



EUROPEAN LIST OF EMERGENCY MEDICINES (ELEM)

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*A EAHP resource for pharmaceutical preparedness
in case of emergencies and disasters*

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1. Introduction

The organization of health relief during a disaster is one of the strategic factors of any territorial emergency system. Considering that catastrophic events require the participation of several health care components, it is appropriate that the aforementioned members follow, in the management of the catastrophe, effective criteria that should be univocal and universally validated. In this context, the Hospital Pharmacy plays a decisive role in supplying drugs capable of ensuring a highly professional service even in the most critical conditions, as it represents the most suitable source of pharmaceutical and pharmacological information. A catastrophe or a disaster is an event (or a series of events) that causes irrecoverable or long-term recoverable damage. The CRED (Center for Research on the Epidemiology of Disasters) defines a disaster as:

"a situation or event which overwhelms local capacity, necessitating a request to a national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering " [1]

Conflicts or natural disasters could result in humanitarian emergencies frequently characterized by the displacement of large numbers of people. Those affected are often resettled in temporary locations characterized by high population densities, inadequate food and shelter, unsafe water and poor sanitation. These conditions could be correlated to an increased transmission of communicable diseases and the worsening of previous clinical conditions, which can lead to an increased mortality [2]

CRED identifies an event as a disaster if at least one of the following criteria is met:

- 10 or more dead people;
- Reporting of 100 or more people affected;
- Declaration of a state of emergency;
- Request for international assistance.

1.1. Disasters in Europe

According to the data reported in the Annual Disaster Statistical Review 2016 [3], in Europe, the total number of people reported affected by disasters was 93,192 for a total cost of US\$ 10.79 billion. The greater part of these damages is attributable to the Central Italy earthquake which cost 5 billion US\$.

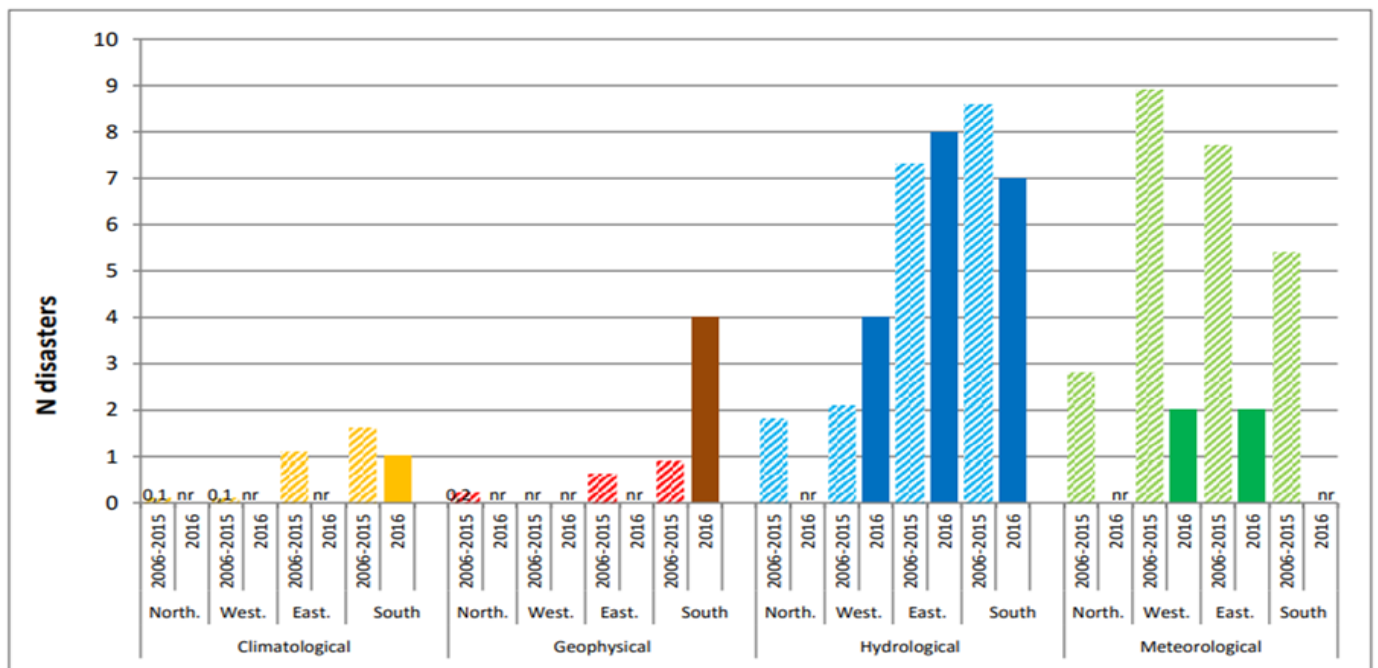


Figure 1. Disaster occurrence by type. Mean 2006-2015 vs 2016. [Annual Disaster Statistical Review 2016 – The numbers and trends].

As showed in figure 1, Climatological and Geophysical disasters occur infrequently in most European countries, with the exception of some isolated events such as: thirteen earthquakes reported in Southern Europe during the years 2006-2016 (five in Italy, two in Greece, one in Albania, one in Serbia, one in Spain and one in Macedonia), five droughts occurred in the Russian Federation and neighboring countries in 2007, 2010 and 2012, and six wild fires reported in the Russian federation and Bulgaria in 2007, 2010, 2012 and 2015. Concerning geophysical disasters, the annual average of 34 deaths in Southern Europe was heavily affected to L’Aquila earthquake, in Italy, in 2009 in which 295 people died. A similar number, 297 people, was reported in 2016 for the Amatrice earthquake that, if considered together with other central Italy regions seismic events, affected more than 26.000 people. Hydrological and meteorological disasters were the most frequently reported in Europe with some significant differences between regions. Floods were much more common in Eastern and Southern Europe (2006 - 2015 annual averages = 7.3 and 8.6 respectively), than Northern and Western Europe (2006 - 2015 annual averages 1.8 and 2.1 respectively). The most relevant floods were in Czech Republic in 2013 that affected 1.4 million people and in Ukraine and Poland in 2008 and 2010 that affected more than 200,000 people. In Southern Europe, the annual average of more than 140,000 people affected by floods comes mostly from the one million people affected by a flood in Bosnia-Herzegovina in 2014, and the 100,000 affected by another flood in Macedonia in 2015. In Northern Europe, meteorological disasters are slightly more frequent than hydrological ones. In Western Europe, the annual average of meteorological disasters is more than four times that of hydrological disasters. In Eastern Europe, the two averages are comparable, while in Southern Europe, meteorological disasters appear less frequent than hydrological ones. In line with global trends, Europe is also experiencing an increased frequency and magnitude of extreme weather events as shown by two heat waves in Western Europe in 2006 and 2015 which resulted in 3,340 and 3,685 deaths, respectively and one in Eastern Europe in 2010 which resulted in 55,736 people killed. In particular the influence of global climate change on the

occurrence and intensity of these hazards will likely increase human vulnerability to disasters in Europe. The numbers of floods, storms, droughts and related disasters experienced in the new millennium already far exceed the averages of the 1980s and 1990s [4]. Thus, there is a clear need for improved measures of prevention, preparedness and response in all countries. In order to respond to an increasing number of large-scale disasters and emergencies, the prevention and management of serious threats to the survival and health of the affected populations requires the countries to develop a timely and appropriate emergency and disaster management plan. The priorities during the acute phase of the emergencies are to treat exacerbations and minimize treatment interruptions. Chronic conditions were recognized as an important health concern in emergencies and disasters: cardiovascular diseases (hypertension, ischemic heart disease, cerebrovascular disease and heart failure), cancer, diabetes, acute and chronic respiratory disease (asthma and chronic obstructive pulmonary disease) and mental health problems (psychiatric disorders and symptoms derived from severe distress) [2]. Soon after an emergency, it is important to focus on providing continuous health services in health facilities, disease surveillance, and essential medicines supplying. A standard medicines list in emergencies and disasters permits an effective response with medicines focused to meet priority health needs in emergencies.

1.2. Role of Hospital Pharmacy in case of disaster

The Hospital Pharmacy is one of the fundamental cornerstones for the effective and efficient performance of rescue operations before and during the catastrophe. The strategic organization of human and material resources should be set, taking into account the following aspects:

- Formulation of operational protocols;
- Staff training;
- Continuous updating of the therapeutic disaster guide;
- Finding critical drugs;
- Stock organization.

On the other hand, the hospital pharmacist is professionally and deontologically involved in updating, as far as possible, the stocks of drugs to use in case of disaster, in order to guarantee assistance to the entire affected population.

2. Aim of the project

The aim of this project is to create a European List of Emergency Medicines (ELEM) as a support tool for clinicians, pharmacists and Institutions in providing an effective healthcare to patients involved in post disaster or emergency situations.

This objective will be achieved through the development of 2 excel templates:

1. **Disaster medicine assessment template**, composed by:
 - The final version of the ELEM based on the most relevant WHO emergency lists, adapted to a European scenario;

- A calculation sheet that quantifies the number of drugs needed based on the number of patients considered;
 - A self-assessment indicator that allows each hospital to rapidly evaluate its percentage of compliance with the proposed ELEM.
2. **Disaster stock management template**, composed by a template that allows to manage the stock of drugs during an emergency, automatically update the quantity of stock available and keep notes about all restock and withdrawal movements through a printable form.

3. Criteria of medicines selection

In order to select medicines to be included on ELEM we considered the medicines with proven efficacy for clinical relevant outcomes and adequate profile of safety according the WHO Model List of Essential Medicines (21th edition, 2019) [5] and included in two widely accepted and used emergency kits as the WHO Interagency Emergency Health Kit (IEHK, 2017) [6] and Noncommunicable Disease Kit (NCDK, 2016) [7].

3.1. Lists used as reference to create ELEM

Model List of Essential Medicines (21th edition, 2019)

Essential medicines are those that satisfy the priority health care needs of the population. The medicines reported in this list were selected with due regard to disease prevalence and public health relevance, evidence of clinical efficacy and safety, and comparative costs and cost-effectiveness. Essential medicines are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality, and at a price the individual and the community can afford. The list is composed by two sections:

1. **The core list:** that presents a list of minimum medicine needs for a basic health-care system, listing the most efficacious, safe and cost-effective medicines for priority conditions. Priority conditions are selected on the basis of current and estimated future public health relevance, and potential for safe and cost-effective treatment.
2. **The complementary list:** that presents essential medicines for priority diseases, for which specialized diagnostic or monitoring facilities, and/or specialist medical care, and/or specialist training are needed.

Interagency Emergency Health Kit (IEHK, 2017)

The IEHK has been widely accepted and used to respond to various emergencies. It is one of the most popular emergency health kits available and has been benchmarked for the development of other health kits. The IEHK 2017 is designed principally to meet the priority health needs of a population affected by emergencies, who have limited access to routine health care services. The kit is designed primarily for “life-saving” purposes, not for health conditions requiring continued care. Given its use in emergency situations, the IEHK fills immediate medical gaps; it does not aim to replace existing medical supply chain mechanisms. The

selection of medicines in the kit is based on the global burden of disease, expert knowledge on the types of health conditions presented by the affected population in recent emergencies and recommendations of the WHO Expert Committee on Selection and Use of Essential Medicines. The full IEHK contains medicines and medical devices for 10000 people for approximately three months. The list is made up of two modules:

The basic module that covers the primary health care needs of a catchment population of 1000 people. It contains medicines (oral and topical), medical devices, renewable, stationary, guidelines for IEHK 2017 users, equipment and a basic malaria module. One full IEHK contains 10 basic modules.

The supplementary module that covers the primary health care needs and basic hospital care needs of a target population of 10 000 people, when used together with 10 basic modules (total 10 basic modules and 1 supplementary module). It contains, Supplementary Medicines to treat the main diseases that may arise during an emergency, malaria, Post Exposure Prophylaxis (PEP), plus renewables and equipment.

Noncommunicable Disease Kit (NCD)

An NCD kit contains a list of essential medicines and medical devices to meet priority NCD health needs of 10 000 people for three months during emergencies, when medical facilities and regular supplies have been disrupted. The basic NCD kit is intended for outpatient care in a variety of primary health care settings, such as mobile clinics and primary health care units, particularly to refill ongoing treatment regimens. Current emergency health kits, including the Interagency emergency health kit (IEHK) do not contain enough and adequate medicines to manage the most commonly encountered NCDs in primary health care. Consequently, the NCD kit attends to cover this gap by providing essential medicines for the management of hypertension and cardiac conditions, diabetes and endocrine conditions, chronic respiratory diseases, and mental health and neurological conditions. This kit is composed by:

- Module (1a): Medicines only, without cold chain insulin;
- Module (1b): Medicines cold chain only, insulin;
- Module (1c): Renewable;
- Module (1d): Supply for equipment;
- Module (1e): Equipment.

Epidemiological data have been used to estimate the quantities of medicines needed.

4. ELEM content and layout

The ELEM list was created by integrating the IEHK's basic (only medicines) and supplementary (medicines and PEP kit) modules with the quantities and items present in modules 1a (Medicines only, without cold chain insulin) and 1b (Medicines cold chain only, insulin) of the NCD list. The resulting list was structured in 4 modules: basic module, cold chain module, supplementary module and PEP module. All quantities have been standardized to assist 10,000 patients for 3 months according to the above WHO lists. In our list we have deliberately chosen to include only medicines in order to create a practical tool that is easy to use, avoiding the difficulties related to the great variability of medical devices and renewable available in the various national realities. We have also not included the malaria module given that the low incidence

emerged from epidemiological data in Europe is equal to 1.2 cases per 100,000 inhabitants [8]. The main changes that we made from the reference lists were mainly dictated by:

1. Pharmacokinetic characteristics and compliance of use of selected pharmaceutical formulations in order to improve their suitability to the majority of the targeted population;
2. Supply availability of active principles and dosages present in Europe.

The final version of ELEM list is composed by 4 main modules described below. All the changes made are reported in Tab. 1.

4.1. Basic module

This module includes 13 medicines for responding to the acute phase of the emergency and disaster, and aimed at the prevention and treatment of communicable diseases, such as: fever, acute respiratory infections, diarrhea, gastrointestinal tract problem and injuries (physical trauma, prevention and management of wound infection, skin infections). This module was mainly based on the IEHK's basic module, with some appropriate changes:

1. Amoxicillin dispersible tablets 250 mg was replaced with Amoxicillin dispersible tablets 500 mg due to the greater availability in the European market. In case of pediatric patients, an alternative could be the amoxicillin suspension 250mg/5mL (100mL), which is also characterized by a better compliance for this target population.
2. Paracetamol dispersible tablets 100 mg was replaced with Paracetamol solution 100mg/ml (30ml) or Paracetamol suspension 120mg/5ml (120ml), due to the greater availability in the European market and a better compliance for pediatric population.
3. Tetracycline, eye ointment 1% was replaced with Gentamicine, eye drops 0,3% due to the greater availability in the European market and similar clinical use confirmed by the overlap of 4 levels out of 5 of the ATC classification (S01AA09 for tetracycline and S01AA11 for Gentamicine)
4. Zinc sulfate, dispersible tablets 20 mg was not included due to the supply difficulties and the limited clinical use in Europe.

4.2. Cold chain module

This module includes mainly hormones and other endocrine medicines which require the maintenance of a cold chain to be stored correctly. It is composed by insulin with different half-lives and glucagon. It was included in our list on the basis of module 1b of the NCD list and no changes were made.

4.3. Supplementary module

This module contains drugs referred to 17 pharmacological classes aimed to treat patients during a post-disaster condition. The long-lasting priorities of an emergency are to avoid the exacerbations of chronic conditions and minimize treatment interruptions, which would increase morbidity and mortality during aftermath situations. This module was created according the IEHK supplementary module and enriched or modified with drugs (and relative quantities) included in the NCD list. The classes included in the final version of our list were: anaesthetics, analgesics, antiallergics, antidotes, anticonvulsants/antiepileptics, anti-

infective medicines, cardiovascular medicines, dermatological medicines, diuretics, gastrointestinal medicines, medicines affecting the blood, oxytocics, mental health medicines, medicines acting on the respiratory tract, solutions correcting water, electrolytes and acid-based disturbances, vitamins, medicines to treat diabetes and endocrine conditions. The main changes made were:

1. Magnesium sulfate injection 500mg/ml was replaced with Magnesium sulfate injection 200mg/ml due to the greater availability in the European market, maintaining the same indications.
2. Benzathine benzylpenicillin, powder for injection 2.4 million IU/vial was replaced with Benzathine benzylpenicillin, powder for injection 1.2 million IU/vial due to the greater availability in the European market, maintaining the same indications.
3. Benzylpenicillin, powder for injection 5 million IU/vial, inj was replaced with Benzylpenicillin, powder for injection 1 million IU/vial, inj due to the greater availability in the European market, maintaining the same indications.
4. Cefalexin, solid oral dosage form 250 mg was replaced with Cefalexin, powder for oral suspension 250 mg/5 mL due to the greater availability in the European market, same indications and better compliance for the pediatric population.
5. Furosemide, tablets 40 mg was replaced with Furosemide, tablets 25 mg due to the greater availability in the European market, maintaining the same indications.
6. Oxytocin, injection 10 IU/ml was replaced with Oxytocin, injection 5 IU/ml due to the greater availability in the European market, maintaining the same indications.
7. Retinol (vitamin A), capsules 200,000IU was replaced with Retinol (vitamin A), solution os/ev 100,000IU/ml due to the greater availability in the European market, maintaining the same indications.
8. Ascorbic acid, tablets 250mg was replaced with Ascorbic acid, tablets 500mg due to the greater availability in the European market, maintaining the same indications.
9. Regarding antiepileptics, valproic acid was introduced in two different formulations (500mg enteric coated tablets and 200mg scored tablets) in order to assist both adult and pediatric patients according to the NCD list. Therefore, the quantities provided for in the IEHK list for carbamazepine have been reduced in accordance with those reported in the NCD list.
10. Nystatin, oral liquid 100,000IU/ml (30 mL) was replaced with Nystatin, oral liquid 100,000IU/ml (100 mL) due to the greater availability in the European market, maintaining the same indications.
11. Acetylsalicylic acid 100mg tablets and Amlodipine besylate 5 mg tablets were inserted according to the quantities reported in the NCD lists.
12. Sodium dichloroisocyanurate (NaDCC), tablet 1.67g was not included due to the supply difficulties and the limited use in Europe.
13. Risperidone 2mg tablets was inserted according to the NCD list
14. Prednisolone, tablets 5 mg was replaced with Prednisone tablets 5mg (due to the greater availability in the European market) increasing the quantities according to the NCD list in which it is indicated to treat chronic respiratory diseases, and not only allergies (as proposed by the IEHK list)
15. We created the category “Medicines to treat diabetes and endocrine conditions” containing the drugs reported in the NCD list indicated to treat “Diabetes and endocrine conditions” that were not included in the aforementioned cold-chain module.

4.4. Post Exposure Prophylaxis (PEP) module

This module includes drugs indicated to the reduction of the likelihood of infection after potential exposure to HIV and sexually transmitted infectious agents. Indeed, in situation of disasters, persons are often physically and socially powerless, with women and children at particular risk of sexual coercion, abuse or rape and the potential sexual health consequences could lead to the onset of sexually transmitted infections (STIs), and human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS). This module was mainly based on the IEHK's PEP module, the main changes made were:

1. Azithromycin tablets 250mg was replaced with azithromycin tablets 500mg due to the greater availability in the European market, maintaining the same indications.
2. Cefixime (as trihydrate), powder for oral suspension, 100 mg/5 ml (15ml) was replaced with Cefixime (as trihydrate), powder for oral suspension, 100 mg/5 ml (100ml) due to the greater availability in the European market, maintaining the same indications.
3. Cefixime tablets 200mg was replaced with Cefixime tablets 400mg due to the greater availability in the European market, maintaining the same indications.

The quantities of the drugs modified from the reference lists have been standardized taking into consideration the needs emerged from the dosage schedules. Concerning the multidose drugs (bottles, tubes etc ...), the quantities that emerged from the standardization process were rounded up appropriately. All the changes from the reference lists were mainly made trying to meet the same therapeutic needs of the replaced medicines. Therefore, the cost-effectiveness criteria utilized by the reference lists might not be completely met in the ELEM list, due to the changes made. Our list has been structured indicating the description, the Unit Of Measure (UOM) and the quantity (Qty) of each item. To facilitate the procurement process or the identification of an appropriate therapeutic alternative, the ATC code has also been inserted. The supplementary module was also divided in sub-categories according to the different pharmacological classes.

Tab. 1 ELEM changes made from the reference lists

Module	Item changed	New Item	Motivation	
Basic	Amoxicillin dispersible tablets 250 mg	Amoxicillin dispersible tablets 500 mg	Greater availability in EU market	
		Amoxicillin suspension 250mg/5mL (100mL)	Better compliance for pediatric use	
	Paracetamol dispersible tablets 100 mg	Paracetamol solution 100mg/ml (30ml)	Greater availability in EU market (both new options are interchangeable)	
		Paracetamol suspension 120mg/5ml (120ml)		
	Tetracycline, eye ointment 1%	Gentamicine, eye drops 0,3%	Greater availability in EU market	
Zinc sulfate, dispersible tablets 20 mg	Removed	Supply difficulties and limited clinical use in EU		
Cold chain	No changes			
Suppl.	Magnesium sulfate injection 500mg/ml	Magnesium sulfate injection 200mg/ml	Greater availability in EU market	
	Benzathine benzylpenicillin, powder for injection 2.4 million IU/vial	Benzathine benzylpenicillin, powder for injection 1.2 million IU/vial	Greater availability in EU market	
	Benzylpenicillin, powder for injection 5 million IU/vial, inj	Benzylpenicillin, powder for injection 1 million IU/vial, inj	Greater availability in EU market	
	Cefalexin, solid oral dosage form 250 mg	Cefalexin, powder for oral suspension 250 mg/5 mL	Greater availability in EU market and better compliance for pediatric use	
	Furosemide, tablets 40 mg	Furosemide, tablets 25 mg	Greater availability in EU market	
	Oxytocin, injection 10 IU/ml	Oxytocin, injection 5 IU/ml	Greater availability in EU market	
	Retinol (vitamin A), capsules 200,000IU	Retinol (vitamin A), solution os/ev 100,000IU/ml	Greater availability in EU market	
	Ascorbic acid, tablets 250mg	Ascorbic acid, tablets 500mg	Greater availability in EU market	
	New introduction	Valproic acid, enteric coated tablets 500mg	Valproic acid, scored tablets 200mg	Inserted according to NCD kit
	Nystatin, oral liquid 100,000IU/ml (30 mL)	Nystatin, oral liquid 100,000IU/ml (100 mL)	Greater availability in EU market	
	New introduction	Acetylsalicylic acid, tablets 100mg	Amlodipine besylate, tablets 5 mg	Inserted according to NCD kit
	Sodium dichloroisocyanurate (NaDCC), tablet 1.67g	Removed	Supply difficulties and limited clinical use in EU	
	New introduction	Risperidone, tablets 2mg	Inserted according to NCD kit	
Prednisolone, tablets 5 mg	Prednisone tablets 5mg	Greater availability in EU market		
PEP	Azithromycin tablets 250mg	Azithromycin tablets 500mg	Greater availability in EU market	
	Cefixime (as trihydrate), powder for oral suspension, 100 mg/5 ml (15ml)	Cefixime (as trihydrate), powder for oral suspension, 100 mg/5 ml (100ml)	Greater availability in EU market and same indications for pediatric use	
	Cefixime tablets 200mg	Cefixime tablets 400mg	Greater availability in EU market	

4.5. Final version of ELEM

Basic Module				
N°	Item description	UOM	Qty	ATC
1	Albendazole, chewable tablets 400 mg	tablet	2000	P02CA03
2	Amoxicillin, dispersible tablets 500 mg [1]	tablet	15000	J01CA04
3	Benzyl benzoate, lotion 25% [2]	bottle, 1 litre	10	P03AX01
4	Chlorhexidine digluconate, solution 5%	bottle, 1 litre	10	A01AB03
5	Ferrous sulfate + folic acid, tablets 200 mg+0.4 mg (and analgesics)	tablet	20000	B03AE
6	Ibuprofen, tablets 200 mg	tablet	40000	M01AE01
7	Miconazole, cream 2%	tube 30 g	200	D01AC02
8	Omeprazole, solid oral dosage form 20 mg	tablet/capsule	1000	A02BC02
9	ORS (oral rehydration salt) powder for dilution	sachet for 1 litre	2000	A07CA
10	Paracetamol, solution 100mg/ml (30ml) [3]	bottle	334	N02BE01
11	Paracetamol, tablets, 500 mg	tablet	20000	N02BE01
12	Povidone iodine, solution 10%	bottle, 200 ml	120	D08AG02
13	Gentamicine, eye drops 0,3%	bottle 10 ml	500	S01AA11

[1] Could be also used amoxicillin suspension 250mg/5mL (100mL).

[2] Can be procured in smaller sizes for single patient use packs

[3] Could be also used paracetamol syrup 120mg/mL, suspension.

Cold chain module				
N°	Item description	UOM	Qty	ATC
Hormones , other endocrine medicines				
1	Human Insulin NPH 100 IU/ml, 10 ml	vial	60	A10AC01
2	Human Insulin Mix 70/30 100IU/ml, 10 ml	vial	200	A10AD01
3	Human Insulin R100 IU/ml, 10 ml	vial	60	A10Ab01
4	Glucagon 1 mg/ mL.	vial	20	H04AA01

Supplementary Module				
N°	Item description	UOM	Qty	ATC
Anaesthetics				
1	Ketamine, injection 50 mg/ml	10 ml/vial	25	N01AX03
2	Lidocaine, injection 1%	20 ml/vial	50	N01BB02
Analgesics				
3	Morphine, injection 10mg/ml	1 ml/ampoule	50	N02AA01
4	Morphine, tablets 10 mg (immediate release)	tablet	200	N02AA01
Antiallergics				
5	Hydrocortisone, powder for injection 100mg/ml (as sodium succinate)	vial	50	H02AB09
Antidotes				
6	Calcium gluconate, injection 100mg/ml	10 ml/ampoule	10	A12AA03

7	Naloxone, injection 0.4 mg/ml	1 ml/ampoule	10	V03AB15
Anticonvulsants/antiepileptics				
8	Carbamazepine tablets 200mg [1]	tablet	1605	N03AF01
9	Diazepam, injection 5mg/ml	2 ml/ampoule	200	N05BA01
10	Sodium Valproate, enteric coated tablets 500mg	tablet	1900	N03AG01
11	Sodium Valproate, scored tablets 200mg	tablet	3200	N03AG01
12	Magnesium sulfate, injection 200mg/ml	10 ml/ampoule	75	A12CC02
Anti-infective medicines				
13	Benzathine benzylpenicillin, powder for injection 1.2 million IU/vial	vial	100	J01CE08
14	Benzylpenicillin, powder for injection 1 million IU/vial, inj	vial	1250	J01CE01
15	Ceftriaxone, powder for injection 1g	vial	800	J01DA13
16	Cefalexin, powder for oral suspension 250 mg/5 mL	bottle 100ml	100	J01DB01
17	Clotrimazole, pessary 500mg	pessary	100	G01AF02
18	Doxycycline, tablets 100mg	tablet	3000	J01AA02
19	Metronidazole, tablets 500mg	tablet	2000	G01AF01
20	Nystatin, oral liquid 100,000IU/ml	bottle, 30ml	50	A07AA02
Cardiovascular medicines				
21	Acetylsalicylic acid, tablets 100mg	tablet	22000	B01AC06
22	Amlodipine besylate, tablets 5 mg	tablet	15000	C08CA01
23	Bisoprolol, tablets 5 mg	tablet	2000	C07AB07
24	Hydralazine, powder for injection 20mg	ampoule	20	C02DB02
25	Enalapril, tablets 5 mg	tablet	5000	C09AA02
26	Glyceryl trinitrate: (FCH)-free oral spray 0.4mg/ dose (200doses)	spray	3	C01DA02
27	Methyldopa, tablets 250mg	tablet	100	C02AB01
Dermatological medicines				
28	Silver sulfadiazine, cream 1%	tube, 50 g	30	D06BA01
Diuretics				
30	Furosemide, injection 10mg/ml	2 ml/ampoule	20	C03CA01
31	Furosemide, tablets 25 mg	tablet	800	C03CA01
32	Hydrochlorothiazide, tablets 25mg	tablet	500	C03AA03
Gastrointestinal medicines				
33	Atropine, injection 1mg/ml	1 ml/ampoule	50	A03BA01
Medicines affecting the blood				
34	Folic acid, tablets 5mg	tablet	1000	B03BB01
35	Heparin sodium, injection 5,000 IU/ml	vial 5 ml	25	B01AB01
Oxytocics				
36	Oxytocin, injection 5 IU/ml [2]	ampoule	400	H01BB02
37	Misoprostol, tablets 200mcg	tablet	60	G02AD06
Mental health medicines				
38	Biperiden, tablets 2 mg	tablet	400	N04AA02
39	Diazepam, tablets 5 mg	tablet	240	N05BA01
40	Fluoxetine, tablets 20 mg	tablet	5000	N06AB03
41	Haloperidol, injection 5 mg/ml	1 ml/ampoule	20	N05AD01
42	Risperidone tablets 2mg	tablet	400	N05AX08
43	Haloperidol, tablets 5mg	tablet	1300	N05AD01

Medicines acting on the respiratory tract				
44	Beclomethasone, inhaler 100 mcg/dose	unit	75	R03BA01
45	Epinephrine (Adrenaline), injection 1 mg/ml	1 ml/ampoule	50	C01CA24
46	Prednisone tablets 5mg	tablet	7700	H02AB07
47	Salbutamol, inhaler 100 mcg/dose	unit	75	R03AC02
Solutions correcting water, electrolytes and acid based disturbances				
48	Compound solution of Sodium lactate (Ringer lactate), injectable solution, with giving set and needle	500 ml bag	200	B05BB01
49	Glucose 5%, injectable solution, with giving set and needle	500 ml bag	100	B05BA03
50	Glucose 50%, injectable solution (hypertonic)	50 ml/vial	100	B05BA03
51	Water for injection	10 ml/plastic vial	2000	
Vitamins				
52	Retinol (vitamin A), solution os/ev 100,000IU/ml	Vial	8000	A11CA01
53	Ascorbic acid, tablets 500mg	Tablet	2000	A11GA01
Medicines to treat diabetes and endocrine conditions				
54	Glibenclamide, tablets 5 mg	Tablet	26000	A10BB01
55	Levothyroxine sodium 100 mcg (sodium salt)	Tablet	4100	H03AA01
56	Metformin, tablets 500mg	Tablet	60000	A10BA02

[1] Phenobarbital tablets 50 mg is an alternative if carbamazepine is not available or if inclusion does not impact importation.

[2] May require Cold chain.

Supplementary Module – Post Exposure Prophylaxis (PEP)				
N°	Item description	UOM	Qty	ATC
1	Atazanavir (ATV) + ritonavir (r), tablets 300+100 mg	Tablet	1500	J05AR23
2	Azithromycin, oral suspension 200mg/5 ml	bottle, 15 ml	10	J01FA10
3	Azithromycin, tablets 500mg	Tablet	100	J01FA10
4	Cefixime (as trihydrate), powder for oral suspension, 100 mg/5 ml	bottle, 100 ml	2	J01DD08
5	Cefixime, tablets 400mg	Tablet	56	J01DD08
6	Lamivudine (3TC) + Tenofovir (TDF), tablets 300+300mg	Tablet	1500	J05AR12
7	Lamivudine (3TC) + Zidovudine (AZT), tablets 30+60 mg	Tablet	1800	J05AR01
8	Levonorgestrel, tablets 1.50mcg	Tablet	50	G03AC03
9	Lopinavir (LPV) + ritonavir (r), tablets 200+50 mg	Tablet	480	J05AR10
10	Lopinavir (LPV) + ritonavir (r), tablets 100+25mg	Tablet	180	J05AR10

5. Excel templates

In emergency situations, due to its inherently critical circumstance, it can be particularly complex to make timely and effective decisions. Therefore, having support tools available during the decision-making phases can be crucial to face the ongoing health emergency. For this purpose, we have created two informatic instruments easy to use for the correct evaluation and management of resources to be provided by the hospital pharmacy during emergencies (disaster medicine assessment template and disaster stock management template).

5.1. Disaster medicine assessment template

This template could be particularly helpful for a preventive or early assessment of the availability of resources to be used during an emergency. It is composed by 4 excel sheets:

1. ELEM list
2. Assessment form
3. Dashboard
4. Data summary

5.1.1. ELEM list

In this section, the user is allowed to consult and print the definitive version of the ELEM list. This sheet is protected and no changes are allowed.

5.1.2. Assessment form

In this section the user can assess whether the quantities of drugs available are adequate to face a state of emergency in accordance to the ELEM list. This form is composed by 9 columns:

1. Module: this column reports the source module (basic, cold chain, supplementary, PEP) for each item, in accordance to the ELEM list;
2. ATC: the anatomical, therapeutical and chemical code of each item;
3. Pharmacological class;
4. Items description: this column reports for each item the same pharmaceutical information as the one present in the respective field of the ELEM list;
5. UOM: the unit of measure of each item;
6. Qty std 10.K patients: the quantity needed for each item to treat 10000 people for 3 months in accordance to the ELEM list;
7. Qty for patients considered: the quantity needed for each item to treat the number of patients considered for the assessment. If the estimated value to treat the selected number of patients is fractional, the system is programmed to automatically round up this value to the nearest integer. The lowest possible value is equal to 1.
8. Qty in stock: this is a field that should be filled by the user with the quantity in stock for each item;
9. % covered: for each item the percentage covered of the theoretical quantities relating to the treatment of the number of patients considered. This is calculated as the percentage ratio obtained by dividing the Qty in stock by the Qty for patients considered. The maximum value allowed is 100% even if the quantity in stock entered by the user exceed the quantity predicted by the form.

This section is protected and only certain cells can be filled by the users (identifiable by the orange color). As shown in the figure 2, it is possible to find these cells in:

- N° of patients considered (figure 2.1): the user inserts the N° of patients to be taken into account for the assessment of the quantity of medicines in stock;

- Items description (figure 2.2): in this column there are some orange cells in which the user can choose, through a drop-down menu, between two interchangeable therapeutic alternatives;
- Qty in stock (figure 2.3): the same as the previous paragraph.

	D	E	F	G	H	I
2	4. Comment	Disaster Index	1. N° patients considered	65	5. Clean_template	
3						
7	Items description	UOM	Qty std 10.K patients	Qty for patients considered	Qty in stock	% covered
8	Albendazole, chewable tablets 400 mg	tablet	2000	13	4	30,8%
9	Amoxicillin, dispersible tablets 500 mg	tablet	15000	98		0,0%
	Amoxicillin, dispersible tablets 500 mg	le, 1 litre	10	1		0,0%
	amoxicillin suspension 250mg/5mL (100ml)	bottle. 1 litre	10	1		0,0%

Figure 2 Assessment form.



8	Albendazole, chewable tablets 400 mg	tablet
9	Amoxicillin, dispersible tablets 500 mg	tablet
	Amoxicillin, dispersible tablets 500 mg	le
	amoxicillin suspension 250mg/5mL (100ml)	tle

As shown in the figure 2, this section contains the disaster index (D.I.) and its relative comment. The D.I. represents the overall percentage of coverage based on the quantities entered, and the patients considered. The system automatically calculates the D.I. using the following equation:

$$D.I. = (\Sigma \% \text{ covered}) / (N^{\circ} \text{ items})$$

Σ % covered = the sum of all the values in the “% covered” column

N° items = the n° of items inserted in the ELEM list, equal to 82.

The score ranges from 0 to 100%.

Based on the score of D.I. obtained, the values are classified into 4 levels of coverage (low, medium, high and full coverage) showed in the comment cell (figure 2.4) and characterized by different colors:

- The low coverage corresponds to values between 0 and 33% (33% excluded). With this level of coverage the cells of the D.I. and the related comment turn red
- The medium coverage corresponds to values between 33 and 66% (66% excluded). With this level of coverage the cells of the D.I. and the related comment turn orange

-
- The high coverage corresponds to values between 66 and 100% (100% excluded). With this level of coverage the cells of the D.I. and the related comment turn yellow
- The full coverage corresponds to the value 100% and is reached when all the items of the list are in stock with a quantity equal or superior to the one predicted by the form. With this level of coverage, the cells of the D.I. and the related comment turn green.

Once the assessment is complete, it is possible to start a new one by deleting all the data entered automatically through the "clean template" button (figure 2.5)

5.1.3. Dashboard

In this section it is possible to consult the data entered through a quick visual overview provided by 3 types of graphs:

1. **N° and qty of items covered for each pharmacological class:** this is a combo graph (bars and lines) that provide a quali-quantitative information about the ELEM list coverage. In particular, the bar graph (figure 3) shows the percentage of items for each pharmacological class for which there is at least one stock (qualitative information), the line graph, alternatively, shows the percentage of stocks covered for each pharmacological class (quantitative information).

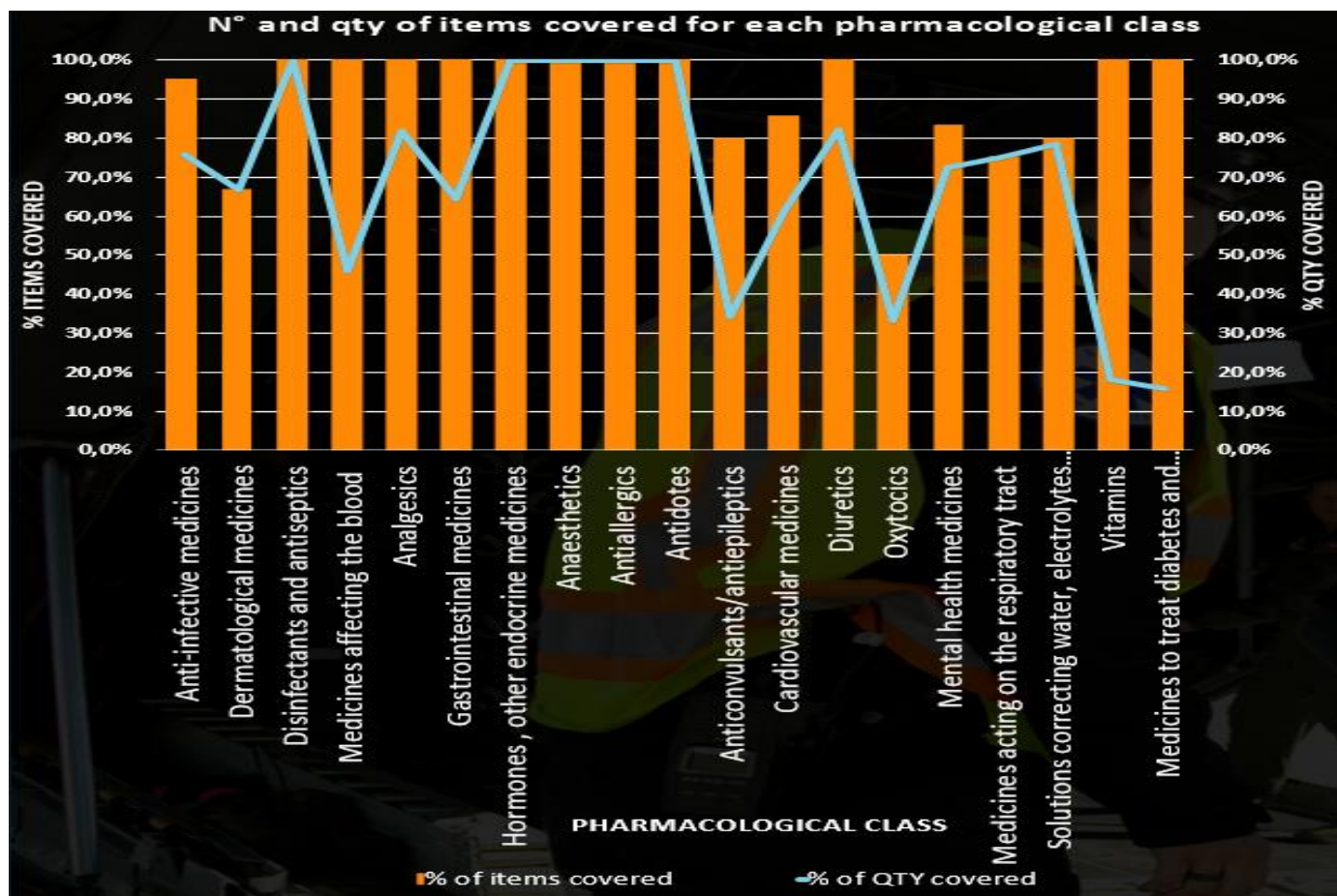


Figure 3. N° and qty of items covered for each pharmacological class.

2. **Type of coverage:** This is a cake graph (figure 4) that provides information about the percentage of items that are classified in each of the 4 coverage levels (missing, low, medium, high and full coverage). The word missing is used to define the items for which there is not any quantity in stock.

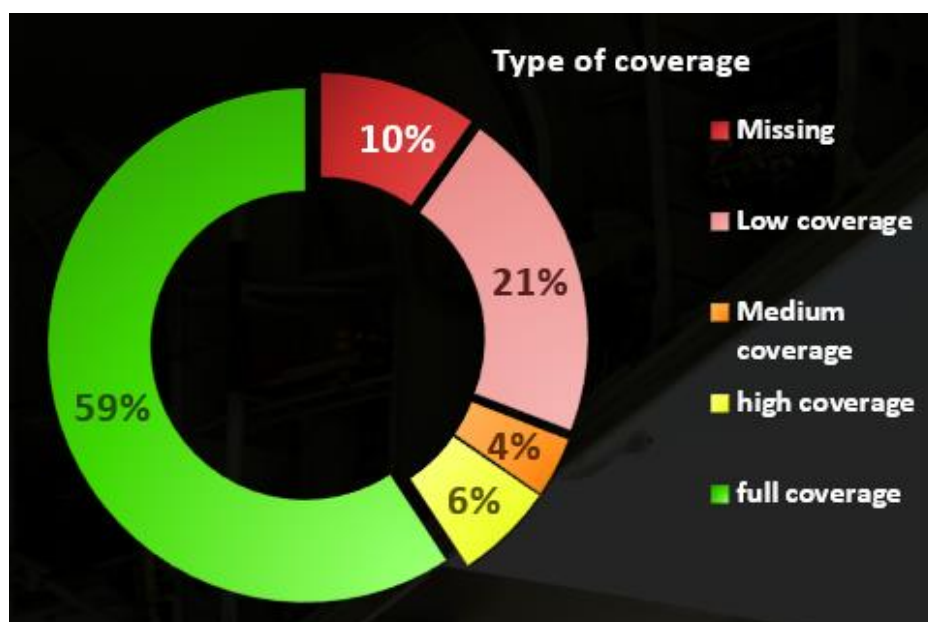


Figure 4. Type of coverage.

3. **% Module covered:** This is a bar graph (figure 5) that provides information about the average of the percentages of items covered for each module included in the ELEM list (basic, cold chain, supplementary and PEP).

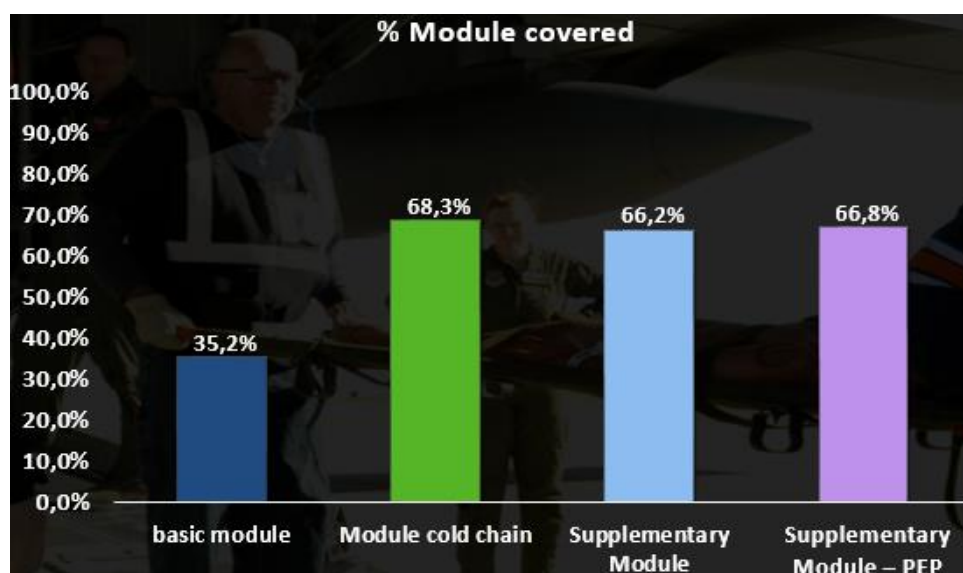


Figure 5. % Module covered

This section is protected and the user can only check the results without changing or deleting the information showed.

5.1.4. Data summary

This section contains the same information showed in the dashboard's graphs, but providing the numeric value of each parameter considered (figure 6).

Modules covered		N° patients covered	Disaster Index
Modules	% avg coverage	500	60,9%
basic module	35,2%		
Module cold chain	68,3%		
Supplementary Module	66,2%		
Supplementary Module – PEP	66,8%		

N° and qty of items covered for each pharmacological class			
Pharmacological class	N°	% of items covered	% of QTY covered
Anti-infective medicines	19	95,0%	64,7%
Dermatological medicines	3	100,0%	100,0%
Disinfectants and antiseptics	0	0,0%	0,0%
Medicines affecting the blood	3	100,0%	63,7%
Analgesics	4	80,0%	27,0%
Gastrointestinal medicines	2	100,0%	52,0%
Hormones , other endocrine medicines	4	100,0%	68,3%
Anaesthetics	1	50,0%	50,0%
Antiallergics	1	100,0%	100,0%
Antidotes	2	100,0%	100,0%
Anticonvulsants/antiepileptics	5	100,0%	69,6%
Cardiovascular medicines	7	100,0%	60,2%
Diuretics	3	100,0%	85,8%
Oxytocics	2	100,0%	83,3%
Mental health medicines	6	100,0%	49,2%
Medicines acting on the respiratory tract	4	100,0%	100,0%
Solutions correcting water, electrolytes and acid-based disturbances	5	100,0%	61,2%
Vitamins	2	100,0%	12,0%
Medicines to treat diabetes and endocrine conditions	2	66,7%	4,2%

Type of coverage	N° for each category	% for each category
Missing	6	7,4%
Low coverage	23	28,4%
Medium coverage	6	7,4%
high coverage	6	7,4%
full coverage	40	49,4%

Figure 6. Data summary.

5.2. Disaster stock management template

During an emergency situation, having knowledge of the available resources and being able to carry out a correct management of the stock of drugs can be crucial. For this purpose, this template allows the user to keep track of all restock or withdrawal movements of the drugs used. In particular, it is composed by 4 excel sheets: Stock, Restock, Withdrawal and Daily stock management print, whose functions are explained below.

5.2.1. Stock database

This section allows the user to create a database of medicines managed. It is composed by 5 columns: Code, Item description, Unit Of Measure (UOM), Original stock and Updated stock, 3 of which are user editable (Item description, UOM and Original stock) and are marked with orange color (figure 7), utilizing the same convention as in the “Disaster medicine assessment template”.

Code	Items description	UOM	Original stock	Updated stock
A0001	Albendazole, chewable tablets 400 mg	tablet		0
A0002	Amoxicillin, dispersible tablets 500 mg	tablet		0
A0003	Benzyl benzoate, lotion 25%[1]	bottle, 1 litre		0
A0004	Chlorhexidine digluconate, solution 5%	bottle, 1 litre		0
A0005	Ferrous sulfate + folic acid, tablets 200 mg+0.4 mg (and analgues)	tablet		0
A0006	Ibuprofen, tablets 200 mg	tablet		0
A0007	Miconazole, cream 2%	tube 30 g		0
A0008	Omeprazole, solid oral dosage form 20 mg	tablet/capsule		0
A0009	ORS (oral rehydration salt) powder for dilution	sachet for 1 litre		0
A0010	Paracetamol, solution 100mg/ml (30ml)	bottle 30ml		0
A0011	Paracetamol, tablets, 500 mg	tablet		0
A0012	Povidone iodine, solution 10%	bottle, 200 ml		0
A0013	Gentamicine, eye drops 0,3%	bottle 10 ml		0
A0014	Human Insulin NPH 100 IU/ml, 10 ml EP	vial		0
A0015	Human Insulin Mix 70/30 100IU/ml, 10 ml EP	vial		0

Figure 7. Stock database

1. Code: in this column there is a unique alphanumeric code for each item inserted. The number of codes already prepared allow the user to insert up to 1000 items in the database (from A0001 to A1000). This column is not editable by the user.
2. Items description: this column should be filled as in the “item description” field of the ELEM list. By default, all 82 items included in the aforementioned list are already present.
3. UOM: this column should be filled as in the “UOM” field of the ELEM list. By default, all 82 unit of measures included in the aforementioned list are already present.
4. Original stock: in this column, the user should enter the starting stock quantity for each item considered.
5. Updated stock: this column will update automatically the stock of each item in relation to the restock and withdrawal movements. This column is not editable by the user.

All the new data inserted in the editable columns will appear automatically also in the other sections of this template.

5.2.2. Restock

This section is used to keep track of all restock movements for each item.

It is divided in 2 parts, non-editable and editable columns.

The non-editable part is composed by 5 columns (figure 8): Code, item description; UOM, Updated stock and Tot restocked. The first 4 columns contain the same information reported in the columns with the same title of the "stock database" section and are automatically update from them. The 5th column (Tot restocked) sums automatically all the restock movements for each item according to the data entered in the editable fields as explained below.

code	Items description	UOM	Updated stock	Tot restocked
A0001	Albendazole, chewable tablets 400 mg	tablet	0	
A0002	Amoxicillin, dispersible tablets 500 mg	tablet	0	
A0003	Benzyl benzoate, lotion 25%[1]	bottle, 1 litre	0	
A0004	Chlorhexidine digluconate, solution 5%	bottle, 1 litre	0	
A0005	Ferrous sulfate + folic acid, tablets 200 mg+0.4 mg (and analgues)	tablet	0	
A0006	Ibuprofen, tablets 200 mg	tablet	0	
A0007	Miconazole, cream 2%	tube 30 g	0	
A0008	Omeprazole, solid oral dosage form 20 mg	tablet/capsule	0	
A0009	ORS (oral rehydration salt) powder for dilution	sachet for 1 litre	0	
A0010	Paracetamol, solution 100mg/ml (30ml)	bottle 30ml	0	
A0011	Paracetamol, tablets, 500 mg	tablet	0	
A0012	Povidone iodine, solution 10%	bottle, 200 ml	0	
A0013	Gentamicine, eye drops 0,3%	bottle 10 ml	0	
A0014	Human Insulin NPH 100 IU/ml, 10 ml EP	vial	0	

Figure 8. Restock (non-editable part)

The editable part consists of 365 columns sufficient to record a number of daily movements corresponding to a whole year. As shown in the figure 9.1, the first row of all the cells relating to this part are reserved for manually entering the date of the movement done. The second row (figure 9.2) is instead reserved for the progressive number of the movement done (the user can't change this values). The subsequent cells are dedicated to inserting the restocked quantity for each item regarding to the specific movement number (figure 9.3).

Following the usual convention, all the editable cells are marked in orange.

Date:							1.
Movement N°1	N° 2	N° 3	N° 4	N° 5	N°		2.
							3.

Figure 9. Restock (editable part)

5.2.3. Withdrawal

This section is used to keep track of all withdrawal movements for each item.

As for the “restock” section, it is divided in 2 parts, non-editable and editable columns.

The **non-editable part** is composed by 5 columns (figure 10): Code, item description; UOM, Updated stock and Tot withdrawn. This part differs from the previous section “Restock” only for the 5th column (tot withdrawn) that sums automatically all the withdrawal movements for each item according to the data entered in the editable fields.

code	Items description	UOM	Updated stock	TOT Withdrawn
A0001	Albendazole, chewable tablets 400 mg	tablet	0	
A0002	Amoxicillin, dispersible tablets 500 mg	tablet	0	
A0003	Benzyl benzoate, lotion 25%[1]	bottle, 1 litre	0	
A0004	Chlorhexidine digluconate, solution 5%	bottle, 1 litre	0	
A0005	Ferrous sulfate + folic acid, tablets 200 mg+0.4 mg (and analgues)	tablet	0	
A0006	Ibuprofen, tablets 200 mg	tablet	0	
A0007	Miconazole, cream 2%	tube 30 g	0	
A0008	Omeprazole, solid oral dosage form 20 mg	tablet/capsule	0	
A0009	ORS (oral rehydration salt) powder for dilution	sachet for 1 litre	0	
A0010	Paracetamol, solution 100mg/ml (30ml)	bottle 30ml	0	
A0011	Paracetamol, tablets, 500 mg	tablet	0	
A0012	Povidone iodine, solution 10%	bottle, 200 ml	0	
A0013	Gentamicine, eye drops 0,3%	bottle 10 ml	0	

Figure 10. Withdrawal (non-editable part)

As the for section “restock”, the **editable part** consists of 365 columns in which the first row is reserved for manually entering the date of the movement done (figure 11.1), the second row (figure 10.2) for the movement’s progressive number (the user can’t change this values) and the subsequent cells for inserting the withdrawn quantity for each item regarding to the specific movement number (figure 10.3). Following the usual convention, all the editable cells are marked in orange.

Date:						← 1.
Movement N° 1	N° 2	N° 3	N° 4	N° 5		← 2.
						← 3.

Figure 11. Withdrawal (editable part)

5.2.4. Daily stock management print

In this section there is a printable (and not editable) form to keep track, on paper, of all the movements made. The paper record can be more practical during the daily management of the ongoing emergency, in which the available IT resources can be limited. In this regard, this section has been designed for an impromptu annotation of the movements carried out which must then be reported later on the appropriate sections (restock or withdrawal according to the type of movement done) of the disaster stock management template. As showed in the figure 12, the form contains 4 columns: code, Items description, UOM and Quantity dispensed or refilled. The first 3 columns contain the same information as the one included in the "stock database" section, and are automatically updated from it when any change occurs. Therefore, to add a new item on this form, it must be inserted in the "stock database" section. The 4th column (Quantity dispensed or refilled) should be manually filled in the printed version with the quantities that have been restocked or withdrawn.

code	Items description	UOM	Quantity dispensed or refilled
A0001	Albendazole, chewable tablets 400 mg	tablet	
A0002	Amoxicillin, dispersible tablets 500 mg	tablet	
A0003	Benzyl benzoate, lotion 25%[1]	bottle, 1 litre	
A0004	Chlorhexidine digluconate, solution 5%	bottle, 1 litre	
A0005	Ferrous sulfate + folic acid, tablets 200 mg+0.4 mg (and analgues)	tablet	
A0006	Ibuprofen, tablets 200 mg	tablet	
A0007	Miconazole, cream 2%	tube 30 g	
A0008	Omeprazole, solid oral dosage form 20 mg	tablet/capsule	

Figure 12. Daily stock management print (overview)

This form also contains a header in which the user should write the following information (figure 13):

1. Type of movement (restock or a withdrawal)
2. Role covered by the user
3. Date of the movement
4. Progressive n° of movement, which must correspond to those reported in the restock and withdrawal sections
5. Signature of the user

Figure 13. Daily stock management print (header)

This part of the form must be properly filled in the printed version in order to produce a documentation that allows in any moment to clearly identify the responsibilities and trace the process.

6. Conclusions

As reported in the Global Assessment Report on Disaster Risk Reduction (GAR 2019) [9], “At no point in human history have we faced such an array of both familiar and unfamiliar risks, interacting in a hyperconnected, rapidly changing world. New risks and correlations are emerging. Decades-old projections about climate change have come true much sooner than expected. With that come changes in the intensity and frequency of hazards. Risk really is systemic, and requires concerted and urgent effort to reduce it in integrated and innovative ways”. Based on what emerged from the Sendai Framework for Disaster Risk Reduction (DRR) 2015-2030 adopted at the Third UN World Conference in Sendai (Japan, on March 18, 2015) [10], “disasters significantly impede progress towards sustainable development. Evidence indicates that exposure of persons and assets in all countries has increased faster than vulnerability has decreased, thus generating new risks and a steady rise in disaster related losses, with a significant economic, social, health, cultural and environmental impact in the short, medium and long term, especially at the local and community levels”. For this reason, it is urgent and critical to anticipate, plan for and reduce disaster risk in order to more effectively protect persons, communities and countries, their livelihoods, health, socioeconomic assets and ecosystems, and thus strengthen their resilience. This goal can be achieved by implementing the “Seven global targets of the Sendai Framework” which at the point A focuses on a reduction in the global disaster mortality in the period 2020-2030 compared to 2005-2015 and, instead, at the point E aims at the increase of the number of countries with national and local DRR strategies, evaluated through the use of two global indicators:

- a) the number of countries that adopt and implement national DRR strategies;
- b) the percentage of local governments that adopt and implement local strategies in line with national strategies.

The strategies to be implemented will be inextricably linked to the challenges of technological innovation, which requires constant research focused on the development of methodologies and tools for risk assessment and mapping. All of these requirements are part of the risk governance, a broader field that includes preventative measures [11], which led to the achievement of a substantial decline in deaths in recent decades, considering a comparable occurrence of catastrophic events, as shown by EMDAT (2019) [12]. In this context we proposed our ELEM list and excel templates as a first approach to be used as contribution for the national disaster preparedness plans which need to be updated regularly. The existence of an emergency medicines list post-disaster is very crucial and, as such, our list could be used as a guideline to be integrated to countries’ national emergency medicines lists. All reasonable precautions have been taken by us to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall EAHP be liable for damages arising from its use.

7. References

1. Vos, F., Rodríguez, J., Below, R., & Guha-Sapir, D. (2010). *Annual disaster statistical review 2009: the numbers and trends*. Centre for Research on the Epidemiology of Disasters (CRED).
2. Pan American Health Organization Essential Medicines List for Emergencies and Disasters in the Caribbean Washington, D.C.: PAHO, © 2012.
3. Guha-Sapir D, Hoyois Ph., Wallemacq P. Below. R. Annual Disaster Statistical Review 2016: The Numbers and Trends. Brussels: CRED; 2016.
4. Rademaekers, K., Eichler, L., Andersen, B. H., Madsen, N., & Rattinger, M. (2009). Strengthening the EU capacity to respond to disasters: Identification of the gaps in the capacity of the Community Civil Protection Mechanism to provide assistance in major disasters and options to fill the gaps—A scenario-based approach. Netherlands: ECORYS.
5. World Health Organization Model List of Essential Medicines, 21st List, 2019. Geneva: World Health Organization; 2019.
6. The interagency health kit 2017: medicines and medical devices for 10 000 people for approximately three months. Geneva: World Health Organization; 2019.
7. Noncommunicable diseases kit. Cairo: WHO Regional Office for the Eastern Mediterranean; 2017.
8. European Centre for Disease Prevention and Control. Malaria. In: ECDC. Annual epidemiological report for 2015. Stockholm: ECDC; 2018.
9. UNDRR (2019), Global Assessment Report on Disaster Risk Reduction, Geneva, Switzerland, United Nations Office for Disaster Risk Reduction (UNDRR).
10. (2015b). Sendai Framework for Disaster Risk Reduction (2015-2030). <https://www.unisdr.org/we/inform/publications/43291>. <https://www.unisdr.org/we/coordinate/sendai-framework>
11. (Disaster Risk Reduction Strategies and Risk Management Practices: Critical Elements for Adaptation to Climate Change Submission to the UNFCCC Adhoc Working Group on Long Term Cooperative Action)
12. EMDAT (2019): OFDA/CRED International Disaster Database, Université catholique de Louvain – Brussels – Belgium.

8. Abbreviations and acronyms

ATC = Anatomical Therapeutic Chemical Classification System

CRED = Center for Research on the Epidemiology of Disasters

DRR = Disaster Risk Reduction

D.I. = Disaster Index

ELEM = European List of Emergency Medicines

IEHK = WHO Interagency Emergency Health Kit

NCDK = Noncommunicable Disease Kit

PEP = Post Exposure Prophylaxis

STIs = Sexually Transmitted Infections

UOM = Unit Of Measure