doses that can have a marked clinical impact. In this context, we developed a 10 mg/mL cyclosporine formulation.

Purpose The aim of this study was to determine the physico-chemical stability of our 10 mg/mL cyclosporine formulation, to establish the shelf-life.

Material and methods Initially, we developed a stability indicating method. We assessed the accuracy, repeatability and linearity of the procedure. We also characterised the degradation products. The concentrations were assessed by high performance liquid chromatography-UV detection method using a Xterra RP18 150x4.6mm-5 µm column. The mobile phase used was acetonitrile/water, 70/30. We then prepared three batches of solution, using cyclosporine powder and olive oil, complying with the European Pharmacopoeia. We used alpha-tocopherol as an antioxidant. All three batches were packaged in amber vials to protect from light and stored at room temperature. Several parameters where monitored on different days (0, 1, 4, 10, 14, 30): physical stability (visual inspection) and chemical stability (cyclosporine residual concentration and degradation product detection).

Results After 30 days, no concentration variations were observed. All three batches showed cyclosporine concentration variation of <5%, which is considered acceptable based on ICH recommendations. No degradation products were detected throughout the study. No macroscopic alteration was observed. However, microbiological stability was not assessed. This parameter will be evaluated in further studies.

Conclusion This study showed that 10 mg/mL cyclosporine oral solution in olive oil was stable for at least 30 days at room temperature and protected from light. Therefore, we can set a shelf-life of 30 days. This 10 mg/mL cyclosporine solution will provide an interesting alternative to the pharmaceutical specialty to administer more accurate cyclosporine doses to paediatric patients.

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http://www.ich.org/fileadmin/Public_Web_Site/ICH_Products/Guidelines/Quality/Q1A_R2/Step4/Q1A_R2__Guideline.pdf

No conflict of interest

TACROLIMUS EYE DROPS AS A THERAPEUTIC ALTERNATIVE FOR PAEDIATRIC PATIENTS WITH INFLAMMATORY OCULAR SURFACE DISEASES

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Background Corticosteroids and cyclosporine eye drops are common treatments in inflammatory ocular surface diseases. In some cases, patients do not respond to standard therapy and therefore it is necessary to search for new alternative formulations.

Purpose The aim of this study was to present an ophthalmic compounded alternative to common therapy for inflammatory ocular surface diseases and to evaluate the efficacy in three paediatric patients.

Material and methods Initially, a bibliographic research was conducted to find active ingredients and compatible excipients that could potentially be included in an ophthalmic formula (Martindale, Pubmed and Micromedex). Subsequently, tacrolimus eye drops (TED) were formulated and then its pH (pHmeter, WTW Inolab) and osmolality (VAPRO 5520) were measured. Finally, an ophthalmologist assessed the efficacy of the treatment over 3 months in 3 paediatric patients with inflammatory ocular surface disease in which previous treatments had failed.

Results Each 1 mL of TED pharmaceutical compound contained 0.3 mg of tacrolimus, obtained from the intravenous presentation (Prograf). This ophthalmic formulation contained the following excipients: polyvinyl alcohol, benzalkonium chloride, sodium phosphate dibasic, sodium chloride, sodium phosphate monobasic, disodium edetate, hydrochloric acid or sodium hydroxide and purified water, all from the commercial presentation Liquifilm tears. The TED were developed in a horizontal laminar flow cabin, filtered through a 0.22 micron filter and packed into 5 mL sterile amber glass bottles. The osmolality of TED was 451.3 ± 12.5 mmol/kg and the pH was 7. The ophthalmologist noticed a dramatic improvement in the evolution of the pathology in these 3 patients during the follow-up period; however, he noted that ocular tolerance should be improved as ocular itching was found after instillation of the eye drops.

Conclusion The TED, presented as an ophthalmic pharmaceutical compounding alternative, were safe and effective for paediatric patients with inflammatory ocular surface diseases who did not respond to cyclosporine eye drops.

No conflict of interest

EFFECT OF TACROLIMUS EYE DROPS ON HUMAN PRIMARY CORNEAL EPITHELIAL CELLS

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Background Ensuring the safety of products made in pharmacy departments is an essential parameter in the development of any ophthalmic formulation.

Purpose The aim of this study was to show the cytotoxic effect of tacrolimus 0.03 mg/mL eye drops on human primary corneal epithelial cells using real time monitoring of dynamic changes based on bioimpedance measurements induced by cell–toxicant interactions.

Material and methods Initially, tacrolimus 0.03 mg/mL eye drops (TED) were prepared as a pharmaceutical compound in the department of pharmacy. The effect of the TED on the viability of cells was studied on ATCC normal human primary corneal epithelial cells. We used the xCELLigence real time cell analyser system (ACEA Biosciences, San Diego, California, USA) for monitoring the growth of cell cultures in real time. The cell index, based on the measured electric impedance across the cell culture, was used to represent the number of cells. 3000 cells/well (16 wells E-plates) were incubated for 20 hours. Subsequently, the original culture medium was aspirated and different TED concentrations (7.5 µg/mL, 15 µg/mL, 22 µg/mL, 30 µg/mL, 37 µg/mL and 45 µg/mL) were added to different wells. The results are represented as dose response curves versus time, and IC50 was calculated in different times. **Results** Surviving rate kinetic curves showed that TED induced a gradual decline in the cell surviving rate over a 20 hour exposure period. This behaviour suggests that TED cause significant corneal cellular toxicity. An analysis of the kinetic curve of the cell surviving rate showed that these effects were time and dose dependent. The IC50 at 30 min was 0.0139 mg/mL, at 4 hours 0.0125 mg/mL and at 16 hours 0.00836 mg/mL. **Conclusion** These results may be particularly relevant to estimate the optimal TED concentration in clinical situations to avoid a toxic effect.

No conflict of interest

PP-017 | **PHYSICOCHEMICAL AND MICROBIOLOGICAL STABILITY OF A NEW PAEDIATRIC ORAL SOLUTION OF CLONIDINE**

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Background As many drugs are unavailable for paediatric use, hospital pharmacies are often requested to develop suitable formulations. Clonidine is often used in paediatrics (in severe hypertension or in anaesthetic premedication) but no appropriate formulation is available.
Purpose We developed an oral solution of clonidine dedicated to children and assessed its physicochemical and microbiological stability.
Material and methods Formulation of an oral solution of clonidine hydrochloride was developed using the active pharmaceutical ingredient (API), with the least excipients as possible and suitable for neonates and children. The stability study was led according to the GERPAC-SFPC guidelines. At each time point (D0, D1, D7, D15, D29, D60 and D90), the visual aspect (limpidity) was checked. pH and osmolality were measured (using 2 vials). Clonidine concentration was determined using a stability indicating HPLC-UV-DAD method (a previous forced degradation study under acidic, basic and oxidative conditions allowed the detection of 6 degradation products). Microbiological stability was also tested according to the

European Pharmacopoeia monograph after assessing that the culture conditions were adequate to inhibit the effect of the preservative agent, and with the most adapted method. Solutions were stored in brown glass bottles with an oral adapter for up to 3 months under two different conditions: at 2–8°C and at 25°C with 60% residual humidity.
Results The formulated oral solution was composed of API at a concentration of 10 µg/mL and potassium sorbate (0.3%), citric acid, potassium citrate (pH 5) and sodium saccharine (0.025%). On day 29, the mean percentages of the initial clonidine concentrations (±SD) were 92.95±1.28% in the solution stored at 25°C and 97.44±1.21% when stored at 2–8°C. On day 90, the mean values were, respectively, 81.82±0.41% and 93.66±0.71%. The visual aspect did not change. Physical parameters remained stable during the study: pH varied from 4.94 to 5.09 and osmolality from 82 to 92 mOsm/kg under the two conditions tested. Whatever the storage conditions, <1 microorganism/mL was identified (only environmental microorganisms) with no *E coli* detected.
Conclusion This formulation was stable for at least 3 months when stored at 2–8°C in brown glass bottles and for 1 month when stored at room temperature. The microbiological stability was proven in accordance with the European Pharmacopoeia.

No conflict of interest

PP-018 | **LONG TERM STABILITY OF 5-FLUOROURACILE AT STANDARDISED ROUNDED DOSES IN TWO TYPES OF PORTABLE INFUSION DEVICES**

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Background The centralised intra-venous admixture service (CIVAS) of the hospital has started to implement dose banding for 5-fluorouracil (5-FU), a chemotherapeutic agent commonly used for colorectal cancer. The dose banding of this molecule includes polyolefin bags and portable infusion devices at standardised rounded doses (SRD). The portable infusion devices are of two types: Folfuser SV 2.5 mL/h Baxter and Myfuser XM 2.5 mL/h Canox.
Purpose To prove the long term stability of 5-FU in portable infusion devices at selected SRD and to compare the two types of devices.
Material and methods 20 infusion devices containing 5-FU in sodium chloride solution were prepared under aseptic conditions and stored at room temperature for 27 days: 5 Folfusor 4000 and 5000 mg and 5 Myfuser 4000 and 5000 mg. On days 0, 2, 4, 7, 9, 11, 15, 17, 22, 24 and 28 at room temperature, and on days 0, 1 and 2 at body surface temperature, two aliquots were withdrawn from each solution. The first was frozen for HPLC (Alliance, Waters Association) analyses and the second went through physical stability tests, including pH, spectrophotometric measurements at 350, 410 and 550 nm, and visual and microscopic inspection after centrifugation. All aliquots were defrosted at the same time to proceed to HPLC analyses to reduce technical variability.
Results The concentration of the solution was considered stable for at least 28 days in MyFuser and for 27 days in

Folfusor, because the lower limit of the 95% unilateral CI on the mean remained >90% of the theoretical concentration. There was no colour change, opacity or turbidity observed in the solutions. The pH measurements remained stable over the time and there were no changes in absorbance. The microscopic observations did not show any crystals.

Conclusion Within the limits of our study, 5-FU can be considered stable for at 27 days in Folfusor and for at least 28 days in Myfuser. These results allow us to use portable infusion devices at selected SRD for ambulatory chemotherapy of 5-FU.

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No conflict of interest

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Background Manipulation of drug formulations (eg, crushing of tablets, opening of capsules) to achieve an appropriate dose is often necessary in the paediatric ward. Such manipulation has, however, been shown to result in inaccurate dosing (eg, not exceeding 76.5% of the intended dose for one aspirin formulation, in one study (Broadhurst, 2008)).

Purpose The purpose of this study was to investigate the dosing accuracy of two different, low dose aspirin tablets, commonly used in paediatric care, using a validated ultra high performance liquid chromatography (UHPLC) analysis.

Material and methods Aspirin tablets: Bayer Chewable (81 mg), Bayer Healthcare LLC, and dispersible aspirin (75 mg), Aspar Pharmaceuticals Ltd. Instrument: UHPLC system from Shimadzu Corp (Nexera, with Prominence diode array detector). Analytical column: ACE Excel 2 µm C18-AR, 2.1 × 100 mm (Advanced Chromatography Technologies Ltd). The analytical method was validated for linearity, precision and specificity. Dosing accuracy study: 6 tablets from each of the 2 formulations were each dissolved in 10 mL of water. After 3 min, samples (1 mL and 2 mL) were withdrawn. Dosing accuracy was recorded and compared between formulations and with previous findings.

Results

Analytical method the analytical method was found to be stability indicating for aspirin. Dosing experiments: for dispersible aspirin (75 mg), 98.7% (80.0–117.3%) and 92.2% (76.0–113.3%) of the intended dose was found for the 1 mL and 2 mL samples, respectively. For Bayer Chewable (81 mg), 9.3% (6.2–22.2%) and 12.3% (4.9–28.4%) of the intended dose was found for the 1 mL and 2 mL samples, respectively.

Conclusion Using a validated UHPLC method, the dosing accuracy of dispersible aspirin (75 mg) was found to be better than previously published. The dosing accuracy of a second formulation (Bayer Chewable, 81 mg) was found to be poor. The study underlines the importance of considering formulations when manipulating tablets.

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No conflict of interest

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Background The development of experimental medicine (EM) for clinical trials is a tedious but lucrative activity for hospital pharmacies. This activity requires the compounding of poorly described compounds with often unfavourable biopharmaceutical characteristics. National competent authorities (NCA) now require a high level of proof to approve such preparations. To evaluate (i) safety of use and (ii) potential efficiency of EM, in vitro characterisation of tissular bioavailability can be performed on devices called diffusion cells.

Purpose Available diffusion cells are research devices that are not well adapted to the context of HP. We developed and validated a new, easy to use, inexpensive and versatile diffusion cell called VitroPharma, meant to obtain permeation and penetration data across a wild range of biological or artificial membranes.

Material and methods VitroPharma was developed in collaboration with a local plasturgist. A validation study using caffeine and testosterone as model compounds, covering (i) infinite and finite donor conditions, (ii) artificial and biological membranes and (iii) different types of liquid and semi-solid receptor fluids was performed. VitroPharma was compared with a widely used diffusion cell reference (ie, Franz cell).

Results Permeation results in both cells were fitted to a mathematical model following Fick's laws of diffusion. Permeability characteristics given by the model were compared using a non-parametric test. VitroPharma was found to be equivalent to the Franz cell under harmonised experimental conditions. Furthermore, VitroPharma enabled the determination of tissular penetration kinetics which in return enabled prefiguration of EM medicine active ingredient exposure and safety profile in future clinical trials. Such data will be presented to the NCA in the EM pharmaceutical dossier to apply for approval.

Conclusion VitroPharma was adapted to EM development. Furthermore, it can be used in quality control hospital preparations containing BSC class III and IV compounds and in other assessments where penetration and permeation data in a biological or artificial (ie, gloves, conditioning device) membrane are required in hospital pharmacies.

No conflict of interest

EVALUATION OF THE SURFACE CONTAMINATION IN A CHEMOTHERAPY PREPARATION UNIT BEFORE A PROCESS CHANGE

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Background Until April 2016, cytotoxic drugs were prepared in isolators placed in a controlled atmosphere area (ISO 7) in the chemotherapy preparation unit (CPU). Since May 2016, part of the preparations is compounded with the robot Kiro Oncology (Kiro robotics, Spain) in a laminar air flow hood.
Purpose The aim of the study was to identify critical sampling points with high risk of chemical contamination in the CPU and to review cytotoxic contamination before automated compounding becomes operational.
Material and methods Sampling points were determined thanks to a risk analysis method 'failure modes effect and criticality analysis' (FMECA). Samples were collected by wiping at the end of a working day before general cleaning. The presence of the following cytotoxic drugs were tested using LC-MS/MS in each sample: 5-fluorouracil, gemcitabin, methotrexate, ifosfamide, cyclophosphamide, etoposide, docetaxel, paclitaxel and total platinum.
Results The working group for the FMECA method was composed of 8 healthcare professionals from the CPU. 19 process steps were analysed with 5 frequency levels, 5 severity levels and 3 protection levels. 3 criticality levels were established. 9 sampling points were selected among those which were revealed to be highly critical: refrigerator door, work surface of isolator, basket rack of isolator, sealing machine, checking area, storage area of finished preparations, storage area of preparation sheets, control laboratory's computer and spectrometer. Among the 81 results, 48% were below the limit of quantification and 12% were above the European reference value of 0.1 ng/cm^2. The work surface of the isolator and the spectrometer were the most contaminated areas (11.4 and 12.3 ng/cm^2). All of the others contained <0.2 ng/cm^2 of cytotoxic drugs. All samples contained platines. 8 of 9 samples contained gemcitabin and ifosfamide.
Conclusion The FMECA risk analysis method enabled us to select the most critical sampling points. The spectrometer as the most contaminated area was an unexpected result. The robot's gravimetric analysis may reduce the number of cytotoxic samples analysed by the spectrometer and thus its contamination. A whole package of prevention and protection measures will be required throughout the preparation circuit to reduce the risk of contamination.

No conflict of interest

CONCENTRATION ACCURACY ASSESSMENT OF KETAMINE, REMIFENTANIL AND SUFENTANIL SYRINGES PREPARED IN THE PAEDIATRIC SURGERY UNIT

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Background In the paediatric surgery unit, low doses of opioid analgesics are used daily for anaesthesia. Because dilutions in series are required, potential preparation errors may occur. Thus stock solution (SS) syringes are prepared each morning in the post anaesthesia care units, resulting from a 10-fold dilution of commercial products. SS syringes are then extemporaneously diluted all day long by a factor of 2, 2.5, 5 or 10 to obtain serial dilution (SD) syringes used in the operating ward.
Purpose We quantified the concentration of ketamine (Ket), remifentanil (Rem) and sufentanil (Suf) in prepared syringes to evaluate the compounding accuracy of the anaesthetic staff before injection to children.
Material and methods Over a 1 month period, Ket, Rem and Suf samples were collected from SS and SD syringes prepared in the care unit. Samples were quantified by a HPLC-UV-DAD method, previously validated according to the SFSTP-Pharma requirements. Results were expressed as bias (%) and were considered acceptable if included between acceptance limits of ±10% of the theoretical concentration (drugs with a narrow therapeutic margin).
Results 150 syringes were collected on 31 days: 73 SS (25 Suf; 24 Rem; 24 Ket) and 77 SD (36 Suf; 24; Rem; 17 Ket). Biases were not within acceptance limits for 15 of the 31 days, representing 25 syringes (17%). Focusing on dilution modalities, the total error rate and extremes biases (min; max) obtained for the 17 SD syringes out of 77 were 28% (−17%; +12%), 21% (−10%; +15%) and 14% (−7%; +14%) for Suf, Rem and Ket, respectively. For the SS syringes, the total error rate and extremes biases (min; max) obtained were 20% (−25%; +22%), 4% (−23%; +2%) and 8% (−23%; +3%) for Suf, Rem and Ket, respectively, representing 8 syringes (11%). Whatever the drug, the error rate was higher with the SD syringes compared with the SS syringes.
Conclusion We found that 22% of syringes administered to children were not within acceptance limits. In order to reduce the occurrence of compounding error in the ward, a preparation procedure will be defined. Its impact will be further assessed.

No conflict of interest

ENVIRONMENTAL MONITORING OF A ROBOTIC SOLUTION FOR CHEMOTHERAPY COMPOUNDING, PLACED IN A EU-GMP CLASS D CLASSIFIED PRODUCTION ROOM

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Background In March 2016, one of our hospital pharmacies started using a robotic solution for chemotherapy compounding. This solution was placed in a production room with an EU-GMP class D classification. During an audit related to the start-up, our governing body requested to see results to determine if the robotic solution could uphold the EU-GMP classification for its respective areas, and sustain the same level of microbiological cleanliness as manual production done in an isolator. We performed extended environmental monitoring of the robotic solution for the first 6 months of production, and

compared the results with routine samples from manual production.

Purpose To show that the robotic solution can sustain the same level of microbiological cleanliness as manual productions in an isolator during chemotherapy compounding, in a EU-GMP class D classified production room.

Material and methods The extended environmental monitoring for the first 6 months of compounding consisted of: daily monitoring with 5 settle plates, 3 were placed in the production area (require EU-GMP class A), 1 in the carousel area and 1 in the loading area (both require EU-GMP class B); weekly monitoring consisted of all swab and contact samples (see figure). Air samples were performed twice. The number of colony forming units (CFU) were determined after incubation for 7 days at 20–25°C and then for 5 days at 30–35°C. 25 separate media fill procedures, 250 media fill preparations in total, were also performed. All environmental samples for the robotic solution were sampled during preparations, and during routine activity in the production room. There were 3445 preparations compounded in the robotic solution during this period.

Results Some of the environmental samples were outside the limits of their respective EU-GMP class, but less frequent and lower averages of CFU than for manual production in the isolators. The media fill preparations had no deviations.

Figure Sample locations and results.

Conclusion Our environmental monitoring showed that it is possible for the robotic solution to obtain at least the same level of microbiological cleanliness as manual production in an isolator in an EU-GMP class D classified production room.

REFERENCES AND/OR ACKNOWLEDGEMENTS
The technicians and pharmacist involved in the daily production and sampling.

No conflict of interest

PP-024 | **HOW TO IMPLEMENT IV ROBOTICS IN GMP ASEPTIC PRODUCTION**

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Background Denmark is one of the European countries that requires the Good Manufacturing Practices (GMP) certification to hospital pharmacies for medication compounding and delivery. In 2012, the Region HovedstadensApotek, the largest hospital pharmacy in Denmark, decided to invest in IV robotics to guarantee EU-GMP and GAMP compliance through the highest standards of safety, quality and efficacy in the compounding process. The go-live of this technology was preceded by a tough qualification aimed at assessing that the new compounding process was GMP compliant. The GMP qualification consisted of several validation procedures in sequence: design qualification, factory acceptance test, operational qualification, installation qualification and performance qualification.

Purpose Case study on how the technology can help the hospital pharmacy to be GMP compliant.

Material and methods A dedicated multidisciplinary team thoroughly studied the reference documentation: EU Guidelines for Good Manufacturing Practice for Medicinal Products for Human and Veterinary Use. The analysis led to the definition of 89 user requirements specification (URS) associated with GMP requirements, for a total of 143 URS addressed in the tender. The GMP requirements covered several aspects, such as environmental conditions, equipment design, product safety and efficacy, documentations, alarm alerts and messages, user accessibility, training and maintenance, and data storage and recording. During the tender, the competing systems were challenged on each URS to verify their compliance.

Results The system that scored best in the tender evaluation was APOTECAchemo. It fulfilled 74 of the 89 GMP requirements from the beginning, and the manufacturer developed and validated the additional 15 before the qualification process. In November 2013, the Danish Health and Medicines Authority certified that APOTECAchemo was totally compliant with the GMP regulations and authorised the go-live. Since September 2016, 4 additional inspections have been successfully passed, without any deviation. Moreover, they approved the use of this robotic system in a class C cleanroom, different from the manual compounding that now requires a class B cleanroom.

Conclusion Installation of an IV compounding robot in full compliance with GMP regulations ensures benefits in terms of the highest level of preparation quality, operator safety, continuous monitoring of environmental conditions and reduction in human interventions in controls and reports.

No conflict of interest

PP-025 | **IMPLEMENTATION OF A HAEMODIALYSIS ANTIBIOTIC LOCK CATHETER THERAPY PROTOCOL AND ANALYSIS OF THE RESULTS**

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Background Data on antibiotic lock catheter therapy (ALCT) with high heparin doses in haemodialysis is described in many guidelines. However, the bibliography is heterogeneous and unclear.

Purpose To develop an ALCT protocol for the treatment of catheter related bloodstream infections (CRBSI) which ensures stability and compatibility of different antibiotic concentrations with high heparin doses, and to analyse the results of its implementation, comparing clinical outcomes before and after the start up.

Material and methods A bibliographic search was performed in Pubmed using antibiotic lock, catheter and haemodialysis as the main terms. Mixings with higher heparin and antibiotic doses with at least one reference that guaranteed its stability were selected for testing to ensure physical compatibility. The forming or absence of a precipitate was checked by 2 different observers in a total of 70 solutions following several elaboration techniques. Patients fitted with a catheter during the 6 month period before (n=43) and after (n=47) implementation of the ALCT protocol were monitored to register CRBSI and number of catheter removals.

Results Only 10 solutions were selected due to adequate compatibility, as shown in the table.

Antibiotic (+heparin 1000 UI/mL)	Concentration (mg/mL)
Vancomycin	2
Gentamicin	0.4
Vancomycin+gentamicin	2+0.4
Ciprofloxacin	0.2
Ampicillin	10
Cefazolin	5
Ceftazidime	5
Linezolid	1.6
Daptomycin	1
Amphotericin	2.5
Presented in sterile syringe containing 5 mL of the mixture	

After protocol development, 14 patients were affected with 16 CRBSI (64±16 years; half-life of the catheter 22±16 months). 9 ALCT solutions for empiric treatment were administrated: 7 with vancomycin in patients fitted with a jugular catheter and 2 with vancomycin and gentamicin in patients fitted with a femoral catheter. 7 ALCT solutions for confirmed infection were prepared: 2 ceftazidime for *E coli*, 2 ciprofloxacin for *S epidermidis* and *E aerogenus*, 1 vancomycin for MRSA and 2 amphotericin B for *C parapsilosis*. ALCT was successful in 15 CRBSI. 1 patient with *Candida* (2.12% of 47 patients) required removal of the catheter due to a severe infection and delayed treatment. Before implementation of ALCT, 2 patients (4.65%) required removal of the catheter.

Conclusion The validation and implementation of the ALCT protocol ensures preparation of safe and stable solutions with the final purpose of optimising clinical outcomes.

No conflict of interest

INTRANASAL BEVACIZUMAB TREATMENT ON EPISTAXIS IN HEREDITARY HAEMORRHAGIC TELANGIECTASIA: A CASE REPORT

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Background Hereditary haemorrhagic telangiectasia (HHT), also known as Osler–Weber–Rendu disease, is a rare, vascular, autosomal dominant disorder. Telangiectasias and arteriovenous malformations (AVMs) of the lung, liver and CNS are vascular lesions present in HHT, most commonly causing epistaxis and gastrointestinal bleeding. The diagnosis is based on the Curaçao criteria. Recently, the epistaxis severity score (ESS) was created as a standardised measure to estimate the degree of epistaxis.

Purpose To describe the effectiveness and safety of treatment with intranasal bevacizumab in HHT.

Material and methods A 42-year-old woman with HHT presented with the chief complaint of frequent episodes of epistaxis. She had undergone gingival mucosa cauterisation 10 years ago and it resolved oral bleeding. Iron studies showed anaemia of iron deficiency from chronic blood loss. Initially her anaemia was treated with oral ferroproteinsuccinylate.

This treatment failed; consequently, physicians replaced her treatment with intravenous iron. She received 4 blood transfusions in 2 years. Arterial embolisation was carried out in February 2015; it was unsuccessful.

Results Because of the frequent epistaxis (ESS 6.76) and varying haemoglobin (Hb) levels (Hb range 7.7–9.9) her physicians sought treatment with intranasal bevacizumab. This treatment was prepared at the hospital pharmacy department with Avastin 400 mg/16 mL vial in a laminar flow hood. Placed in a nasal spray bottle were 2.5 mL (25 mg). Each bottle was discontinued after 21 days; physicochemical properties were stable during the treatment period (21 days). The dosage was given twice a day for 2 consecutive months. Nasal treatment seemed to control her epistaxis and no adverse effects were reported. She had only a few minor episodes of epistaxis, which were easily controlled. Hb reached normal levels (Hb range 12.8–14.1) and currently iron treatment is not necessary.

Conclusion Vascular endothelial growth factor is a key pathogenic factor that acts to increase and maintain vascular density. To avoid the systemic adverse effects of bevacizumab, intranasal treatment, by either submucosal injection or topical nasal spray, has recently been reported to be a safe alternative to intravenous injection for nose bleeds.

Intranasal bevacizumab is an effective and safe treatment for severe epistaxis in patients with HHT. This therapy reduces epistaxis severity and frequency.

No conflict of interest

PREPARATION OF TOPICAL AMPHOTERICIN FOR OROPHARYNGEAL CANDIDIASIS IN PREGNANT WOMEN

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Background Oropharyngeal candidiasis is a common local infection usually caused by candida species. The primary treatment is usually nystatin or topical azoles but both drugs are known to be teratogenic, at least during first semester of pregnancy.

Purpose The aim was to present a new buccal formulation of amphotericin and determine its effectiveness in the treatment of oropharyngeal candidiasis in pregnant women.

Material and methods A bibliographic research was conducted to find the appropriate active substance that could be used during pregnancy and, as a result, amphotericin was chosen as it is considered the safest antifungal (it is classified in the B group of the FDA list) compared with other antifungal agents. Regarding excipients, we searched on Martindale, European Pharmacopoeia, etc, to find ones suitable that were compatible with the oropharyngeal mucosae.

Results The formulation was prepared from the amphotericin in powder form and dissolved in propylenglycol, Tween 80 and finally water. Strawberry extract was added. This topical solution had an amphotericin concentration of 25 mg/mL. The patient showed an improvement during treatment with amphotericin mouthwash, mentioning that the ulcers and little haemorrhages started to decrease after 3 days and that all symptoms remitted after 8 days. No relapses have occurred.

The formulation was tolerated well without any adverse effects.

Conclusion Amphotericin formulated as a mouthwash is an attractive alternative for oropharyngeal candidiasis in pregnant women.

No conflict of interest

STABILITY STUDY OF 1 MG/ML PAEDIATRIC WARFARIN ORAL SUSPENSION IN SYRSPEND

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Background Warfarin (Coumadin) is the most commonly used vitamin K antagonist, a drug with a narrow therapeutic range. One suspension exists but is available for adults only and with special authorisation in some countries. The absence of a paediatric formulation means the pharmacist has to produce a magistral preparation.

Purpose The aim of this study was to determine the stability of warfarin oral suspension in Syrspend in order to establish a shelf-life for the preparation after manufacturing.

Material and methods 6 oral suspensions were prepared, using coumadine 5 mg tablets and Syrspend SF-PH4, packaged in amber vials, to protect from light, and stored at room temperature (3 batches) or at +2°C and +8°C (3 batches). Several parameters were studied on different days (0, 1, 3, 6, 10, 14, 23 and 44 (n=7)): physical stability (visual inspection, osmolality measurements) and chemical stability (pH measurement, concentrations were analysed by liquid chromatography-high resolution-UV detection (HPLC-UV) with an AT3 column, 5 μm, 4.6×150 mm). Degradation products were revealed with acid and alcalin hydrolysis (degradation over 1 hour and 16 hours). Microbiological stability was tested using colony counts on media platings.

Results After 44 days, no variation in pH or osmolality was observed. Once again, the microbiological cultures were negative. Visual inspection showed viscosity increased after 10 days. Also, concentrations were the same until 44 days and no degradation products were observed in the 6 batches.

Conclusion This study showed that 1 mg/mL warfarin oral suspension in Syrspend at room temperature, was stable for at least 44 days, so we can fix the shelf-life at 44 days. A study is in progress to determine stability at 60 days.

No conflict of interest

STABILITY OF FROZEN 1% VORICONAZOLE EYE DROPS IN GLASS AND IN INNOVATIVE CONTAINERS

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Background Voriconazole is an antifungal agent effective on most keratitis causative fungi with an excellent transcorneal penetration. Voriconazole eyedrops (VED) are unavailable in Europe and are usually compounded in hospital pharmacies. New eyedrop containers emerged on the hospital market (eg,

high density polyethylene bottles available in trays (CAT)) for which few stability data are available, or Novelia bottles which innovative insert maintains sterility after opening (no stability data available).

Purpose To collect data on VED stability in 3 different containers in order to switch if necessary: amber glass, HPDE bottles and Novelia bottles stored frozen (−20°C) and refrigerated once thawed.

Material and methods 3 batches of 1% VED (10 mL) were aseptically compounded under a laminar flow hood from injectable Vfend (Pfizer) and sterile water for injection (Baxter), and stored at −20°C in amber glass (n=32; Gravis), HDPE (n=32; CAT) or Novelia (n=31; Nemera) bottles. The stability study was done according to the GERPAC-SFPC stability study guidelines. At each time point, the visual aspect was checked and voriconazole concentration (using a stability indicating HPLC-UV-diode array detector method), pH and osmolality were measured. Non-visible particle counts (by light obscuration particle count test), sterility and absence of racemisation (impurity D–(2S,3R)-voriconazole–detected by chiral HPLC) were assessed at the beginning and end of the study. Parameters were measured: when stored for 3 months at −20°C; then thawed, after 15 days at +2 to +8°C, with comparison of two thawing methods (+2 to +8°C for 6 hours or 25°C for 2 hours). Statistical analysis were performed using non-parametric tests (α < 5%) to compare containers.

Results During storage, the concentration was between 95.2 ±1.4% and 103.6±1.3% of the initial concentration (Co) (NS); 15 days after thawing, the concentration was between 97.1±1.6% and 98.6±0.8% of Co (NS). pH remained stable (NS). Osmolality was slightly higher in glass than in plastic containers (p=0.003). Sterility was preserved. Count of ≥10 μm particles remained <80/mL. Degradation product areas increased by a maximum of 1.45 and remained unquantifiable. No impact of the thawing method was evidenced. Impurity D was not detected.

Conclusion VED remained stable for up to 3 months at −20°C and for 15 days after thawing, with no notable difference between the three containers, allowing us to choose the most suitable.

No conflict of interest

THE INFLUENCE OF THE DEAD VOLUME OF THE CLOSED SYSTEM (SPIKE–CONNECTOR–SYRINGE) ON THE RECONSTITUTION OF INJECTABLE DRUGS

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Background The closed system is designed, first, to protect patients and clinicians against exposure to hazardous drugs during the preparation of cytotoxic drugs and secondly, to protect the drugs against any exposure to external microbiological and physical contaminants.

Purpose The aim of this study was to determine the dead volume of spike–connector–syringe system used for the

reconstitution of cytotoxic drugs and its impact on the variation of prepared doses.

Material and methods The spike, connector and syringe (10 or 20 mL) were weighed using an analytical balance before and after passing a solution of distilled water. Taking into account the density of water, we can thus determine the dead volume remaining in every material. For each measurement, the test was performed 30 times for each medical device.

Results The table shows that the dead volumes were different for the three devices: spike, connector and syringes (p<0.001). There was no significant differences between the dead volumes of the two syringes tested (10 and 20 mL) (p> 0.05).

Dead volume	Vial adapter (spike)	Connector	Syringe 10 mL	Syringe 20 mL
Mean (mL)	0.1192	0.2043	0.0702	0.0596

Conclusion Reconstitution of cytotoxic drugs is influenced by several factors, some of which are controllable and others are unpredictable. The dead volumes can cause overdose or underdose, especially for preparations of low volume and expensive drugs. This phenomenon is important for connectors and spikes where the dead volume is about 0.2 mL and 0.1 mL, respectively. For syringes, the dead volume is not very important and does not vary with the volume of the syringe. This study showed that we must take into account the dead volume on reconstitution of cytotoxic drugs. Thus it would be highly advisable to use connectors whose dead volume is negligible compared with the prepared final volume.

No conflict of interest

PP-031 | **HAZARDOUS DRUGS: ANALYSIS OF CONSISTENCY WITH NEW RECOMMENDATIONS**

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Background The Spanish National Institute of Security and Hygiene at Work has just published a new technical note 'Hazardous drugs: prevention measures for their preparation and administration', based on the list of biohazardous drugs published by the National Institute for Occupational Safety and Health (NIOSH).

Purpose To determine the degree of implementation of the document recommendations in the pharmacy unit of our hospital. In particular, to quantify the number of drugs whose preparation meets the standards set out in the technical note with the intention to improve the adequacy of the pharmacy unit protocols.

Material and methods The drugs available in the pharmacy unit that are included in the technical note 'Biohazardous drugs' are classified into the three categories: biosafety cabinet (BSC) I and II and reproductive risk (RR).

Results Presently, 121 of 213 drugs included in the technical note are available in our hospital pharmacy. Of these, 53 (43.8%) should be handled into BSC II according to the standards. The preparation of 48 (90.6%) hazardous drugs was performed in accordance with the recommended prevention measures. Only 5 drugs (9.4%) (phenytoin, leuprorelin, risperidone, tacrolimus, triptorelin) were not handled according to the standards. 61/121 drugs should be handled in BSC I (43 only BSC I and 18 BSC I and RR). None of these drugs were prepared in accordance with the recommended prevention measures. From the 7 drugs with a proven RR, 5 (71.4%) were not handled according to the standards.

Conclusion At present, 90.6% of biohazardous drugs BSC II, none of biohazardous drugs BSC I and 28.6% with RR were handled according to the standards set in the technical note, which leads us to conclude that implementation of the recommendations reported is still low in our hospital. Setting up multidisciplinary groups of professionals, including labour union representatives and experts in occupational health and safety, would undoubtedly be helpful to improve the implementation of these recommendations in the healthcare system. The resulting increase in the workload of the pharmacy units is a fact that must be taken into account by the authorities in each centre.

No conflict of interest

PP-032 | **ANTICIPATED CIRCUIT OF ANTICANCER INTRAVENOUS CHEMOTHERAPIES PRESCRIPTION AND PREPARATION IN A DAY HOSPITAL: OBSERVATIONAL STUDY ASSESSING THE IMPACT OF THE NEW WORKFLOW FOR HOSPITAL PHARMACY**

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Background As anticancer intravenous chemotherapies (AIVC) are high risk medications, there are different ways of securing the preparation circuit. In this context, an anticipated circuit of prescription and preparation (ACPP) for AIVC was developed.

Purpose To evaluate the impact of the ACPP protocol on the quality and timing of medication preparations with the primary objective of 40% decrease in mean daily variances.

Material and methods 210 patients were included in the before group and 207 patients in the after group (19% of them were included in the ACPP protocol). A 21% decrease in mean daily variances was observed with the ACPP (p=0.11, SD ranging from 1.27 to 0.83 (p=0.025)). The patient's mean waiting time decreased from 128 to 114 min (p=0.005) between the before/after groups and to 60 min for the ACPP (p < 0.001). 1 of the 174 bags was lost in the ACPP.

Results The mean daily variance enabled us to observe an improvement in the timing of production without reaching our 40% decrease objective. The mean waiting time significantly decreased but remained above 30 min. The losing rate in the ACPP protocol was <2%, as desired. Failure to reach our preset objectives can be explained by the fact that the ACPP is a new concept in the clinic.

Conclusion The ACPP helped to improve pharmacy activities and to decrease patient waiting times but also helped maintain

similar safety and avoided losses. However, the study should be conducted on a larger cohort and over a longer period to confirm the impact of the project.

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No conflict of interest

PP-033 | IMPLEMENTATION OF BACT/ALERT (BIOMERIEUX) CULTURE BOTTLES IN A HOSPITAL PHARMACY PRODUCTION UNIT FOR THE STERILITY TESTING OF CHEMOTHERAPEUTIC BATCHES

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Background Due to an increase in production of chemotherapeutics, we implemented dose banding of chemotherapeutic drugs to prevent errors and improve the quality of cytotoxic drug preparation. The standard sterility tests recommended by the European Pharmacopoeia on chemotherapeutic batches are time consuming (14 days incubation before the final result).
Purpose The goal of the study was to create a more sensitive sterility test, which assured a more rapid and reliable result and reduced the period of quarantine of chemotherapeutic infusions from that batch.
Material and methods We investigated the BacT/ALERT FA (BioMérieux) culture bottles (ref 410851) as a rapid microbiological method. Microbiological growth creates CO_2 production which is detected by an automatic photometric method. We inoculated the bottles with 1 of 4 standard microorganisms (10–100 colony forming units) which are recommended in the European Pharmacopoeia (Staphylococcus aureus (SA, ATCC6538), Pseudomonas aeruginosa (PA, ATCC9027), Bacillus subtilis (BS, ATCC6633) and Candida albicans (CA, ATCC10231)). We compared every step with a traditional trypcase soy broth (BioMérieux, ref 42633) with a phased incubation period (14 days) as recommended in the PIC/s. We also had to take into account the possible inhibition of microorganism growth by the cytotoxic drugs. We tested bacterial growth with the highest cytotoxic batch concentration, 0.4 mg/mL for paclitaxel and 1.9 mg/mL for trastuzumab.
Results All microorganisms were detected in the BacT/ALERT culture bottles with or without cytotoxic drug. The rapid microbacterial method was, as expected, more sensitive and easier in detection than the classic method, with a difference of 7 days. Paclitaxel had a low inhibiting effect on the growth of Pseudomonas aeruginosa and Candida albicans.
Conclusion BacT/ALERT culture bottles can successfully be implemented in a hospital pharmacy production unit. Our goal to instal a more sensitive and rapid detection method for sterility testing was achieved and led to a more secure system in the release of chemotherapeutic infusions. Further research with other cytotoxic drugs will be needed to validate this method.

No conflict of interest

PP-034 | SUBCUTANEOUS TRASTUZUMAB VERSUS INTRAVENOUS TRASTUZUMAB: AN IMPACT STUDY

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Background Trastuzumab is a monoclonal antibody used to treat HER2 positive breast cancers. Initially, only intravenous trastuzumab (IT) was available until the EMA authorised subcutaneous trastuzumab (ST) in 2013. The posology of IT depends on the patient's weight whereas the posology of ST is fixed (600 mg).
Purpose Comparison of times (preparation, nurse and medical) and costs.
Material and methods Preparation time in isolators and administration time were measured for 4 weeks. Times were converted to costs with the average salary scale of the hospital. Then, the costs of medical devices used were compared. The results were extrapolated to 1 year.
Results By switching IT to ST, the average preparation time was reduced by 76.2% (500 s (SD 166.0) vs 119.2 s (SD 29.2)) for the loading dose and by 69.3% (387.6 s (SD 109.7) vs 119.2 s (SD 29.2)) for the maintenance dose. This reduction could be explained by the galenic formulation (powder to ready to use solution) and the higher concentration of ST (use of a single vial vs minimum of 3 for IT). In 2015, our hospital prepared 983 ST and 743 IT: an estimated economy of 73.3 hours, or € 2420.34. The average nurse time was also reduced: 55.4% (15.7 min (SD 13.1) vs 7 min (SD 1.2)). This could lead to an economy of 137.20 hours or € 5327.40 in 2015. The medical time was similar with both forms. The costs of medical devices were reduced from € 655 to € 240. This could lead to a saving of € 4079.45 in 2015. Moreover, the fixed dose of ST and its physicochemical stability enables administration of a non-used treatment to any patient. This has represented an economy of € 20669.42 in 2015 (almost 15 administrations of ST). Overall, the use of ST could lead to an economy of € 32 496.61 in 2015.
Conclusion The use of ST seems to lead to a saving of time and costs. The most interesting savings concern handling and infusion devices and the possibility of reusing non-administered drugs. However, the pharmaceutical staff have to manage the risk of confusion between these two drugs.

No conflict of interest

PP-035 | THE TREATMENT OF SUBMACULAR HAEMORRHAGE DUE TO NEOVASCULAR AGE RELATED MACULAR DEGENERATION USING INTRAVITREAL ALTEPLASE (RTPA): PREPARATION AND CLINICAL OUTCOMES OF THE OFF-LABEL THERAPY

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Background Subretinal haemorrhage is a neovascular age related macular degeneration (AMD) complication and it causes decreased visual acuity (VA). No medical treatment is

registered for the disease. The most widely used approach is vitrectomy. The hospital pharmacy of our centre has validated the operating procedure to prepare a sterile rtPA solution for intravitreal administration with a 0.5 mg/mL concentration. This solution is used 'off-label', with no therapeutic alternatives.

Purpose This work aims to review the formulation development and evaluate the clinical 'off-label' treatment outcomes, to analyse the benefit–risk profile.

Material and methods We investigated the rational use of the intravitreal formulation, prepared from Actilyse, by dilution with ppi water. We retrospectively examined medical records of patients who were treated from January 2006 to March 2012 and analysed the success in subretinal haemorrhage dislocation, VA variations in time (measured in logMar, inversely proportional to VA) and complications.

Results 78 injections in 76 patients (average age 79 ± 7.9 years) were administered. The average VA (VAa) at baseline was 1.79 ± 0.92 logMar. Basal VAa in patients who had been pretreated with anti-VEGF drugs corresponded to 1.58 ± 0.92 logMar and the VAa of non-pretreated patients was 1.93 ± 0.91 logMar. 1 month after treatment VAa decreased of 0.4 logMar compared with baseline. 6 months after treatment, 27/78 eyes had earned at least -0.6 logMar from baseline, and by 1 year after treatment 25/55 eyes. 37/78 eyes had a VA that allowed patient movement before treatment while 51/78 eyes allowed patient movement after 1 month of treatment and 39/55 eyes after 1 year.

Conclusion The off-label use of intravitreal rtPA to treat subretinal haemorrhage was effective (it removed subretinal haemorrhage in 96.2% of patients and the VA trends were favourable in time). VAa increased significantly 1 month after treatment and it stabilised at better values compared with baseline. The intravitreal injections were also safe.

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No conflict of interest

PP-036 | **BLINATUMOMAB: ORGANISATIONAL AND ECONOMIC OPTIMISATION OF TREATMENT AND PROPOSAL FOR SCHEDULED PATIENT CARE**

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Background Blinatumomab (Blincyto) is an antibody bispecific indicated in relapsed or refractory B LAL. A single cycle of treatment of blinatumomab consists of 4 weeks of continuous intravenous infusion at a dose of 9 µg/day for the first week and then 28 µg/day followed by a 2 week treatment free interval. The maximums storage time of the infusion is 4 days. Continuous infusion can be given at home with an ambulatory pump. The cost of a 35 µg vial is € 2880.

Purpose The objective of this study was to propose optimal organisation to limit the cost of the treatment

Material and methods A simple mathematical calculation was used to evaluate the cost of various possibilities for the administration schedule. Several points were studied: (1)

decrease number of bags prepared; (2) optimise the number of vials used; (3) determinate the best administration schedule to reduce changing infusion bag; and (4) avoid changing infusion bag on weekend to reduce costs.

Results (1) Preparation takes account of stability and dose: the first week 2 bags are needed and the following 3 weeks following 6 bags are needed so the minimum number of bags is eight. (2) 651 µg is the efficacy dose for the first cycle, corresponding to 17 vials but the short storage duration of reconstituted vial (24 hours) constrains the use of an additional vial: 18 vials (€ 51 840). (3) The best schedule for reducing changing the infusion bag must include the 28 µg dose realised in J8 during hospitalisation. (4) Changing infusion bag can be avoided during the weekend if the day of treatment initiation is a Saturday; it will be twice at the weekend if the initiation day is Monday or Thursday.

Conclusion The efficient scheduled for patient care corresponds to 8 preparations with 18 vials. The correct administration schedule is the following: J1, J5, J8, J9, J13, J17, J21, J25. Initiation of treatment should start preferably on a Saturday and avoid as much as possible Monday and Thursday. This practice can be applied in all hospitals and generates the best treatment price.

No conflict of interest

PP-037 | **CLOSED SYSTEM TRANSFER DEVICE EVALUATION: SURFACE WIPE STUDY TO MEASURE EXPOSURE OF HEALTHCARE PERSONNEL TO CHEMOTHERAPY AGENTS**

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Background Closed system transfer device (CSTD) mechanically prohibits the transfer of environmental contaminants into the system and the escape of hazardous drug or vapour concentrations outside the system. However, various CSTDs are not equally effective.

Purpose We evaluated the impact of current and new CSTD systems on exposure of healthcare personnel to chemotherapy agents and how the new CSTD would fit into our workflow.

Material and methods To ensure safety and compliance of a new CSTD system, our first step was a hands-on product demonstration to evaluate the new technology. The review included ease of use of the system and review of all system components.

The second step was to take surface wipe samples. We used CytoWipe kits from Exposure Control. We carried out two compounding trials (existing CSTD and new CSTD), each lasting 3 weeks. Sampling locations in pharmacy included:

- Scale in the laminar flow cabinet (LAF)
- LAF surface.
- Counter with prepared chemotherapy.
- Floor in front of the LAF.
- Pass through surface.
- Vials.

Baseline contamination was determined with initial cleaning with NaOH and HCl. During the trials, cleaning was performed per facility protocol (detergent, IPA and biocid B or C (KlerWipe) daily and 0.05 M NaOH weekly). Monitored drugs were cyclophosphamide and 5-fluorouracil. Exposure

Control analysed cyclophosphamide using a GC-MSMS method and 5-fluorouracil using a HPLC system with UV detection.

Results We found that while both systems were easy to use, the new CSTD system provided enhanced safety by ensuring compliance without an option to bypass the system. The limited surface wipe sample analysis showed that cleaning and workflow were important factors in minimising exposure of healthcare personnel to chemotherapy agents. With the current CSTD system, cyclophosphamide contamination was found on surfaces 1, 2 and 4, and barely detectable on 5 and 6. No contamination with 5-fluorouracil was found. With the new CSTD, cyclophosphamide contamination was found only on surfaces 4 and 6 that had little or no correlation with compounding. No contamination with 5-fluorouracil was found.

Conclusion The study showed that the new CSTD system ensures compliance, fits into our workflow and can help minimise exposure of healthcare personnel to chemotherapy agents.

No conflict of interest

PP-038 | **COMBINING A CLOSED SYSTEM TRANSFER DEVICE AND AN IMPROVED DECONTAMINATION PROCESS TO DECREASE THE CONTAMINATION INSIDE ISOLATORS**

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Background Despite the use of closed system drug transfer devices (CSTDs), residual contamination by antineoplastic drugs is still retrieved inside isolators.[1] Improving the chemical decontamination process has been proposed to reduce this contamination more efficiently.

Purpose This study aimed to assess the decontamination efficiency inside isolators of two different decontamination processes associated with a CSTD.

Material and methods A comparative and prospective study was performed in a new opening compounding unit. Compounding was performed with a CSTD (BD-Phaseal, Becton-Dickinson). 8 drugs (cyclophosphamide, cytarabine, dacarbazine, fluorouracil, gemcitabine, ifosfamide, irinotecan and methotrexate) were monitored daily for 14 consecutive weeks in 3 locations inside the isolators: gloves, workbench and window. Drugs were alternatively compounded in one or the other isolator on even and odd days. In one isolator (C), the cleaning process was performed daily with a standard biocide solution (Anioxyspray, Anios). In the other (I), a weekly decontamination with an admixture of sodium dodecyl sulfate 10^{-2} M/isopropanol (70/30) was added.[2] Monitoring was performed by a validated LC-MS/MS method.

The results are presented as OR of contamination between the two groups and as overall decontamination efficiency (Eff_Q%) in each group. This latter parameter was computed according to Anastasi, as follows: $Eff_Q = 1 -$(sum of all contaminations after decontamination process (ng)/sum of all contaminations before decontamination process (ng)). The proportion of $Eff_Q > 90\%$ was compared using Fisher's exact test.

Results The overall contamination rates (CR) after the daily cleaning/decontamination process were significantly different between the two groups: $CR_C = 25.3\%$ versus $CR_I = 10.4\%$ (OR=0.341; p<0.0001). The mean overall Eff_Q was significantly higher in the intervention group (I: $61.0 \pm 41.5\%$ vs C: $42.4 \pm 37.3\%$), but was very variable depending on the drug analysed. Decontamination was more effective for both cyclophosphamide and gemcitabine. The proportion of days with an $Eff_Q > 90\%$ was higher in the intervention group (I: 42.9% vs C: 7.1%; p=0.077).

Conclusion Combining a decontamination protocol including a tensioactive agent to a CSTD leads to better control of contamination inside isolators. Improving decontamination frequency will be further studied.

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PP-039 | **IMPACT OF MASKING ON METHYLPHENIDATE DISSOLUTION FOR OVER ENCAPSULATED CAPSULES OF RITALIN LA 10 MG**

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Background As part of the development of a double blind clinical trial using Ritalin LA (extended release) 10 mg containing methylphenidate hydrochloride (MH), over-encapsulated capsules have to be compounded and MH release studied. This release is bimodal (SODAS technology), with the first 50% of the dose released immediate at strong acidic pH, and the second 50% release at a pH >6. Capsules and backfilled excipient used for masking Ritalin LA capsules have a potential impact on MH release, compared with bare capsules.

Purpose To study the potential impact of masking in over-encapsulated capsules with microcrystalline cellulose (MC), on in vitro biopharmaceutical parameters.

Material and methods A dissolution study was carried out by comparing MH release from bare capsules (n=6) with over-encapsulated capsules (n=6) using MC as the backfilled excipient. The two release phases of MH were studied in a unique dissolution medium. A Britton–Robinson buffer, pH 2, was used for 2 hours at 37°C. Then, the same buffer was adjusted to pH 6.8 for a 5 hour dissolution time. The basket dissolution apparatus (European Pharmacopoeia (EurPh) 2.9.3) was used at 50 rotations/min. 15 samples of 2 mL were filtrated using cellulose acetate membrane filters. MH dosing was quantified by a stability indicating (HPLC-UV-diode array detector) method. The two dissolution profiles were compared with fit factors (difference factor $f_1 < 15\%$, similarity factor $f_2 > 50\%$ for similarity) and the Rescigno index ($zeta_1$ and $zeta_2$ with values close to 0 tending toward similarity). A disintegration test (EurPh 2.9.1) was led on 6 capsules. Statistical analysis was conducted using non-parametric tests ($\alpha < 5\%$).

Results On the whole dissolution, fit factors and Rescigno index were:

- $f_1 = 2.2\%$
- $f_2 = 96.0\%$
- $zeta_1 = 0.012$
- $zeta_2 = 0.025$

A lag time of a few minutes at the beginning of dissolution was observed for over-encapsulated capsules. This can be explained in part by the delay in capsule disintegration (103 s and 170s ($p < 0.001$) for, respectively, bare and encapsulated capsules). MH progressive degradation was highlighted in buffers, which explains why the maximum amount was $< 100\%$ (median on first phase of 47.85% and 47.1% (NS) and on the second phase 42.5% and 43.3% (NS)).

Conclusion A similarity between over-encapsulated and bare capsules was demonstrated using MC.

No conflict of interest

PP-040   WITHDRAWN

PP-041   WITHDRAWN

PP-042 | WITHDRAWN

PP-043 | **EVOLUTION OF COSTS IN BIOLOGICAL INTRAVENOUS TREATMENTS IN RHEUMATIC DISEASES OVER 5 YEARS**

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Background Rheumatic diseases generate considerable consumption of health resources due to the use of biological therapies, continuous monitoring of disease and disability. Biological therapies have proven to be effective in disease control compared with standard therapy, but there are differences between them both in safety and cost. Hence the development of protocols that aim at implementing cost effectiveness criteria are required, and providing individualised choice of biological therapy.

Purpose Our goal was the assessment of the evolution of costs in biological intravenous therapy, with respect to treatment and care burden.

Material and methods An observational, descriptive, retrospective study of costs obtained in biological intravenous therapy over 5 years (2011–2015) was conducted. Each year we obtained total treatment costs, costs per pathology (rheumatoid arthritis (RA), psoriatic arthritis (PsA), ankylosing spondylitis (AS), psoriasis (PS), juvenile idiopathic arthritis (JIA) and Behcet's disease (BD)) and cost of drugs (infliximab (INF), abatacept (ABA), tocilizumab (TOC) and rituximab (RIT)). For assessment of the evolution of the costs and burden of care, the incremental cost and increased number of patients were calculated.

Results There was an overall incremental cost of € −14,719.26. The diagnoses that contributed to savings were: RA with € −211 810.42, PsA € −63 418.96, PS € −28 582.42 and BD € −21 040.86. Pathologies that increased spending were: EA € 150 884.53 and JIA € 37 317.57. The drug that contributed to the most savings was INF, in RA (€ −294 472.77), in PsA (€ −66 691.76) and in PS (€ −33 413, 62). Regarding drug spending, INF contributed the most, in AS (€ 159 884.53), and TOC in JIA (€ 38 358.68). The incremental number of patients was 4.

Conclusion In this study, we observed considerable savings in the cost of treatments, due to drugs, probably due to falling prices and dose adjustment intervals according to the patient's clinical status. The appearance on the market of biosimilars has not changed early treatment with INF in our hospital, so the cost can still improve in this area. Further studies will be needed to assess the inclusion of the majority of biosimilars as treatment of disease in both early treatment and treatment changes.

No conflict of interest

PP-044 | **STABILITY OF 50 AND 100 μG/0.1 ML INTRAOCULAR SOLUTIONS OF VORICONAZOLE AT 2–8°C**

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Background Voriconazole is a triazole antifungal agent effective in most cases of keratitis caused by fungi. Off-label use of extemporaneously compounded intraocular (intrastromal, intracameral) voriconazole has shown promising results in deep fungal ophthalmic infections, and abscessed, recurrent or drug resistant eye infections. Stability data on voriconazole intraocular solutions (VIS) are lacking.

Purpose To assess the stability of 50 and 100 µg/0.1mL VIS stocked at 2–8°C.

Material and methods 2 batches of VIS (2 mL; 1 batch per concentration) were aseptically compounded from injectable Vfend (Pfizer) and Ringer's lactate solution (Baxter), stored at 2–8°C in 3 part syringes (n=66) and analysed on day 13 (D13) and after 1 (D30) and 1.5 (D44) months. Stability study was led according to the GERPAC-SFPC stability studies guidelines. At each time point, visual aspect was checked, and voriconazole relative concentration (% of initial concentration, using a stability indicating HPLC-UV-diode-array-detector method), pH and osmolality were measured. Non-visible particle counts (using light obscuration particle count test) for particle size $\geq$ 10 µm and $\geq$25 µm (Eur Pharm 2.9.19 threshold: 6000 and 600/recipient, respectively) and sterility were assessed. Statistical analysis was carried out using non-parametric tests (α <5%). Degradation rates were compared with a Student t test.

Results For every time point, CI relative concentrations were (0.993; +infinite (and) 0.951; +infinite (respectively, for 50 and 100 µg/0.1 mL), and remained superior to 95% (p<0.0001). No difference was shown in degradation rates (0.008±0.120 and −0.231±0.961 (p=0.497)) between the 2 concentrations, indicating no concentration effect. Osmolality remained stable (from 281.2 (T0) to 282.2 (D44) and from 298.2 to 299.8 mOsm/kg (p=0.490)). pH increased from 6.78 (T0) to 7.11 (D44) (p=0.150). Particles size $\geq$ 10 µm rose from 240.3 (D13) to 339.1 (D44) and from 363.2 to 487.6 particles/syringe, respectively, for 50 and 100 µg/0.1 mL. Particles size $\geq$ 25 µm rose on D13 from 3.3 to 4.4 and from 5.2 to 6.9 particles/syringe respectively. For voriconazole degradation products, whose toxicity is unknown, areas increased by a maximum of 1.3 (D13) and 2 (D44), remaining unquantifiable.

Sterility was preserved to at least D13 with no change in visual aspect.

Conclusion VIS remained stable for 13 days at 2–8°C. We advise a shelf-life of a maximum of 13 days for both VIS kept at 2–8°C.

No conflict of interest

SURVEY ON PARENTERAL NUTRITION PREPARATION IN HOSPITAL PHARMACIES

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Background The aseptic preparation of parenteral nutrition (PN) admixtures is a process which is being implemented in many hospital pharmacies throughout Europe. The prescribing, checking and compounding of PN is critical and can be prone to errors if not carefully planned and monitored.

Purpose To identify critical issues in the prescribing and preparation process of PN admixtures in hospital pharmacies, a national survey on current practices was conducted. Based on the results, standardisation of the preparation methods and products will be initiated.

Material and methods To identify the PN preparation characteristics, an online survey was designed using Limesurvey consisting of multiple choice and free text questions. It focused on the current practices of PN compounding, use of specific products and opinions of the participants on their automated compounding devices and prescribing software. After review by a multidisciplinary team, the survey was sent via email to hospital pharmacists through the mailing list of the national association of hospital pharmacists. It was requested that only one reply be sent from each hospital pharmacy which prepares PN admixtures. The analysis was conducted with Excel software.

Results 85 completed surveys were received. Approximately 40% of the pharmacies prepared between 100 and 500 PN products monthly. 72% of the pharmacies prepared the PN with an automated compounding device. Approximately 70% still relied on fax transmission to receive PN prescriptions. The resulting database on the type of automation and electronic documentation used by the individual hospital pharmacies allowed the facilitation of a direct information exchange between users and also newcomers.

Conclusion The national survey provides an overview of the status quo of PN preparation and shows the necessity for a focus group to create standards in order to jointly optimise the process.

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Limesurvey, https://www.limesurvey.org/

No conflict of interest

A STABILITY INDICATING HPLC-UV METHOD FOR QUANTIFICATION OF SIMVASTATIN AND DETECTION OF ITS IMPURITIES IN ORAL CAPSULES

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Background A clinical trial sponsored by our hospital wished to compare HMG-CoA reductase inhibitors versus placebo for children with genetic diseases. For this purpose, and because the dosage in unavailable, our laboratory is in charge of the galenic development of simvastatin capsules and its placebo. According to GMP, the stability of the simvastatin capsule is evaluated.

Purpose Development and validation of a stability indicating HPLC-UV method for simvastatin capsules.

Material and methods The HPLC system is a Thermofisher P4000. The column is an inertsil-CN, 250×4.6 mm with 5 µm particle. The mobile phase is an isocratic elution made up of 0.1% acetic acid buffer/methanol (50:50 v/v) at 1 mL/min flow rate. λ is included between 200 and 400 nm. Maximal absorbance of simvastatin is 237 nm. Calibration standard curve is between 30 and 70 µg/mL. Niacin is used as the internal standard. Linearity, trueness, accuracy and limits of quantification were evaluated according to SFSTP recommendations. Impurities were searched from SCR impurities of simvastatin dust according to pharmacopoeia 8.0. The matrix effect was evaluated.

Results Linearity for simvastatin was validated with $r^2 > 0.99$ and SD <15%. Recoveries and bias were < 15% for each validation standard. High and low limits of detections were far from the calibration standard curves. There was no matrix effect with the excipients. All impurities were detected and separated with a resolution >1.5.

Conclusion A simple and rapid stability indicating HPLC-UV method was developed and validated according to ICH and SFSTP international recommendations. It will be used to evaluate the stability of our simvastatin capsule. We already have 3 months of validated stability.

No conflict of interest

PP-047 | AUTOMATED INTRAVENOUS CHEMOTHERAPY WORKFLOW: THE ADDED BENEFIT TO REDUCE POTENTIAL MEDICATION ERRORS

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Background Due to the toxicity of molecules involved and the seriousness of adverse drugs events, chemotherapy compounding is a high risk medical practice. To ensure high standards of safety and quality of the process, in September 2014 our hospital pharmacy developed a new oncology workflow, based on implementation of a robotic system for intravenous (IV) chemotherapy compounding. In order to avoid any mistakes that can lead to potential medication errors, the technology adopted was equipped with a set of different sensors able to guarantee the appropriate identification of the all components used for the compounding.

Purpose To present the improvement introduced by automation in terms of quality and safety of the cure offered to patients, highlighting the importance of a total controlled oncology workflow.

Material and methods We analysed 8 weeks of automated IV production, focusing on potential medication errors intercepted by the automated system. All of these events were recorded and processed by APOTECAmanager, the pharmacy IV production management software.

Results The 2 month production evaluation results in 2312 IV chemotherapies prepared were analysed. The automated system detected 59 potential medication errors, preventing any erroneous therapy compounding. In detail:

- 50 events associated with incorrect components barcode scanning (eg, sodium chloride instead of dextrose bag scanning);
- 5 occurrences during the vial weighing procedure;
- 4 episodes during the vial label identification.

All these events were related to incorrect material loading carried out by the technician. We assessed the weekly trend in potential error occurrences: Monday and Tuesday results were the highest frequency (7.1% and 6.2%, respectively, of total daily production). We also noticed that 51% of detected errors occurred between 8am and 11am in the morning.

Conclusion Every step in the oncology workflow is now totally controlled, allowing the traceability of each operation, from prescription to administration. The results showed the added benefit of this technology in terms of reduction of potential medication errors and self-assessment of your own compounding procedure; at the same time, evidences point out to the need for implementing specific interventions in clinical practice to reduce the probability of occurrence of these events.

No conflict of interest

PP-048 | ANTINEOPLASTICS: ANTICIPATED PREPARATIONS OR LONGER OPENING HOURS?

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Background Our centralised anticancer drug preparation unit is only open in the morning. Our annual production is 11 000 preparations for four different care units. Currently, chemotherapy infusions for afternoon patients are prepared in the morning and discarded if the administration is cancelled. To rationalise costs, the unit is considering the option of opening all day.

Purpose This study estimated the profitability of opening the unit in the afternoon compared with the loss related to cancellations of the preparations produced in the morning for the afternoon.

Material and methods The number of daily preparations, preparations dispensed in the afternoon and discarded preparations was recorded over a period of 3 months. The causes of the cancellations were listed. To determine the most profitable choice, we compared the cost of the discarded preparations (including active substance, packaging and the salary of the additional staff) and the cost of longer opening calculated on the basis of staff's hourly rate. The costs of the preparation material (negligible) and the functioning costs of the unit (difficult to estimate) were not taken into account.

Results Over the studied period, 3086 preparations were produced: 10% were intended to be administered in the afternoon. 3% of the afternoon preparations were not dispensed (n=10) versus 1% in the morning. 50% of the cancelled preparations planned in the afternoon were not reusable (n=5), causing a loss of € 1674. 90% (n=9) of the cancellations came from the haematology service. The reasons for cancellation were unpredictable in 70% of cases (n=7). The average number of preparations planned in the afternoon was 4.8 (extremes (0; 15)). The cost of the required time to produce these preparations per afternoon over the studied period was € 6712, 4 times the current losses.

Conclusion The cost of all day opening is high because of staff requirements. Currently, it does not seem appropriate to extend opening hours. A return of the results of the study to the healthcare services is planned to raise awareness of predictable cancellations.

No conflict of interest

PP-049 | IMPACT OF IMMUNOTHERAPY ARRIVAL IN CHEMOTHERAPY PRODUCTION UNITS: RETROSPECTIVE STUDY AND PROJECTION WITH ANTI-PD-1 AGENTS

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Background Immunotherapy (IT) has revolutionised cancer treatment. As with other anticancer drugs, IT preparations have to be centralised for safety and economic reasons. Nivolumab and pembrolizumab are currently used in France for metastatic melanoma and nivolumab for metastatic lung cancer. Nivolumab was approved recently for advanced renal cancer, pembrolizumab for metastatic lung cancer and both are extensively used for bladder and head and neck (HN) cancers.

Purpose In our institution, all tumorous diseases are treated, except for lung cancers. We evaluated retrospectively the impact of the arrival of IT in dermatology on our pharmaceutical production flow, and the impact of IT in bladder and HN cancers on this flow.

Material and methods Real life data were extracted from our prescription software. In dermatology, production flow was assessed retrospectively for 1 year. We compared these data with those obtained a year prior to the arrival of IT. We also conducted a prospective study on bladder and HN cancers to assess production flow evolution. We considered that IT would be used in secondline treatment of metastatic cancers, as reported in clinical trials. We set up an inventory of the corresponding preparations over 1 year. We estimated IT production for the same period, according to nivolumab and pembrolizumab administration schemes.

Results In dermatology, we produced 503 preparations before the arrival of IT compared with 1938 after (+ 285% a year). In HN cancers and bladder cancers, 546 and 59 preparations were produced, respectively. Prediction of numbers of preparations were 200 and 131 for nivolumab and pembrolizumab, respectively (−67 to −78% a year).

Conclusion Global production increased with IT arrival in dermatology. This may be explained by the increase in survival time. In bladder and HN cancers, production will probably decrease even if its impact on our whole production flow (40 000 preparations a year) remains confidential comparatively with dermatology (−0.65% versus 3.6%, respectively). Nevertheless, our prospective study did not take into account survival time improvement due to IT or the impact of IT in renal cancer. Considering the dermatology experience, we can suppose that survival time will increase and that IT production will grow consequently. It may represent around 3000 additional preparations per year (+7.5%).

No conflict of interest

PP-050 | ADJUVANT TREATMENT WITH INTRALESIONAL PHENOL TO PREVENT THE RECURRENCE OF CHONDROSARCOMA AFTER SURGERY

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Background The term chondrosarcoma is used to describe a heterogeneous group of tumours which have in common the production of a cartilaginous matrix, which represent 20% of malignant primary bone tumours. The most common, grade 1 chondrosarcoma (CS1), is a slow growing tumour considered refractory to radiotherapy and chemotherapy for which treatment is based on surgery. Adjuvant treatment with phenol after curettage may be effective in preventing local tumour recurrence.

Purpose The objective was to develop an adequate phenol formulation to be used in the operating room after curettage and evaluate its safety and effectiveness in a report of one case.

Material and methods Surgeons asked our pharmacy department to prepare an 85% phenol formulation. We made a bibliographic research on excipients potentially suitable on Martindale, Micromedex and Pubmed and finally ethanol was chosen because phenol solubility in ethanol is very high and it would not crystalise. Traumatology surgeons used the phenol formulation after curettage in 3 patients. Its effectiveness was assessed measuring the time until tumour recurrence based on imaging and analytical parameters.

Results All of the process was developed in a horizontal laminar flow cabinet and we started heating crystalised pure phenol (ACOFARMA) in a circulator at 60°C until it melted, which took about 1 hour. Next, using a 20 mL Luer-Lock syringe, we took 17 mL of liquefied phenol and added it to 3 mL of absolute ethanol (Farmacia Carreras) at 60°C, and invert the syringe several times until they mixed. Then, we filtered the solution using a 0.22 µm sterilising filter to a new syringe, fitted a plug and packed it into a photoresist bag, with 7 days of stability at 25°C.

Phenolisation after curettage was practiced in 1 patient, a 34-year-old man with a free survival until image progression of 20 months.

Conclusion This formulation of phenol 85% in ethanol appears to be a well tolerated adjuvant treatment after curettage in chondrosarcoma surgery. Further studies are needed to discern where to use it, and to assess its efficacy.

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No conflict of interest

PP-051 | CYTOTOXIC CONTAMINATION RESEARCH IN A CENTRALISED CYTOTOXIC UNIT TO IMPROVE PROFESSIONAL PRACTICES

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Background Long term exposure to cytotoxic substances can lead to serious side effects. In reaction to a constant increase in activity in our oncology department, we decided to organise a campaign of surface tests to evaluate the environmental contamination and staff exposure to cytotoxics.

Purpose To measure contamination in different areas of our preparation unit, corresponding to different stages of the preparation. We then proposed adapted corrective measures.

Material and methods We identified 7 sensitive areas to be tested: gloves of the technician's helper, transfer airlock, telephone, two keyboards from the desk where the preparations

were controlled, the case used to carry the preparations and the handle of the preparation unit's door. Samples were collected by rubbing a sterile compress soaked with 0.1 mL of sterile water for injection onto a surface of 10 cm² of each zone. A quantitative analysis by ultraperformance liquid chromatography combined with mass spectrometry was used to measure contamination in each sample by 10 different cytotoxics. We tested the following drugs: cytarabine, cyclophosphamide, ganciclovir, gemcitabine, ifosfamide, irinotecan, methotrexate, dacarbazine, doxorubicin (detection limit 1 ng) and fluorouracil (detection limit 10 ng).

Results None of these molecules was found on the different areas tested, with the exception of the technician helper's gloves, which were contaminated with 462.4 ng of cyclophosphamide, 180.1 ng of doxorubicin and 1.8 ng of ifosphamide.

Conclusion This study revealed contamination of the technician helper's gloves by cytotoxics. Because the technician's helper is required to pack the preparations, he may be responsible for contamination of the whole transportation network from the pharmacy to the oncology department. To avoid this contamination, corrective measures were implemented: cytotoxic drug preparations are now labelled and packed directly inside the isolator and the outer packaging is made on the way out of the isolator, using a reversible plastic bag. Thus there is no contact between the technician helper's gloves and the preparation. Another campaign of tests will be carried out to evaluate the impact of these corrective measures on environmental contamination.

No conflict of interest

PP-052   WITHDRAWN

PP-053 | **EVALUATION OF 5 COMPOUNDED FORMULATIONS FOR THE TREATMENT OF ORAL MUCOSITIS IN CANCER PATIENTS**

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Background Oral mucositis (OM) is a frequent complication of chemotherapy which severely affects patient quality of life. Management is generally based on topical compounded formulations.

Purpose To analyse the use of our compounded formulation of Lidollanten 1% for the treatment of OM in a tertiary hospital, to describe this and four other formulations and to perform a comparative cost analysis without including professional fees.

Material and methods We performed a 1 year retrospective study (January 2015–December 2015) involving all cancer patients who had used our compounded formulation during the study period. Patient data were obtained from the SAP application.

Results During the study period, we dispensed 3122 Lidollanten 1% preparations for 530 patients. The cost of preparation in the hospital was € 1.55/100 mL, which meant € 4 823.51/year. Different formulations for the treatment of OM are shown in the table.

Compounded formulation	Lidollanten 1%	2	3	4	5
Components	- Llanten leaves - Lidocaine - Sodium borate - Potassium chlorate - Pink honey extract - Syrup	- Chlorhexidine 5% - Methylprednisolone - Mepivacaine 2% - Sodium bicarbonate - Sodium chloride - Sterile water	- Mepivacaine 2% - Aluminium hydroxide - Magnesium hydroxide - Sorbitol 70% - Guar gum 1% - Nipagin - Citric acid - Peppermint oil- Sterile water	- Gentamicine - Hydrocortisone - Nystatin - Lidocaine - Sodium bicarbonate - Cremophor RH 40 - Xanthan gum - Sorbitol 70% - Peppermint oil- Sterile water	- Sucralfate - Lidocaine - Cremophor RH 40 - Sorbitol 70%-Sterile water
Complexity	High	Low	High	Medium	Medium
Preparation time	5 hours	30 min	30 min	2 hours	30 min
Storage	Fridge	Ambient temperature	Ambient temperature	Fridge	Fridge
Expiry time (days)	30 days	30 days	60 days	15 days	15 days
Cost (100 mL) (€)	1.55	1.36	4.27	6.51	2.53

Conclusion According to our data, the least expensive formulation (from the point of view of acquisition cost) was No 2, which also happened to be that requiring the least processing time; it can be stored at room temperature, with an expiry time of 1 month. For these reasons, we believe it is the most efficient. Future studies will determine whether there are differences in effectiveness between the different formulations.

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No conflict of interest

PP-054 | STABILITY STUDY OF 100 MG/ML PAEDIATRIC PYRAZINAMIDE ORAL SUSPENSION IN SYRSPEND

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Background Pyrazinamide is an antituberculosis agent used in adjunctive treatment of tuberculosis infection in combination with other antituberculosis agents, such as isoniazid, rifampicin and ethambutol. The tablet form is unsuitable for paediatric patients and the pharmacist needs to produce an oral suspension. Data on pyrazinamide stability in an oral suspension are scarce and were produced several decades ago. Thus new stability information is needed.
Purpose The aim of this study was to determine the stability of 100 mg/mL pyrazinamide oral suspension in commercial compounding excipient Syrspend SF PH4 (FAGRON).

Material and methods 3 batches of oral suspensions were prepared, using pyrazinamide tablets and Syrspend SF-PH4, packaged in amber vials to protect from light, and stored at room temperature. Several parameters were studied on days 0, 3, 5, 8, 15, 30, 60 and 90 (n=3): physical stability (visual inspection, osmolality measurements) and chemical stability (pH measurement, residual concentrations of pyrazinamide, degradation products identification). Pyrazinamide concentrations were determined using a validated analytical method based on high performance liquid chromatography with UV detection at 280 nm. Chromatographic separation of the analytes was performed with a WATERS C18 ATLANTIS T3 column (150×4.6 mm, 5 μm). The mobile phase was composed of acetonitrile/phosphate buffer at pH 3 (40:60 v/v) and flow rate was adjusted at 1 mL/min. Data were acquired and processed with EMPOWER Software. Microbiological stability was checked according to the test using colony counts on media platings.
Results No change in physical properties was observed during the study period. Drug concentration remained within ±5% of nominal values over 90 days and no degradation products appeared on the chromatograms. Microbiological media plates remained free from any bacterial or fungal colony.
Conclusion This study showed that 100 mg/mL pyrazinamide oral suspension in Syrspend SF PH4 was stable for at least 90 days at room temperature, so we determined a shelf life of 90 days for this preparation. Further study, using a mass spectrometer method, will be conducted to confirm this shelf-life.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Methodological guidelines for stability studies of hospital pharmaceutical preparations. ICH Guidelines

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No conflict of interest

PP-055 | CONGENITAL CHAGAS DISEASE. A CASE REPORT

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Background Congenital infection with *Trypanosoma cruzi* occurs in an average of 5% of children born of mothers with chronic infection.
Purpose To describe a case report of a newborn with Chagas disease (CD) acquired by vertical transmission in a non=endemic zone.
Material and methods Medical history review and literature research.
Results The case was a 10-day-old girl, born after spontaneous gestation of normal evolution and eutocic birth (Apgar test 8/10, 3100 g, 49 cm), whose mother (40-year-old South-American) had negative serologies and SBAgalactiae test, immune rubella and toxoplasma, but had IgG+ for CD. After the newborn had positive PCR for *T cruzi* and IgG+ antibodies to CD, the paediatrics service consulted the pharmacy service regarding the possibility of a pharmaceutical compounding preparation (PCP) for paediatric dosing of benznidazole. The dosage regimen, according to WHO criteria, was 5–10 mg/kg/day of benznidazole for 60 days, divided into two daily doses. 4 PCP were found from available benznidazole tablets (Abarax): 2 oral suspensions (PCP1, PCP2), capsules and

envelopes. PCP1 (benznidazole 1%) contained polysorbate-80, sodium carboxymethylcellulose, acesulfame potassium, methylparaben, propylparaben, banana and strawberry flavour, sunset yellow colourant and distilled water. PCP2 (benznidazole 10 mg/mL) needed sorbitol, sodium carboxymethylcellulose, citric acid and simple syrup. Capsules required an additional carrier diluent and the last PCP only needed Abarax tablets, containing excipients such as corn starch and lactose. The liquid PCP were discarded because these contained sorbitol, acesulfame potassium and/or parabens, opting for the development of envelopes for the newborn and the ease of weekly dosage adjustment based on patient weight. The start dosage was 8.2 mg (3260 g body weight; week 1) and the end dose was 24 mg (4980 g; week 7). After treatment with benznidazole, a progressive decrease in antibody titres was observed, with confirmation of cure at approximately 2 months and negativisation PCR with normal blood count and biochemistry. A review was conducted in the ophthalmology service (11 weeks after initiation of treatment) to assess treatment toxicity, not apparently objectifying alterations in the fundus, although noting that it was difficult to assess the potential toxicity of benznidazole with minimum reliability.

Conclusion Benznidazole was effective and well tolerated, although careful monitoring was necessary. PCP allows the pharmacist to individualise treatment when commercial presentations are not available.

No conflict of interest

PP-056 | **APPLICATION OF A TEST USING FLUORESCEINE TO THE QUALIFICATION AND CONTINUING PROFESSIONAL DEVELOPMENT OF PHARMACISTS AND PHARMACY TECHNICIANS AUTHORISED TO PREPARE CHEMOTHERAPIES**

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Background The preparation of chemotherapies is a sensible operation and technicians must be trained as recommended in international guidelines. In this perspective, an assessment of the manipulation skills was proposed to the whole staff authorised to prepare chemotherapies in a teaching hospital.

Purpose The aim of the study was to evaluate and qualify the staff, pharmacists and pharmacy technicians.

Material and methods A manipulation test using a solution of fluorescein was performed with the whole staff. It included the production of 3 preparations: a syringe with a stopcock and a connector, a syringe for an intrathecal injection and a preparation in an infusion bag. 3 items were assessed: contamination of the environment, manipulation skills and general behaviour (dressing and hand cleaning).

Results 32 persons performed the test. 3 persons failed, not obtaining the minimal score required for one or several steps. The general behaviour in the unit was excellent for all (score 3/3). But the test allowed identification of steps or technical operations whose performance was not optimal. For example, for the preparation of a syringe, 31.3% of people did not connect the stopcock as required, and 15.6% did not correctly homogenise the preparation. Environment contamination was weak, with contamination of gloves found for only 1 person. However, contamination of the compresses used was higher,

varying from 15.6% to 28% according to the type of preparation. Global and individual results of the test were discussed with the staff and a complementary formation was proposed to persons who failed the test.

Conclusion This internal programme was included in a quality approach of the activity of preparation of chemotherapies. It allowed evaluation of the manipulation skills of the staff, involving the staff in a process of continuing professional development. Moreover, technical steps, for which some additional training was needed, were identified. Finally, and after additional training where needed, renewal of preparation authorisations were given to the whole staff. At the end of their validity, 1 year, another evaluation will be performed.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

PP-057 | **PHARMACEUTICAL QUALIFICATION OF BIOINVERT 200, AN ENZYME SUBSTITUTE TO SUCRAID**

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Background Enzyme replacement therapy with SUCRAID offers a pharmacologic alternative to sucrose free diets to treat symptoms in congenital sucrase–isomaltase deficiency (CSID). But a resent shortage leaves patients without any treatment. Invertase, like Kerry's BIOINVERT 200 solution, is an enzyme widely used in confectionery production (E1103). It also hydrolyses sucrose to give glucose and fructose. It may be an interesting substitute for SUCRAID. However, this food grade solution needs pharmaceutical qualification.

Purpose To propose a method of pharmaceutical qualification of BIOINVERT 200 based on our experience, and to evaluate its specifications as a substitute for SUCRAID.

Material and methods Several characteristics were tested or measured, such as density (calculated by weighing), pH, osmolality (measurement by freezing point), enzyme activity (dosage with Sigma-Aldrich MAK118 set), residual solvent (search by gas chromatography coupled with flame ionisation detector), sterility test (by liquid cultures) and abnormal toxicity (tested on mice according to the European Pharmacopoeia).

Results The results obtained are shown in the table.

Parameters	Results
Osmolality (mOsm/L)	9188±203
pH	5.15±0.02
Enzyme physiological activity expected (IU/mL) (37°C, pH=4.5)	2822±22
Enzyme activity in qualification conditions (IU/mL) (55°C, pH=4.5)	6172±87
Sterility	No bacteria or fungus after 10 days of culture
Residuals solvents	Ethanol (4 mg/L), no solvent under C8
Abnormal toxicity	No lethality in mice according to the European Pharmacopoeia

Conclusion Because of high osmolality, BIOINVERT, like SUCRAID, has to be diluted 10 times before use. The enzyme activity is lower than Kerry's specifications (11 020–13 340 IU/mL at 55°C). It is also lower than SUCRAID (8500 IU/mL). For pharmaceutical qualification, heavy metals research is required. Then, the clinical effectiveness of BIOINVERT 200 could be tested.

No conflict of interest

PP-058 | **EVOLUTION OF THE PAEDIATRIC PARENTERAL NUTRITION BAG PRESCRIPTIONS FURTHER TO NUMETAH (THREE CHAMBER BAG) MARKETING**

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Background The use of parenteral nutrition (PN) is necessary for a child waiting for optimum enteral nutrition or when this is not possible or contraindicated. Three different types of PN bags exist: bag with marketing authorisation (AMM), standardised bag and bag on demand. According to the IGAS Report (General Inspection of Social Affairs) on paediatric PN practices, it is necessary to promote, as far as possible, specialities with AMM, in order to guarantee optimum safety clinically, microbiologically and physicochemically. The first multichamber PN bag with a ternary combination, intended for paediatrics, was commercialised under the name Numetah and has been listed in AP-HM since August 2015.

Purpose This study's purpose was to determine the product marketing influence on PN bag prescription in paediatrics.

Material and methods The study was based on a comparison before/after Numetah commercialisation. Consumption of different bag types was analysed in 4 paediatric departments (paediatric intensive care (RP), paediatric surgery (CP), paediatric oncology (OP) and multidisciplinary paediatrics (PP)). Two periods were defined: period 1, from August 2014 to March 2015 (before Numetah) and period 2, from August 2015 to March 2016. Data were collected using Pharma software.

Results In RP, the number of bags on demand decreased, whereas it increased for standardised bags and 664 Numetah were delivered. In CP, the number of bags on demand decreased, there were no difference for standardised bags and 79 Numetah were delivered. In OP, the number of bags on demand decreased, as did standardised bags, and 209 Numetah were delivered. In PP, the number of bags on demand and standardised bags increased, and 139 Numetah were delivered. We observed a decrease in prescription of manufactured bags in favour of Numetah, especially in RP. Numetah represents about 50% of prescriptions, except in PP, which could be explained by the presence of a PN specialist.

Conclusion Commercialisation of Numetah allowed the nutritious needs of more newborn babies and hospitalised children to be met, particularly in RP. As a result, the Numetah bag is the best match with the IGAS recommendations in paediatric parenteral nutrition. Nevertheless, some patients with particular needs still require standardised bags on demand prescriptions.

No conflict of interest

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Patient safety and risk management

PS-001 **MEDICATION RELATED EMERGENCY VISITS LEADING TO HOSPITAL ADMISSIONS IN A TERTIARY CARE HOSPITAL IN SAUDI ARABIA**

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Background Medication related problems (MRPs) are an unintended event caused by a drug and result in undesirable health outcome. MRPs could require a patient to visit the emergency department (ED). Unfortunately, many of these visits lead to hospital admissions depending on the severity of the presented cases. Internationally, many studies have addressed the incidence, preventability and causes of MRPs leading to hospitalisation. However, few studies have looked into the relation of the occurrence of MRPs with patient factors, hospital setting and the healthcare system that regulates each country.

Purpose To investigate the frequency of MRPs that lead patients in Saudi Arabia (SA) to visit the ED. The study examined the severity and factors contributing to medication related emergency visits leading to hospital admission (MREA) at a tertiary care hospital in SA.

Material and methods A retrospective observational study was conducted over a 6 month period. All medical record numbers listed in the quality records for patients admitted through the ED and reviewed by a pharmacist for medication reconciliation were examined retrospectively for possible MRPs causing admission.

Results Of 2199 emergency admissions over the period October 2015–March 2016, a sample of 698 patients was reviewed. 92 (13%) were MREA. Adverse drug reactions were the primary cause of admission (47%), as well as compliance (14%), drug prescribing (30%) and drug dosing (9%). The majority of cases were of moderate severity (83%). Most medications involved in emergency admission were antihypertensive, chemotherapy, anticoagulant and antidiabetic agents.

Conclusion There was insignificant difference in the incidence of MREA in a tertiary care hospital in SA compared with other tertiary care hospitals nationally and internationally. For the purpose of reducing the incidence of MRPs, it is recommended to involve pharmacists in emergency and ambulatory care settings to counsel and educate patients, and to support healthcare providers in making best medication related decision. It is also recommended to motivate physicians to apply patient centred strategies during prescribing.

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No conflict of interest

PS-002 WITHDRAWN

PS-003 WITHDRAWN

PS-004 **THE PREVALENCE, POSSIBLE CAUSES AND OUTCOMES OF SELF-MEDICATION WITH ANTIBIOTICS IN MIDDLE EASTERN COUNTRIES**

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Background Antibiotic resistance is a growing problem worldwide. It has considerable implications on societies' health and resources. However, there has been no systematic review on non-prescription antibiotics in Middle Eastern (ME) countries.

Purpose To review relevant studies published in ME countries to establish the prevalence, possible causes and clinical outcomes of self-medication with antibiotics (SMA) and identify recommendations to reduce irrational use of antibiotics.

Material and methods Databases (PubMed, Scopus, ProQuest, Web of Science) were searched for peer reviewed research published between January 2000 and June 2016 on SMA among adults aged ≥18 years living in the ME. A hand search for relevant citations and key journals was also performed. Articles were scrutinised for country of origin, sample size, recall period, prevalence rate, determinants and possible causes of SMA, type of antibiotic, source of supply, indication for SMA, inappropriate use, source of drug information, clinical outcomes and recommendations to address the problem where possible.

Results 22 studies were found. The prevalence of SMA ranged from 19% to 82%. Age, gender, educational and income levels were the main determinants of SMA. The reasons for SMA varied across studies. Sociocultural, economic and regulatory factors were the most commonly cited reasons for SMA. Penicillins were the antibiotics most commonly used; the antibiotics were obtained mainly via stored leftover drugs at home, pharmacies/drug stores without prescriptions and friends/relatives. SMA was mainly for sore throat, fever and respiratory problems, such as cold/flu and cough. The primary sources of drug information and recommendations included relatives/friends and previous successful experience with the same antibiotic. Inappropriate drug use such as incorrect indication, short and long duration of treatment, exchange/sharing of antibiotics, and storing antibiotics at home for use at a later time were reported. Negative and positive outcomes of SMA were identified. Some recommendations were made based on the problems that were found, but these were not evaluated.

Conclusion The prevalence of SMA is high in ME countries. Thus we have to understand the links between different factors promoting SMA and assess the changing trend in order to help us derive strategies aimed at reducing drug related health risks among the ME population.

No conflict of interest

| PS-005 | **OPTIMISATION OF PHARMACEUTICAL SUPPLY CHAIN SAFETY FOR OUTPATIENTS' MEDICATION RESERVED FOR HOSPITAL PHARMACY** |

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Background In France, drug retrocession consists of delivering to outpatients innovative drugs reserved for hospitals due to their required monitoring. Such patients are at the interface of primary care through community practitioners (physicians, pharmacists or medical biologists) and secondary care through hospital pharmacists for the delivery of the retroceded drugs. In addition, there are few networks connecting the community and hospital healthcare professionals (HCPs). This explains the frequent dysfunctions and poor therapeutic management of this drug supply chain, thereby resulting in critical patient safety issues.

Purpose This project aimed to study the incidents in this drug supply chain in our health territory and to propose solutions, allowing safety and continuity of care for our patients.

Material and methods Adverse events were collected over 2 years in 2 hospitals and were classified into different 'never events'.

Results 6 never events were defined:

- Drug interaction between community and hospital medications.
- No information to outpatients about requirements of hospital pharmacy dispensation.
- Cessation of treatment.
- No compliance with prescription or dispensation constraints.
- No therapeutic management.
- No compliance with confidentiality requirements.

The main source of all of these dysfunctions in the drug supply chain was the lack of coordination between the different HCPs.

Conclusion This study has shown that solutions to secure this medication system cannot be provided by one hospital alone. Outpatient mobility needs regional management with cooperation between the 9 public hospitals, community pharmacies and physicians to ensure continuous and safe care. As of next year, hospitals and community pharmacies will be connected through the pharmaceutical file, a secured cloud service managed by the French pharmacy college, to share information on drug dispensations and interactions. Common tools such as patient information leaflets will be created to optimise pharmaceutical care. All potential dysfunctions in these new network practices for drug retrocession will be collected by the quality department of one participating hospital for feedback and optimisation. This project is supported by our regional health institution (OMEDIT) and the French national college of pharmacists, and shows the mobilisation of the healthcare professionals in Normandy to improve patient care.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

| PS-006 | **ANALYSIS OF DRUG RELATED PROBLEMS AND PHARMACIST'S RECOMENDATION OF HOSPITALISED PATIENTS WITH CHRONIC KIDNEY DISEASE AT A MAJOR TEACHING HOSPITAL IN JAKARTA** |

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Background Chronic kidney disease (CKD) is characterised by a decline in kidney function. The decline in kidney function causes an alteration in the pharmacokinetics of the drug; this condition will make patients become vulnerable to drug related problems (DRPs). The role of the clinical pharmacist is important in the drug selection process in accordance with the severity of kidney disease, providing recommendations to use the least nephrotoxic drug and monitoring side effects or toxic drug reactions.

Purpose The purpose of this study was to assess pharmacist's recommendation profile of DRPs in patients with CKD and factors which influenced physician acceptance of pharmacist's recommendation.

Material and methods This was an observational prospective study. CKD patients hospitalised during November 2015 to January 2016 who matched with the inclusion and exclusion criteria were recruited to this study. Assessment of DRPs were performed using the PCNE classification scheme for DRPs V6.2. Descriptive analysis was applied for demographic data, drug utilisation, DRP profile and pharmacist's recommendations. Predicting factors which influenced physician acceptance of the pharmacist's recommendations was analysed by logistic regression.

Results There were 105 patients hospitalised with CKD and 80% of these patients had CKD stage G5. 1026 DRPs were identified during this study, the most frequent DRP domain was drug effect (47.08%) and adverse reactions (46.39%). 1307 recommendations were given to resolve 653 DRPs. Among 1307 recommendations given by the pharmacist, 47.52% recommendations were at the prescriber level, 29.99% at the drug level, 5.36% at the patient level and 17.14% other recommendations. 30.92% of 621 recommendations at the prescriber level were approved by the prescriber and 24.64% was not approved. Predictor factors which influenced physician acceptance towards the pharmacist's recommendation were patient's sex, haemodialysed or non-haemodialysed state, type of DRP, recommendation category and the pharmacist communication.

Conclusion DRPs are prevalent in CKD patients and may result in adverse consequences. Pharmacists' competencies to identify, prevent and resolve DRPs are vital to improve clinical outcomes in this fragile patient population.

PS-007 RETROSPECTIVE COHORT STUDY IN PATIENTS TREATED WITH ORAL LINEZOLID

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Background Linezolid is an antibiotic used to treat pneumonia and some infections of the skin or subcutaneous tissue.

Purpose To describe the cohort of patients receiving outpatient treatment with oral linezolid in a tertiary hospital.

Material and methods A retrospective study was conducted in patients referred to the outpatient pharmacy consultation (OPC) for treatment with linezolid on discharge from hospital from January 2015 to January 2016. Variables included: age, sex, prescriber service, dosage, indication, duration, microbiology, adverse reactions, interactions and whether any intervention was made. The information was collected through medical history (Diraya), Farmatools and drugs.

Results 16 patients were on oral linezolid (5 women, 11 men), median age 65 years (50–88). Clinical judgement: 7 diabetic foot, 3 osteoarticular infections, 2 wound dehiscence, 2 pressure ulcer, 1 bacteraemia (digestive focus) and 1 peritonitis (44% general surgery, 38% infectious diseases, 12% digestive and 6% traumatology). In 50% (8/16) of cases the treatment was conducted (microbiology tests previous prescription) and in 56% (9/16) was appropriate according to local guidelines. The indication less adjusted to the protocol was diabetic foot (2/7). Sequential therapy was 81% of cases and 54% came from linezolid iv. The mean duration of oral treatment was 10 days. A significant reductions in platelet count in 10/11 patients was detected with a mean decrease of 128.3 platelets/µL after treatment without requiring suspension. There was no analytical follow-up of 5 patients. There were 13 patients with more that 3 drugs as home treatment, 11 had interactions with linezolid, 54% being major interactions. 4 interventions were performed by the pharmacy which were accepted.

Conclusion Our study highlights the high risk of interactions, especially those considered 'major'. There seems to be an acceptable tolerance despite low analytical control of post-treatment by some prescribers so it is appropriate to insist on the pharmacotherapy follow-up of these patients.

PS-008 DEGREE OF COMPLIANCE WITH THE STANDARDS OF HIGH ALERT MEDICATIONS ESTABLISHED BY THE INSTITUTE FOR SAFE MEDICATION PRACTICES IN A SECONDARY HOSPITAL

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Background High alert medications are drugs that bear a heightened risk of causing significant patient harm when used in error. The Institute for Safe Medication Practices (ISMP) and other organisations, worried about safe medication practices, insist on specific procedures to reduce the risk of adverse events when these drugs are handled.

Purpose To assess the degree of compliance with the standards of high alert medications in different nursing units in a secondary hospital.

Material and methods This was an observational, descriptive, transversal study carried out in a secondary hospital. The items studied were:

- Knowledge of the list of high alert medications.
- Standardisation storage, preparation and administration.
- Number of limited presentations and concentrations of heparin, morphine and insulin, among others.
- Double checking practices in preparations and administrations.
- No storage of concentrated solutions.
- Protocols to prescribe and simplify processes.

- Standardisation infusion dosage, especially morphine, insulin, heparin and inotropic solutions.

Results 12 hospitalisation units were reviewed. Regarding the ISMP standards: all units had knowledge of the high alert medications list and they were prescribed using protocols; 7 had standardised storage, preparation and administration; 8 had established electronically maximum doses and automated alerts; 4 had limited the number of presentations and concentrations of heparin, 10 of morphine and 2 of insulin. Preparation and administration double-checking practices was not used. Every unit stored solutions of potassium chloride, 1 stored potassium phosphate and 7 sodium chloride. 8 used established protocols to simplify processes and so reduce dependence on memory. Finally, all had standardised infusion dosage, especially morphine solutions, insulin, heparin and inotropics used for adults, in a single concentration in at least 90% of cases.

Conclusion In general, hospitalisation units achieved most of the ISMP objectives about safe medication practices. However, further standards should be implemented in order to accomplish ISMP requirements, especially insisting on double-checking in high alert medication preparation and administration by nurses, and avoiding the storage of concentrated solutions.

No conflict of interest

PS-009 | **IMPACT OF SYRINGE TYPE ON PH VARIATION OF DRUG SOLUTIONS STORED FOR INTRAVENOUS CONTINUOUS INFUSION**

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Background In hospital, continuous intravenous drug administration to patients for 24 hours is common. In some wards, such as intensive care units, these infusions may be kept beyond 24 hours.

Purpose We aimed to assess pH variation of morphine 10 and 100 µg/mL and 10% dextrose solutions stored in three types of 50 mL polypropylene syringes for 72 hours.

Material and methods Three solutions: (A) 10 µg/mL morphine and (B) 100 µg/mL morphine in water for injection, and C) 10% dextrose were prepared and divided in triplicate in two types of syringes: (1) polypropylene syringes unprotected from light (UPLS) and (2) light shielded polypropylene syringes (LSS). LSS came from two different companies, manufacturer 1 (LSS-1) and manufacturer 2 (LSS-2). Syringes were stored in a climatic chamber (daylight, $30 \pm 2°C$, RH $65 \pm 5\%$) over the full duration of the study. The pH of solutions in UPLS, LSS-1 and LSS-2 was measured at T0, 24 hours and 72 hours. At each point time, the pH of each syringe was performed in triplicate.

Results The pH of the 10% dextrose solution varied from T0 to T72: UPLS, 4.05 ± 0.01 to 4.10 ± 0.20; LSS-1, 4.23 ± 0.08 to 6.12 ± 0.08; and LSS-2, 4.09 ± 0.02 to 4.14 ± 0.02 (p<0.05). The pH of 10 µg/mL morphine in water for injection varied from T0 to T72: UPLS, 4.02 ± 0.05 to 4.08 ± 0.02; LSS-1, 4.12 ± 0.04 to 4.82 ± 0.07; and LSS-2, 3.93 ± 0.05 to 3.98 ± 0.01 (p<0.05). The pH of 100 µg/mL morphine in water for injection varied from T0 to T72: UPLS, 3.90 ± 0.02 to 3.98 ± 0.05; LSS-1, 3.98 ± 0.04 to 5.56 ± 0.11; and LSS-2, 3.95 ± 0.01 to 3.99 ± 0.02 (p<0.05).

Conclusion The pH of identical drug solutions varied depending on the type of syringe in which they are stored. The pH values of solutions stored in LSS-1 were modified more than in UPLS and LSS-2. This phenomenon could be a serious problem in unbuffered solutions of drugs which are stable only in a defined range of pH, administered continuously over several days.

No conflict of interest

PS-010 | **EVALUATION OF A CLINICAL DECISION SUPPORT SYSTEM TO OPTIMISE CYTOTOXIC DRUG DOSING AND CONTINUOUS SURVEILLANCE IN OUTPATIENT CANCER PATIENTS WITH RENAL IMPAIRMENT**

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Background The incidence of renal impairment is increasing in cancer patients as patients are getting older and more aggressive treatments become available for this population. For those drugs in which renal excretion is an important determinant in elimination, dose adjustment is often required if renal function is impaired. 'CS rules' is a cognitive clinical decision support system (CDSS) designed to assist clinical pharmacists in making dosing adjustments for individual patients.

Purpose To optimise cytotoxic drug dosing in outpatient cancer patients with renal impairment.

Material and methods For a period of 6 months, a pilot was performed with the CDSS to optimise chemotherapy in patients with renal failure in the outpatient setting. Clinical rules were defined for 11 cytotoxic drugs used in the outpatient setting, for which dose reduction is required if renal function is impaired, according to the guidelines. The CDSS was run overnight and alerts were generated on all active electronic medication orders with chemotherapeutics using the most recent creatinine value. Rules were generated during the whole period that a chemotherapeutic agent was used, independently of doctor or pharmacy visits. Alerts were analysed by the pharmacist in the outpatient pharmacy of the hospital. If a dose reduction seemed necessary, the oncologist was contacted by the pharmacist and the necessity of a dose reduction or modification was discussed.

Results During the pilot period, the investigated chemotherapeutics were prescribed to 232 cancer patients. The 11 clinical rules generated alerts for 33 patients with impaired renal function. Overall, these alerts resulted in an intervention by the clinical pharmacist about dose reduction due to impaired renal function in 9.1% of patients.

Conclusion Identification of patients at risk helps the pharmacist and oncologist to optimise drug therapy in cancer patients with renal dysfunction in the outpatient setting. The 'impaired renal function' alerts resulted in valuable interventions by the pharmacist. This study showed that a CDSS can effectively be used in an outpatient pharmacy practice to select patients at risk of cytotoxic drug overdose due to renal impairment with continuous surveillance independently of new drug dispensing in the pharmacy or a doctor visit.

No conflict of interest

IDENTIFYING AND REPORTING MEDICATION ERRORS: LEARNING FROM OTHER COUNTRIES

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Background It is important to identify medication errors (MEs) in the healthcare system in order to be able to prevent them. Is there a possibility to combine forces and transfer strategies between countries?

Purpose Based on analyses of data in a defined medication error reporting system (MERS), strategies were shaped to reduce MEs. Further investigations looked for similarities in MEs from other countries to develop ways of transferring existing strategies between different healthcare systems.

Material and methods MEs were reported in an MERS from November 2014 to July 2016 in 4 (European) countries. The reported data were exported to Microsoft Excel and analysed for type and cause of error reported. The participating countries were compared, finding similarities. Existing strategies preventing MEs developed in one of the countries were discussed to outline possible ways to transfer them.

Results During the reporting period, 7107 MEs on every level were reported. The most frequent type of errors were reported in the areas of 'administration' and 'drug formulation', including preparation before application (7.6%). These were prevalent types of MEs in 3 of the 4 countries. Frequent problems were crushing or dividing of solid oral drug formulations, even modified release-systems. Mostly related drugs were modified release oral systems containing opioids, isosorbidemononitrate or metoprolol, mirtazapine in orally disintegrating tablets and proton pump inhibitors. In one of the countries a former analysis identified numerous reports with crushed or divided proton pump inhibitor tablets as well as crushed or divided modified release opioid drug formulations. Mostly there was 'lack of knowledge' as the leading cause of these errors, similar in 2 more countries. Therefore, there was a need to transfer established strategies to these countries. In these countries, a poster was made about the risks arising from crushing and dividing to raise awareness among healthcare professionals and patients. This poster has now been translated into English and can be easily transferred to project partners.

Conclusion Results from this analysis has enabled pharmacists to recognise similarities between countries. Based on these, opportunities were identified to transfer strategies between countries. Furthermore, it is essential to look for additional areas to compare and analyse in order to outline 'best practices' as transfer strategies between countries.

No conflict of interest

SURFACE CONTAMINATION IN A TEACHING HOSPITAL: A 6 YEAR PERSPECTIVE

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Background Many cross sectional studies have been published about surface contamination with hazardous drugs in healthcare settings.

Purpose The aim was to review the surface contamination of three hazardous drugs within a teaching hospital and comment on the different strategies put in place over the years.

Material and methods This was a descriptive, retrospective, longitudinal study. The study was conducted in a 500 bed mother–child teaching hospital. Closed system transfer devices are not used. 12 standardised sampling sites, 6 in pharmacy areas and 6 in outpatient patient care areas, were selected and collected every year. 12 additional points of measure were identified for 2 inpatient care wards that were sampled in May 2016. For each sample, a standardised surface of about 600 cm^2 was sampled with one wipe and quantified by ultra performance liquid chromatography-tandem mass spectrometry (UPLC-MS-MS).

Results A total of 72 samples (eg, 36 in pharmacy and 36 in outpatient care areas) were obtained between 2010 and 2016 for 216 analyses (3 drugs/sample tested). The proportion of positive samples was 50% (36/72) for cyclophosphamide, 32% (23/72) for ifosfamide and 19% (14/72) for methotrexate. There were a similar proportion of positive results in the pharmacy (35% (38/108)) than in the outpatient care areas (32% (35/108)). Cyclophosphamide concentrations varied from undetectable to 400 pg/cm^2, from undetectable to 830 pg/cm^2 for ifosfamide and from undetectable to 660 pg/cm^2 for methotrexate. The median value of cyclophosphamide was 16.0 pg/cm^2 in 2010, 3.0 in 2012, 0.0 in 2013, 0.0 in 2014, 0.0 in 2015 and 1.7 in 2016. The 24 additional samples obtained in two patient care wards were all negative. Numerous factors may explain this low and reduced contamination, including targeted training, increased awareness, improved cleaning strategies and centralised priming of IV tubing in pharmacy hoods.

Conclusion This study provides a longitudinal perspective of the surface contamination of hazardous drugs in a teaching mother–child hospital. Every hospital should review its annual scorecard of contamination with a longitudinal perspective to minimise drug contamination. It is possible to contain surface contamination with hazardous drugs with different strategies.

No conflict of interest

MULTICENTRE STUDY OF ENVIRONMENTAL CONTAMINATION WITH CYCLOPHOSPHAMIDE, IFOSFAMIDE AND METHOTREXATE IN 66 CANADIAN HOSPITALS: A 2016 FOLLOW-UP STUDY

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Background Oncology workers are occupationally exposed to antineoplastic drugs. This exposure can induce adverse health effects. In order to reduce their exposure, contamination on surfaces should be kept as low as possible.

Purpose To monitor environmental contamination with cyclophosphamide, ifosfamide and methotrexate in oncology pharmacy and patient care areas in Canadian hospitals. To describe the impact of some factors that may limit contamination.

Material and methods This was a descriptive study. 12 standardised sites were sampled in each participating centre (6 in the pharmacy and 6 in patient care areas). Samples were analysed for the presence of cyclophosphamide, ifosfamide and methotrexate by ultra performance liquid chromatography-tandem mass spectrometry technology. Descriptive statistical analyses were done and results were compared with a Kolmogorov–Smirnov test for independent samples.

Results In 2016, 66 hospitals from Canada participated in this study (66/202, 33%). A total of 752 samples were quantified. Overall, 43% (326/752) of the samples were positive for cyclophosphamide, 13% (99/752) for ifosfamide and 7% (52/752) for methotrexate. The 75th percentile value of cyclophosphamide surface concentration was 6.8 pg/cm^2. For ifosfamide and methotrexate, they were lower than the LOD. The most frequently contaminated sites were the arm rest, the floor in front of the hood, the front grille of the hood and on the counter used for priming. Centres who prepared more antineoplastic drugs per year ($p < 0.0001$), centres who used more cyclophosphamide per year ($p < 0.0001$) and centres who primed antineoplastic IV tubing in patient care unit by nurses ($p = 0.004$) showed significantly higher surface contamination. Over the years, we observed stabilisation in surface contamination.

Conclusion Environmental surveillance is one part of a comprehensive approach for minimising hazardous exposures in healthcare. By repeating this multicentre study annually and systematically, it increases all stakeholders' awareness about the level of traces of hazardous drugs and the potential strategies that can minimise contamination. This study highlights a low level of contamination of three hazardous drugs among 66 Canadian hospitals. Regular environmental monitoring is a good practice to maintain contamination as low as reasonably achievable. As long as no health based limit is known, we are encouraging centres to monitor their contamination.

No conflict of interest

PS-014 | **AN OBSERVATIONAL REVIEW AND AUDIT OF THE TREATMENT OF HYPOGLYCAEMIC EVENTS IN A UNIVERSITY TEACHING HOSPITAL**

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Background Hypoglycaemic events may have grave implications for patients with diabetes mellitus, and is defined as a blood glucose (BG) level of <4 mmol/L. Anecdotally, it has been reported that events were not treated as per evidence base in the hospital setting.

Purpose This study aimed to conduct a baseline audit and review of the treatment of hypoglycaemic events among diabetic inpatients in a university teaching hospital. Quality improvement methods and a reaudit were also planned.

Material and methods Baseline adherence to the hypoglycaemic hospital protocol was determined in an audit undertaken on 148 retrospective hypoglycaemic events, by clinical pharmacists, over a 5 week period. Data were analysed and quality improvement initiatives were implemented by the pharmacy department in conjunction with the endocrinology department. The efforts employed included the development and launch of a new hypoglycaemia protocol, the provision of educational material in the form of a quiz, a medication safety alert, and informal and formal education. A reaudit was undertaken over a 5 week period on 151 hypoglycaemic events.

Results 72.9% (n=108) of hypoglycaemic events in the baseline audit were treated with short acting carbohydrate, which increased to 81.4% (n=123) in the reaudit (p>0.05). Lucozade was the predominant short acting carbohydrate used to treat hypoglycaemic events throughout the study. Of those events treated with Lucozade, 33.3% were treated with the recommended amount in the baseline audit, increasing to 70.6% in the reaudit (p<0.05). There was limited compliance with retesting of BG within 15 min in the baseline audit (repeated within 15 min in 9.5%; within 30 min in 24.8%). The time to retest was significantly reduced (p<0.05) in the reaudit (BG repeated within 15 min in 30.5%; within 30 min in 63.5% of events).

Conclusion We established the baseline incidence of hypoglycaemic events. With the provision of a clear, colour coded evidence based hypoglycaemia protocol and a multifaceted educational drive, it was possible to improve the management of these hypoglycaemic events to improve patient safety.

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No conflict of interest

PS-015 | **THE DEVELOPMENT OF A VIDEO TO DEMONSTRATE EXTEMPORANEOUS EYE DROP PREPARATION FOR USE BY COMMUNITY PHARMACISTS**

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Background The hospital is a tertiary ophthalmology referral centre. Extemporaneous eye drops are required to treat acute ophthalmic conditions when a commercial alternative is not available. Due to the specialised nature of these ophthalmic preparations, the critical need of the patient, short shelf-life and the geographical dispersion of the patients, often extemporaneous preparation is the only option. The ophthalmology pharmacist provides community pharmacies with aseptic preparation guidelines and eye drop protocols for patients on discharge. Additionally, the pharmacist fields calls in relation to the preparation of these drops. Anecdotally, community pharmacists find the preparation of eye drops a complicated process, leading to fear of undertaking a procedure not routinely practiced.

Purpose To aid the discharge process for patients on extemporaneous eye drops.

Material and methods A survey of 13 community pharmacists who had been asked to prepare extemporaneous eye drops over 3 months was undertaken to determine if the development of a video was a helpful initiative. Pharmacy stakeholders met to agree the inclusion material. The 'biomedical imaging department', agreed to film the video. A pharmacy technician and the ophthalmology pharmacist researched the process and split the process into individual steps. A story

board was drafted and presented to clinical photography. The video was reviewed by pharmacy management and further amended. A link to the video was emailed to community pharmacies as was required. The video was also hosted on the website of a national pharmacy professional development organisation.

Results All 13 community pharmacists surveyed felt that a video demonstrating extemporaneous preparation of eye drops would be a useful reference tool. The video was developed for dissemination to community pharmacists.

Conclusion It is envisioned that the development of this innovative tool will aid community pharmacists when extemporaneous eye drops are required to treat acute ophthalmological conditions. The video was developed to complement existing written material provided. It will be disseminated to community pharmacies via an email link and has been hosted on national pharmacist education websites. There is also potential for future dissemination on video sharing sites.

PS-016 | **MEDICATION SAFETY IN NEONATAL CARE: ANALYSIS OF HIGH ALERT MEDICATIONS**

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Background Medication errors are common in neonatal units. Errors with potential to cause harm are more likely to occur here due to vulnerability of this population and the complexity of calculations for prescribing and preparing their medications. Errors with high alert medications (HAM) in neonatal units have been reported. These errors bear a heightened risk of causing significant patient harm. The incidence of errors is variable among studies. Having knowledge of your own HAM utilisation rate could help organisations to prioritise safe medication practices.

Purpose To analyse the use of HAM in a neonatal unit as a tool to prioritise patient safety practices.

Material and methods An observational retrospective study was conducted in 2015 (12 months) in the neonatal unit of a university tertiary hospital. Recorded data of admissions, hospital stays and HAM consumption were analysed. The classification of HAM was according to the ISMP list and high risk drug list adapted to the neonatal or paediatric population (Cotrina *et al*, 2013).

Results During the study period 1470 admissions and 21 611 stays were registered (14.7 stays per patient). A total of 311 different drugs were used, 23.2% (n=72) were HAM, 11 of these HAM (15.3%) being exclusively on the paediatrics list. 214 607 units were consumed, 11% were HAM (n=23 550). The main HAM detected were: antithrombotics/anticoagulants/heparins (20%), sterile water 500 mL (19%), acetaminophen (13%), general anaesthetics (11%, mainly fentanyl), antibiotics (10%, mainly vancomycin), adrenergic agonists (7%), adrenergic antagonists (3%), opioids (3%), hypertonic glucose (3%) and antiepileptic drugs (3%). The remaining 8% corresponded to: antihypertensives, neuromuscular blocking agents, inotropics, sedatives, electrolytes, antiarrhythmics and insulin. All

of these drugs are frequently involved in published medication errors. General safe practices were already implemented in our hospital: protocols, training sessions and courses, summary charts for drug preparation, a dose calculator and a patient safety multidisciplinary group. Specific additional safe practices should be implemented for the HAM most frequently used.

Conclusion Specific strategies in the safe use of antithrombotics, anticoagulants and heparins, sterile water, acetaminophen, fentanyl and vancomycin must be implemented. This is critical in neonatal units, where the use of these HAM is more common and the risk of harm is higher.

PS-017 | **CORRECTIVE ACTIONS AFTER PARTICIPATING IN THE STUDY MULTICENTRE WATCHING FOR DETECTION OF MEDICATION ERRORS (EMOPEM)**

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Background In 2014, we participated in the study EMOPEM through observation of drug administration errors.

Purpose To describe the corrective measures implemented after participating in the EMOPEM project.

Material and methods The study was conducted for a week, including holidays and weekdays and three nursing shifts. 4 hospitalisation floors representative of a general hospital were selected. After entering the data into the national database we obtained the following results: 306 observations, 201 (65.7%) with errors (considering time and patient information) and 24.51% regardless of patient information. The distribution of errors regardless of patient information was: omission (38%), error time (16%), incorrect speed of administration (12%), wrong dose (excess) (8%), failure to register (8%), erroneous preparation plant (8%) and others (10%). These results were presented in the functional unit risk.

Results The following measures were implemented:

change in the management and description of the active ingredients in drugs, in addition to describing possible routes of drug administration. A multidisciplinary working group on drug safety was established, consisting of nurses, doctors, quality unit and the pharmacy. This group has generated a guide-safe medication administration, including updates on antibiotic tables, annexes published on parenteral administration or subcutaneous administration, regulations for high risk medications and proper administration of low molecular weight heparins. Within the newsletter, edited by the pharmacy department, a section on safety and prevention of medication errors is included. The electronic health record programme now has a portal information pharmacy services, including programme therapeutic equivalents, and a part with information regarding medication administration accessible to all medical personnel. Regarding the errors of omission detected, it has been found that there were no differences in turn and several therapeutic groups were affected, whose causality is because nurses have fixed computers, but distant patients and sites of administration, so a pilot on the use of tablets has been suggested.

Conclusion The EMOPEM, as indicated by its objectives, has served to obtain an error rate, to identify and implement corrective measures to help reduce medication administration errors. The pharmacist must be proactive and lead this process.

No conflict of interest

PS-019   WITHDRAWN

PS-018   **STARTING A PERIODICAL MEDICATION REVIEW IN A LONG TERM CARE UNIT: BENEFIT OF PHYSICIAN/ PHARMACIST ASSOCIATION**

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Background To improve medicinal treatment management, we decided to review prescriptions in a long term care unit (LTCU), because elderly patients are at higher risk of adverse drugs events. Firstly, they benefit from entrance medicines reconciliation (MedRec) but this can be very difficult with poor efficiency. Indeed, for these patients, questioning is difficult and their pharmacist or general practitioner are not informative because multiple hospitalisations results in loss of medical information. Secondly, it was decided to start periodical medication reviews (MedRev) in association with a physician/pharmacist to evaluate the efficiency of therapeutic medications.

Purpose The aim of this study was to evaluate the efficiency of this new activity and physician acceptation to improve appreciation of MedRev.

Material and methods Only patients in the LTCU were selected; MedRev is performed quarterly for each department. The LTCU covers 4 departments. Recorded information was ATC class, and type and number of pharmaceutical interventions (PI). Three tools were used: PAPA Guide, Laroche and STOPP/START lists.

Results 2 departments benefited from this MedRev (34 patients). The average number of PI per patient was 1.3, with 47% acceptance rate. PI performed concerned mainly drugs of N ATC class (64%, nervous system medicines) and then drugs of A ATC class (28%, digestive system medicines). These PI were dose reduction in 58% and discontinuation in 38%. Whereas 60% of PI offering dose reduction were accepted, only 20% of PI regarding discontinuation were accepted. For medicines ATC A, 67% of the IP were accepted and only 41% of IP regarding ATC N drugs were followed.

Conclusion It seems necessary to continue this work, which allows the creation of close links with doctors to discuss and optimise each prescription. High level of physician approbation shows the interest in the MedRev. It also helps pharmacists to improve their impact as members of the patient care team.

No conflict of interest

PS-020 **INTRODUCTION OF A LONG STAY DRUG CHART IN POST-ACUTE CARE SERVICES: A PRE- AND POST-IMPLEMENTATION STUDY**

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Background Patients in post acute care services (PACS) usually require multiple transcriptions of their drug chart. The general drug chart which is used for all acute care patients allows for 14 days of administration of a prescribed medication. The development of a long stay drug chart (LSDC) to accommodate a greater number of days of administration was proposed for usage in the PACS.

Purpose To introduce and evaluate a LSDC in the PACS.

Material and methods A 1 month prospective pre-implementation baseline study was conducted by the clinical pharmacist, using a data collection form, to establish

a. the number of general drug charts in use in the PACS,
b. the time taken to review these charts and
c. the number of transcription errors noted.

A pilot LSDC was developed and introduced, in which the number of days of administration was extended from 14 to 37. A 1 month prospective study was conducted 6 weeks after the introduction of the LSDC, to establish its impact on (a), (b) and (c) above.

Results The results from the pre- and post-implementation study included:

(1) Number of fully transcribed drug charts in use was reduced by 42%. (2) The average time taken by the clinical pharmacist to review each drug chart was very similar between the two groups (6 min). (3) Number of transcription errors noted was numerically less (10 vs 14) in the post-implementation group but the study was not powered to detect a statistically significant difference.

Conclusion The feedback from medical and nursing staff was very positive. As expected, the number of drug charts in use was reduced and there was a numerical reduction in transcription errors. As there were fewer drug charts to review, clinical pharmacist time was saved. Despite a slight increase in associated cost, the universal benefits of the LSDC will lead to roll out throughout the PACS.

No conflict of interest

PS-021 **NATALIZUMAB DISCONTINUATION IN PATIENTS DIAGNOSED WITH RELAPSING REMITTING MULTIPLE SCLEROSIS**

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Background Natalizumab is effective in relapsing remitting multiple sclerosis (RRMS) treatment, although it is associated with serious adverse events that may require therapy discontinuation.

Purpose To assess the reasons for discontinuing natalizumab treatment in patients diagnosed with RRMS, and to estimate the length of these treatments.

Material and methods An observational retrospective study was conducted from December 2007 to June 2016. Patients who received at least one dose of natalizumab in our hospital were included. Collected data, obtained from medical records, were: sex, age, Expanded Disability Status Scale (EDSS), reasons for treatment discontinuation and treatment duration. When natalizumab was discontinued because of the risk of developing progressive multifocal leukoencephalopathy (PML), John Cunningham virus antibody index value was recorded at baseline, after 2 years of therapy and when natalizumab was discontinued. This index classified results as positive or negative until 2012, when the reference laboratory set the numeric value (≤ 0.9, $>0.9 \leq 0.5$, >1.5).

Results 54 patients with EDSS ≤ 5 received at least 1 natalizumab dose. 7/54 patients without follow-up in our hospital were excluded. On completion of the study, 19/47 patients (average age 31.3 ± 8.6 years, 14/19 women) discontinued natalizumab. Median EDSS at the start of treatment was 3.2 (1.9–4.0). Median EDSS when treatment was discontinued was 3.3 (1.3–5.0). Reasons for natalizumab discontinuation were:

- Risk of developing PML (9/19). Index value at baseline: 4/9 patients positive, 2/9 negative, 3/9 not available. Index value 2 years after starting natalizumab: 5/9 patients positive, 1/9 negative, 3/9 not available. Index value when natalizumab was discontinued: 9/9 patients showed positive status (≤ 0.9, 1/9; $>0.9 \leq 1.5$, 1/9; >1.5, 6/9; 1/9 no numerical value recorded). There was no PML.
- Disease progression to secondary progressive multiple sclerosis (3/19).
- Anti-natalizumab antibodies (5/19). 4/5 patients reported adverse events: 3/4 infusion reactions, 1/4 paradoxical reaction to natalizumab.
- Start of breast cancer chemotherapy (1/19).
- Patient´s requirement (1/19).

Average natalizumab treatment duration was 2.3 ± 1.6 years. 10/19 patients received natalizumab for over 2 years.

Conclusion Despite the fact that there was no PML in our hospital, the main reason for discontinuing natalizumab was the increased risk of developing PML, which increased with treatment duration. Adverse events requiring natalizumab discontinuation only appeared in patients with anti-natalizumab antibodies. Average duration of treatment was slightly over 2 years.

No conflict of interest

PS-022 **COMPLEX AUTOMATED MEDICATION SYSTEMS REDUCE MEDICATION ADMINISTRATION ERROR RATES IN AN ACUTE MEDICAL WARD**

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Background Medication errors have received extensive attention in recent decades and are of significant concern to healthcare organisations globally. Medication errors occur frequently, and adverse events associated with medications are one of the largest causes of harm to hospitalised patients. Reviews have suggested that up to 50% of the adverse events

in the medication process may be preventable. Thus the medication process is an important means to improve safety.

Purpose The objective of this study was to evaluate the effectiveness of two automated medication systems in reducing the medication administration error rate in comparison with current practice.

Material and methods This was a controlled before and after study with follow-up after 7 and 14 months. The study was conducted in two acute medical hospital wards. Two automated medication systems were tested: (1) automated dispensing cabinet, automated dispensing and barcode medication administration; (2) non-patient specific automated dispensing and barcode medication administration. The occurrence of administration errors was observed in three 3 week periods. The error rates were calculated by dividing the number of doses with one or more errors with the number of observed doses (opportunities for errors). Logistic regression was used to assess changes in error rates after implementation of the automated medication systems.

Results A total of 269 doses with one or more errors were identified out of 3216 doses administered. The complex automated medication system effectively reduced the overall risk of administration errors in the intervention ward (OR 0.53, 95% CI 0.27–0.90), and the procedural error rate was also significantly reduced (OR 0.44, 95% CI 0.126–0.94). The non-patient specific automated medication system effectively reduced the clinical error rate in the intervention ward (OR 0.38; 95% CI 0.15–0.96).

Conclusion The implemented automated medication systems reduced the error rate in the medication administration process and thus improved quality and patient safety.

No conflict of interest

PS-023 | WITHDRAWN

PS-024 | **PHARMACEUTICAL RECOMMENDATIONS IN TRAUMATOLOGY DEPARTMENT**

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Background Detection of drug related problems (DRP) and medication reconciliation (MR) are essential to decrease the harmful effects in patients. If any DRP is found during admission, it is important to notify not only the professional responsible but also the general practitioner (GP).

Purpose To identify and notify DRP and discrepancies between chronic treatment and hospital medications when patients are admitted to the traumatology department (TD) in a hospital with 400 beds.

Material and methods Patients over the age of 65 years admitted to the TD with 5 or more chronic medications were included. Pharmacists reviewed the treatment 24 hours after hospitalisation, to perform MR, taking into consideration the patient's interview and clinical history. Moreover, the patient's medical prescription and analytical parameters were reviewed every day. If any DRP or any change in medication was found during admission, patients and their GPs were informed.

Results Between November 2015 and July 2016, 241 pharmaceutical recommendations (PR) were registered, corresponding to 230 patients. 60% were accepted, 13.4% were justified discrepancies and 26.6% were not accepted. From the 241 PR, 80.8% were discrepancies between usual medication and medication on hospitalisation and 19.2% were DRP (inappropriate medications in patients with Parkinson's disease and elderly patients, dose adjustment in patients with renal insufficiency, interactions, sequential therapy and adequacy of treatment). From the MR discrepancies, more than half (52.2%) were related to omission of medication, 29.6% were discrepancies

found with the dose prescribed and 18.6% were related to medication prescribed at admission time that patients were not taking any more. During this period of time, 18 GPs were informed about detected DRP and changes in medication during hospital admission.

Conclusion Pharmacists integration in multidisciplinary teams can help to detect and resolve discrepancies between chronic treatment and hospital medications and minimise DRP. It is essential to update GPs if any discrepancies or changes in medication have been found during healthcare transition.

No conflict of interest

PS-025 | **PRESCRIPTION OF PROTON PUMP INHIBITORS IN THE ELDERLY: DO PHYSICIANS HAVE A PROPER RISK PERCEPTION?**

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Background Many recent publications highlight the risk of side effects with long term prescriptions of proton pump inhibitors (PPIs).

Purpose We wished to know physicians' perceptions of this risk in our rehabilitation, recuperative and long term care establishment. This study was carried out within our evaluation of professional practices in the elderly.

Material and methods We analysed on a given day all the prescriptions for patients hospitalised over 65 years of age and treated with oral PPIs. For each prescription, a survey was completed during a meeting between the pharmacist auditor and the physician (time of taking, associated treatments, indications, revaluation, duration of prescription, etc). Physicians then completed a questionnaire on their risk perception of such therapeutic class (deprescribing strategy, rebound, short and long term side effects).

Results 58 patients out of 130 over 65 years were treated with PPIs (45%). Only 28% were prescribed the morning (marketing authorisation (MA)) recommendations. 33% of prescriptions were in the MA indications whereas physicians believed they had prescribed in the context of the MA in 56% of patients. The off-label indications were post surgical stress (28%) and antiplatelet prescriptions without an NSAID association (24%). In 17% of cases PPIs indications were unknown by physicians. 29% of prescriptions were initiated in our establishment, 72% were not revaluated during the stay and the end of treatment was scheduled in only 29% of cases. Among the 32 physicians interviewed, 94% perceived PPIs as a treatment of low or moderate risk. Only 25% had a deprescribing strategy and 55% believed that rebound did not exist. Physicians correctly discerned the short term side effects but few perceived the long term effects: only 44% quoted the risk of vitamin B12 deficiency, 47% hypomagnesaemia, 33% osteoporosis/bone fractures and 41% infections.

Conclusion According to the literature, PPIs in post surgical stress have a beneficial effect in intensive care. Recommendations for this off-label indication were missing. 75% of prescriptions were reconducted and were not revaluated during the hospital stay because of poor perception of the long term side effects. Our results confirm the necessity to highlight to physicians the need for revaluation and PPIs risks. Such information can be relayed by hospital pharmacists.

No conflict of interest

PS-026 | **DEVELOPING A RULE TO REDUCE THE RISK OF WRONG DOSE ERRORS WITH INJECTABLE MEDICINES IN PAEDIATRICS**

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Background A 10-fold error occurred in our hospital when multiple vials were used to prepare a single dose of an injectable medicine. We aimed to prevent future similar errors and proposed and tested a '1 vial rule'.

Purpose To compare paediatric injectable drug doses with available products; to identify doses which could be administered using a single ampoule or vial; and to determine the feasibility of a '1 vial rule'.

Material and methods This study did not require ethics approval. Electronic prescriptions were screened on 1 day in January 2015. Each prescribed dose of injectable medicines was recorded. The number of vials needed to prepare the dose was calculated. For each dose we determined whether a single vial could be used. For all options, we calculated the excess drug in the vial. We determined the extent to which a '1 vial rule' could apply.

Results 169 prescriptions for 48 different injectable medicines were observed. 70% (119/169) of doses could be administered using the smallest vial available. 50 doses needed multiple vials, including 20 doses requiring 3 or more vials. Using larger vial sizes, 95% (160/69) of doses could be administered using a single vial. For 32/50 of doses, the excess drug available was unchanged. For 8/50 prescriptions, only 1 vial size of the drug was available.

For 10 prescriptions for 6 drugs using larger vials resulted in greater excess of drug being available than with smaller vials, increasing the potential for overdose.

Conclusion Most injectable doses prescribed could be administered using a single vial if the vial size nearest the dose was used. A '1 vial' rule applies to 95% of paediatric injectable doses. Using more than 1 vial alerts staff that correct doses may be exceeded, prompting staff to double check prescriptions and dose or volume calculations. The rule has been successfully accepted and promoted across our paediatric unit as an error prevention strategy.

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PS-027 | **AVAILABILITY OF DRUG SAMPLES IN OUTPATIENT CLINICS: OPPORTUNITIES AND RISKS**

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Background The Food and Drugs Act (FDA) does not allow direct consumer advertising for prescription drugs. At the hospital, distribution of drug samples is prohibited for

hospitalised patients but is tolerated for outpatient clinics. Distribution of drug sample by physicians may compromise the optimal drug use process in hospitals and the community.

Purpose The objective of this study was to estimate the number of drug samples available in outpatient clinics in a teaching hospital in 2016 and to compare these numbers with 2007, 2009 and 2012.

Material and methods This was a cross sectional observational study conducted in a 500 bed teaching hospital. The inventory was conducted by 2 research assistants during 2 weeks each year through unannounced visits. The total number of units (dispensed format/drug) and doses of drug samples were calculated in 2007, 2009, 2012 and 2016. We calculated a ratio of units of drug samples per patient visits to estimate the potential patient exposure.

Results A total of 78 941, 74 972, 91 000 and 93 881 doses were found, respectively, in 2007, 2009, 2012 and 2016. Drug samples were found in 11 locations in 2016 out of 15 storage areas. The ratio of per patient visit was, respectively, 0.40, 0.38, 0.41 and 0.40. A total of 75% of doses (70 264/93 881) were not listed on the hospital drug formulary and 6% (5298/93881) had expired.

Conclusion The ratio of doses of drug samples per patient visit has remained stable over the past 10 years; however, the total number of doses of drug samples reached a peak in 2016 with 93 881 doses. While we believe the majority of drug samples do not contribute to optimal drug use, it is difficult to proscribe their presence in a large healthcare facility where numerous prescribers and pharmaceutical representatives walk in. Drug samples are quite prevalent in hospitals. Pharmacists and all stakeholders should be aware of their presence when they treat a patient and complete medication reconciliation.

No conflict of interest

PS-028 | **CONSOLIDATION OF DRUG DATA SHEETS TO DECREASE ELECTRONIC PRESCRIPTION ERRORS**

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Background The development of electronic prescriptions secures patient medication care in hospital. However, software can also lead to medication errors, for example when the drug data sheet is misconfigured.[1]

Purpose To correct configuration errors related to prescription and distribution parameters in prescription software, in order to obtain a more accurate drug database, improve drug information and decrease the number of prescription errors.

Material and methods 3 pharmacists and 2 pharmacy residents developed a monthly checklist to consolidate the key data regarding drugs which were available in our hospital. Between June and October 2016, all of the data sheets corresponding to these drugs were extracted monthly and then analysed. Configuration errors were identified, quantified and corrected in prescription software (Orbisv8.4, AGFA).

Results During the initial set up, 25 checkboxes and 15 path fields were available on 7 tabs. Using data mining, the main parameters of prescription (5 path fields) and distribution (5 path fields) were first studied. On average, 2073 data sheets per month were extracted. Regarding prescription parameters,

1641 of 2125 data sheets (77.2%) included at least 1 error in June. This rate decreased to 13.4% in October (270/2021). The rates of data sheets with at least 1 errors were, respectively, in June and October: 72.3% (1536/2125) and 9.6% (194/2021) for the pharmacotherapeutic groups, 8.4% (179/2125) and 3.4% (69/2021) for the pharmaceutical forms, 4.8% (102/2125) and 0.89% (18/2021) for administration routes, and 3.8% (80/2125) and 0.15% (3/2021) for prescription units. In June and October, 84.1% (1787/2125) and 2.28% (46/2021) of data sheets, respectively, included at least 1 error of distribution: respectively, 74.4% (1581/2125) and 0.30% (6/2021) for the minimum unit of distribution, 18.7% (397/2125) and 0.0% for the global order mode, 4.1% (87/2125) and 2.1% (42/2021) for the packaging, 3.8% (80/2125) and 0.15% (3/2021) for the distribution unit, and 2.4% (50/2125) and 0.0% for the restocking.

Conclusion Updating data have led to a more accurate drug database for prescription software. Enlargement of the method to other criteria (drug status, colour of the wording according to the class, etc) will improve drug information. This work should also decrease the number of medication errors in our hospital.

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No conflict of interest

PS-029 | **FEASIBILITY OF UTILISATION AND PATIENT SATISFACTION WITH A NATIONWIDE STANDARDISED ELECTRONIC MEDICATION PLAN**

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Background During patient admission and discharge from hospital, the loss of information about patients' medications implies a challenge for patients and healthcare providers. Taking the patient's drug history in a face to face interview is routinely done in hospital but more reliable sources, such as standardised medication plans, are necessary to improve medication and patient safety.

Purpose The innovative, nationwide, standardised electronic medication plan was evaluated in a pilot project on feasibility and usefulness for 600 patients. Moreover, utilisation of the e-medication plan for 6 months after discharge by primary physicians and local pharmacies was evaluated, and patients' and healthcare providers' satisfaction.

Material and methods Patients were recruited according to the study plan in 5 different hospitals. The e-medication plans were compiled in an online portal especially set up for the project. They were used for medication reconciliation in cooperation with the attending physicians and printed when patients were discharged. Concomitantly, hospital pharmacists counselled patients and explained the medication plan to them. Over a period of 6 months, the e-medication plans were updated on the internet platform by the local pharmacists and/or general practitioners, and each new version was printed and handed over to the patient. Patients were interviewed 2 weeks and 6 months after hospital discharge, and local pharmacists and physicians 6 months after discharge by

a written questionnaire concerning the feasibility and satisfaction with the e-medication plan.

Results An interim analysis included interviews of 387 patients, 128 pharmacists and 55 general practitioners. The patient interviews 2 weeks after hospital discharge indicated that 97% of patients were satisfied with the content and comprehensibility of the medication plan. A broad majority of patients stated having gained new information on indication (65%) or proper administration of their medicines (76%). Pharmacists and physicians were mostly satisfied with this new tool to facilitate communication between pharmacists, doctors and patients.

Conclusion Utilisation of the standardised e-medication plan was feasible in the inpatient and outpatient setting. Patients acknowledged the useful design and content of the medication plan and had better understanding of their medication. Healthcare providers acknowledged the availability of comprehensive information about the patients' medication.

No conflict of interest

PS-030 | **IMPACT OF ELECTRONIC PRESCRIBING ON THE QUALITY AND SAFETY OF CHEMOTHERAPY PRESCRIBING IN ONCOLOGY AND HAEMATOLOGY**

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Background In July 2015, the electronic software CATO was introduced for chemotherapy prescribing. Before CATO implementation, chemotherapy prescriptions were handwritten on a designated form.

Purpose To determine the impact of electronic prescribing by comparing the rate of prescribing errors and omissions using handwritten versus electronic prescriptions, and to compare the clinical significance of errors and omissions for both prescribing methods.

Material and methods A data collection form was designed based on chemotherapy prescription requirements detailed by the National Cancer Control Programme (NCCP) in Ireland. Omissions and errors were defined as the absence or incorrect recording of these requirements. Data collection was completed by 4 pharmacists. Pharmacists categorised prescription errors/omissions as potentially clinically significant or not. This was not graded for this analysis.

A pilot (n=30) was completed by all data collectors to ensure consistent data collection. Only parenteral oncology/haematology prescriptions were included. Data were collected in two phases. Phase 1 was a retrospective review of handwritten chemotherapy prescriptions identified by random systematic sampling. Phase 2 was a prospective analysis of electronic prescriptions. A sample size with 60% population proportion was chosen.

Results 153 handwritten prescriptions and 153 electronic prescriptions were analysed. 53% reduction in prescribing errors was found (p<0.05). At least 1 error was found in 29% of handwritten prescriptions (range 1–4) compared with 14% of electronic prescriptions (range 1–2). The mean number of omissions found per handwritten prescription was 3 (range 1–6) compared with 0 for electronic prescriptions (range 0–1) (p <0.05). Electronic prescribing reduced the incidence of errors/omissions considered potentially clinically significant from

17% to 6% (p <0.05). Examples of these included incorrect doses and chemotherapy or supportive care omissions. Common errors encountered with handwritten prescriptions were incorrect body surface area and cycle number. Common errors associated with electronic prescriptions were incorrect dose reductions and incorrect date of treatment.

Conclusion Introduction of CATO prescribing has significantly reduced prescribing errors. Potentially clinically significant errors and omissions have also greatly reduced. These data, although subjective, suggest that the quality and safety of chemotherapy prescribing has greatly improved. Continued auditing of prescribing errors and omissions is imperative to further improve these results.

No conflict of interest

PS-031 | **PHARMACEUTICAL INTERVENTIONS PERFORMED IN A SHORT STAY EMERGENCY SERVICE**

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Background One of the objectives of the Health Department of Catalonia (Spain) is the clinical review of medications in chronic complex patients (CCP) and patients with advanced disease (PAD). The reconciliation and validation of treatments to detect and prevent drug related problems (DRPs) in a short stay emergency service (SSES) is among the functions of the hospital pharmacist.

Purpose To describe the pharmaceutical interventions (PI) implemented in an SSES and their degree of acceptance by the physician, and to analyse PI according to the type of patient (CCP, PAD and others).

Material and methods A retrospective, descriptive, observational study of data retrieved from January to August 2016 was conducted. Interventions performed by a pharmacist in SSES (20 beds) from Monday to Friday were recorded and communicated to the responsible prescriber. Data collected: class of patient, type of PI and acceptance of the recommendation by the prescriber.

Results A total of 344 PI in 248 patients were registered: 14 PI in 8 PAD, 95 in 66 CCP and 235 in 174 others. The degree of acceptance of PI were: 79.9% accepted, 6.7% rejected and 13.4% not evaluated due to the discharge of the patient before resolution of the PI. The PI most frequently performed were: 36.6% detection of omission of chronic treatments (65.9% accepted, 7.9% rejected, 26.2% not evaluated), 20.1% therapeutic equivalent switching (98.6% accepted, 1.4% rejected), 16.3% safety monitoring recommendations (96.4% accepted, 3.6% rejected) and 7.3% dosage adjustment (72% accepted, 16% rejected, 12% not evaluated). The most frequent PI in PAD were 35.7% therapeutic equivalent switching and 28.6% detection of omission of chronic treatments, while for CCP the most frequent PI were 47.4% detection of omission of chronic treatments, 14.7% safety monitoring recommendations, 7.4% renal dose adjustment and 7.4% therapeutic equivalent switching. For other patients, 32.8% were detection of omission of chronic treatment, 24.3% therapeutic equivalent switching and 17.4% safety monitoring recommendations.

Conclusion Detection of omission of chronic treatments was the most frequent PI recorded. The degree of acceptance of the PI by the prescriber was high. The interventions performed by the pharmacist in the SSES are key to prevent DRPs.

No conflict of interest

PS-032 | STUDY OF EFFECTIVENESS AND SAFETY OF ADALIMUMAB, ETANERCEPT AND INFLIXIMAB IN ELDERLY PATIENTS WITH RHEUMATOID ARTHRITIS

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Background Although elderly patients with rheumatoid arthritis (RA) are probably the largest group of patients with RA, this age group has been excluded from clinical trials and therefore maximum evidence of effectiveness and safety data is not available. For this reason, it is interesting to conduct a study to evaluate the effectiveness and safety of treatment with anti-tumour necrosis factor (anti-TNF) in an elderly population.

Purpose To analyse and compare the effectiveness and safety of treatment with anti-TNF agents (adalimumab, etanercept and infliximab) in elderly patients (>65 years) with RA.

Material and methods A descriptive and retrospective study was conducted in a tertiary hospital with 800 beds. All patients aged >65 years diagnosed with RA treated with adalimumab, etanercept or infliximab were included from 2013 to 2015. The data analysis was performed using SPSS.

Results The sample for RA patients >65 years was 47 patients. 85% were women. 31.9% (n=15) were treated with infliximab, 29.8% (n=14) with etanercept and 38.3% (n=18) with adalimumab. Mean age was 71.7 ± 5.2 years. At the end of the study period, 46.7% had discontinued treatment with infliximab, 41.2% with adalimumab and 28.6% with etanercept. The main reasons for treatment discontinuation were: remission in 13.3% for infliximab and 11.1% for adalimumab, therapeutic failure in 14.3% for etanercept and 16.6% for adalimumab, and adverse event in 11.1% for adalimumab. Median survival was 11.4 years (95% CI) for infliximab and 9.6 years (95% CI) for adalimumab. For etanercept, the median was not reached at the end of the study period. Survival at 5 years was 73% for infliximab, 75% for etanercept and 62% for adalimumab (log rank p=0.613; Breslow p=0.927). The main adverse effects observed were: infections and respiratory disorders for 3 drugs, followed by vascular disorders and asthenia for infliximab, renal and urinary disorders and eye disorders for adalimumab and gastrointestinal disorders for etanercept.

Conclusion The effectiveness of treatment with etanercept, adalimumab and infliximab in elderly patients showed no statistically significant differences in our study. The main adverse effects were infectious disorders, with the highest prevalence with infliximab and adalimumab.

No conflict of interest

PS-033 | IFOSFAMIDE INDUCED ENCEPHALOPATHY: PROPHYLAXIS AND THERAPY WITH METHYLENE BLUE

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Background Ifosfamide is an alkylating agent effective in young patients affected by sarcoma. Its use is limited due to severe side effects: haemorrhagic cystitis, prevented with mesna; neurotoxicity is currently its worse adverse effect. Hepatic conversion of ifosfamide to chloracetaldehyde seems to be the main pathophysiologic mechanism responsible for development of ifosfamide induced encephalopathy (IIE). There are sporadic case reports suggesting the use of methylene blue as effective treatment for this dose limiting side effect.

Purpose The aim of the study was to evaluate the benefit derived from use of methylene blue for treatment and prophylaxis of IIE in paediatric and young adult patients. These subjects are more sensible to neurologic damage, irreversible in some cases.

Material and methods We conducted a retrospective analysis of 74 patients (range 1–25 years of age), most of whom were affected by rhabdomyosarcoma. They were divided into 3 groups based on methylene blue administration; all were treated between 2010 and 2015, with regimens including ifosfamide at an average dose of 9.1 g/cycle. 75% of patients were at high risk of developing IIE due to specific comorbidities. The control group did not have the same risk factors as other two groups, and this was the reason why MB was not used.

Results 23% (17/74) of patients developed neurotoxicity grade 1 or more (NCI-CTC). Comparing the prophylaxis and non-prophylaxis groups, homogenous for risk factors, there was a difference of 5.4% in the incidence of IIE. 14/17 (82.35%) were treated with MB at a dose of 3×50 mg/day intravenously, and all recovered. 3/17 (17.65%) patients spontaneously recovered. 13/17 (76.47%) patients continued ifosfamide cycles with MB as secondary prophylaxis and did not manifest other neurologic symptoms. Patients at high risk, prophylactically treated with MB before the beginning of chemotherapy, manifested neurotoxicity of lower grade, compared with patients with the same risks but without prophylaxis.

Conclusion Methylene blue is an effective and low cost antidote to treat and prevent IIE in patients at major risk of developing it. MB has potential use in the primary prophylaxis of patients with risk factors for neurotoxicity; it can also be used in secondary prophylaxis and acute treatment. Another important result is that MB enabled our patients to continue further ifosfamide chemotherapy.

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No conflict of interest

PS-034 | CURRENT STATUS OF CARDIAC DIGITALIS GLYCOSIDES TOXICITY IN A THIRD LEVEL HOSPITAL

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Background Digoxin is used to manage supraventricular arrhythmias and low output chronic heart failure (CHF). Due to its narrow therapeutic window, digoxin must be monitored clinically and pharmacokinetically. Blood levels below 0.6–0.8 ng/mL are infratherapeutic, but above 2–2.5 ng/mL serious gastrointestinal, cardiovascular, visual and neurological toxicity appears. Kidney failure and thyroid disease can trigger this phenomena.
Purpose To describe digoxin toxicity epidemiology and clinics in a third level hospital, comparing the current situation with past data and suggesting measures to minimise its incidence.
Material and methods We studied our hospital's 2015 basic minimum dataset, which collects all the diagnoses of admitted patients at discharge, coding them using the WHO's International Classification of Diseases (ICD9, digitalis toxicity code E942.1). Data were consigned in a Filemaker database, and statistically managed with SPSS21.
Results Our hospital registered 31 257 admissions, 453 (1.45%, 248 men, average age 66.5±21.5 years) related to adverse reactions (E930-E949). E942.1 was coded 24 times (0.77‰, 23 women, average age 83.4±10.2 years, 18 in internal medicine), 9 less than in 2014, for the second year in a row being the fourth most frequent cause of adverse reactions, after antineoplastics and oral anticoagulants (64 times each), and adrenocortical steroids (43). Due to privacy issues, 4 patients' clinical histories could not be accessed. Among the 20 studied, 1 did not experience toxicity (mistakenly coded). The remaining 19 were diagnosed with atrial fibrillation, 11 also with CHF. 8 had started digoxin within the previous month (4 within the previous week). The most frequent reactions were gastrointestinal (9), cardiovascular (9) and neurological (5). 9 episodes were severe, being the reason for admission. We found a correlation between severity and incidence of cardiovascular symptoms (χ^2, p=0.04). Two cases were related to medication errors (dosing without considering kidney function). Digoxin toxicity was related to kidney failure (ClCr <60 mL/min) in 15 patients. 1 suffered from hyperthyroidism (T4 overdose). Potentially relevant drug interactions were not found.
Conclusion The incidence of digoxin toxicity has decreased as its use has decreased, at the expense of safer alternatives. If alternatives are not possible, it seems key to tighten pharmacokinetic monitoring in older patients, mainly those with kidney failure. Doctors should be re-instructed about digoxin peculiarities (narrow window, serious toxicity) to maintain the trend.

No conflict of interest

PS-035 | EVALUATION OF PHARMACIST INTERVENTION ON VANCOMYCIN DOSING AND NEPHROTOXICITY PREVENTION

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Background Vancomycin is an anti-gram positive antibiotic with a narrow therapeutic index which is used widely for the treatment of nosocomial infections.
Purpose The aim of the study was to evaluate the impact of pharmacist interventions on vancomycin dosing and nephrotoxicity prevention
Material and methods This was a comparative study performed in our hospital between 1 June and 30 September. 200 adult patients undergoing vancomycin therapy were included. Half of the patients received pharmacist intervention and half of patients received routine medical care without pharmacist involvement. The pharmacists' interventions included: initial dosage determination, therapeutic drug monitoring and monitoring of kidney function. The 2 groups were compared to evaluate the outcome of pharmacist intervention.
Results In the pharmacist intervention group, trough plasma concentration of vancomycin was measured in all patients, whereas in the non-pharmacist intervention group, vancomycin level was checked only in 40% of patients. The percentage of trough concentrations within the therapeutic range was significantly higher in the pharmacist intervention group, 62 versus 41% (p<0.05). The incidence of nephrotoxicity was significantly lower in the pharmacist intervention group, 28 versus 16% (p<0.05).
Conclusion Pharmacist intervention may improve optimal dosing of vancomycin and decrease the incidence of acute kidney injury concomitantly.

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No conflict of interest

PS-036 | RISKS AND INEFFICIENCIES IN HOSPITALS CAUSED BY INADEQUATE PACKAGING OF ORAL MEDICATIONS

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Background Lack of adequate packaging of oral solid medications is an important source of inefficiency in hospitals. There are drugs marketed by pharmaceutical companies in blister-packs where identification data appear printed for a group of

pills rather than each one, a requisite for inpatients. This inadequate labelling requires the pharmacy to repackage them, leading to waste of time. This process generates new potential medication errors because repackaged pills look similar, making it easy for healthcare professionals to confuse them with one another.

Purpose To evaluate the extent to which drugs prescribed to inpatients were manipulated in hospitals because of their inadequate marketed presentation. Wastage in the process of adequate medication trade-dress was evaluated, as was the proportion of look-alike repackaged drugs.

Material and methods A prospective longitudinal study was carried out (14 days) in a tertiary hospital. Pharmacotherapy prescribed to adult patients was evaluated daily (410 beds). Using a CPOE programme, pharmacists checked the number of repackaged look alike drugs dispensed to these patients on a daily basis. Moreover, we checked the number and time consumed in repackaging.

Results Pharmacotherapy of 4199 inpatients was analysed. 2000 received at least one repackaged pill. Admitted patients received a total of 3336 repackaged look alike drugs. Specialties most frequently involved were internal medicine (73.3% of their inpatients) and haematology (70.7%). On the other hand, a total of 13 758 units were repackaged in the pharmacy service which meant that 983 media (SD±600) of look-alike medications were generated in the pharmacy every day. According to data registered in the pharmacy, it takes 4.9 s on average to repackage 1 pill (approximately 80 min were wasted daily). Over the study period, a dispensing error related to look alike repackaged pills occurred because of confusion in their storage.

Conclusion There is a high rate of inadequately marketed oral medications being dispensed to inpatients. Medications marketed in blister packs require individual pills to be repackaged by pharmacy services, leading to a waste of time. Moreover, this process may constitute a hazard to patient safety, increasing medical errors by confusion. Drug regulatory agencies should promote standards for packaging and labelling of drugs individually identified to improve safety and efficiency in the medication use process in hospitals.

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Pharmacy staff.

No conflict of interest

OPTIMISATION OF THE MEDICATION PROCESS STARTING AT THE EMERGENCY DEPARTMENT

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Background An internal audit at a surgical ward showed that the medication process is not adequate in terms of efficiency and safety. At the time of transfer of the patient from the emergency department (ED) to the ward, home medication is often unknown or incomplete. Furthermore, the medication is prescribed using a different medium at the ED compared with the other wards (on paper vs electronic). Both processes can easily cause medication errors.

Purpose The purpose was to create a safe, efficient and continuous medication process for hospitalised patients, starting at

the ED. By creating a multidisciplinary team (physicians, nurses and pharmacists), we obtained a fully known and reviewed medication therapy that was electronically prescribed and validated at the time of transfer of the patient from the ED to the ward.

Material and methods To achieve this goal, 3 different projects were set up. Firstly, a computerised physician order entry (CPOE) coordinated by a pharmacist was started up at the ED. Secondly, the clinical pharmacist performed a reconciliation of the medication, followed by an appropriateness control of the therapy. Thirdly, faster delivery of medication to the ward was provided by changes in the practical organisation of the hospital pharmacy.

Results During the study period after the start up of the CPOE at the ED, there was an average validation rate by physician of 71%, and a median validation time of 2 hours 16 min. The validation rate during the weekends was lower than during the week but was not significantly different. The second project, the appropriateness control by a clinical pharmacist, showed an acceptance rate by the physicians of 77% of the pharmaceutical advices.

Conclusion We can conclude that enrolment of the CPOE and the multidisciplinary cooperation between physicians, nurses and pharmacists at the ED had a positive impact on the medication process in the hospital. The import of a CPOE at the ED provides a safer, more efficient and continuous medication process which improves the quality of the therapy.

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No conflict of interest

DEVELOPING A METHOD FOR IDENTIFYING A UNIVERSITY HOSPITAL'S HIGH ALERT MEDICATIONS

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Background There are medications that pose a higher risk of harmful effects and medication errors (high risk or high alert medications). It is possible to use existing high alert medication lists, although they reflect clinical practices in the contexts where the lists are compiled. Therefore, it is also preferable to use hospital specific safety data to customise these lists to fit the local context. Medication error (ME) reporting systems provide such data that could be used for compiling customised lists.

Purpose The study objective was to develop a method for identifying high alert medications in a university hospital by using ME and near miss reports gathered through the hospital's ME reporting system.

Material and methods Altogether, 18 136 MEs and near misses were reported in 2007–2013. This study was targeted to the

reports where medications were coded as a contributing factor to MEs. This targeted sample included more high alert medications than a random sample (10%). Therapy groups and individual medications were identified. These were compared with the hospital's drug consumption and Institute for Safe Medication Practice's (ISMP) list of high alert medications,[1] which is probably the most widely used high risk medication list. The reports including most reported and high alert medications (120 reports) were qualitatively analysed by applying the simplified root cause analysis.

Results The total sample included 249 reports with 280 medications of which 34% were ISMP's high alert medications. The therapeutic groups most commonly related to MEs were antibacterials for systemic use (13%), psycholeptics (10%), analgesics (9%), antithrombotic agents (9%) and anaesthetics (7%). Serious patient harm (n=7) was related to cefuroxime, enoxaparin, ibuprofen, midatsolam, propofol and warfarin. Half of the MEs were related to parenteral preparations. Typical ME types were administration (34%), dispensing (18%), prescribing (15%), and documenting (15%) errors. The qualitative method deepened the understanding about key safety risks with high alert medications, drug nomenclature, formulations and administration routes, and changes in the formulary.

Conclusion The method is applicable for compiling a hospital specific high alert medication list and related analysis of key process safety risks contributing to MEs.

PS-039 | ESSENTIAL MEDICINES BY THE WORLD HEALTH ORGANISATION AND THEIR CONVENIENCE IN ELDERLY PATIENTS

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Background The World Health Organisation (WHO) updates the model list of essential medicines (MLEM) every 2 years. The list reflects the medicines that every healthcare system should have as a minimal requirement. On a global scale, elderly patients with chronic diseases are prioritised by healthcare systems, requiring a complex and multidisciplinary approach. Explicit criteria guides have been produced to adapt prescriptions to elderly patients, detecting potentially inappropriate medications (PIM) and potential prescribing omissions (PPO).

Purpose To evaluate the adequacy of the WHO MLEM with Beers, Priscus and Screening Tool of Older Person's Prescriptions-Screening Tool to Alert doctors to Right Prescriptions (STOPP-START) criteria.

Material and methods This was an observational study comparing Beers 2015, Priscus 2010 and STOPP-START 2014 criteria with the MLEM 19th edition, dismissing no chronic/no elderly disease drugs: anaesthetics, palliative care drugs, antidotes, anti-infectives (except for antiretrovirals, anti-hepatitis B and nitrofurantoin), cytotoxics, blood products of human origin and plasma substitutes, metildopa, thrombolytic and dermatological medicines, diagnostic agents, ovulation inducers, progestogens, immunologicals, vaccines, muscle relaxants, ophthalmic preparations (except miotics, glaucoma medicines and bebacizumab), oxytocis/antioxytocs, solutions correcting water, electrolyte and acid–base disturbances, ear, nose, throat, neonatal and juvenile joint diseases medicines.

Results MLEN has 409 medicines; 140 are considered chronic disease drugs. According to Beers criteria, MLEM has 16/140 (11.43%) absolute PIMs (with 133 drugs), 29/140 (20.71%) that may exacerbate an illness/syndrome (among complex drugs list), 18/140 (12.86%) that must be used with caution (Beers includes dabigatran, prasugrel, mirtazapin, oxcarbazepin and vasodilatation drugs that do not appear in MLEM) and 3/140 (2.14%) to avoid/adjust with liver/renal impairment (of 20 drugs). According to Priscus criteria (with 83 PIMs), MLEM has 11/140 (7.86%). According to STOPP-START criteria, MLEM has 44/140 (27.50%) PIMs and 31/140 (22.14%) PPOs. MLEM does not includes some PIMs (ticlopidine, acetylcholinesterase inhibitors, first generation antihistamines, prochlorperazine, iron, theophylline, COX-2 inhibitors, α-1 receptor blockers, thiazolidinediones, z-drugs) or PPOs (acetylcholinesterase inhibitors, dopaminergic agonist, fibre supplements, anti-resorptive and anabolic therapy for bones, angiotensin receptor blocker, α-1 receptor blockers, 5-α reductase inhibitors, topical and pessary vaginal oestrogen).

Conclusion Explicit criteria guides have different potentiality to detect PIMs. MLEM can avoid PIMs. However, according to STOPP-START criteria, MLEM has not enough PPOs.

PS-040 | MEDICATION REVIEW IN THE HOSPITAL PHARMACY: AN EVERYDAY CLINICAL PRACTICE OR WISHFUL THINKING?

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Background Hospital pharmacists are expected to play a key role as members of a multidisciplinary therapeutic team, to ascertain the best therapeutic results with respect to limited resources available in all healthcare systems.

Purpose To investigate the extent that medication review takes place in everyday clinical practice, the number and type of proposed interventions, as well as identification of barriers to be overcome, so that seamless care, regarding pharmacotherapy, is assured.

Material and methods Medication review at the prescription and ward level, by hospital pharmacists, was investigated in 2 (general and terminal patient clinics) hospitals located in the same health region, for a period of 3 months. Benchmarking of all implemented procedures was evaluated by weekly questionnaires.

Results In both hospitals, a computerised physician order entry system was available, characterised more by its administrative and less by its clinical value. In both cases, all prescriptions were reviewed by pharmacists, while the average number of medicines/patient was 8. However, the fact that pharmacists do not participate in direct patient care (ward rounds) in combination with limited access to the complete patient record renders medication review time consuming and fragmented. In

the general hospital, the absence of any type of feedback, regarding the actual administration at ward level, hinders the intergraded evaluation of pharmacotherapy outcomes. In the case of the end stage patients' hospital, where an extended length of stay is observed along with a higher ratio of pharmacists per hospital beds (1/50 vs 1/200 for the general hospital), a more complete monitoring of medication use is feasible, as interventions take place before transformation of medical instructions into prescriptions. In both cases, the majority (almost 60%) of the hospital pharmacists' interventions concern the dosage form, length of drug administration, incompatibilities and interactions, polypharmacy management and substitution with low cost generic formulations.

Conclusion Although medication review should be a high priority, the extent that this happens depends on the initiative/expertise of the hospital pharmacists and the type of institution. Lack of and deficiencies in relevant legislation, infrastructure and collaboration culture are identified as key barriers. Nevertheless, hospital pharmacists are engaged in medicines optimisation, against all odds.

No conflict of interest

PS-041 OPTIMISATION OF MEDICATION RECONCILIATION AT PATIENT ADMISSION TO HOSPITAL: WHAT ABOUT PATIENT SELECTION?

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Background Medication reconciliation at patient admission is performed for all patients hospitalised in the internal medicine unit at a teaching hospital in this study. Optimising pharmaceutical activities is a key issue.

Purpose The aim of this study was to assess the adequacy of pharmaceutical analysis after medication reconciliation at patient admission according to iatrogenic risks factors (IRF).

Material and methods Pharmaceutical interventions (PI) were carried out by the pharmacist for each potentially inappropriate prescription. The following IRF were researched in hospitalised patients: severe renal impairment, cirrhosis, pregnancy, age ≥75 years, polypharmacy (≥ 5 drugs), not scheduled hospitalisation (through emergency or direct admission), immunosuppressive therapies, oral chemotherapy or other high risk medications.

Results 151 inpatients were included in the study between November 2015 and May 2016. We achieved an average of 0.55, 0.32, 0.53, 0.78, 1.25 and 2.4 PI for patients with, respectively, 0, 1, 2, 3, 4 and 5 IRF. We identified 3 IRF that were more often associated with PI: severe renal impairment, age ≥75 years and polypharmacy with, respectively, 64%, 57% and 40% of patients having at least 1 PI. This study showed that if we have selected patients with at least 1 of these 3 risk factors (who represent 64% of admitted patients to the internal medicine unit), we would reconciled 90% of patients with at least 1 PI.

Conclusion Pharmacists are more likely to suggest medicines optimisation to the elderly, to patients affected by polypharmacy or those suffering from severe renal dysfunction. Reducing our activities by 36%, 90% of patients who need at least 1 PI still benefit from pharmaceutical analysis. The clinical impact of the 10% of unrealised PI should be considered and

compared with the benefits of the extra time setting up new activities, such as output information or therapeutic education of patients.

No conflict of interest

PS-042 FOR BETTER IATROGENIC LACTIC ACIDOSIS PREVENTION: LET'S MANAGE ITS RISK FACTORS BETTER!

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Background Adverse drug events (ADE) represent up to 27% of intensive care unit (ICU) admissions and 28% of deaths, whereas they could be prevented in 86% of cases. Metformin associated lactic acidosis (MALA) is rare (<10 per 100 000 patients per year) but represents a common cause of hospitalisation in the ICU. It is therefore necessary to study and evaluate this ADE to know its main risk factors and avoid it.

Purpose The main objective of our study was to identify the main risk factors of MALA responsible for hospitalisation in the intensive care unit.

Material and methods This was a 20 month prospective study, including all ICU patients admitted for MALA. We recovered hospitalisation reports before pharmaceutically analysing each clinical case.

Results 21 cases were studied for MALA for an average age of 69 years (55–87) and an average IGSII score of 52 (25–87). This ADE was avoidable in 76.2% of cases. On average, patients were hospitalised 7 days (1–15) in the ICU and 14 days post-ICU (0–44). 2 patients (9.5%) died during their stay. 1 patient was lost to follow-up. 5 patients died after their hospital discharge for an average time of follow-up of 10.7 months (1–22). 2 patients maintained renal functional impairment. Regarding the main risk factors, 71.4% of patients were dehydrated by diarrhoea and/or vomiting leading to the nephrotoxicity of their continuous associated treatments, acute kidney injury (AKI) and MALA. The other cases were due to urinary obstructions, liver failure, sepsis and cardiogenic shock. 90.5% of patients had potentially nephrotoxic treatments.

Conclusion Hospitalisations for MALA are still too frequent despite the fact that it is avoidable in most cases. Dehydration, continuation of nephrotoxic treatment and AKI remain the main risk factors. Consequently, it is necessary to continue and develop prevention strategies to prevent their appearance, to limit their consequences and to reduce their recurrences. In our department, we will electronically send this information to general practitioners in order to make their diabetic patients more aware of the precautions with this type of treatment.

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No conflict of interest

ASSESMENT OF OPPORTUNITIES FOR PHARMACEUTICAL INTERVENTION IN PATIENTS ON IBRUTINIB

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Background Clinical trial (CT) data have some limitations due to their design: patient recruitment for CTs select patient groups in terms of age, comorbidities and concomitant medication. Real life settings can be different and a specific opportunity for patient intervention may exist in novel drugs. Ibrutinib is the first bruton kinase inhibitor, and is indicated for patients with chronic lymphocytic leukaemia and mantle cell lymphoma. A literature search was performed to assess previous work with this drug.

Purpose To assess opportunities for pharmaceutical intervention based on real life data regarding concomitant medications and reported adverse events (AE) that could lead to dosage adjustments/suspension for patient safety.

Material and methods For every patient that started ibrutinib between January 2015 and August 2016, clinical records were examined for concomitant medications, reported AE, dose adjustments/suspension. Concomitant medication was scanned for potential drug–drug Interactions (DDI).

Results 21 patients initiated ibrutinib. 7 patients suspended therapy, 2 due to disease progression, 1 to unrelated motives and 4 to toxicity. AE: gastrointestinal (33%); haemorrhaging (14%); haematological grade 3–4 (24%); tiredness/pain (19%); respiratory tract infections (57%); non-infectious pneumonitis (9.5%); exacerbated hypertension (9.5%); atrial fibrillation (5%); and dermatologic (5%). Dosage adjustment/suspension of ibrutinib due to AE occurred in 62% of patients. Concomitant medications were present in 95% of patients, 12 had at least a major or moderate DDI with ibrutinib. CYP4503A4 inhibitors, P-gp substrates and drugs increasing ibrutinib's haemorrhagic potential were involved in interaction mechanisms. Concomitant CYP4503A4 inhibitor usage led to 9 dosage adjustments of ibrutinib and 2 of the CYP4503A4 inhibitor.

Conclusion Rate and type of AE were more serious than reported in CTs. Considering the 57% of patients with significant DDI and 62% with dose adjustments due to AE, it is clear that drug optimisation is relevant for the outcome of the treatment and patient safety. Pharmacists can support this process by reviewing all the medication, monitoring AE, supporting patient compliance and providing feedback to the physicians and/or replacing physician intervention. This review was presented to the haematology department and a systematic pharmaceutical intervention was implemented.

REFERENCES AND/OR ACKNOWLEDGEMENTS

The Importance of Pharmacovigilance during Ibrutinib Therapy for Chronic Lymphocytic Leukaemia (CLL) in Routine Clinical Practice.

No conflict of interest

PROACTIVE REVIEW OF HAZARDOUS MEDICATION IN THE OUTPATIENT UNIT, ACCORDING TO THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH USA

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Background The National Institute for Occupational Safety and Health USA (INSHT) in collaboration with the Spanish Society of Hospital Pharmacy (SEFH) has conducted a compilation of all drugs used in hospitals considered dangerous, with recommendations for proper preparation and administration, considered of great interest for all workers and patients.

Purpose To optimise pharmaceutical care in outpatient consultation by including INSHT recommendations into the pharmacotherapeutic interview, and by updating the written information received by patients.

Material and methods In September 2016, the INSHT's list of hazardous medications was published in collaboration with SEFH. Medications included in our pharmacotherapeutic guide that were administered to outpatients were revised. Pharmaceutical care protocols including the aforementioned medications were revised and modified. Also, necessary modifications to the information sheets were made. The following items were included in the information sheets for patients: preparation recommendations, administration recommendations and causes of hazard.

Results Of the 319 pharmaceuticals labelled hazardous by INSHT, 24 hazardous pharmaceuticals were detected, which were being administered in the outpatient care area. The majority of those phamaceuticals were antivirals against HIV and chronic hepatitis virus (33.33%), immunosuppressants (25%) and medication for pulmonary hypertension (16.66%). Pharmaceutical care protocols and information sheets for patients were modified in 100% of all medications involved, which included a section with specific recommendations.

Conclusion Patients and healthcare workers are exposed to a series of chemical hazards due to preparation and administration of drugs. They must take preventive measures in order to avoid exposure, as its effects can be dangerous for the workers. Periodic review and update of pharmaceutical care protocols, and of all materials employed, improves both the quality of outpatient healthcare services and patient safety.

No conflict of interest

ANALYSIS OF MEDICATION USE OF FRAIL ELDERLY PATIENTS WITH FREQUENT HOSPITAL ADMISSIONS

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Background This descriptive analysis of medication prescribed for frail elderly patients with frequent hospital admissions is the first of such nature in this population group. Hospital readmission in the frail elderly is common and poses increased risks relating to medicines use and transition of care.

Purpose To describe the types of medication frequently admitted frail elderly patients are prescribed.

Material and methods This study was a retrospective cohort analysis of discharge summaries of 100 patients aged ≥75 years with ≥3 unplanned medical admissions in 12 months into the study site.

Results The mean number of admissions for these patients was 4.6 times a year (range 3–13). Of the 100 patients: 5% were taking <5 medications, 23% were taking between 5 and 9 medications, and 72% were taking ≥10 medications. The discharge summaries of the study population showed that 89% of the 100 patients were taking at least 1 high risk medicine[1] as regular medications. These high risk medicines were non-steroidal anti-inflammatory drugs (NSAIDs), antiplatelets, antiepileptics, hypoglycaemics, diuretics, inhaled corticosteroids, cardiac glycosides, beta-blockers and anticoagulants (including direct acting oral anticoagulants). The class of high risk medicines are outlined in the figure.

Regular medication lists of the 100 patients were examined to identify any potentially inappropriate medicines (PIMs) in accordance with the Beers criteria. 48% of patients were found to be taking at least 1 PIM. The PIMs prescribed includes alpha-blocker, hypnotics, antipsychotics, tricyclic antidepressants and antimuscarinics, high dose diuretics and cardiac glycosides, and some antiarrhythmics (flecainide). This is not exhaustive as the PIM in certain medical conditions, as outlined by Beers criteria, was not assessed as clinical judgement could not be made from just looking at the discharge summary.

Conclusion A large proportion of frail elderly patients who had frequent hospital admissions were found to be taking high risk medicines and PIMs. This could facilitate targeted deprescribing of medicines in this patient population.

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No conflict of interest

Purpose To compare three different assessment tools used for medication review in elderly patients of a nursing home: STOPP-START, Beers and EU(7)-PIM.

Material and methods A cross sectional study was performed over 6 weeks in a nursing home with daily medication validation by hospital pharmacists. Inclusion criteria: patients aged ≥65 years, pluripathology (≥5 chronic diseases) and polypharmacy (≥5 drugs). Data collected: sex, age, Barthel Index of Activities of Daily Living, Mini Mental State Examination (MMSE), Instrumental Activities of Daily Living Scale (IADLS) and Charlson Comorbidity Index at admission; pathologies and all medications prescribed. The medication of each patient was carefully reviewed according to the assessment tools indicated previously. Statistical analysis was carried out with SPSS Statistics V.22. For parametric data, mean and SD were used, and for non-parametric data, median and range were used. ANOVA test was used to compare the 3 assessment tools.

Results 51 patients were included; 16 (31.4%) men; age 81.6 (7.7) years. Barthel Index 50 (25–70), MMSE 16 (13–22), IADLS 0 (0–1) and Charlson Comorbidity Index 3 (2–4), mortality at 3 years 52% (26–52%). Most frequent pathologies: cardiovascular 44 (86.3%); neurologic 40 (78.4%); metabolic 30 (58.8%); and psychiatric 27 (52.9%) patients. Number of drugs prescribed 8.0 (3.2). After the revision, the number of patients with PIMs detected and the number of drugs involved according to STOPP, START, Beers and EU(7)-PIM criteria were 44 (86.3%), 12 (23.5%), 44 (86.3) and 38 (74.5%) patients and 1.7 (0.8), 1.1 (0.3), 1.6 (0.8) and 1.8 (0.9) drugs, respectively. Most frequent family drugs detected: STOPP: proton pump inhibitors (PPI), benzodiazepines, antihypertensives; START: acetylcholinesterase inhibitors, antihypertensives, antiplatelets; Beers: benzodiazepines, PPI, antidepressants; EU(7)-PIM: PPI, benzodiazepines, antipsychotics. There was no statistically significant difference among the assessment tools analysed.

Conclusion
- The three assessment tools analysed were similar without many differences in the number or type of drugs detected.
- The only tool that allows introducing necessary drugs is START.
- Any tool assesses the severity of the PIMs detected.

No conflict of interest

PS-046 | **HOW DIFFERENT ARE THE ASSESSMENT TOOLS USED FOR MEDICATION REVIEW IN THE ELDERLY?**

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Background The number of elderly people does not stop growing in developed countries. Consumption of medicines increases as they age. It is important to detect as many potentially inappropriate medications (PIM) as possible to ensure safe and effective prescription. In 2015, a European group developed a new list of PIM for older people which can be used in European countries for clinical practice.

PS-047 | WITHDRAWN

times more confirmed serious events than these other methods.

Purpose To identify and measure the incidence of hypoglycaemia and hyperkalaemia in a tertiary hospital due to medication errors using dextrose 50% as the trigger tool.

Material and methods The study was conducted over a period of 1 month. A daily report was generated using a reporting system for all dextrose 50% that had been removed from the automated dispensing cabinets. The report was used to identify patients, and then each patient case was reviewed to find the indication for usage. If the case was recognised as a medication error, then a classification for the type and severity was established using the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) categories. The study was approved by the institutional review board.

Results The total reviewed charts was 184. The indications to use dextrose 50% were as follows: 92 cases for hypoglycaemia, 59 cases for hyperkalaemia and 33 deviations from hospital policy. The dextrose 50% was used due to medication errors in 49 cases of hypoglycaemia and 16 cases of hyperkalaemia.

Conclusion This study demonstrated the usefulness of trigger tools such as a KPI in order to evaluate the efficiency of the safety systems that are used in hospitals.

No conflict of interest

PS-048   **DETECTING MEDICATION ERRORS IN A TERTIARY HOSPITAL USING DEXTROSE 50% AS TRIGGER TOOL**

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Background To prevent medication errors and reduce the risks of harm, organisations need tools to detect them as well as to develop key performance indicators (KPI) to identify adverse drug events (ADEs) and to determine whether ADEs are reduced over time as a result of improvement efforts. The Institute for Healthcare Improvement (IHI) global trigger tool for ADEs provides an easy to use method for accurately identifying ADEs and measuring the rate of ADEs over time. A study comparing focused trigger tools and traditional reporting to identify medical related problems showed that 107 of ADEs were identified using trigger tools while only 3.7% of ADEs were identified by using traditional voluntary reporting methods. Another study carried out to evaluate the incidence of ADEs in hospitals utilising 3 methods of detecting ADRs, revealed that the IHI global trigger tools found at least 10

PS-049   **PHARMACEUTICAL INTERVENTION TO IMPROVE DOSE CALCULATION OF 4 MABS**

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Background The monoclonal antibodies (mAb) market has grown significantly in the past years. Worldwide sales will be nearly $125 billion by 2020. Cetuximab (Cet), trastuzumab (Tra), bevacizumab (Bev) and panitumumab (Pan) were the most used at our hospital. This represents 35% of the oncology department's total expenditure.

Purpose To calculate mAb doses on the day of treatment, and to analyse differences between PD and CD, and the economic impact when PD >CD

Material and methods Patients' weights with prescription of these mAb at the hospital were monitored over 4 months. Prescribed dose (PD)=dose prescribed by oncologist at the beginning of treatment. Calculated dose (CD)=weight based dose calculated by the pharmacist, according to the summary of product characteristics. CD was the dose actually administered to the patient (after authorisation by the head of the department). PD and CD were recorded and their differences were analysed. Using the drug's average price (mg/€) cost savings where calculated when PD >CD (economic Impact=-cost of PD – cost of CD).

Results mAb doses were calculated for 77 patients(n=367). PD=CD in 24% of total treatments. PD and CD were the same in 64% of treatments using Cet, 20% using Pan, 18% using Bev and 9% using Tra. Treatments with PD <CD (n=170) were more frequent. Cost savings were approximately € 9527.

Conclusion Deviations from recommended dose were not significant. Study time may not have been enough to weight

changes to reveal an impact on dose. Amount of cost savings of €9527 is an estimate. This cost review should have been done assessing number of vials consumed per patient. Analysis performed by Bai *et al* assessing either fixed or body weight based dosing would be superior in reducing pharmacokinetic (PK) variability. PK variability introduced by either dosing regimen is moderate relative to the variability generally observed in pharmacodynamics, efficacy and safety. Therefore, mAb dosing can be flexible. Given many practical advantages (error minimisation and easiest preparation), fixed dose might be a future approach.

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No conflict of interest

PS-050 | **PREVALENCE OF POLYPHARMACY AND FALL RISK INCREASED DRUGS AT DISCHARGE IN FALL RELATED HIP FRACTURE ELDERLY PATIENTS**

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Background Polypharmacy and fall risk increased drugs (FRIDS) have been associated with injury falls leading to hospital admission. However, at discharge, polypharmacy and FRIDS are not usually assessed in elderly patients admitted to hospital after a fall related hip fracture.

Purpose To quantify the number of FRIDS and total drugs, and to estimate the prevalence of polypharmacy and FRIDS at discharge in elderly patients admitted to hospital after a fall related hip fracture.

Material and methods A 3 month retrospective search of patients was made at the orthogeriatric unit in a third level hospital in Madrid (Spain). Patient demographics, baseline characteristics, FRIDS and total number of drugs were collected from hospital discharge reports. According to the Swedish National Board of Health and Welfare, the FRIDS considered were: opioids, antipsychotics, anxiolytics, hypnotics and sedatives, antidepressants, vasodilators used in cardiac diseases, antihypertensives, diuretics, beta blocking agents, calcium channel blockers, agents acting on the renin–angiotensin system, alpha-adrenoreceptor antagonists (benign prostatic hypertrophy) and dopaminergic agents (anti-Parkinson).

Results 80 patients (77.5% women, mean age 87.3 years, SD 4.5) who had been admitted to the hospital after a fall related hip fracture were discharged. Previous to admission, 39.0% of patients had a recent past history of falls (previous 6 months), a mean Barthel Index of 80.4 (SD 28.6), a FAC scale of 4.2 (SD 1.3) and a Global Deterioration Scale (GDS) of 2.4 (SD 1.7). At discharge, the mean number of drugs per patient was 11 (SD 3.2); 96.2% of patients were polymedicated ($\geq$5 drugs), and 81.2% were highly polymedicated ($\geq$9 drugs). The number of FRIDS per patient was 2.6 (SD 1.6); 91.2% of patients were discharged with at least 1 FRID (89.0% 1–4 FRIDS and 11.0% 5–6 FRIDS). The most frequent FRIDS at discharge were: antipsychotics (41.2% of patients), agents acting on the renin–angiotensin system (38.7%), antidepressants (33.7%), opioids (27.5%), anxiolytics (23.7%) and diuretics (23.7%).

Conclusion At discharge, polypharmacy and FRIDS were highly prevalent after a fall related hip fracture leading to admission in elderly patients. Due to a high risk of falling in these patients, reducing polypharmacy and number of FRIDS at discharge, as far as possible, could be useful.

No conflict of interest

PS-051 | **PHARMACEUTICAL VALIDATION: A NECESSARY APPROACH IN ONCOLOGY CLINICAL TRIALS UNITS**

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Background The necessity of pharmacist validation for patient safety and risk management is well established. We previously published an instrument for the documentation of pharmaceutical interventions (PIs) specific to oncology (FIPO)[1] based on the pharmacist intervention form published by the French Society of Clinical Pharmacy. Few communications about the pharmaceutical validation in clinical research are available; none of them concern PIs.

Purpose The aim of this study was to describe the PIs on experimental drug prescriptions in oncology.

Material and methods A 3 month prospective observational study was performed. Clinical trials prescriptions in oncology were analysed using the computerised physicians order entry CHIMIO and the patient medical file. Identification of drug related problems (DRPs), the pharmacist's intervention and their future were categorised according to our validated pharmacist interventions form, FIPO.

Results In 387 prescriptions analysed, 31 interventions were performed (8%). DRPs identified were wrong patient biological and/or physiological data (6.5%), inappropriate drug prescribed (19.5%), inappropriate arm of treatment (13%), untreated indication (3%), subtherapeutic or supratherapeutic dosage (48.5%) and improper administration (9.5%). The pharmacist's interventions were recommendation of patient data modification (6.5%), drug switch (32.5%), dose adjustments (48.5%), addition of a new drug (3%) and administration mode optimisation (9.5%). The acceptance rate by clinicians reached 90% (n=28). Among the 3 unaccepted interventions, 2 concerned an improper administration (inappropriate timing of administration) and were considered as protocol deviations compromising the participation of the patient in the clinical trial.

Conclusion The critical nature of observed DRPs should be understood not only from a clinical impact point of view. Indeed, the impact of medication errors in clinical trials can vary from lack of statistical power compromising data analysis to patient exclusion. Avoiding them is one of the pharmacist's missions, so that we need to improve pharmaceutical validation and make it easier by developing multidisciplinary software specifically adapted to clinical research.

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No conflict of interest

PS-052   WITHDRAWN

controversy over the benefit of antihypertensive treatment in these patients, which must be implemented individually.

Purpose To define and develop a set of prescription quality indicators for the appropriate use of antihypertensive medication in elderly patients in the socio-sanitary sector, to be used as a useful tool in the pharmacotherapeutic monitoring of these patients.

Material and methods A scientific evidence review was accomplished through studies and meta-analyses, searching in Medline, consensus documents, protocols and clinical practice guides (CPG). The definition and presentation of each indicator were based on the Joint Commission on Accreditation of Healthcare Organisations' recommendations.

Results 27 prescription quality indicators in the socio-sanitary sector for antihypertensive medication in elderly patients were made. The type of indicators made were process indicators, which showed what should be done to prevent safety problems and to guarantee pharmacotherapeutic quality. They were mainly related to treatment, initial evaluation and its monitoring. At the same time, these indicators were classified into 5 sections: initial treatment evaluation (ie, lifestyle changes and pharmacologic treatment indication); contraindications (beta-adrenergic blockers, diuretics, calcium antagonists, alpha adrenergic blocking agents, ACEI and ARB); evaluation of treatment strategy (ie, initial doses, response to treatment, therapeutic strategy); treatment in special situations (ie, diabetes mellitus, proteinuria, osteoporosis); and monitoring (ie, dose reduction and treatment suppression, adherence and treatment follow-up).

Conclusion The prescription quality indicators for antihypertensive therapy in institutionalised elderly which have been prepared will constitute a useful tool, easy to use in clinical practice for the expert pharmacist in the socio-sanitary field, as all the most important aspects of antihypertensive therapy have been considered in this clinical setting, in addition to the most up to date recommendations from the leading CPG.

PS-053   **PRESCRIPTION QUALITY INDICATORS OF THE ANTIHYPERTENSIVE TREATMENT OF ELDERLY PEOPLE IN THE SOCIO-SANITARY SECTOR**

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Background The patient profile in the socio-sanitary sector is a fragile elderly person aged 80 years or older, whose most common pathology is arterial hypertension. There is

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PS-054   **PREDICTIVE MODEL OF HOSPITAL MORTALITY RISK OF COMPLEX CHRONIC PATIENTS OR PATIENTS WITH ADVANCED DISEASE IN A GERIATRIC CENTRE**

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Background Identifying the risk factors in patients that are more susceptible to drug related problems (DRPs) promotes closer pharmacotherapy monitoring that prevents morbidity–mortality in these patients.

Purpose To develop a predictive model of hospital mortality risk in older patients.

Material and methods We included patients >64 years admitted to a geriatric centre with 233 beds in a university hospital

from January to September 2016. We determined the relationship between mortality and number of DRPs detected during admission, adjusted to these variables: age, sex, admission unit (acute geriatric unit (AGU), convalescence, psychogeriatric), Barthel Index and Pfeiffer test before admission, length of stay, number of chronic drugs/patient, DRP type (indication, efficacy, safety, other) and number of potentially inappropriate prescriptions (PIP, according to STOPP-START 2015, Beers 2015 and Priscus criteria) with pharmacist intervention. We used a predictive model of multivariate logistic regression, including significant variables in the bivariate analysis by using the χ^2 test for binary qualitative data, the Kruskal–Wallis test for >2 categories and the Mann–Whitney U test for quantitative data. In the bivariate model, $p \leq 0.1$ was considered statistically significant and in multivariate analysis, $p < 0.05$ was considered statistically significant. Statistical analysis was performed with Stata13.

Results 523 patients were included. Admission unit: AGU 359 (68.6%) patients; convalescence 103 (19.7%); and psychogeriatrics 61 (11.6%). Median age 86 (82–89) years. Women 292 (55.8%). Discharged 488 (93.3%). Died 102 (19.5%). Of 13 potential predictors, 8 were statistically significant in the bivariate analysis and 3 in the multivariate analysis. Protective factors: Barthel Index (OR=0.99; 95% CI 0.98–1.00); length of stay (OR=0.97; 95% CI 0.95–0.99); number of drugs (OR=0.97, 95% CI 0.91–1.04); intervention of PIPs (OR=0.91; 95% CI 0.69–1.20); and PRM security (OR=0.33, 95% CI 0.08–1.47). Risk factors: age (OR=1.04; 95% CI 1.00–1.09); Pfeiffer test (OR=1.02; 95% CI 0.93–1.13); and psychogeriatrics (OR=2.58; 95% CI 1.19–5.58). The model likelihood ratio test was significant (χ^2=37.46, df=10, p<0.001). Regarding the goodness of fit test, the model explained 13.0% of data uncertainty (Nagelkerke index). It correctly classified mortality in 82.21% of patients. Sensitivity: 8.33%; specificity: 99.4%; positive predictive value: 77.78%; and negative predictive value: 82.3%. The AUC of the ROC curve for the mortality and mortality predicted variable was 0.69 (95% CI 0.653–0.741).

Conclusion The results indicate that this logistic model acceptably classifies patients with an increased risk of mortality, and helps us to identify which patients should undergo pharmacotherapy monitoring.

No conflict of interest

PS-055 | **BENZODIAZEPINES AND Z-DRUGS DEPRESCRIPTION BY A MULTIDISCIPLINARY PHARMACOTHERAPY REVISION FOCUSED ON THE PATIENT**

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Background Chronic treatment revisions optimise drug treatment and prevent potential drug related problems. Therefore, we started a new healthcare model based on multidisciplinary team work, integrated and focused on the patient. This programme is a tool to revise the benzodiazepine/Z-drug prescriptions, which are increasing in older patients, and may cause adverse effects.

Purpose To evaluate the potentially inappropriate prescribing associated with benzodiazepines/Z-drugs in polymedicated patients and to determine the deprescription rate after multidisciplinary pharmacotherapy revision.

Material and methods The primary care pharmacist checked chronic treatment through multidisciplinary pharmacotherapy revision with clinical, functional and psychosocial variables, and established recommendations. The physician agreed with the patient preferences, and revised the recommendations through weekly drug safety appointments. The multidisciplinary primary care team (pharmacist, physician, nurse and patient) decided on the deprescription modifications to make. Data collected: demographics, total number of drugs, number of drug related problems, and number and type of benzodiazepines/Z-drugs before and after the revision. Data are expressed as median (Q1–Q3).

Results Patients revised:

125. Age 79.5 (75.8–84.0) years; women 30 (75%). Number of drugs 15 (13–17). Number of drug related problems/patient detected on revision 3 (2.0–3.25). Patients with a benzodiazepine/Z-drug prescribed >6 months 40 (32%) and out of these 9 (22.5%) taking 2 benzodiazepines/Z-drugs. Classification of benzodiazepines/Z-drugs: clonazepam 10 (20.4%); lorazepam 9 (18.4%); alprazolam, diazepam, lormetazepam 8 (16.3%) each; zolpidem 3 (6.1%), loprazolam 2 (4.1%) and 1 (2.0%) bromazepam. Total deprescription interventions: 49. In 4 (10%) patients the deprescription succeeded. Deprescribed drugs: 2 lorazepam, 1 loprazolam and 1 clonazepam. In 8 (20%) other patients benzodiazepine/Z-drug was switched to a better profile drug. Switched drugs: from alprazolam to lorazepam or zolpidem, from clonazepam to lorazepam, from diazepam to lorazepam or lormetazepam and from lormetazepam to zopiclona.

Conclusion

- A third of our patients had a prescription of benzodiazepines/Z-drugs.
- Half of the benzodiazepines/Z-drugs prescribed had a long half-life.
- The benzodiazepine/Z-drug switching rate was higher than the deprescription rate.
- Multidisciplinary pharmacotherapy revision permitted detection of potentially inappropriate prescribing and identification of drug related problems to optimise chronic treatment. New strategies are being implemented to increase the benzodiazepine/Z-drug deprescription, such as consciousness raising in the patient and closer monitoring.

No conflict of interest

PS-056 | **HOW DO YOU REVIEW A MEDICATION ORDER? A FRANCE–QUEBEC COMPARISON**

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Background Medication order review is a fundamental pharmacist activity. Several guidelines from different countries specify the validation elements required for medication order review in general but none of specify the optimal order to consider for these elements and taking into account its applicability in the hospital pharmacy.

Purpose The objective was to identify and justify similarities and differences between the medication order review processes in France and Quebec.

Material and methods This was a descriptive prospective study. 22 validation elements for medication order review were selected and sequenced from guidelines. An online survey was developed in three parts: (A) selection of validation elements in three scenarios—(1) centralised validation, (2) decentralised validation and (3) centralised validation by a pharmacist with a decentralised pharmacist present in patient care areas; (B) sequence of the 22 validation elements; and (C) level of agreement about medication order review statements. The survey was sent to hospital pharmacists at 2 teaching hospitals in Quebec and France.

Results The response rate was 60% (45/75: 23 in France; 22 in Quebec). For scenario (1), there was a significant difference between France and Quebec for 10 validation elements, 8 of these being more supported by Quebec respondents. For scenario (2), there was only 1 significant difference between France and Quebec. For scenario (3), nine elements were significantly different between France and Quebec, 5 of these being more supported by French respondents. These differences can be explained by local drug use process organisation and tools, current practices and personal prioritisation. For instance, a computerised prescriber order entry was used in the French hospital, but not in the Quebec one. Quebec pharmacists are used to having decentralised clinical pharmacists in patient care programmes but exposure of French pharmacists to this practice model is only emerging. Medication reconciliation has been required in Canada since 2008, while it has only started to be implemented in France.

Conclusion Medication order review practices are different between France and Quebec, in terms of validation elements considered by hospital pharmacists and their optimal sequence. Such differences can be explained by numerous factors, including tools used to prescribe and validate drug order and the presence of pharmacists in patient care areas.

No conflict of interest

PS-057 DRY GANGRENE TREATED WITH SILDENAFIL AND MEDICATION ERROR

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Background Gangrene is defined as ischaemic damage. Fever followed by marked coldness, cyanosis, pain and restricted mobility of extremities should always raise suspicion of gangrene. Intravenous nitroprusside, prostaglandins and hyperbaric oxygen have been tried with little success. Despite therapeutic interventions, mortality of up to 40% and an amputation rate of 30–50% have been reported.

Purpose There are a few published reports on the use of sildenafil in dry gangrene. We describe the use of sildenafil in a patient with progressive systemic sclerosis.

Material and methods A clinical case and literature review.

Results The case was an 89-year-old institutionalised woman with arterial hypertension and a history of stroke. She was on acenocumarol and enalapril therapy. In February 2014, the patient showed necrosis of the third and fourth fingers of the left hand which were amputated, and the fifth finger of the right hand. The blood culture was negative. In November 2015, the patient attended the hospital emergency department with cyanosis, coldness and pain in the third finger of the right hand, which was amputated. 3 days after discharge, she showed cyanosis and pain in her fifth finger of the left hand, and necrotic tissue with bleeding blisters on the heels. During her hospital stay, sildenafil treatment was started and the condition of the patient improved, although without complete response. On 24 February 2016, the patient had problems buying sildenafil so her dermatologist changed to tadalafil. On 9 March 2016, she showed worsening of lesions. Acenocumarol was changed to apixaban due to the lesions worsening when acenocumarol doses were higher (we found several reports on gangrene due to the use of acenocumarol) although antiheparin antibody results were negative. On 26 March 2016, she was admitted to the vascular surgery service with pain and necrosis of the fifth finger of the left hand. Her doctor prescribed sildenafil and tadalafil because the nursing home´s prescription contained tadalafil but the dermatologist´s prescription contained sildenafil. This error did not affect the patient because when the pharmacist transcribed the prescription, she called the dermatologist who stopped both drugs during her hospital stay. The patient kept her fifth finger and continues with apixaban and sildenafil with remission of lesions.

Conclusion The use of sildenafil in patients with gangrene is occasional, and efficacy results come from isolated cases or series of cases. Sildenafil improves tissue perfusion and decreases erythema in affected areas.

No conflict of interest

PS-058 EVALUATION OF CLINICAL PHARMACISTS' INTERVENTIONS IN A CARDIOLOGY DEPARTMENT

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Background Previous studies have reported that clinical pharmacists improve medication safety. A clinical pharmacy team (1 senior pharmacist, 1 junior pharmacist, 7 student pharmacists) was deployed in cardiology units (79 beds) to develop medication reconciliation (MR), identify medication errors (ME) and optimise patients' pharmacotherapy.

Purpose The aim of this study was to describe and analyse pharmacists' interventions in cardiology units over 9 month and to evaluate their impact on the management of cardiovascular diseases.

Material and methods This work was a prospective, non-randomised, observational study performed between December 2015 and August 2016. Interventions were made during MR or during the prescriptions analysis in cardiology (1 intensive care, and 2 clinical units). Analysis criteria were number and type of ME, proportions of drugs involved in ME and the physicians' acceptance rate. A focus on cardiovascular ME was

made to highlight interventions about management of heart failure (HF) and acute coronary syndrome (ACS).

Results A total of 532 interventions were performed for 339 patients. Mean (median) age was 70.4 (72) years. The 3 most frequent types of ME were incorrect dose (overdosage (107; 20.1%) and underdosage (96; 18%)), untreated indication (178; 33.5%) and inappropriate form of administration (52; 9.8%). 48.5% of pharmacists' interventions were identified by MR. The percentage of intervention accepted was 98.2% and concerned mostly treatments of the cardiovascular system (137; 25.8%), alimentary tract and metabolism (94; 17.7%), and nervous system (80; 15%). In the cardiovascular system, the most prevalent drugs therapy involved were statins (35; 25.6%), ACE inhibitors (21; 15.3%) and beta-blockers (18; 13.1%). 39 (28.5%) and 31 (22.6%) of interventions for cardiovascular drugs improved HF and ACS therapies, respectively.

Conclusion These results highlight a positive impact of the pharmacy team on reduction of ME. Prescription analysis and MR are 2 key points in avoiding medication discrepancies. The pharmacist has become a key member in the cardiology team. They are involved in therapeutic strategy, and most of the interventions concerned cardiovascular drugs. Moreover, half of these interventions involved treatment of HF and ACS, so pharmacists can improve the management of these chronic diseases.

REFERENCES AND/OR ACKNOWLEDGEMENTS
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No conflict of interest

PS-059 | **CONFORMITY OF THE DRUG USE PROCESS IN PATIENT CARE AREAS: A 5 YEAR DESCRIPTIVE STUDY**

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Background Pharmacy practice is highly regulated and the drug use process is complex in patient care areas.

Purpose The objective of this study was to describe and compare conformity of the drug use process in patient care areas.

Material and methods This was a prospective, cross sectional, descriptive study conducted in inpatients care areas of a 500 bed teaching hospital. An audit was conducted annually. A paper checklist of 26–35 criteria grouped into 13 categories (eg, storage, waste, controlled substances, refrigerators, carts, automated dispensing cabinets, medication reconciliation, documentation, resuscitation carts, pharmacy intranet, abbreviations, antibiotics and high alert medications, hazardous drugs) was used. 2 research assistant evaluated conformity of each criteria per patient care areas (eg, compliant, partially compliant or not compliant). A conformity report was written, checked by decentralised clinical pharmacists and transmitted to patient care area managers with suggested corrective measures.

Results 27 patient care areas were audited each year from 2012 to 2016. Global conformity went, respectively, from 71%, to 65%, 78%, 64% and 62%. Between 2015 and 2016, a significant decrease in conformity was observed for the following 6 criteria: presence of a bin for pharmaceuticals wastes (89% in 2015 vs 62% in 2016, p<0.021), presence of a drug

tray for resuscitation cart without expired drugs (100% vs 79%, p=0.016), nurses interviewed knew what to do in case of a technical problems with drug related technologies (19% vs 0%, p=0.017), or how to report an adverse drug reaction (19% vs 0%, p=0.017), where they can find antimicrobial drug use rules (63% vs 30%, p=0.024) and how to use personal protection equipment when administering hazardous drugs. A significant increase in conformity was observed for 2 criteria related to the medication reconciliation process. While this audit has been conducted for 5 years, we observed a decrease in global conformity that can be explained by the following: 9 criteria were added over time, conformity is difficult to reach for some criteria without technologies, a transfer to a new building is planned and staff can be less motivated to comply.

Conclusion Conformity of the drug use process in patient care areas did not improve over 5 years.

No conflict of interest

PS-060 | **ANALYSING AND OPTIMISING THE USE OF SMART INFUSION PUMPS IN THE INTENSIVE CARE UNIT**

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Background Smart pumps, including an IV medication error prevention drug library, alert operators if a drug dosage is programmed out of its predetermined safety dose limits. The timely intervention reduces medication errors and improves patient safety. The drug library data are collected via wireless technology and can be analysed to permanently adapt and optimise the smart pump system. Until now there has been no working knowledge about the management of smart infusion pumps in the investigated country.

Purpose The objective of this project was to carry out the first analysis of smart infusion pumps in a cardiothoracic intensive care unit of a university medical centre to identify problems with smart pumps and optimise the system (eg, handling and acceptance of pumps and management of alerts).

Material and methods With the help of the programme Dose-Trac, the drug library data were evaluated over a period of 8 months (January 2016 to August 2016). Adherence of the drug library and all types of errors were analysed. Hard limits were not determined, so only soft limits and technical alerts were proved in detail. By means of the standard database, a special look was taken on drugs with a high alert priority (eg categories, infusion type). A questionnaire for the operators about administration and acceptance was developed to optimise the infusion pump system.

Results Adherence of the drug library was 93%. There were many soft limit alerts (1085), mostly triggered by adrenaline, noradrenaline or insulin. Adaption of these limits is indispensable to prevent alarm fatigue of the operator. 31 alerts were attributed to technical errors, so the users should be educated about the technical conditions. High alerting drugs belonged to categories such as cardiovascular, blood coagulation and analgesia. A questionnaire will show which problems occur during everyday work and how the pumps are accepted.

Conclusion The periodic data analysis seemed to be essential to adapt to permanent changes to reduce alerts. According to the DoseTrac report, acceptance of the drug library was high

(93%), but the questionnaire will show if the operators really recognise the benefits of smart pumps.

No conflict of interest

IMPACT OF A PLAY BASED TRAINING SCENARIO FOR ERROR CHECKING ON NURSES' SAFETY CULTURE

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Background Continuous training of healthcare professionals has a key role in preventing medication errors. In order to increase nurses' safety culture, we developed a play based training scenario for error checking. Based on a preliminary study regarding errors reported in our hospital, 14 errors on administration of injectable potassium chloride, heparin and insulin were included in the scenario and placed in a standardised patient room.

Purpose To evaluate the training impact on nurses' awareness and knowledge of administration errors.

Material and methods 2 training sessions of 5 days and 5 nights occurred 3 months apart. The same nurses were invited to participate in the 2 sessions by their head nurses. Trainers conducted a briefing before the error checking, and a debriefing with information on errors. We compared the number of errors detected by nurses during the first and second sessions. Statistical analyses were done on R Software 3.1.3 on matched data.

Results 198 nurses participated in the first session and 151 in the second session. Nurses' characteristics were homogeneous between the 2 sessions. Mean score for the first session (7.99 errors; SD 1.88) was significantly lower than for the second session (10.30 errors; SD 1.96) (p value $<10^{-15}$). Regarding error detection rates, the 3 greatest improvements were for the 'wrong patient' (+40%), the 'wrong syringe to administrate the insulin' (+38%) and the 'wrong potassium chloride storage' (+37%). Concerning nurses' opinions of the training, more than 95% were satisfied or very satisfied with the concepts, the topics chosen, the quality of the briefing and debriefing, and the material conditions, and 77% for the time given for the errors checking. 91% felt that they had learnt about errors and 92% would like to repeat the experiment.

Conclusion Learning from our mistakes is one of the first steps towards a safer care system. This study has shown the effectiveness of our training on increasing nurses' awareness and safety culture. Furthermore, this playful training aroused great satisfaction from participants, except for the time given for error checking. This point will be corrected in further sessions. In future, we will use this type of training with other topics, such as hygiene and haemovigilance.

No conflict of interest

A PLAYFUL APPROACH TO IMPROVE SAFETY OF THE PREPARATION PROCESS IN A CENTRALISED PHARMACEUTICAL UNIT FOR CHEMOTHERAPY DRUGS

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Background Medication errors in oncology are known to cause serious iatrogenic complications. Over time, pharmacy technicians handling cytotoxic agents become less attentive to potential errors that can occur during the fabrication process. A simulation tool called 'Room of errors' has shown its utility to raise awareness of healthcare professionals to potential risks in their everyday work.[1]

Purpose The aim of our study was to heighten awareness of technicians to major potential errors during preparation.

Material and methods The pharmacist and the resident compiled a list of the main potential errors with a criticality level attributed to each one. Each manipulator spent 15 min in the atmosphere controlled area and wrote down every error they noticed; the answer sheet was anonymous. The results were analysed and presented to the pharmacy technicians during a staff meeting. When required, some reminders were done by the pharmacist and resident, especially for high risk errors.

Results 6 of the 7 technicians working in our unit participated. The results are shown in the table.

Error	No of manipulators that noticed the error (%)	Criticality level
Record sheet of pressure not completed	33	+
Hydroalcoholic gel outdated	**50**	**++**
Sterile work field upside down	0	+
Missing pair of gloves	**100**	**++**
Overflowing dustbin	83	+
Wrong diluent infusion bag	**100**	**++**
Wrong dosage on the adhesive label	83	+
Wrong infusion line	**100**	**++**
Infusion bag outdated	**17**	**++**
Wrong syringe	83	+
Adhesive label misplaced on the syringe	17	+
No 'intrathecal injection' label on the preparation	50	+
Switched patients on delivery boxes	**100**	**++**
Missing cytotoxic dustbin	67	+

Conclusion The experience has been very appreciated: the simulation is a good tool to identify and manage risks in a playful way, without accusations among participants. Reminders have been done to staff, especially on the importance of verification of expiration dates. The next step of our work is to assess whether this simulation programme would help prevent medication errors with a second simulation in the next 6 months.

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No conflict of interest

PS-063 MEDICATION RECONCILIATION: THE LINK BETWEEN POTENTIAL HARM AND THE CORRECTION RATE CONCERNING MEDICATION ERRORS

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Background According to the WHO, 50% of medication errors (ME) occur on admission or discharge from hospital. At his arrival in the emergency department, the patient does not provide much information on his treatment. Medication reconciliation (MR) can provide solutions to this issue.

Purpose To estimate the severity of potential consequences of ME detected by MR in an emergency department and follow the correction rate for ME.

Material and methods A prospective observational study was conducted. Retroactive MR on admission was performed in an 8 bed ward over 30 weeks. Inclusion criteria were, first, age (65 years and older) and second, a planned transfer to a medical or surgical department. MR was performed by a pharmacist, using different sources of information (electronic medical file, patient's prescriptions, community pharmacist, etc). Each unintentional discrepancy was recorded as ME. Data were analysed with 2 software programmes (Excel (Microsoft) and Epi-Info (CDC, Atlanta)). ME severity was assessed at monthly multidisciplinary meetings (physicians and pharmacists). The rating (minor, significant, major, critical, catastrophic) was based on national recommendations. ME follow-up (corrected or not) was performed.

Results 129 patients were included (41% men, 59% women). Mean age was 81 years. On average, 2.6 sources of information per patient were used. 167 ME were detected. At least 1 ME occurred in 61 patients. The most prevalent ME was omission (59%). 72% of ME were assessed as minor, 21% as significant, 7% as major and 0% as critical or catastrophic. Physicians and pharmacists who evaluated ME severity were also those involved in patient care. Thus the ME severity may have been underestimated. The rates of ME corrected by physicians was, respectively, 62% of minor, 77% of significant and 91% of major. The more severe the ME , the more it was corrected after MR (p<0.05).

Conclusion This study shows that the severity of potential consequences of ME detected by MR is more often minor. It reveals that every ME detected with MR on admission was not systematically corrected by physicians but the correction rate increased with the severity of potential harm.

No conflict of interest

PS-064 IMPACT OF REMEDIAL ACTIONS AFTER A RISK ANALYSIS BY A FAILURE MODE EFFECTS AND CONSEQUENCES ANALYSIS ON PHARMACEUTICAL INTERVENTIONS IN A PAEDIATRIC HOSPITAL

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Background Paediatric patients are more subject to medication errors. Since 2015, pharmaceutical interventions (PI) are gathered during the pharmacist validation process on a daily basis.

During the first 2 months (P1) of the study, we observed 212 PI out of 2354 prescriptions (9%). The failure mode effects and consequences analysis (FMECA) was used. The severity (S), frequency (F) and response time (T) of these PI were scored by a multidisciplinary team (physician, pharmacists). A critical score was calculated by $C=S \times F \times T$. In a Deming wheel approach, 7 remedial actions were implemented. The same study was carried out in a 2 months period in 2016 (P2).

Purpose The aim of this study was to compare P1 and P2 to measure the impact of our remedial actions.

Material and methods PI were gathered on Genois software. The data analysis was performed in Excel. The results were compared using a χ^2 test.

Results During P2, we observed 151 PI out of 2608 prescriptions (5.8%). The rate of PI during P2 was significantly lower than during P1 (p<0.05). The ATC distribution was the same. The most represented drug classes were GI tract drugs, nervous system drugs and anti-infective drugs, respectively. The most frequent problems were the same between P1 and P2. Wrong dosage represented 65% in P1 and 57% in P2 of PI, respectively. No significant difference was observed between P1 and P2 for PI outcomes. Of 212 PI (P1), 46.3% were accepted (49% during P2), 19.8% were not accepted (10.6% during P2) and 34% were unanswered (40.4% during P2). The insufficient number of pharmacists in medical units could explain the low rate of accepted PI. The severity and frequency of PI were significantly reduced (p<0.05) between P1 and P2. Criticality of PI did not change. This could perhaps be explained by the fact that all high critical PI were due to high response time.

Conclusion With FMECA and our remedial actions, the number of PI, their severity and frequency were decreased. To enhance our prescription validation process, several actions must again be undertaken to improve the acceptation rate and to decrease response time.

No conflict of interest

PS-065 STANDARDISATION IN THE PREPARATION OF INTRAVENOUS MIXTURES

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Background Following the indications issued by the National Institute for Occupational Safety and Health (NIOSH), it was compulsory to review the new recommendations for handling of hazardous drugs. Each hospital will use the NIOSH lists as a reference. Lack of resources and the increase in the assistance workload in the areas of elaboration are leading to the development of new systems to optimise production without reducing safety. One of the proposed strategies is the procedure of dose banding. This new approach standardises the doses in ranges or bands, accepting a percentage of maximum variation.

Purpose To define the intravenous mixtures and the standardised optimal doses to be prepared in the pharmacy service according to the new regulations and available resources.

Material and methods A review of all mixtures prepared in 2015 was carried out to find out the workload involved in

the preparation of new mixtures. After review of the list 2 and 3 it was decided to prepare those drugs that provided added value (manipulator security, patient safety and cost optimisation). Possible theoretical doses were calculated based on the dosage of the drug (real weight/adjusted weight/ideal weight). We analysed whether the theoretical and the standardised dose was <10% and standardised doses were chosen.

Results The new proposal implied a decrease of 20% in the number of intravenous mixtures carried out annually (5 intravenous mixtures less per day). We decided to carry out a total of 96 standardised mixtures corresponding to 15 drugs. 24% of the defined preparations provided safety to the manipulator (hazardous drugs). 76% improved patient safety and optimisation costs. No defined preparation presented a variation between the theoretical and the standardised dose higher than 10%.

Conclusion Normalisation of intravenous mixtures allows more efficient management of the elaboration area. It is also expected that we will see a reduction in the errors in the production, a greater re-utilisation of the returned mixtures and, possibly, savings in direct and indirect costs.

No conflict of interest

PS-066 | **USE OF A RISK ANALYSIS METHOD IN A CHEMOTHERAPY PRODUCTION CENTRALISED UNIT**

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Background The significant increase in the number of patients affected by cancer has provoked medical and pharmaceutical teams to improve the quality and safety of the chemotherapy process.

Purpose The objective was to analyse the production of chemotherapy treatments in an isolator after physician's prescription, and pharmaceutical analysis of the prescription in our cytotoxic production centralised unit.

Material and methods The preliminary hazard analysis (PHA) method was used. To lead this analysis, a multidisciplinary group was formed. The different steps of the PHA were to:

-define the boundaries of the study, the scales of likelihood and severity, and the risk ranking table;

-realise the cartography of hazardous situations (HS) and determine the priority's level associated with the vulnerability of exposed elements (priority 1 for very vulnerable element and priority 2 for vulnerable element); -elaborate scenarios corresponding to HS and evaluate initial risk index;-propose preventive actions and evaluate final risk index.

Data were analysed by the software Statcart.

Results The study of chemotherapy process revealed 5 phases: picking of drugs and medical devices, sterilisation, chemotherapy preparation in an isolator, packaging and dispensing. 129 HS: 43 HS of priority 1 and 86 HS of priority 2. Categories of hazards causing most HS were linked to management (29/129) and human factors (32/129). The phase 'chemotherapy preparations in an isolator' represented more than 55% (24/43) of priority 1 HS. From these 24 HS, 34 scenarios were developed: 44% (15/34) presented an acceptable risk (C1), 56% (19/34) presented a tolerable risk under control (C2) and none presented an inacceptable risk (C3). The 19 scenarios quoted in C2 needed preventive measures to reduce the risk. After implementation of these measures, all scenarios will present an acceptable risk.

Conclusion This PHA allowed us to highlight HS in our chemotherapy production process. Professional practice evaluations of pharmacy technicians and analytical controls of preparations are part of recommended preventive measures. A timetable for the implementation of measures is being drafted. To improve quality of the entire process, the other critical phases, such as administration, will be analysed. PHA is a method which can be used in cytotoxic production units to assess and optimise risk management.

No conflict of interest

PS-067 | **TRACEABILITY INTENDED FOR PATIENTS: INVESTIGATION OF SUPPLIERS OF IMPLANTABLE MEDICAL DEVICES**

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Background The European Regulatory Framework of Medical Devices is constantly evolving. Soon, hospitals will have to issue to patients traceability support for the medical device they receive. Since 2015 in France, this criterion has been evaluated by health authorities. In a previous study, we observed that few suppliers insert an implant card in the packaging of their implantable medical devices (IMD) (only 28% of references contained an implant card). Therefore, hospitals have to create their own implant card.

Purpose In order to evaluate the suppliers' knowledge and involvement about the traceability intended to patients, we conducted a supplier survey.

Material and methods An online questionnaire was produced (Google Forms) and sent by electronic mail to 47 of the 60 IMD suppliers of our hospital. The 11 questions allowed assessment of the supplier's offer and opinion about traceability of IMDs. The survey lasted 45 days (September to October 2015).

Results 23 (49%) on the 47 suppliers requested answered. 44% of the suppliers admitted that none of their implants contained support for patient traceability, 32% assured that all their implants were delivered with this support whereas 20% declared that only a few of their implants were provided with it. For the number of labels for traceability available on the box, 36% declared they supplied 4 or less labels, which can be a brake in fast transmission of information. More than one-third of the suppliers (40%) were not aware of this obligation of traceability intended for patients. A minority (12%) believed that they were not ready to provide this support. Many of the suppliers were interested in the survey and were ready to improve the situation.

Conclusion A minority of the suppliers provided an implant card in their packaging. A very small number of suppliers felt concerned by the transmission of information to the patient, although it will soon be an obligation. This survey made them aware of the situation and some are ready to help us to improve the situation.

REFERENCES AND/OR ACKNOWLEDGEMENTS
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No conflict of interest

PS-068 ANALYSIS AND IMPROVEMENT OF PRESCRIPTION AND ADMINISTRATION IN HOSPITAL TRANSITIONS

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Background At admission and discharge from the intensive care unit (ICU) to other services, information concerning correct medicines has to be transferred between health professionals. If this information is incomplete or lost, the correct pharmacological treatment is at risk; so it is necessary to analyse adverse events at the inpatient interface in order to optimise the medical treatment at these critical steps.

Purpose To analyse the pharmacological errors and inconsistencies that occur in medical orders of transferred patients to optimise medical treatment and to implement measures to avoid pharmacological errors.

Material and methods The prescription and administration of medicines for patients who were transferred over 2 months were recorded prospectively. The medical orders and nursing administrations were evaluated and collected. We analysed the resulting dataset in terms of frequency and severity of medical errors and regarding acceptance of the clinical pharmacist's interventions. Some measures established on the reported errors were implemented to avoid new problems.

Results 94 patients were included. A total of 158 errors were detected and 64% (60) of the patients evaluated had some medication error. The ICU discharge report information, concerning post-discharge medicines, was only available in 60% (56) of patients at the time of transfer. The most frequent types of errors were: error of omission 28% (44.2), no administration for more than 24–36 hours 21%(33), medication not needed 20% (31.6), double administration 19% (30.2) and error of dose 12% (19). The prescription was correct in 93% of cases and the average number of errors per patient was 2.6. To optimise treatment at the inpatient/outpatient interface, some processes were modified (schedule of drugs administration, PNTs and role of physicians defined). Also, a new role for the clinical pharmacist was established to evaluate prescriptions and to assess the physicians on specific medicines issues.

Conclusion To achieve a higher level of pharmacological safety, some processes of the medical prescription and administration process were modified. The pharmacist plays an important role in the task of detecting and avoiding errors in prescriptions and administrations in hospital transitions.

No conflict of interest

PS-069 SIMULATION TRAINING: AN INNOVATIVE AND EFFICIENT TOOL TO TEACH MEDICATION RECONCILIATION TO PHARMACY STUDENTS

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Background Medication reconciliation is an essential clinical pharmacy activity that requires appropriate knowledge, skills and behaviours. For this purpose, a simulation training programme on best possible medication history and medication reconciliation was developed for clinical pharmacy students.

Purpose To evaluate the feasibility and effectiveness of the training.

Material and methods Over 1 year, 2 pharmacists trained all clinical pharmacy students. The training programme was divided into 3 parts: (1) theoretical part; (2) simulation session using the 'standardised patient's method'; and (3) tutored practice in the clinical unit. The effectiveness of training was evaluated by the achievement of the first 3 levels of the Kirkpatrick model: 'reactions' using a satisfaction survey; 'learning' using a knowledge quiz before and 1 month after training; and 'behaviours', observed by trainers with a competency sheet. Regarding statistical analysis, Z score for paired data was used (α=0.05).

Results 39 students performing their pharmacy internship in 8 clinical units received the training. Statistical analysis showed a significant difference between the quiz's mean score obtained before and after training (13.96/20 vs 17.67/20, Z=13.13, p<5x10^{-10}). All students were deemed competent to formalise a comprehensive best possible medication history. Regarding students' satisfaction, 95% of participants were 'satisfied' or 'very satisfied' with the training programme. The content, organisation, difficulty level and the trainers' availability satisfied more than 97.8% of students. Overall, 100.0% felt that they had acquired new knowledge and that this training will cause a change in their daily professional practice, and 97.3% would like to make it systematic. From an organisational viewpoint, the training was easy to implement. The limiting factor was the time spent by the two trainers. Indeed, this activity was added to the clinical pharmacists' daily work.

Conclusion This training let us to standardise students' medication reconciliation learning in our hospital. It appears to be effective and feasible training. Simulation is an innovative, playful and relevant tool. It allows the combination of 3 essential qualities needed for good medication reconciliation practice: knowledge, skills and behaviours. In future, this training will be extended to other professionals, such as hospital pharmacy technicians.

No conflict of interest

PS-070 THROMBOPROPHYLAXIS OPTIMISATION IN A COHORT OF NEUROCRITICAL PATIENTS

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Background Neurocritical patients have a significant risk of developing further venous thromboembolisms. Therefore, appropriate use of pharmacological and mechanical thromboprophylaxis (TP) is needed to reduce the incidence of these events.

Purpose The aim of this study was to compare the use of TP in two cohorts of neurocritical patients, before and after implementation of corrective measures.

Material and methods A retrospective study of the use of TP was performed in two cohorts of neurocritical patients during their stay in the intensive care unit (ICU). The study was undertaken for the period of time from July to September

2013, and from July to September 2016. Demographic and TP related data were collected. Patients with anticoagulant therapy prior to hospital admission were not included.

Results We included 30 patients (86.6% men), mean age 45.5 years (16–80) in 2013, and 20 patients (75% men), mean age 48.7 years (17–83) in 2016. Median length of stay in the ICU was 17 days (3–51) in 2013 and 16 days (4–48) in 2016. The main diagnoses at admission in 2013 and 2016 were, respectively, acute spinal cord injury (30% vs 50%), stroke (26.6% vs 0%), head injury (23.3% vs 35%) and subarachnoid haemorrhage (3.3% vs 15%).

	2013	2016
Mechanical prophylaxis alone (intermittent pneumatic compression, IPC)		
Treated patients	3.8%	15%
MST	1.7	1 (same day)
MTD	12.3	18.5
Pharmacological prophylaxis alone (LMWH)		
Treated patients	48.1%	20%
MST	5.4	3.25
MTD	8.7	10
Mixed prophylaxis (IPC+LMWH)		
Treated patients	48.1%	65%
MST	13.7	4.8
MTD	11.9	19.8

MST, mean days before treatment; MTD, mean days of treatment.

Conclusion After TP corrective measures were implemented, we observed the following improvements:

- 100% of patients received some method of TP, exceeding the 90% recommended by the Spanish Intensive Society (quality indicator selected), and higher than in 2013 (90%).
- There was an improvement in TP startup time, both mechanical TP and pharmacological TP, as recommended by different clinical practice guidelines.
- An increase in the use of mechanical (51.9% vs 80%) and mixed prophylaxis (48% vs 65%) was documented.

No conflict of interest

PS-071 | **A NEW SEMI-AUTOMATIC TOOL FOR ASSESSING TREATMENT PRESCRIBING BASED ON REAL TIME BLOOD TESTS**

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Background Optimisation of treatment for patients with renal insufficiency (RI) is necessary to avoid excessive or insufficient dosing of drugs. Identification and selection of adequate treatments for RI patients is mainly limited by time.

Purpose To assess data obtained data for the first 2 months after a new semi-automatic validation tool for physicians' prescriptions of treatments for RI patients.

Material and methods A descriptive prospective study of pharmaceutical interventions was conducted. Medications prescribed to RI patients during the first 2 months after implementation of the new software (1 August 2016 to 01 October 2016) were evaluated. Farmatools application from computerised physician order entry system (CPOE) was used to obtain treatments of all kidney failure patients. Inpatients' serum creatinine values were checked from clinical analysis laboratory based on real time blood test. Clearance of creatinine (ClCr) urine values were achieved for equation MDRD-4 (IDMS). Both databases were integrated and associated with Access using ODBC. It identifies RI patients with at least 2 stable values of ClCr <60 mg/min/1.73 m^2. Every day, a report on prescribed treatment for RI patients was automatically generated and a suitable treatment was proposed automatically by the new software for each patient. The pharmacist validated the generated reports each day and informed the physicians about differences detected between the original prescriptions and the semi-automatic recommendations tool, using CPOE. The number of pharmaceutical interventions carried out, medical departments and drugs involved were analysed.

Results There were 2076 inpatients during the study period. Medication prescriptions and RI were checked every day during hospitalisation for all of them. New software allowed the pharmacist to check all CLCr values and prescribed treatments of each inpatient in less than 10 min a day. A total of 33 pharmacist recommendations in 32 inpatients were recorded. internal medicine (63.6%), cardiology (12.1%) and neurology (9%) were departments with more pharmaceutical suggestions. Drugs most frequently involved were: ranitidine (27.8%), ramipril (12.1%), morphine (9.1%), enalapril (6.1%), levofloxacin (6.1%), enoxaparin (6.1%), allopurinol (6.1%), simvastatin (6.1%) and spironolactone (6.1%).

Conclusion The new semi-automatic validation tool allowed time optimisation: the assessing team of RI patients was able to check all treatments of inpatients quickly each day. More than 25% of pharmacist interventions involved ranitidine. The most frequent discrepancies detected were carried out in internal medicine and cardiology inpatients.

No conflict of interest

PS-072 | **ORAL CONTRACEPTIVES AND RISK OF THROMBOEMBOLIC EVENTS**

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Background Oral contraceptives (ACOs) have been associated with an increase in thromboembolic events (TE) in women. TE severity and wide use of ACOs make it necessary to promote further studies.

Purpose To estimate the incidence of exposure to treatment with ACOs in hospitalised women diagnosed with TE. To describe treatment related risk factors associated with TE. To determinate causality and severity of adverse drug reactions (ADRs) of TE related to ACOs therapy. To communicate ADRs not reported to the National Pharmacovigilance Centre.

Material and methods This was a descriptive retrospective observational study. Cases of TE in women (15–49 years) were identified in a tertiary hospital from January 2013 to June 2015. Those who had taken ACOs were selected and

their medical records (MR) were revised. TE were classified as arterial (ATEs) and venous (VTEs) thromboembolic events. Risk factors associated with ACOs therapy were collected:

- Progestogen composition: progesterone, spironolactone, testosterone derivatives (third or fourth generation in testosterone derivatives).
- Starting time of therapy with regard to TE onset.

All ADRs were classified according to its causality (Karl Lasagne algorithm) and severity (Schenneider *et al*), and were notified.

Results Among 61 TE episodes, 36% (22) of women had been exposed to ACOs at the time of hospital admission or approximately a month before; 76.47% (17) were VTEs and 11.76% (3) corresponded to ATEs. ACO composition was found in 50% (11) of MR. 45.45% (5) of the contraceptives had spironolactone derivatives, 36.36% (4) progesterone derivatives and 18.18% (2) testosterone derivatives, one of them fourth generation progestagen and the other third generation. Start time and period of therapy were recorded in 54.5% (12) of MR. 50% (6) of patients had started ACOs therapy less than a year before the TE episode. 100% of ADRs were classified as 'possible'. 100% of TE caused hospitalisation. Only 50% of ADRs were notified as the other 50% lacked data.

Conclusion A high incidence of TE related to ACOs therapy stands in contrast with the low percentage of ADR notification for ACOs. To improve safety, it is essential to keep promoting ADR notifications.

No conflict of interest

PS-073 | **PATIENT RECORDS ANALYSIS FOR POTENTIALLY PREVENTABLE ADVERSE DRUG EVENTS LEADING TO ACUTE KIDNEY INJURY FOLLOWING A PROPENSITY MATCHED COHORT STUDY**

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Background Relevant inhospital adverse drug events (ADE) are often documented in clinical administrative data (CAD) using ICD-10 codes (International Classification of Diagnosis Related Diseases, 10th revision). In a previous propensity matched cohort study, we analysed the CAD of 48 072 inpatients of a university hospital for potentially preventable inpatient ADE affecting length of stay. From a hospital's perspective, particularly ICD-10 codes coding for drug induced renal failure, appeared to be preventable.

Purpose We aimed to evaluate causes and conditions leading to renal failure in hospital and develop prevention strategies.

Material and methods We assessed the validity of such codes in patient records and evaluated whether acute renal failure occurred during the hospital stay. Using the updated causality score by Bégaud *et al*, we currently assess, using 2 independent reviewers, whether acute renal failure was drug related.[1] Based on root cause analyses, preventive strategies will be developed.

Results The records of 69 patients were analysed (mean age 62 years (range 23–94), 33% women). 26 cases (38%) had a known history of renal failure or were hospitalised because of acute renal failure. In 43 cases (62%), the adverse event occurred in hospital. Nearly half of these cases (n=20) had a known history of renal failure. The pilot results of four randomly selected cases of this ongoing assessment revealed 6 suspect drugs with a high imputability to the ADE (1 drug with level I4 and 5 drugs with level I6 out of 7 possible scores from I0 to I6). As conceivable prevention strategies, we identified a priori dose adjustment and/or longer intravenous application duration for nephrotoxic drugs (eg, aciclovir) in patients with a known history of renal failure.

Conclusion Unless CAD do not explicitly flag inpatient ICD-10 codes, CAD based ADE identification is laborious, and adequate risk management by the hospital is challenging. Screening for (pre-existing) renal (dys)function at the stage of hospitalisation for appropriate dose adjustment could prove a promising preventive strategy for our hospital.

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No conflict of interest

PS-074 | **EFFECT OF ELECTRONIC MEDICATION ADMINISTRATION RECORD APPLICATION ON PATIENT SAFETY**

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Background New technology can improve patient safety but also has the potential to introduce new errors and risks into healthcare delivery

Purpose To evaluate the effect of an electronic medication administration record (eMAR) application on the rate of medication errors in medication administration recording (ME-MAR).

Material and methods A before and after, quasi-experimental study was conducted in a university hospital that was implementing the eMAR application. eMAR application implementation took place in March 2014. Data collection was conducted in April 2012 (pre-) and June 2014 (post-) by two pharmacists. The ME-MAR found were clarified by the staff involved to discover the cause. A group of experts in patient safety was set up with the task of reviewing the ME-MAR to classify and determine their potential future risk. ME-MAR were classified according to the taxonomy defined by the Ruiz-Jarabo 2000 group. ME-MAR found in the post-implementation period were also classified according to technology induced error taxonomies defined by Magrabi *et al*. The potential future risk was assessed according to the risk matrix defined by Vicente *et al* 2016. All statistical analyses were performed using STATA V.12 software.

Results The pharmacists observed 2835 (pre-) and 2621 (post-) MAR, respectively. Overall, the rates of ME-MAR decreased from 48.11% (pre-) to 37.15% (post-) (p<0.05). They were found to be the same types of ME-MAR, except MAR with incomplete information that disappeared post-implementation. The type of ME-MAR more frequent in both phases was MAR at the wrong time (31.64% vs 30.18%). The main

cause of ME-MAR in both phases was failure to follow work procedures. There were overall differences in the potential future risk of the ME-MAR between the two phases (p<0.05). Following the technology induced error taxonomies, all ME-MAR were use errors due to human factors and 1.24% (12) of ME-MAR did not exist in the pre-implementation period.

Conclusion Use of the eMAR application significantly reduced the rate of ME-MAR and their potential risk. The main cause of ME-MAR was failure to follow work procedures. Thus new strategies should be developed for improving the work procedures and integrating the use of a newly introduced eMAR application into nurses' daily work.

No conflict of interest

PS-075 | **PARAMETISATION OF A PROGRAMME ASSISTED ELECTRONIC PRESCRIPTION IN PSYCHIATRY**

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Background It has been demonstrated that assisted electronic prescription (AEP) is an effective measure of reducing medication errors. It is necessary to correct parameterisation of the system, adapting it to the peculiarities of each clinical unit.

Purpose To establish parameterisation requirements of an AEP tool, prior to implementation in a psychiatric service (PS).

Material and methods From the AEP (Mira) programme, we proceeded to make decisions for adaptation of the PS; 30 beds belonging to a reference hospital area acted as a pilot for the implementation of the AEP in all of the hospital. Firstly, we performed an analysis of service needs according to consumption of drugs during the previous year (class of drugs, routes and hours of administration). Later, we took parameterisation decisions: (1) to facilitate prescription/administration, such as regular dosing schedule, preconfigured protocols, information about restrictions drugs and administration instructions; (2) to provide safe prescriptions, such as, maximum dose alerts, drug interactions (DI), high alert medications (HAM) and narrow therapeutic margin (NTM).

Results During the previous year, the PS had used 151 active substance, 487 products and 73 699 dispensation units. 85% of the prescribed drugs belonged to 3 therapeutic groups according to the ATC classification: N-nervous system (43%), C-cardiovascular system (23%) and A-digestive system (19%). 76.3% of drugs were administered orally, followed by intramuscularly (7%). It was possible to parameterise default regular dosing schedule in 59% of medicines. Most administration instructions were related to oral administration: 25.3% with food and 16.3% without food. Furthermore, 3 protocols for clinical condition were created: 'if agitation', that included haloperidol, biperiden and clonazepam. Finally, to improve safety, we selected 6 DI considered clinically relevant and established maximal doses in 70.2% of active substances according to the technical data sheets. We discarded incorporation of all alerts of HAM or NTM to reduce saturation and increase effectiveness of those selected.

Conclusion We consider that parameterisations can facilitate previous work on implementation in other units, adapting the tool to the peculiarities of each service. PS benefits from the existence of a regular dosing schedule for most drugs. However, their prescriptions are not easily protocolised. We have highlighted a large number of drugs with maximum established dose, which can be useful to the prescriber who caters for chronic patients, whose reason for hospitalisation is often therapeutic failure which could lead to an excessive increase in doses.

No conflict of interest

PS-076 | **A NEW PHARMACEUTICAL ORGANISATION FOR MEDICATION RECONCILIATION IN AN EMERGENCY DEPARTMENT**

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Background Since June 2016, medication reconciliation (MR) has started in an observational unit of our emergency department (ED) where patients are waiting before their transfer to permanent care units. Patient's best possible medication history (BPHM) is collected by a pharmacy intern who transmits it to the referent pharmacist of the transferred care unit. Then, the referent pharmacist compares BPHM with the admission prescription produced by the specialist in this unit and detects unintentional discrepancies (UD). If a UN is found, he alerts the prescriber and tracks the pharmaceutical intervention (PI). 8 pharmacists are involved in this organisation: 1 pharmacy intern in ED and 7 referents of care units.

Purpose The objectives were to assess the benefits of this new organisation on the safety and quality of drug management at admission and during hospitalisation.

Material and methods From June 2016 to September 2016, all patients with a BPHM collected during their stay in the ED were included. The following data were collected and analysed with Excel: time for collecting BPHM and comparing it with admission prescriptions; number and types of UD; and number and acceptance rate of PI.

Results 75 patients were reconciled. Median times were: 20 min to obtain BPHM in the ED and 10 min for the referent pharmacist to finalise MR. 30 UD were identified, including 19 (63%) drug omissions and 11 (37%) incorrect frequencies or incorrect dosages. Mean number of UD per patient was 0.4 (30/75) and 27% (20/75) of patients had at least 1 UD in their prescriptions. 30 PI were found and 93% (28/30) were accepted by prescribers.

Conclusion Although patients' BPHM were collected at admission in the ED and traced in their files, referent pharmacists found UD in admission prescriptions after transfer to care units. Thanks to this organisation, medications errors were avoided and acceptance rate of PI was important. Sharing of MR steps allowed referent pharmacists to take time for these clinical pharmacy activities. MR, already well accepted and considered a support by emergency physicians, is ongoing. It will be necessary to assess the relevance of this new organisation by measuring the clinical impact of PI.

No conflict of interest

LONG TERM HEPATOTOXICITY OUTCOME OF ENDOTHELIN RECEPTOR ANTAGONISTS AS TREATMENT IN PULMONARY ARTERIAL HYPERTENSION

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Background Bosentan and ambrisentan, endothelin receptor antagonists, are used as treatment for pulmonary arterial hypertension (PAH), alone or in combination. It is known that elevations in liver aminotransferases (AST/ALT) associated with bosentan and ambrisetan are dose dependent, and hence aminotransferases levels must be monitored.

Purpose To analyse hepatotoxicity in patients diagnosed with PAH treated with bosentan or ambrisentan.

Material and methods A retrospective observational study was conducted from 2010 to 2016. We included all patients receiving treatment with bosentan or ambrisentan for at least 2 months. We registered AST and ALT levels prior to initiation of treatment, at 2 and 8 weeks after initiation and then monthly. Based on the summary of product characteristics, we considered aminotransferases levels 3 times the upper limit of normal (ULN) as hepatotoxicity. Information was obtained from electronic medical records (SAP).

Results We enrolled 39 patients (37 women, 2 men) with a mean age of 57 years (20–85) at the start of treatment with bosentan. The mean period of treatment until the end of the study was 57.2 months (2–146). During the study period, we registered 3×ULN in 18% of patients; 57% required a reduced dose, 14% stop treatment and the rest did not required modification of treatment. 6 patients (5 women, 1 man), with a mean age of 51 years (45–77) (at the start of treatment) were treated with ambrisentan. At the end of period of study, mean time of treatment was 18.5 months. We registered 3×ULN in 33% of patients; in any case, medical prescription changed treatment.

Conclusion The hepatotoxicity results registered in our study were very similar to outcomes from clinical trials. The pharmacist must check the correct dose, based on AST/ALT level. Also, side effect are dose dependent and mainly asymptomatic, but nevertheless some cases of liver cirrhosis and liver failure have been reported.

No conflict of interest

DEVELOPMENT OF RHEUMATOLOGY SHARED CARE GUIDELINES: IMPROVING TRANSITIONAL CARE

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Background Shared care guidelines (SCGs) assist healthcare professionals and patients in clinical decision making while ensuring safety and continuity of care during movement of patients between primary and secondary care settings.

Purpose To develop shared care guidelines for rheumatology drugs taking into account the role of the community pharmacist.

Material and methods A literature review to identify existing foreign SCGs was carried out to design the optimal rheumatology shared care guideline template for a local scenario. Data from the Interface Pharmacist Network Specialist Medicines, summaries of product characteristics and international monitoring guidelines were used to compile the shared care guidelines for infliximab, methotrexate, azathioprine and hydroxychloroquine. A questionnaire assessing the design, content and layout of the SCGs was disseminated to an expert panel consisting of hospital and community pharmacists, specialist clinicians and general practitioners.

Results The SCGs consisted of 3 main sections. Section A outlined the pharmacological background of the drug, indications, drug administration and dosage regimen. Section B defined the associated responsibilities of the healthcare professionals working within the secondary healthcare infrastructure, general practitioner, community pharmacist and the patient. A shared care details sheet to address communication issues between the different healthcare settings was also designed. Section C included appendices for clinical particulars; monitoring and dosage worksheets; shared care request form; acceptance letter by GP to participate in shared care; and pharmaceutical care documentation sheet. All members of the expert panel (n=10) agreed that the community pharmacist who is dispensing the rheumatology medications is part of the extended healthcare team. All members agreed that communication with the community pharmacists should be improved and that the guidelines designed provide the necessary information and knowledge to participate in shared care. A common consensus was that ideally the guidelines should be more concise.

Conclusion Patient safety can be compromised as patients move across the primary and secondary care settings. The expert panel agreed that the SCGs compiled are essential for improving communication between healthcare professionals across different care settings, thereby improving patient care and safety.

No conflict of interest

ANALYSIS OF THE DATA OBTAINED FROM ELABORATION OF A GUIDE FOR ADMINISTRATION OF DRUGS THROUGH ENTERAL FEEDING TUBES

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Background The oral route of administration for drugs is often unavailable for several reasons. These difficulties often require placement of an enteral feeding tube (EFT) to supply nutritional support and pharmacological treatment. A Guide for the Administration of Drugs through Enteral Feeding Tubes (GADEFT) aims to provide clear and easily accessible information for the general and standard rules on how to select, manipulate and administrate drugs.

Purpose Analysis of the data obtained from elaboration of a GADEFT for drugs included in a pharmacotherapeutic guide (PG) of a tertiary hospital.

Material and methods Drugs administered through EFT were collected from the recently updated PG. For each active

ingredient (AI) and pharmaceutical form (PF) the following bibliography was reviewed: other guides, summaries of products characteristics, databases, specialised books and publications. Laboratories were also consulted when no information was found on the previous alternatives. We collected: AI; brand name; PF; possibility of administration via a nasogastric tube (NGT); percutaneous endoscopic gastrostomy (PEG); nasoenteric tube (NET) (including nasoduodenal and nasojejunal tubes) and percutaneous endoscopic jejunostomy (PEJ); stability of the manipulated drug; alternative drug available; drug–food/enteral nutrition interactions; manipulating instructions according to the National Institute for Occupational Safety and Health (NIOSH) list; relevant information; and pharmaceutical laboratory and bibliographic references where the data were cited. In the event of disparity, the most recent bibliography and the one with the greatest scientific weight were selected.

Results 654 records were obtained, 537 different AI. 64 requests for information were made to laboratories. 22.3% (146/654) must not be administered via NGT and PEG, mainly due to manipulation of the PF. We did not obtain enough information about administration through EFT in 30.1% (44/146). It was not possible to recommend an alternative drug in 67.7% (96/146). Of the total records, there was no information on the stability of manipulated drugs in 88% and data supported the possibility of administering drugs via NET and PEJ in only 4.4%.

Conclusion A GADEFT increases the quality of the health assistance as well as the safety of patients and health professionals. However, more studies are needed on stability and administration via NET and PEJ.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Pharmacy service.

No conflict of interest

Results Some of the identified problems using the ATC classifications can be illustrated following a patient admitted to hospital with the medicines prescribed on admission shown in the first table.

Medicine	Active ingredient	ATC description	ATC-code
Losartan Tab 50 mg	Losartan	Losartan	C09CA01
Furix Inj 10 mg/mL	Furosemide	Furosemide	C03CA01
Fortil eye drops	Pilocarpin and timolol	Timolol, combinations	S01ED51

The patient was allergic to paracetamol (ATC: N02BE01) and penicillin (ATC: J01CE02). During the stay 2 new drugs were prescribed to the patient (as shown in the second table).

Medicine	Active ingredient	ATC description	ATC-code
Penicillin Inj 2 mill IE	Benzylpenicillin	Benzylpenicillin	J01CE01
Cozaar Comp 50 mg/12.5 mg	Losartan/ hydrochlorothiazide	Losartan and diuretics	C09DA01

These examples of new prescriptions will not give rise to any warnings to the doctor for penicillin allergies or duplicate prescriptions of losartan as there is no match between the ATC codes of the drugs involved.

Conclusion Use of the ATC classification as a single index for warnings on duplicate prescriptions and other critical warnings will lead to lack of clinically relevant warnings in the CPOE systems. Manual connexion of ATC codes or using different levels of the ATC code could be a solution, but is time consuming and will not be very reliant over time.

No conflict of interest

PS-080 | **THE USE OF ATC CODES AS INDEX FOR DECISION SUPPORT IN COMPUTERISED PHYSICIAN ORDER ENTRY SYSTEMS**

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Background The most common way of introducing decision support in computerised physician order entry (CPOE) systems is warnings on drug combinations that should be avoided, such as drug–drug interactions or duplicate prescriptions. To allow for the CPOE to provide decision support, the system needs structured drug registers and indexes. One index that is commonly used in CPOE solutions is the Anatomical Therapeutic Chemical Classification (ATC) System developed by World Health Organisation (WHO).

Purpose The purpose of this study was to evaluate the use of ATC codes as an index in a CPOE decision support system for duplicate prescribing and other critical warnings.

Material and methods The study demonstrates how the ATC classification as an index gives some incorrect warnings and lack of other relevant warnings for prescribing as there is no 1:1 relation between the ATC code and the active ingredients. This was shown using prescribing examples and knowledge on algorithms for duplicate prescribing and critical warnings in CPOE systems.

PS-081 | **MONITORING KEY PERFORMANCE INDICATORS ON PHARMACEUTICAL VALIDATION: FEEDBACK OVER A MILLION PRESCRIPTIONS IN A GENERAL HOSPITAL**

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Background Computerisation of medical prescriptions in our hospital began on 2006 and reached 100% in 2013 with complete pharmaceutical analysis. The activity indicators are monitored on a monthly basis.

Purpose The objective was to analyse the evolution of our practices over the past 6 years on more than 1 million prescriptions. The study focused on the impact of pharmaceutical interventions (PIs), their relevance and their consideration.

Material and methods From January 2010 to June 2016, key performance indicators on pharmaceutical validation were monitored on a monthly basis (number of prescriptions, prescription and validation schedules, number of PI and their consideration). Indicators were retrospectively analysed via prescription software (Dxcare, Medasys).

Results Over the study period, 1 080 115 prescriptions were validated. In the first quarter of 2016, it represented 763 lines of prescription per day. Pharmaceutical validation was made in real time: the schedules of prescriptions and pharmaceutical

validation were similar. The percentage of PIs made by pharmacists did not stop decreasing over 6 years: 9.2% in 2010 versus 3.9% at the end of the first quarter of 2016. In the same way, the percentage of pharmaceutical refusals decreased by a factor of 2 between 2010 and 2016 (respectively, 4.1% and 2.1%). However, the period of time between the transmission of a PI by the pharmacist and the physician reaction hardly evolved. For instance, in 2016, 42% of PIs were taken into account within the first 24 hours that followed their establishment against 36% in 2010. Nevertheless, this observation also depended on the therapeutic class. A study carried out in the hospital on the appropriate use of direct oral anticoagulants (DOA) revealed that 73% of the PIs established for the DOAs in 2016 were taken into account within the first 24 hours, against 40% in 2014.

Conclusion Through the computerisation of prescriptions, pharmaceutical analysis and transmission of PIs can be facilitated. The actions carried out by the pharmacists greatly improved the accuracy of prescriptions by raising awareness of the physicians about proper use of drugs, in particular therapeutic classes at risk.

No conflict of interest

PS-082 | **DRUG RELATED RISK FACTORS AND FALLS IN HOSPITALISED OLDER ADULTS MEASURED WITH AN ELECTRONIC INCIDENCE REPORTING SYSTEM**

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Background Falls are a major cause of morbidity in older people, and a matter of concern in hospitals and long term care settings. Drugs may contribute to an increase in the risk of falling in these patients.

Purpose To identify drug related risk factors associated with falls during hospital stay in older adults admitted to a medium stay hospital with an electronic error and adverse event reporting system.

Material and methods This was a retrospective observational study of all patients admitted to our hospital in November 2015. Demographics and medication data were collected from electronic medical records, and falls were registered with an electronic incidence reporting system. Errors and adverse events related to care were reported by all health professionals of the hospital, and were analysed by the pharmacists. We assessed the incidence of falls in different groups regarding drug related variables: polypharmacy (≥ 5 chronic medications), hyperpolypharmacy (≥ 10), anticholinergic burden measured with the anticholinergic risk score (ARS) and STOPP criteria section K (drugs that predictably increase the risk of falls: benzodiazepines and neuroleptics).

Results 96 patients were included, mean age 82.3 years (SD=7.6); 66 (68.8%) were women. Mean length of hospital stay was 25.9 days (SD=11). 15 falls were reported (15.6% of patients); 5 of 33 patients from the convalescence unit (15.2%), 6/48 from the rehabilitation unit (12.5%) and 4/15 from the psychogeriatry unit (26.7%). Polymedicated patients fell more than non-polymedicated (13/74 (17.6%) vs 2/22

(9.1%) (p=0.508)) and also those with hyperpolypharmacy (7/29 (24.1%) vs 8/67 (11.9%) (p=0.131)). There were more falls in those with higher anticholinergic risk: low risk (ARS=0) 5 falls in 49 patients (10.2%); medium risk (ARS=1–2) 7/39 (17.9%); high risk (ARS ≥ 3) 3/8 (37.5%) (p=0.105). Patients taking benzodiazepines experienced more falls (11/62 (17.7%) vs 4/34 (11.8%) (p=0.440)) and also those taking neuroleptic drugs (5/23 (21.7%) vs 70/73 (13.7%) (p=0.354)). Statistical significance was not reached.

Conclusion Polypharmacy, anticholinergic burden and STOPP criteria may be associated with a higher incidence of falls in older people admitted to a medium stay hospital. It is important to address the risk of falling in these patients according to their medications, and electronic incidence reporting tools can allow assessment of the risk and initiate interventions.

No conflict of interest

PS-083 | **MEDICATION REVIEW AND MEDICATION RECONCILIATION: MOST FREQUENT ERRORS IN ELDERLY POLYMEDICATED PATIENTS**

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Background Medication errors are currently a health problem of great magnitude, which causes the appearance of problems related to drugs and adverse drug reactions, an increase in morbidity and mortality, and healthcare costs.

Purpose To analyse the impact of pharmaceutical interventions in traumatology and emergency services in a tertiary hospital.

Material and methods A retrospective descriptive study was conducted from June to July 2016. We choose emergency and traumatology departments because in our hospital there are a multidisciplinary team in these units, including an internist, geriatrician, orthopaedic surgeon and pharmacist. In the emergency department we only selected institutionalised patients, while in the traumatology service we selected patients with some type of fracture, whether or not they were institutionalised. We identified newly hospitalised patients aged >75 years and compared patients' usual medicines with prescribed medicines. Data collected were: number of patients reconciled, number of drugs evaluated, number and type of discrepancies, and medicine errors identified.

Results We reconciled 68 patients (mean age 86.5 years) (53 women). Each patient took an average of 9.7 drugs chronically. A total of 81 recommendations were made. This corresponds to an average of 1.2 recommendations per patient (0–8). Of the total recommendations, 70 corresponded to unjustified discrepancies and 19 accounted for prescription errors. The main types of discrepancies were unjustified omission (24), commission (10), duplication (2), dosage (26) and unnecessary medication (8). The main prescription errors detected were dosage (1), duplication (1), indication (1), STOPP-START criteria[1] (2) and pharmacotherapeutic exchanges (14). Of the 68 patients reconciled at admission, 37 required more than 1 pharmaceutical intervention. Among the types of interventions, 33 required more than 1 pharmaceutical intervention corresponding to unjustified discrepancy, and there were 14 prescription errors.

Conclusion Medicines reconciliation is important in emergency and traumatology departments because of the proportion of

elderly patients and the amount of drugs for chronic treatment, and numerous discrepancies requiring clarification. Omission of a medicine was the most common unjustified discrepancy. The pharmaceutical intervention is important in order to avoid possible medications errors that could cause damage to the patient. We should improve communication with clinical teams to encourage patient safety.

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No conflict of interest

Anti-TNF	No of patients	Total No of DRP	DRP per patient
Infliximab	44	36	0.8
Etanercept	19	37	1.9
Adalimumab	22	48	2.2

There were statistically significant differences when comparing total number of DRP with each drug (p=0.005), with a higher prevalence using adalimumab. There were 5 treatment changes undertaken between the 2 interviews: 2 because of safety DRP (optic neuritis in a patient with adalimumab; recurrent herpes virus infections in a patient with infliximab) and 2 because of ineffectiveness (1 patient with adalimumab; 1 patient with infliximab) and 1 because of the patient's comorbidities.

Conclusion Infliximab presented less DRP per patient. The data suggest a better safety and effectiveness profile for infliximab according to the number or related DRP compared with other anti-TNF.

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No conflict of interest

PS-084 NEGATIVE RESULTS ASOCCIATED WITH TNF ANTAGONISTS IN RHEUMATOID ARTHRITIS AND ANKYLOSING SPONDYLITIS

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Background Drug related problems (DRP) are defined as negative clinical outcomes resulting from pharmacotherapy, which do not achieve therapy objectives or produce undesirable effects. They can be necessity, safety or effectiveness DRP.

Purpose To measure the incidence of DRP (effectiveness and safety) in patients with rheumatoid arthritis (RA) and ankylosing spondylitis (AE) treated with TNF antagonists (anti-TNF).

Material and methods A transversal, prospective, observational study was carried out in patients with AR and AE from the rheumatology unit in our hospital. Patients were selected by controlled randomisation (C4-study design pack), with voluntary study participation. Exclusion criteria: patients with anti-TNF for <3 months and <18 years. Pharmacotherapy follow-up (PFU) was conducted according to Dáder methodology-Universidad de Granada. All patients were interviewed twice a year. Variables collected: demographics (age, sex); clinical (diagnosis, time from diagnosis (TFD); and therapeutic: (previous and actual anti-TNF drug, initiation of use, adverse effects). Statistical study was conducted with Epidat 3.1-programme.

Results 85 patients were included. RA: mean age 49.7±6.62 years (83.9% women), TFD 11.5±9.2 years. AE: mean age 41.6±6 years (31% women), TFD 9.5±7.6 years. The table shows the DRP since PFU.

Disease-anti-TNF	No of patients	Total No of DRP-effectiveness	Effectiveness DRP per patient	Total No of DRP-safety	Safety DRP per patient
RA-infliximab	25	9	0.4	9	0.4
RA-etanercept	14	3	0.2	18	1.3
RA-adalimumab	17	5	0.3	30	1.8
AE-infliximab	19	9	0.5	9	0.5
AE-etanercept	5	3	0.6	13	2.6
AE-adalimumab	5	3	0.6	10	2

PS-085 ESTABLISHING A PROCESS FOR MAINTAINING NEW TREATMENT WITH NEW ORAL ANTICOAGULANTS DURING TRANSITION FROM HOSPITAL TO A COMMUNITY SETTING

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Background New oral anticoagulants (NOAC), such as apixaban, rivaroxaban and dabigatran, are indicated for stroke prevention in atrial fibrillation and acute thromboembolic events. Provision of treatment with NOAC is contingent on prior administrative approval according to district criteria in order to obtain the health service provider's discount. Before our project, there was no clear policy for submission of requests when starting treatment with NOAC during hospitalisation. Many patients discharged from our hospital with a prescription for NOAC without the administrative approval chose not to purchase the drug at full price and to turn to the family physician to request administrative approval. As a result, a gap in medical treatment may occur which puts the patient at risk that may have negative consequences on their health state.

Purpose To establish a process and implement a workflow for requesting administrative approval when starting NOAC treatment during hospitalisation.

Material and methods

- Mapping the desired process for requesting administrative approval for new treatment with NOAC for patients members of Clalit Health Services (CHS), the largest health maintenance organisation (HMO) in Israel. Meir Medical Centre belongs to Clalit HMO.

- Creating a request form for the administrative approval.
- Presenting the process in the internal wards.
- Implementing the process and conducting a pilot in internal wards while monitoring sending requests and receiving administrative approval for the treatment.

Results Before starting our project, we collected data regarding request submission when starting treatment with NOAC. We found that of 42 patients (members of Calit HMO) who started a new treatment, only 1 (2.4%) approval request was sent during hospitalisation. Preliminary data at the end of a month of a pilot in 3 internal wards showed that treatment with NOAC was started for 32 patients. 22 (68.7%) were members of Clalit HMO. For 14 (63.6%), a request form for the administrative approval was sent while they were still hospitalised.

Conclusion By establishing a process for requesting administrative approval for new treatment with NOAC during hospitalisation, we improved patient safety and ensured continuity of treatment with these important drugs during transition from the hospital to the community setting.

No conflict of interest

PS-086 | **ADDING LOW DOSE ALLOPURINOL AS HEPATOPROTECTOR TO THE MAINTENANCE TREATMENT WITH MERCAPTOPURINE IN CHILDREN WITH ACUTE LYMPHOBLASTIC LEUKAEMIA**

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Background It is believed that allopurinol alters the metabolism of mercaptopurine in favour of 6-thioguanine nucleotide (6TGN), decreasing the production of 6-methyl-mercaptopurine (6MMP). 6TGN is responsible for leukocyte suppression, and 6MMP is associated with liver and pancreatic toxicity.

Purpose To evaluate the protective effect of low dose allopurinol on liver toxicity induced by mercaptopurine.

Material and methods We describe 3 cases of children with acute lymphoblastic leukaemia receiving maintenance treatment with daily mercaptopurine and weekly oral methotrexate according to ALL/SEHOP-PETHEMA-2013 protocol, that required interruptions due to hepatotoxicity secondary to mercaptopurine.

Results The 3 patients (2 boys 13 and 4 years old and 1 girl 3 years old) required discontinuation of treatment at 2, 19.8 and 13 weeks due to hepatotoxicity (ALT 15, 10.5 and 11.4 times above the upper limit of normal ($\times$ULN); AST 8.4, 6.2 and 3.1$\times$ULN, respectively). The treatment was restarted after 1 week with dose reduction to 25%, 95% and 55%. ALT was 6.1, 3 and 2.6$\times$ULN, and AST 2.1, 1.8 and 0.9$\times$ULN. After 16, 27 and 16 weeks of initiating maintenance treatment, allopurinol was added due to a new increase in ALT (8.1, 17.3 and 10.9$\times$ULN) and AST (3.3, 5.7 and 4.1$\times$ULN), with a dose of 30%, 75% and 55%, which were reduced to 25%, 50% and 28%, respectively. In the first patient, the same dose was maintained for the next 24 weeks with an ALT median of 0.59$\times$ULN (range 0.3–4.0) and AST 0.7$\times$ULN (range 0.5–

2.9) and subsequently was increased to 37.5%. In the second, the dose was maintained for the next 11 weeks with an ALT median of 6.8$\times$ULN (range 1.4–17.1) and AST 3.2$\times$ULN (range 1.0–9.3). At 14 weeks, the dose was increased to 40% with an ALT median of 5.4$\times$UNL (range 2.8–10.5) and AST 2.1$\times$UNL (range 0.9–3.6), and at 25 weeks it was increased to 50%. In the third patient, the dosage was increased every 2 weeks for the next 5 weeks (40% and 55%) with an ALT median of 8.5$\times$ULN (range 3.6–11.4) and AST 2.8$\times$ULN (range 1.2–4.1).

Conclusion Addition of allopurinol to mercaptopurine allowed better tolerance to the treatment without new episodes of hepatotoxicity and with appropriate myelosuppression.

No conflict of interest

PS-087 | WITHDRAWN

No conflict of interest

PS-089 PROTOCOL BASED USE OF POTASSIUM BINDERS IN INTERNAL MEDICINE WARDS IS ASSOCIATED WITH A DECREASE IN TREATMENT RELATED ADVERSE REACTIONS

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Background Hyperkalaemia is a common, potentially life threatening, disorder. Potassium binders (eg, sodium polystyrene sulfonate (Kayexalate)) are the mainstay of hyperkalaemia treatment regimens. However, there is no protocol for the use and monitoring of these drugs in our institution, nor did we find any published guidelines.

Purpose To evaluate the safety of non-protocol based treatment of hyperkalaemia using Kayexalate in internal medicine wards. Our hypothesis was that repeat administration of the drug is associated with higher toxicity than single administration and monitoring.

Material and methods This was a retrospective observational study. The study included all patients treated with Kayexalate during 2013 in internal medicine wards. Patients receiving chronic Kayexalate treatment, and patients treated during anuric shock who died during treatment, were excluded. Patients were divided according to initial computerised treatment order: 'once' order (repeated according to laboratory results) or 'constant' order (x1/day, or x2/day, etc). Data collected included: pretreatment potassium level, number of doses given until normokalaemia, mean total doses given, hypokalaemia events (potassium levels <3.5 mEq/L), and time to first post-treatment laboratory results. Hypokalaemia was considered treatment related if it occurred during 48 hours post-treatment.

Results A total of 696 treatment events met the inclusion and exclusion criteria of the study. We found significant inter- and intra-ward differences in preference of treatment regimens. Regimen choice of constant orders was associated with higher pretreatment potassium levels (p<0.0001). A total of 91 hypokalaemia events were documented. Hypokalaemia events were significantly more common in the constant versus the once treatment regimens (23.85% vs 6% respectively, p<0.0001). Mean time to first post-treatment laboratory assessment was 14.4 hours. Mean number of doses given until normokalaemia was 1.2 doses, while mean total number of doses was 3.9 doses.

Conclusion Lack of treatment protocol was associated with significant inter- and intra-ward differences in treatment and monitoring regimens. Treatment using constant regimens was significantly associated with superfluous doses and higher treatment related hypokalaemia. In light of these findings, we have developed and implemented an institutional treatment protocol. The post-intervention data are being processed—final results are pending. So far the results show a significant decrease in the number of treatment related hypokalaemia events.

No conflict of interest

PS-088 THE IMPACT OF A CLINICAL PHARMACIST'S CONSULT ON DOCTORS MANAGEMENT OF DRUG–DRUG INTERACTIONS WITH POTENTIAL QT PROLONGATION IN AN INTERNAL MEDICINE WARD

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Background LQTS, the long QT syndrome, is associated with an increased risk of ventricular arrhythmias, named torsades de pointes (TdP). TdP can result in ventricular fibrillation and sudden death. The incidence of such arrhythmia is often a result of polypharmacy and drug–drug interactions. Several studies have shown an advantage of pharmacist involvement in monitoring and reducing the risk.

Purpose The purpose of this study was to evaluate the potential role of a clinical pharmacist consult on monitoring and management of pharmacodynamic drug–drug interactions potentially causing QTc prolongation.

Material and methods This was an observational and retrospective study. It included all admissions to a single 44 bed internal medicine department during 2013 for whom a 'combination of drugs' was prescribed. The 'combination of drugs' was defined as pharmacodynamic drug–drug interactions of major severity, potentially causing QTc prolongation. The study group, as opposed to the control group, received a clinical pharmacist consult and interventions. Demographic data and risk factors were collected and ECG records were obtained. Patients' files were scanned for doctor's mentioning of ECG results in the follow-up, and treatment interventions. The ECG records were read by an internal medicine resident. Evaluation of the impact of pharmacist consult on doctor's follow up, and ECG records, was made. Factors affecting a doctor's decision to intervene were identified.

Results During the study period, pharmacist consultations were written in 643 electronic charts. About 6% of the total consultations involved QT prolonging interactions. Pharmacist consult resulted in higher ECG recordings (71.8% vs 39.2%; p=0.0004). In addition, the consult resulted in higher doctor's attention to ECG findings in the follow-up (53.8% vs 5.7%; p<0.0001). Finally, a doctor's decision to intervene in the treatment was influenced by the pharmacist consult (p=0.03). This decision was not influenced by the degree of QTc prolongation or the presence of risk factors. The most frequent intervention was drug discontinuation.

Conclusion A clinical pharmacist has the ability to identify potentially dangerous drug combinations, increase medical awareness and monitoring where necessary. Most importantly, a pharmacist's consult resulting in a doctor's attention to ECG findings in the follow-up increases the probability of doctors' interventions even in the absence of meaningful ECG changes.

PS-090 THE EFFECTIVENESS OF NEW DIRECT ACTING ANTIVIRALS IN THE TREATMENT OF CHRONIC HEPATITIS C IN PREVIOUSLY TREATED PATIENTS

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Background Some patients do not achieve successful results after treatment with older hepatitis C virus (HCV) antiviral drugs. We made a bibliographic research in PubMed and did not find any similar study in this area.

Purpose To assess the effectiveness of new direct acting antivirals (DAA) in previously treated HCV patients, and its relation to the type of previous treatment received.

Material and methods An observational, descriptive, retrospective study of previously treated patients with HCV that ended their treatment with DAA before February 2016 was conducted. Patients were selected after online clinical history and from a pharmacy service database, analysing the following variables: genotype, degree of fibrosis, HIV coinfection, previous treatment, treatment using DAA, viral load at the end of treatment (VLET) and after 12 weeks (VR12).

Results Of 250 patients that finished treatment, 160 (64%) had received previous treatment, 146 with pegylated interferon–ribavirin (INF-RBV) and 14 with first generation protease inhibitors (boceprevir/telaprevir). 16 patients had HIV coinfection. The distribution of patients according to genotype (G) was: 15 (9.37%) G4, 14 (8.7%) G3, 4 (2.5%) G1 untyped, 39 (24.37%) G1a and 88 (55%) G1b. According to the degree of fibrosis (F): 1 (0.62%) had F0, 8 (5%) F1, 34 (21.25%) F2, 35 (21.87%) F3 and 82 (51.25%) F4. Following the recommendations of the Clinical Practice Guidelines and the Strategic Plan of the Spanish NHS, 11 combinations of DAA were used (daclatasvir, ledipasvir, sofosbuvir, dasabuvir, ombitasvir, paritaprevir/r, simeprevir), ribavirin and pegylated interferon. VLET was undetectable in 100% of patients. Data were available concerning 121 patients after 12 weeks, 117 of whom (96.7%) maintained a sustained VR12 (SVR12). 4 patients (3.3%) who failed had been treated previously with INF-RBV; 2 had G1b F4, 1 had G1a F4 and 1 had G3 F2.

Conclusion The effectiveness of DAA in patients who had received previous treatment in clinical practice was within the percentages presented in clinical trials. Although there were too few failures in the treatment to conclude significant associations, there may be some relation between failures with DAA and pretreatment with INF-RBV. All patients who had not achieved SVR12 relapsed after an undetectable VLET.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

PS-091 MEDICATION INDUCED SIADH: DISTRIBUTION AND CHARACTERISATION ACCORDING TO MEDICATION CLASS

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Background Although medication induced syndrome of inappropriate antidiuretic hormone secretion (SIADH) is a common clinical entity, several issues remain unaddressed in the current literature. As most of the available data are derived from case reports and small case series, the distribution of the different medication classes as SIADH aetiologies is unknown. It is also not known whether different medication classes are associated with different severity and outcomes of SIADH. The percentage of patients with SIADH who take a suspected medication and are actually diagnosed with medication induced SIADH is unknown. Also, whether these patients can be differentiated by clinical parameters from those with SIADH due to other causes has not been studied.

Purpose To determine the distribution of aetiologies for medication induced SIADH in hospitalised patients, and to characterise them according to the different medication groups.

Material and methods A single centre retrospective study was conducted including all patients diagnosed with SIADH in a large community hospital and tertiary centre between 1 January 2007 and 1 January 2013 who were treated with medications known to be associated with SIADH. Two physicians reviewed every patient's medical file for predetermined relevant clinical data.

Results The study cohort included 198 patients who had SIADH and received medications associated with SIADH. Most patients (146, 73.7%) were diagnosed with medication associated SIADH, while 52 (26.3%) were diagnosed with SIADH due to other aetiologies. The Naranjo algorithm differentiated well between the two groups (p<0.001). 5 medication classes, namely antidepressants, anticonvulsants, antipsychotics, cytotoxic agents and analgesics, were implicated in 82.3% of patients diagnosed with medication associated SIADH. Specific serotonin reuptake inhibitors and carbamazepine were commonly implicated. There were no clinically significant differences in characteristics or severity of SIADH according to medication class.

Conclusion Medication induced SIADH is mostly caused by 5 medication classes. The Naranjo algorithm successfully differentiated between medication induced SIADH and SIADH due to other aetiologies in patients treated with these medications. Clinical characteristics were comparable between SIADH caused by different medications. Physicians should be aware of the high likelihood of medication induced SIADH among patients treated with the implicated medication classes.

No conflict of interest

PS-092 | WITHDRAWN

Material and methods The Medication Assessment Tool for heart failure (MAT-HF) was developed using indicators intended to support monitoring of adherence with processes of care related to medication and disease management to improve health outcomes. Each criterion in the MAT-HF follows a basic algorithmic scoring structure with a qualifying statement and a standard, with 6 different answer categories. The MAT-HF was psychometrically evaluated and implemented in the initial part of the ward round and again after relevant discussion with pharmacist and the multidisciplinary team and the patient. The targeted patient population was selected as per the inclusion criteria. The approach taken was to note down anything in relation to the MAT-HF standard during the primary assessment. Care issues were identified and the relevant changes in treatment and/or patient's ailments were discussed with the other healthcare professionals directly during the ward round. Thereafter, the MAT-HF was used for re-assessment.

Results 312 patients were reviewed; only 50 patients (44–93 years; 58% women) met the inclusion criteria. The average score of the MAT-HF adherence rate within the initial part of the ward round was 69% (CI 65%, 74%) and the MAT-HF adherence rate average score implemented subsequent to the pharmacist consultations with the team was 90% (CI 89%, 92%). There were justified incidences of non-adherences to the tool mainly due to treatment of comorbidities, such as arthritis and malignancy.

Conclusion The pharmacist has a crucial role in either delivering the actual tool or monitoring the improvement in quality of care for both ambulatory and hospitalised patients. The collaborative therapeutic management had a positive outcome on the treatment of the patient. Inappropriate prescribing, dispensing and omissions would be avoided by the use of such explicit assessments.

No conflict of interest

PS-094 | PHARMACEUTICAL VALIDATION OF MEDICATION ORDERS IN AN EMERGENCY DEPARTMENT OBSERVATION UNIT. RECOMMENDATIONS AND DEGREE OF ACCEPTANCE

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Background The emergency departments have operating characteristics that make them especially prone to the occurrence of medication errors (ME). Moreover, usual medication management in this area is more complicated. Hence, any intervention to minimise ME is justified, including medication reconciliation in a multidisciplinary way.

Purpose To analyse the intervention of a pharmacist in an emergency observation unit, and to focus on reducing ME, including pharmaceutical validation of free text medication orders and medication reconciliation.

Material and methods A prospective cross sectional study was carried out from January to March 2016. We analysed patients who were admitted to the emergency observation unit in a tertiary referral hospital daily at the start of the working day. We validated the medication orders as free text for all patients aged >65 years, and we carried out a process of reconciliation of medication in patients aged >65 years who

PS-093 | COLLABORATIVE EFFORT WITHIN A MULTIDISCIPLINARY HEART FAILURE TEAM

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Background Pharmacists work directly with other healthcare professionals and with patients to assess, monitor and modify their pharmacotherapy. Pharmaceutical care is not just about expanding the pharmacist's role but about a system that pharmacists help to establish and maintain.

Purpose To develop a pharmaceutical contribution within evolving multidisciplinary patient centred models of care leading to continuous improvement in the standard of care provided to patients with chronic heart failure.

were awaiting admission to a hospital bed. We communicated verbally with the doctors any medication related problems that we detected. These recommendations and their acceptance were recorded and classified in Excel format.

Results 289 patients were validated of whom 105 (36.3%) had reconciliation of medication. We conducted 153 interventions: medication related problems concerning allergies 2.6% (4), change in dose or dose regimen 11.8% (18), change in route of administration or pharmaceutical form 3.9% (6), complete the medication dose or dose regimen 9.8% (15), complete the route of administration 3.9% (6), information about treatment at home 1.3% (2), start medication not prescribed 9.2% (14), drug interaction 4.6% (7), adaptation to the hospital´s pharmacotherapy guide 34% (52), inadequate drug suspension 4.6% (7), unnecessary drug suspension 3.3% (5), suspension of drugs with a controversial therapeutic use 1.3% (2), suspension of the medication that the patient was not taking at home 5.2% (8) and therapeutic duplicity 4.6% (7). The doctors accepted 134 of the 153 recommendations (87.6%).

Conclusion The intervention of the pharmacist in the emergency departments may reduce ME of medical orders as a free text. As our results show, the degree of acceptance was high. This initiative could be the beginning of other activities related to the safe use of medicines in which the pharmacist is involved.

No conflict of interest

| PS-095 | ANALYSIS OF MATERIOVIGILANCE BOTTOM UP ALERTS RELATED TO MEDICAL PERFUSION DEVICES |

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Background Materiovigilance (MV) bottom up alerts related to medical perfusion devices represent 14% of all received alerts. They include several types of medical devices (MD) and may instigate incidents or risks of serious incidents

Purpose The purpose of this investigation was to conduct a risk mapping of infusion based on MV bottom up alerts to prioritise our preventive actions.

Material and methods A retrospective study of MV bottom up alerts in our establishment was conducted from October 2015 to September 2016. We applied a failure modes and effects analysis method for each bottom up alert. We quoted frequency and severity to determine net criticality and classified them as minor, major or critical.

Results A total of 80 incidents or risk of incidents was reported in our MV service. 26.25% of our MV bottom up alerts involved perfusion sets, 40% involved extensions and 33.75% a catheter. 12.5% of our MV bottom up alert were classified as minor, 53.75% as major and 33.75% as critical. Among the critical alerts (n=27), 17 cases were associated with an extension tube, 7 cases were associated with a central catheter and 3 with the perfusion line. The main risks identified were gas embolism and infectious risk. In 8 cases the cause of the incidence was the device itself. In the other cases, either the cause was not identified or it was due to misuse of the device.

Conclusion MV deals with a default of a device. Bottom up alerts received most often were related to misuse of the

device. Training concentrated on prevention of gas embolism and infectious risk in infusions will be set up in partnership with our hygiene service and the nursing directorate of our institution.

No conflict of interest

| PS-096 | METHADONE AND LEVOMETHADONE: RISKS AND COSTS ANALYSES |

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Background Methadone oral solution 10 mg/mL is the gold standard in opioid agonist treatment (OAT). With the recent marketing authorisation of the levomethadone solution 5 mg/mL, cardiac toxicity has decreased but the risks of errors and confusion in prescriptions, preparation and administration seems to be significant and the costs will probably be high.

Purpose To analyse the risks of different dosage forms and product formulations from prescription to administration of methadone and levomethadone in the Ambulatory Addiction Treatment Centre (AATC) and general psychiatry. To assess the associated costs for the entire hospital.

Material and methods A multidisciplinary team identified and listed the failure modes (FM) and prioritised these based on their criticality indices using the failure modes, effects and criticality analysis. Improvement measures (IM) were proposed. An economic calculation compared the annual costs between methadone and levomethadone.

Results 61 FM were identified and organised in an Ishikawa diagram. Among the 25 most critical FM, 10 concerned the preparation step and 7 the prescription. 3 involved confusions or errors between methadone and levomethadone. 30 IM have been proposed including the following:

- An information letter about changes in treatments with OAT.
- A conversion table (mg/volume).
- Basic 'bedscanning' based on coloured stickers (prescription sheet and levomethadone bottle in orange; slow release oral morphine (SROM) in yellow); once the prescriber wants to change from methadone to levomethadone and/or SROM, depending on clinical risks of heart rhythm disorders induced by prolongation of the QTc interval.
- A checklist of preparation and administration steps.
- A clinical algorithm defining the use of levomethadone in the hospital, choosing between methadone and SROM, balancing costs and clinical risks.
- The purchase of a balance allowing the double checking of prepared doses (AATC).

A systematic switch from methadone to levomethadone will generate an additional annual cost of € 60 000 for the hospital.

Conclusion This study allowed the identification and quantification of the main risks related to methadone and levomethadone in our hospital. IM have been proposed taking into account the clinical and pharmacoeconomic aspects. A cost–

benefit analysis would be a better assessment of the impact of levomethadone on morbidity/mortality and the costs involved.

No conflict of interest

PS-097 | A COMPARATIVE STUDY BETWEEN INVESTIGATOR SAFETY DATA AND A PHARMACOVIGILANCE DATABASE: A KEY ROLE OF THE PHARMACOVIGILANT IN THE RELEVANCY OF CLINICAL TRIAL PUBLICATIONS

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Background Safety assessment of an investigational medicinal product is an essential requirement of a clinical trial, and the Consolidated Standards of Reporting Trials group has produced recommendations to improve the communication of pharmacovigilance (PV) data in scientific publications. However, little data have been published on the quality of reporting.

Purpose To compare safety data of a clinical study reported in a published article and in the sponsor's PV database.

Material and methods The article was randomly selected among studies in a PV database. This randomised study compared two drugs in terms of efficacy; safety was not the primary outcome. Cases of serious adverse events (SAEs) were extracted from the sponsor's PV database. These SAEs were coded using the MedDRA dictionary according to an international terminology. SAEs presented in the article and those reported in the PV database were compared with regards to frequency, system organ class (SOC), severity, causality with treatment, expectedness and the outcome of each SAE.

Results The article reported that a total of 60 patients experienced at least 1 SAE whereas 78 patients were found in the PV database. 2 deaths were reported in the article, whereas 3 were found in the PV database. 4 SAEs in the infectious SOC failed to be reported in the article. 15 SAEs in the injury SOC were not reported in the article: 14 were a drug administration error. An additional SAE in cancer SOC was present in the PV database. 1 SAE regarding eye disorders SOC was not reported in the article. Severity, causality, expectedness and outcome were never presented in the article; data regarding all of these aspects were reported for all SAE in the PV database.

Conclusion A number of SAEs and all characterising data (ie, severity, causality, etc) were omitted in the restitution of the safety data. With the same data, the investigator in charge of writing the article did not lay out the safety elements according to the same methodology and skills as the pharmacovigilant.

No conflict of interest

PS-098 | REORGANISATION OF MEDICATION CIRCUIT IN THE OPERATING AND DELIVERY ROOM

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Background Pharmacy practice is highly regulated and the medication circuit is complex in healthcare settings. Required organisational practices of the national accreditation authority also provide a normative framework.

Purpose To describe the reorganisation of the medication circuit in the operating (OR) and delivery (DR) room.

Material and methods A prospective descriptive study was conducted in OR and DR in a 500 bed teaching hospital. Following a review of literature, an Ishikawa diagram was developed to identify failure modes. Thereafter, a semi-structured direct observation in OR and DR was done to identify key issues. Corrective measures were discussed and adopted by consensus with a multidisciplinary group, including pharmacists, anaesthesiologists, nurses and respiratory therapists.

Results 10 failure modes associated with the medication circuit and 18 key issues were identified. A total of 30 corrective measures were proposed. While all inpatient care areas have designated pharmacists to provide decentralised pharmaceutical care in the hospital, the OR and DR have none. Pharmacists were identified to share such coverage within their current intensive care and surgical care daily duties. Automated dispensing cabinets were implemented to better control drug dispensing and stock replenishing for each room. A safe anaesthesia box system was chosen and the drug content standardised with a detailed record sheet, improving the management and the documentation of prepared and administered doses, including residual quantities at the end of a shift. The system was pre-tested and improved before implementation. A radio-identification based system was also developed to manage RFID labels and anaesthesia box replenishing steps within the central pharmacy. A monitoring system was chosen to monitor cold chain of drugs stored in refrigerators. Expiration dates were reviewed according to current standards to minimise risks of contamination. Drug utilisation reviews were identified for drug targets to offer feedback to drug prescribers.

Conclusion OR and DR are often less supported by pharmacy to insure an optimal medication circuit. With a view to ensuring continuous improvement of quality of patient care, audits should be performed to measure the impact of corrective actions implemented.

REFERENCES AND/OR ACKNOWLEDGEMENTS

No conflict of interest

PS-099 | KNOWLEDGE OF HEALTH PROFESSIONALS OF HIGH ALERT MEDICATIONS

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Background High alert medications (HAM) are drugs that bear a heightened risk of causing significant patient harm when used in error. The Institute for Safe Medication Practices (ISMP) created and periodically updates a list of potential HAM for acute care settings. The Joint Commission requires that hospitals have their own list of HAM and a process in place for managing those medications.

2015 BC was diuretic use (22%), followed by proton pump inhibitor (PPI) use without indication (21%), and benzodiazepine use (12%).

Conclusion Number of PIM and mean PIM per patient increased with each update of BC, suggesting that sensitivity has increased and become more applicable to our environment. The withdrawal of some criteria, according to evidence updates, means that frequent PIM according to 2003 BC, such as the use of amiodarone or antiplatelet therapy in anticoagulated patients, are not present in subsequent revisions. Likewise, other PPIs that were not present in 2003 and 2012 BC, became habitual, such as the use of PPIs without indication, added in 2015, with widespread use in our environment.

REFERENCES AND/OR ACKNOWLEDGEMENTS
Beers criteria.

No conflict of interest

PS-102 BARCODE SCANNING IN THE DRUG DISPENSING PROCESS IMPROVES PATIENT SAFETY

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Background Drug dispensing is a process with a high risk of errors. Barcode scanning can improve patient safety when implemented and used correctly. In 2010, a barcode system was implemented at several hospitals but a study from 2012 showed that only 53% of all dispensed drugs were scanned.

Purpose To determine to what extent barcode scanning was used during drug dispensing and to identify the number and type of errors identified by the system. Furthermore, nurses' perceptions of the effect of barcode scanning on patient safety was evaluated together with nurses' perceptions of time consumption related to the use of barcode scanning. Finally, actions to improve scanning frequency were investigated.

Material and methods Data were collected from March to April 2016 from 4 medical wards. Drug dispensing was performed manually by nurses/assistants. All drugs were dispensed directly from the original package. Nurses/assistants were observed during drug dispensing and subsequently interviewed using a structured interview guide. Structured interviews were performed with 1 charge nurse from each ward. Results from the observation study were analysed using descriptive statistics. Interviews were audio recorded, verbatim transcribed and analysed by categorisation.

Results A total of 685 dispensed drugs were observed and 28 nurses were interviewed. On average, 76% (68–88% per department) of all drugs were scanned. A total of 8 errors were identified by the barcode system (error rate 1.2%) and 2 errors were potentially serious (wrong drug dispensed). Interviews showed that 95% of the nurses/assistants believed that barcode scanning was safe to use and 89% believed that barcode scanning can prevent medication errors. A total of 57% of the nurses/assistants believed that time used on drug dispensing was reduced after introduction of the barcode system. Improved scanning frequency was supported by actions such as continuous focus from leaders, happenings and use of scanning frequency as a quality measurement.

Conclusion On average, 76% of all dispensed drugs were scanned. A total of 8 errors were identified by the system, emphasising that barcode scanning can prevent dispensing errors. Nurses believe that scanning improves patient safety and decreases time used on dispensing. Successful implementation of barcode scanning was supported by ongoing focus from users and their leaders.

No conflict of interest

PS-103 OPTIMISATION OF THE DRUG PRESCRIPTION PROCESS IN PATIENT ADMISSION

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Background As pharmacists, medical prescription plays a major part of our daily activity. However, management of personal treatment is left behind. Our action plan of the quality management system (QMS) focused on several themes, including medication reconciliation and continuity of treatments.

Purpose Our objectives were to assess the following: conformity with the personal treatment procedure at admission; conformity of the initial medical prescription; and medication errors (ME).

Material and methods Our work involved a 2 month prospective study in 28 care units of our hospital. Adult patients over 18 years of age were included if they were hospitalised for at least 24 hours in our hospital and agreed to answer our questions. We assessed 5 patients per unit each day, 28 units in total. ME were identified as a result of missing information on patients' records (such as who their general practitioner was, the management of the patient's other treatments). Improvement measures were suggested in order to reduce ME.

Results 127 patients were included (sex ratio M/F: 0.6). Mean age was 60.5 years. Retired (A1) people represented 56% of the population. Only 15% of patients had no traceability of a general practitioner (GP) compared with 86% for a pharmacist, and 59% had no copy of their prescription in their medical file. Nurses transcribed medication prescriptions in 36.4% of cases (66.1% among nursing files with the patient's own treatment traceability), which was the source of errors. The patient's own treatment was not returned in 69% of cases. Therefore, it was stored in the patient room. These poor practices and/or standards could lead to ME. We found that 38.4% of unintentional discrepancies among patients' prescriptions were mainly as a result of omission (40.5%), posology (35.7%) and timing errors (31%).

Conclusion Previous studies on medication reconciliation have already shown we should focus on high risk drugs and patients to reduce ME. Improving communication between different health professionals can also help reduce ME. We cannot currently implement medication reconciliation among all units in need in our hospital, but we can focus on patients with a high risk of discrepancies, using the HAS tools.

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No conflict of interest

MEDICATION RECONCILIATION: WHICH SELECTION CRITERIA IN PSYCHIATRY?

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Background Medication reconciliation (MR) was implemented in a psychiatric unit in January 2016. A test phase of 3 months was conducted by following the Med'Rec[1] study indicators. Standard criteria (all incoming patients were eligible for the study) were found unsuitable in psychiatric patients. Selection criteria were determined in order to target the high risk population. A second phase was implemented to assess if the chosen criteria allowed reconciliation of patients at a high risk of medication errors.

Purpose Are the chosen criteria for the selection of patients relevant for MR?

Material and methods The study was conducted in the same unit until reaching the same number of reconciled patients (RP) than the test phase. The retained criteria for inclusion (or/and) were:

- Patients with at least 1 somatic medicine on admission prescription orders.
- Patients >65 years.
- New unknown patients.
- Patients admitted to hospital for 6 months or more.

The selected indicators were those of the test phase.[1] The results were compared statistically (χ^2 test). Discrepancies (D) corresponded to medication errors (addition, omission, etc). D were found between the list of all medications patients were taking daily and admission prescriptions orders.

Results Results were preliminary, with 44 RP (average age 45.3 years) for phase II compared with 67 RP (average age 44.9 years) for the test phase.

Indicators	Test phase (%)	Phase II (%)	Results
MR in 24 hours/RP	54	44	Patient's mental state can be an obstacle
D/RP	33	32	p=0.9, NS. Results were not lower than those expected
At least 1 D corrected/RP	10	14	p=0.4, NS. Involvement of the somatician physician (not consulted during test phase), in addition to the psychiatrist, enabled better patient care
D/RP with 1 somatic medicine	61	53	p=0.58, NS. As in the test phase, somatic drugs are more often involved than psychotropic drugs
D/Patients >65 years	14	75	Samples too small for χ^2 analysis. This criterion is to be maintained even if the psychiatric population is young

Conclusion At this stage of the study, the retained criteria seem to fit our psychiatric unit. A multicentre study could confirm that these criteria are suitable for psychiatry.

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No conflict of interest

APPLICATION OF FAILURE MODE AND EFFECTS ANALYSIS ON DRUG MANAGEMENT PROCESS IN CARDIOLOGY INPATIENT UNIT

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Background Our hospital mission is to insure patient safety and quality of care. Evaluation and improvement of drug management processes are essential to prevent and limit iatrogenic events.

Purpose The present study aimed to assess the risk of drug management processes in a cardiology inpatient unit according to a proactive analysis: failure mode and effects analysis method (FMEA).

Material and methods A multidisciplinary study group was assembled and a process diagram was drafted, illustrating all steps of the hospital medication system in the cardiology inpatient unit. Failure modes that could occur were identified and classified according to their risk priority score (RPS), determined on the basis of the likelihood of occurrence, severity of the potential effect and the detection probability rated on a scale from 1 to 10. The most critical failures were selected by applying the Pareto principle which states that, for many events, approximately 80% of the effects come from 20% of the causes. The failures causes were closely examined by establishing Ishikawa diagrams in order to propose corrective and preventive actions.

Results The evaluation process detected 66 potential failures. The frequency of failure modes were as follow: 44% in the prescription step, 24% in the distribution step, 20% in the drug delivery step and 12% in supplies from the pharmacy step. RPS ranged from 11 to 466. The Pareto principle was used to select 35 failure modes that had the highest RPS (from 132 to 466). Among those potential failures, we selected 18 higher RPS which it was essential to act. 50% applied to the medical prescription step, 39% to the drug delivery step and 11% to the distribution step. Preventive measures, such as prescription computerisation or nominative individual drug delivery, have been proposed to address the most critical failures. These actions are to be applied in the short, medium and long term.

Conclusion FMEA was useful to aid in understanding process care, detecting possible failures and prioritising remedial interventions. Systematic use of proactive risk analysis is needed for continuous safety improvement of drug management processes in hospitals.

No conflict of interest

PS-106 | LOOK-ALIKE AND SOUND-ALIKE DRUG INCIDENTS IN A HOSPITAL: A RETROSPECTIVE ANALYSIS

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Background Many medications have similarities in their appearance and/or the sound of their drug names. Confusion between these 'look-alike and sound-alike (LASA)' drugs can result in potentially harmful medication errors. These errors are often multifactorial and can occur at any step of the medication use process.

Purpose The aim of this study was to analyse all LASA drug incidents reported in a university hospital in order to prevent them and educate caregivers.

Material and methods A retrospective study was conducted over a 36 month period (September 2013–September 2016) in a university hospital. All reported LASA drug incidents were analysed. For each incident, ATC (Anatomical Therapeutic Chemical Classification System) drug class, step of the medication process, potential gravity for the patient (according to a tool validated by the National Health Authority) and corrective measures introduced were collected.

Results 28 LASA drug incidents were analysed. This represented 6.4% of the total medication errors reported. No incident was lethal, but 9 errors (32.1%) were classified as potentially lethal. For example, confusion between domperidone and digoxin, and administration of digoxin resulted in prolongation of hospitalisation. 16 of the 28 LASA drug incidents occurred during drug administration to the patient (57.0%). 20 of these 28 errors were confusion between the same ATC classes of drugs (71.4%). Opioids and antibiotics were the drugs most involved (respectively, 28.6% (n=8) and 14.3% (n=4)). Injectable forms were often involved (60.7%, n=17). 2 incidents were reported to the National Agency for Medicines and Health Products Safety. A local multidisciplinary medication safety committee defined preventive measures of LASA drug incidents: specific training for the pharmacy staff, placing warning stickers 'confusion' on storage bin and good drug storage practices in the care units.

Conclusion Medication errors caused by LASA drugs are frequent but are certainly underestimated. Their reporting must be encouraged in order to identify and prevent them in the future.

No conflict of interest

PS-107 | MEDICATION ADMINISTRATION TRACEABILITY: BEFORE, IN REAL TIME OR AFTER?

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Background Medication administration traceability allows us to know exactly which drugs were effectively taken by the patient. The accuracy of the information is essential to assess treatment efficacy or to analyse adverse drug reactions. However, an injection falsely traced as administered was observed in our hospital, implying the traceability was noted before the act of administration.

Purpose To review when the medication administration is traced in our hospital.

Material and methods A 2 week prospective clinical audit was conducted by 16 nurses in 10 clinical units. Three 45 min periods of observations per clinical unit were allocated among the different administration times (morning, 10am–noon; evening, noon–4pm). Data collected included: administration route, if the medication was effectively administered or not and when the information was recorded (in real time, before or after the administration, untraced). Data were analysed by a pharmacist. Only administrations traced in real time were analysed.

Results 342 observations were analysed (from 5 in paediatrics to 102 in pneumology). 106 (31%) administrations were registered before the medication intake and 20 (6%) after. In 5 clinical units, almost all of the administrations were traced in real time. In pneumology and geriatrics, administrations were registered mostly before drugs intake. In obstetrics, 5 of 7 administrations (71%) were traced a posteriori. In the emergency room, all situations were encountered: 10 (48%) in real time, 7 (33%) before and 4 (19%) after the administration. 70% of drugs administered in the morning were traced a priori (80 on 114). However, 89 (78%) morning observations were provided by pneumology and geriatrics. 39% of the traceability of oral drugs was recorded before the act of administration (102 of 260). For 62 drug injections (intravenous and subcutaneous), 55 (89%) administrations were traced in real time.

Conclusion 61% of observations met the criteria. The rate of traceability recorded before the act of administration was too high and was mostly clinical unit dependent. The results were transmitted to the units and the medication administration rules were promoted (poster, professional training). To evaluate the measures taken, a new audit will be conducted.

No conflict of interest

PS-108 | DOES THE COMPLETION OF A RISK ASSESSMENT TEMPLATE IMPROVE THE RATE OF APPROPRIATE VENOUS THROMBOEMBOLISM RISK MANAGEMENT FOR HOSPITALISED MEDICAL PATIENTS?

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Background Venous thromboembolism (VTE) is associated with substantial morbidity and mortality within European Union (EU) countries. Managing the risk of VTE for hospitalised medical patients requires a thorough assessment. Risk assessment templates enable clinicians to assess the risk of VTE but they are often not available or not completed.

Purpose This study aimed to assess whether completion of a VTE risk assessment template significantly increased the rate of appropriate VTE risk management.

Material and methods A risk assessment template, which included appropriate prophylaxis measures, was created and attached to the medication administration record for medical patients admitted to the hospital from the acute medical

assessment unit (AMAU). Medical patients from the emergency department (ED) were admitted, as normally, without recourse to this assessment template. Details of the VTE risk management of patients admitted from both units over a period of 1 month were collected and reviewed for appropriateness.

Results 207 patients were included for analysis (AMAU=122, ED=85). 50 patients (41%) admitted from AMAU had a risk assessment completed on admission. 43 (86%) were given appropriate prophylaxis. 72 patients (59%) admitted from AMAU did not have a risk assessment completed. 47 (65.3%) were given appropriate prophylaxis. 46 patients (54.1%) from ED patients, where no risk assessment template was provided, were given appropriate prophylaxis. The rate of appropriate prophylaxis for patients admitted from AMAU with a completed risk assessment was significantly higher than patients admitted from AMAU without a completed risk assessment (p=0.0121) and patients admitted from ED (p=0.0001).

Conclusion Medical patients with a completed risk assessment template were significantly more likely to have their risk of VTE managed appropriately after admission. This study highlights the importance of completing risk assessment templates to manage the risk of VTE for hospitalised medical patients. Measures should be put in place to ensure that a VTE risk assessment template is completed for all medical patients on admission to hospital.

The number next to the author indicates the page number, not the abstract number.

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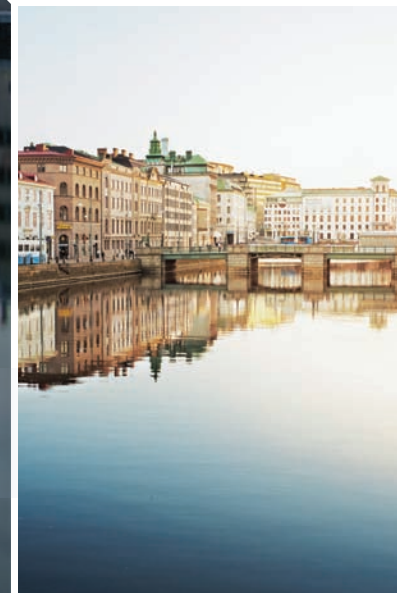making the difference in medication

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