



Heidelberg University Hospital

*Dr. Torsten Hoppe-Tichy, Chief Pharmacist*

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# How to implement Antibiotic Stewardship without having the resources for that?

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No conflict of interests

# Questions to the audience (Yes/No)

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- Is it promising to work on topics of antimicrobial stewardship without having the structures published in several guidances?
- Is there a must for having a budget for a group working in antimicrobial stewardship?
- Can a pharmacy department build up an antimicrobial stewardship group without getting staff for this?
- Is it possible to have a positive outcome for antimicrobial consumption without having an ABS-Team according to the published guidances?

# Agenda

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- Recap of existing guidelines / guidances on antimicrobial stewardship groups (→ „ABS-Teams“)
- A reality check: The German situation
- What can help us in working in this field without having the structure mentioned elsewhere?
- What kind of ABS interventions are likely to end up creating a positive outcome for the antibiotic use in my hospital?

General condition for this presentation:

„We don't have the financial  
and personnel resources!“

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- ... that means ...
  - Who can / will do the work?
  - What is the priority of ABS in the hospital?
    - „*No financial resources*“: Why should money be invested in ABS instead of in other projects?

# Problems of this approach

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- a personal point of view
- hospitals without on-site hospital pharmacy lack the driving force of a pharmacist
- re-organization of hospital pharmacy is necessary to set pharmacist time free
- without hospital management policy approach (→ goal of the hospital!) perhaps no acceptance by physicians in the hospital

# Antibiotic Stewardship in Small Hospitals: Barriers and Potential Solutions

Edward Stenehjem,<sup>1,2</sup> David Y. Hyun,<sup>3</sup> Ed Septimus,<sup>4,5</sup> Calvin C. Yu,<sup>6</sup> Marc Meyer,<sup>7</sup> Deepa Raj,<sup>3</sup> and Arjun Srinivasan<sup>8</sup>  
Clinical Infectious Diseases® 2017;65(4):691–6

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To be successful, ASPs need clear support from hospital leadership. This support can come in many forms but dedicating the necessary human, financial, and/or IT resources is paramount.

Nevertheless ... ..

# The „How-it-should-be“

- IDSA-Guideline
- AWMF-Guideline (Austria, Germany)
- → Staffing (e.g. AWMF)
  - team with resources and assignment given from hospital management
  - team members
    - medical specialist (infectious diseases,)
    - pharmacist (specialized in clinical pharmacy)
    - other medical specialists (microbiology, virology, epidemiology, hygiene)
    - all trained in the field of Antimicrobial Stewardship
  - 0.5 FTE / 250 hospital beds



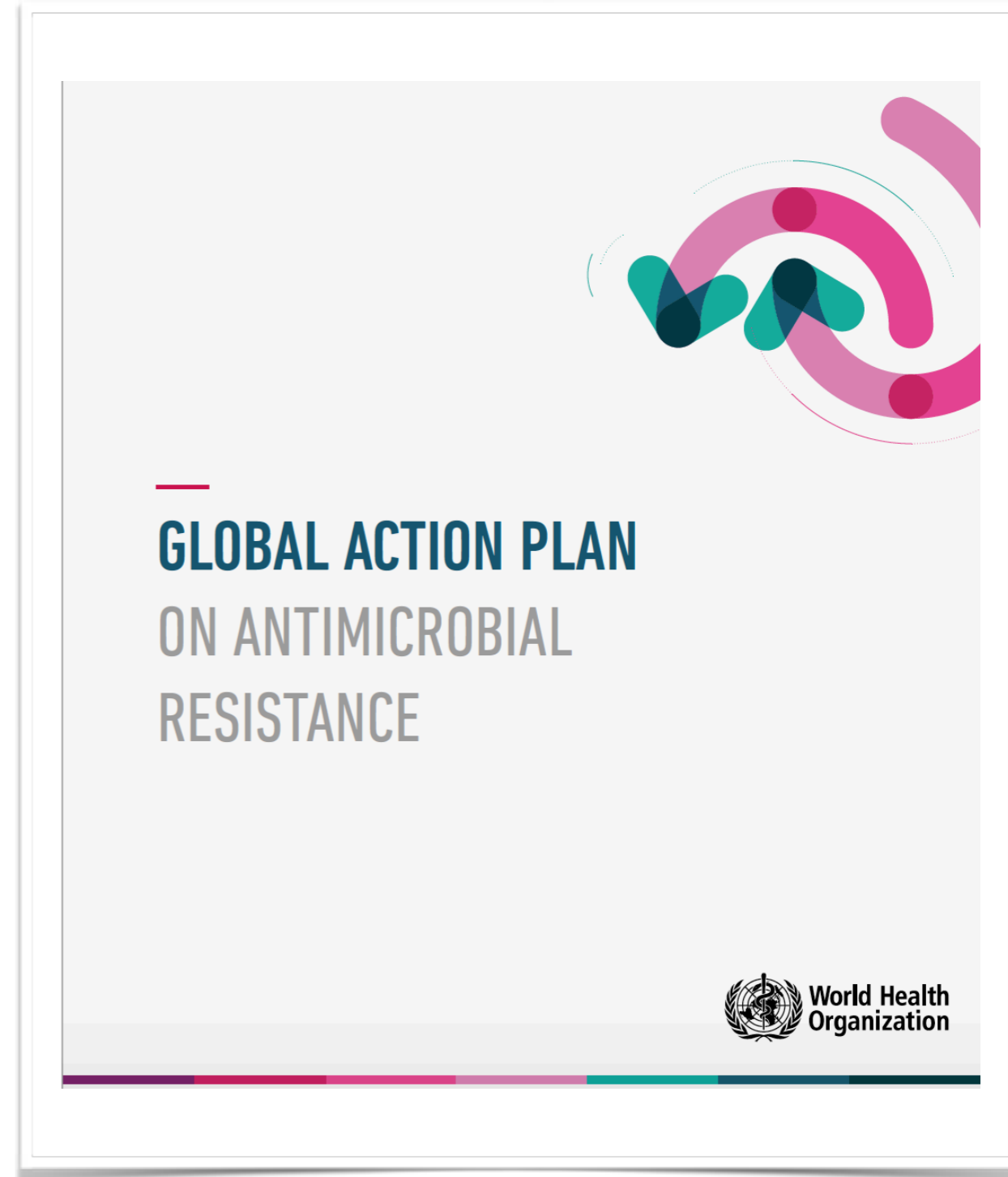
Centers for Disease Control and Prevention  
Campaign to Prevent Antimicrobial Resistance in  
Healthcare Settings

# WHO

Potential measure of effectiveness: extent of reduction in global human consumption of antibiotics (with allowance for the need for improved access in some settings), the consumption of antibiotics used in food production

- Member State action

- ....
- provision of stewardship programmes that monitor and promote optimization of antimicrobial use at national and local levels in accordance with international standards in order to ensure the correct choice of medicine at the right dose on the basis of evidence;
- ....



CDC „7-Core-Elements“ of ABS vs. ... ..

# The „real world of ABS“

- Small hospitals in the US
  - <200 beds: 49% meet all 7 core elements of ABS
    - „Multiple studies have found that smaller hospitals are less likely to have an active ASP and pharmacy support.“
- Germany
  - lack of ID-specialists
  - lack of hospital pharmacies
  - lack of hospital pharmacists



## Summary of Core Elements of Hospital Antibiotic Stewardship Programs

- **Leadership Commitment:** Dedicating necessary human, financial and information technology resources.
- **Accountability:** Appointing a single leader responsible for program outcomes. Experience with successful programs show that a physician leader is effective.
- **Drug Expertise:** Appointing a single pharmacist leader responsible for working to improve antibiotic use.
- **Action:** Implementing at least one recommended action, such as systemic evaluation of ongoing treatment need after a set period of initial treatment (i.e. “antibiotic time out” after 48 hours).
- **Tracking:** Monitoring antibiotic prescribing and resistance patterns.
- **Reporting:** Regular reporting information on antibiotic use and resistance to doctors, nurses and relevant staff.
- **Education:** Educating clinicians about resistance and optimal prescribing.

*CDC „7-Core-Elements“ of ABS vs. ... ..*

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  - lack of hospital pharmacists
  - in most cases no additional staffing

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## The „real world of ABS“

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- ADKA-Survey 2015 (121 hospital pharmacies)
  - 25% with ABS-Group according to AWMF-Guideline
    - 21% with other structure
  - 86% with pharmacist involved
    - 16% with management function
    - 56% member function
  - new staff due to establishment of ABS
    - pharmacists: 31%
    - physicians: 44%
    - microbiologists: 50%
  - participation in national antimicrobial consumption surveillance program 54%

Krankenhauspharmazie 2015;36(6):304-7.

... .. so what can we do?





# Implementation of Antimicrobial Stewardship Programs in Small Community Hospitals: Recognizing the Barriers and Meeting the Challenge

Daniel J. Sexton and Rebekah W. Moehring

Duke Center for Antimicrobial Stewardship and Infection Prevention, Duke University Medical Center, Durham, North Carolina  
*Clinical Infectious Diseases*® 2017;65(4):697–8

You have to overcome  
„a lack of personnel to perform stewardship  
and a lack of understanding on where the  
opportunities to improve stewardship exist.“

# ABS activities in small hospitals

**Table 1. Summary of Published Antibiotic Stewardship Studies in Acute Care Hospitals With <200 Beds**

Study	Setting	Key ASP Members	Intervention	Results
Day et al [22]	70-bed hospital	ID physician	ID physician traveled to the hospital weekly and reviewed medical records of all patients receiving antibiotics and made recommendations to staff. Available by phone all other times	(1) Improved <i>Pseudomonas aeruginosa</i> susceptibilities, (2) decrease in DDD/1000 PD for levofloxacin; piperacillin/tazobactam; and doripenem, and (3) decrease in antibiotic costs per patient-day
Bartlett et al [23]	135-bed hospital	ASP pharmacist and 2 hours of ID physician support daily, Mon–Fri	ASP pharmacist reviewed all patients on antibiotics and made interventions per policy. Reviewed cases with the ID physician as needed	(1) Decreased antibiotic acquisition costs, (2) decreased cost of antibiotics per discharge, (3) Decreased total DDD/1000 PD, and (4) increased IV-to-oral antibiotic conversion
Storey et al [21]	100-bed hospital	ID physician, clinical pharmacy supervisor, pharmacy director	1 hour twice weekly, the ID physician and one of the pharmacists audited medical records of all patients receiving antibiotics for >2 days. Written recommendations were placed in the medical record	(1) Decrease in DDD of all antibiotics per 100 admissions and 1000 PD, (2) reduction in antibiotic costs
Yam et al [24]	141-bed hospital	ID physician, chief medical officer, director of pharmacy	Daily review of all patients on piperacillin/tazobactam, imipenem, ertapenem, vancomycin, linezolid, and daptomycin. Recommendations given to treatment team. A remote ID physician spent 30 minutes per week teleconference “rounding” with the pharmacy staff	(1) Reduction in antibiotic purchase costs, (2) possible decrease in hospital-acquired <i>Clostridium difficile</i> infection
LaRocco [25]	120-bed hospital	ID physician and clinical pharmacist	3 days a week, the ASP team reviewed medical records of patients receiving multiple, prolonged, or high-cost antibiotic therapy. Written recommendations given to treatment team	Reduction in antibiotic costs

Abbreviations: ASP, antibiotic stewardship program; DDD, defined daily dose; ID, infectious diseases; IV, intravenous; PD, patient-days.

... .. but do we really need ABS in  
small hospitals?

# Some statements from literature (→ US)

- no difference in usage rates and spectrum of antibiotics used between small and large hospitals
- no difference in prescribing patterns in small or large hospitals
- hospital size is not a predictor for antibiotic use
- similar to higher rates of C. diff. in smaller hospitals
- smaller hospitals less likely to have ABS-Teams or pharmacy support
- only 50%–58% of smaller hospitals have access to ID physicians

... .. but is it really about small or  
big hospitals? ... ..

# Just an example

- The history of the „how-we-do-it“ at Heidelberg University Hospital („UKHD“)
  - established a „working group on antibiotics“ inside the drugs & therapeutics committee
    - initiative of hospital pharmacy and department of microbiology
  - renamed to „working group on antimicrobial therapy“
    - free entrance: specialists from all medical specialities are welcome

# Just an example

- The history of the „how-we-do-it“ at UKHD
  - microbiologist and chief pharmacist leading the working group
  - hospital pharmacy in charge of administration of the working group
    - interfaces to „ward pharmacists“
    - interfaces to national antibiotic consumption benchmark system
      - one of them built up by the German Association of Hospital Pharmacists („ADKA“) together with Department of Infectious Diseases at University Hospital of Freiburg („if“) and the German Society of Infectious Diseases („DGI“)

# Just an example

- The history of the „how-we-do-it“ at UKHD
  - tasks (viewpoint: pharmacy department)
    - create guidelines for antimicrobial therapies
    - bedside counseling regarding antimicrobial therapy (e.g. specialized pharmacists, during ward rounds)
    - controlling antimicrobial consumption (pharmacy)
    - benchmarking antimicrobial therapy with other German hospitals
    - controlling the correct and prudent use of antimicrobials at UKHD
      - compliance with existing guidelines, absence of medication errors (5-R-rule), etc.
  - ... ..



# How did we start?

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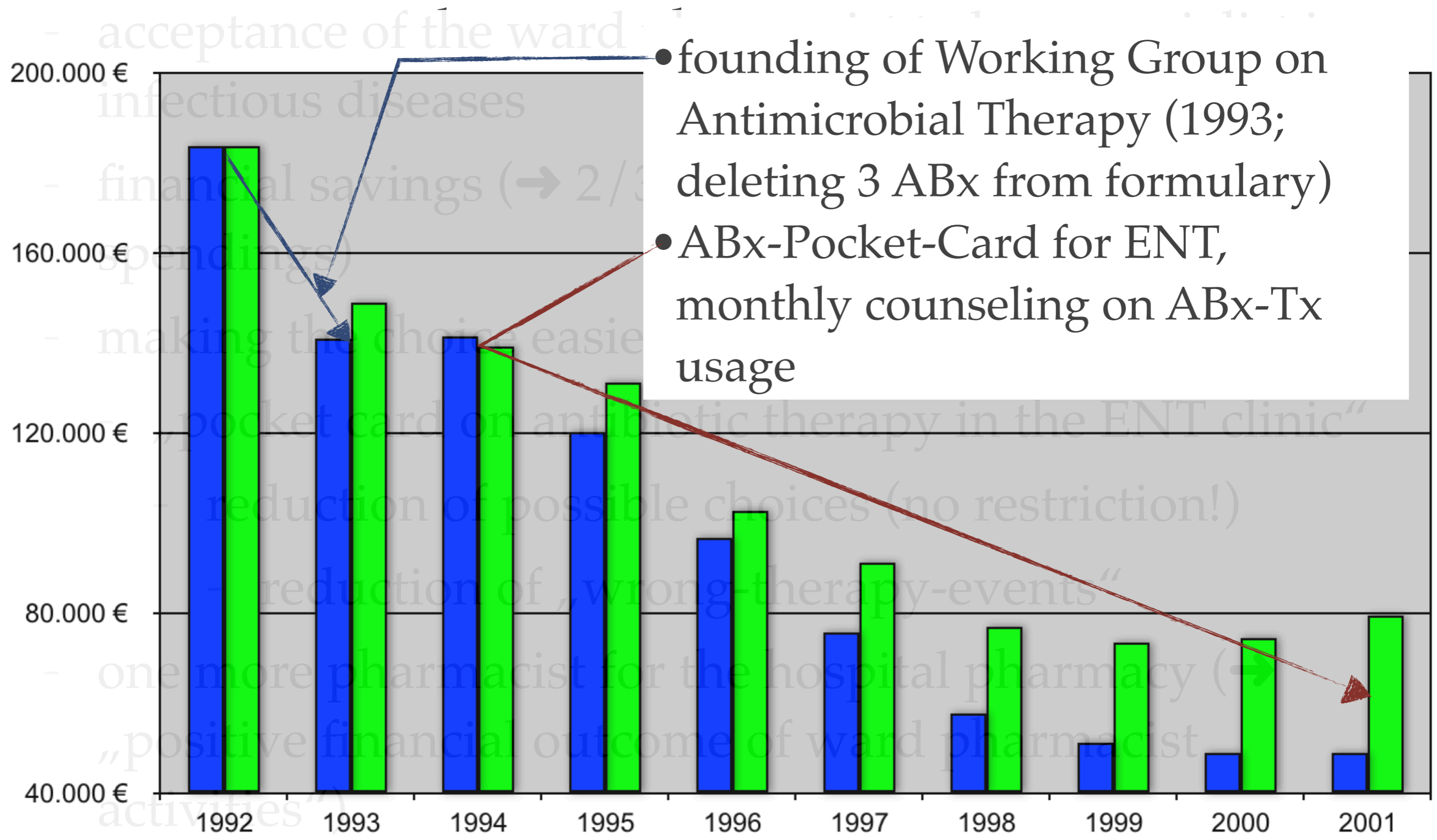
- working group in P&T committee deleted 3 antibiotics from the existing formulary
- project on antibiotic consumption in the Ear, Nose and Throat Clinic (ward pharmacist, combined activity)
  - narrowing formulary (→ „ENT-pocket-card“)
  - switch from i.v. to oral
  - giving transparency for DDD price and alternative antibiotic therapies
  - presentation of consumption data once a month, before ward rounds

# Outcomes of the ENT project at UKHD

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- acceptance of the ward pharmacist to be a specialist in infectious diseases
- financial savings
- making the choice easier
  - „pocket card on antibiotic therapy in the ENT clinic“
    - reduction of possible choices (no restriction!)
      - reduction of „wrong-therapy-events“
- one more pharmacist for the hospital pharmacy  
(board of directors: „there is positive financial outcome of ward pharmacist activities“)

# Outcomes of the ENT project at UKHD



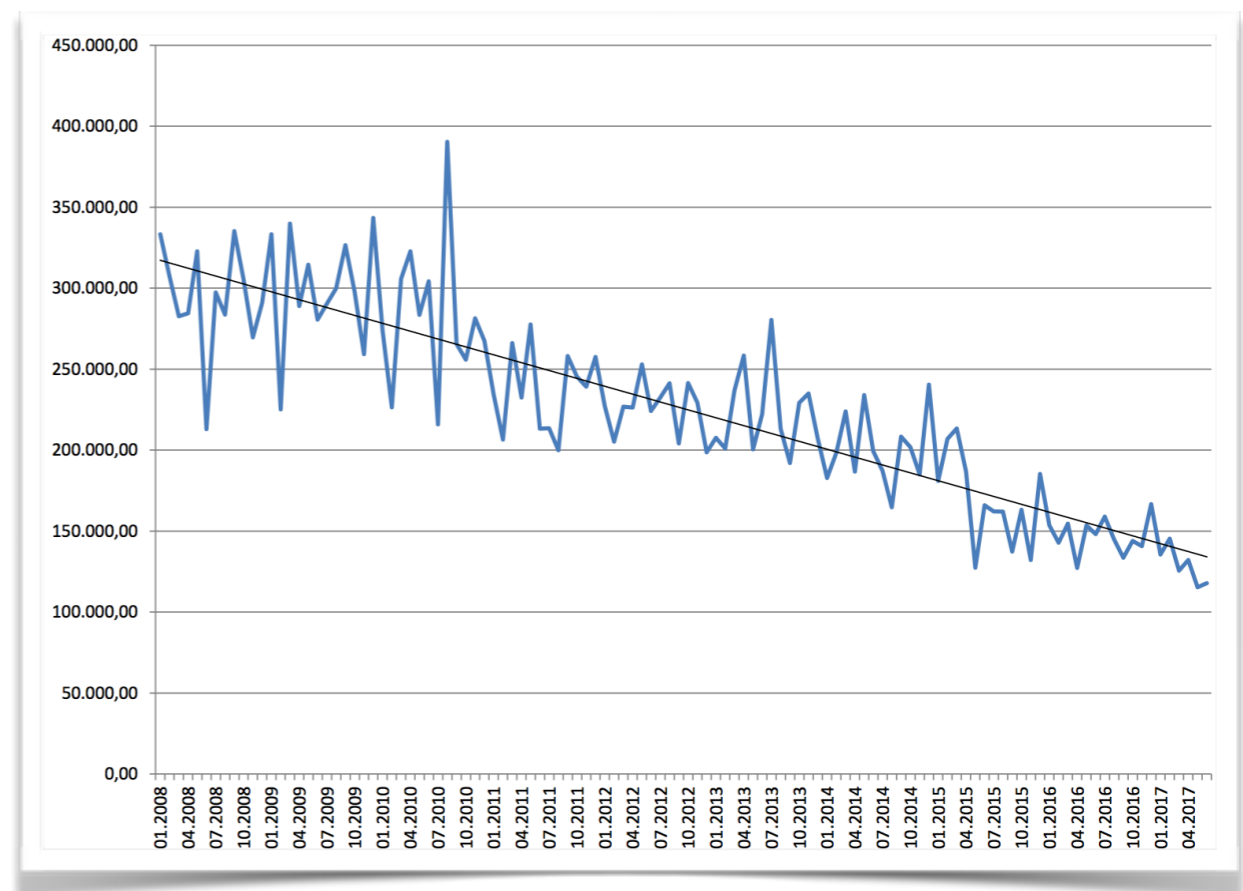
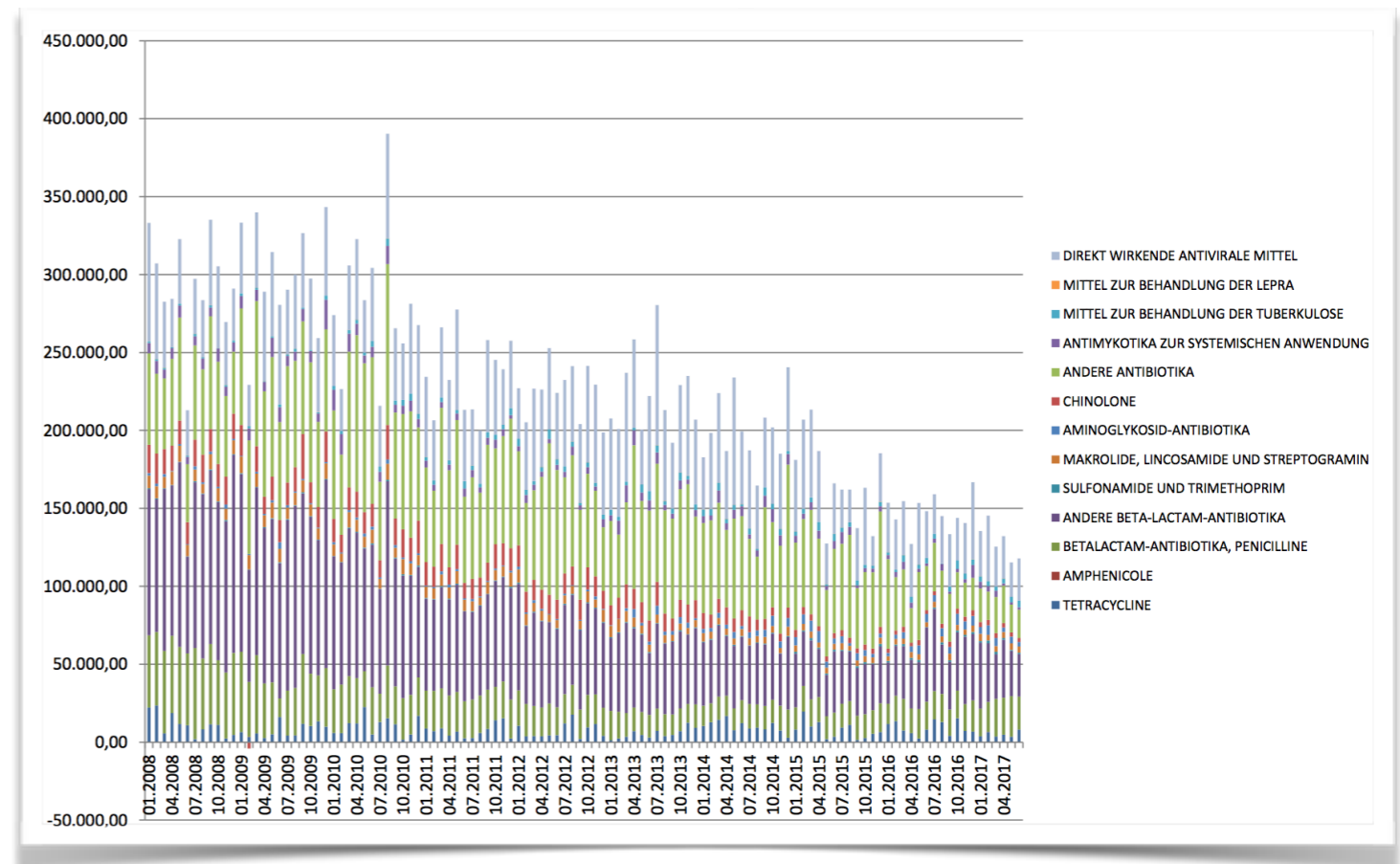
# What do you need to start?

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- knowledge
- network
- communication skills
- presentation skills
- IT
- supporters
- enthusiasm
- stamina and tenacity
- forbearance / high tolerance for suffering

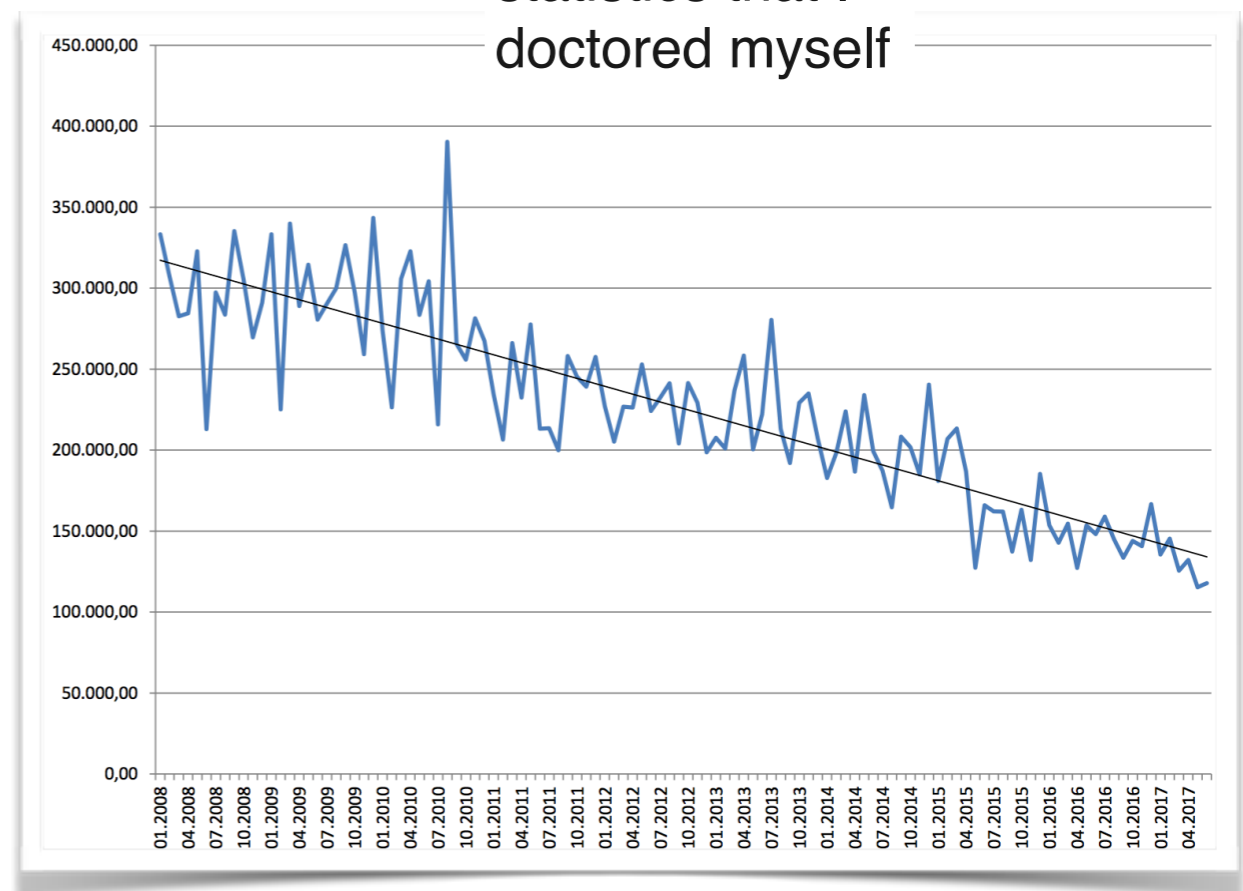
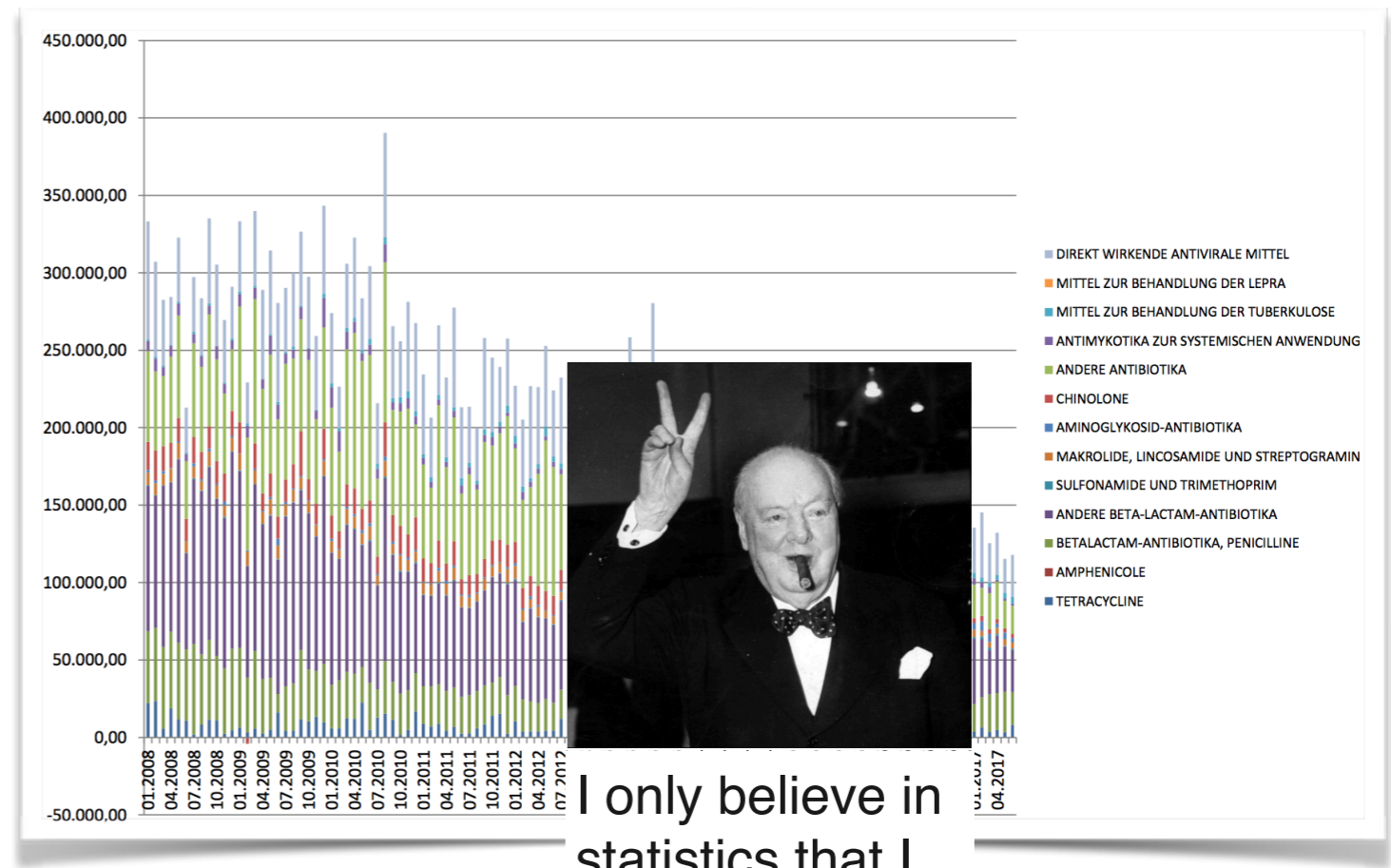
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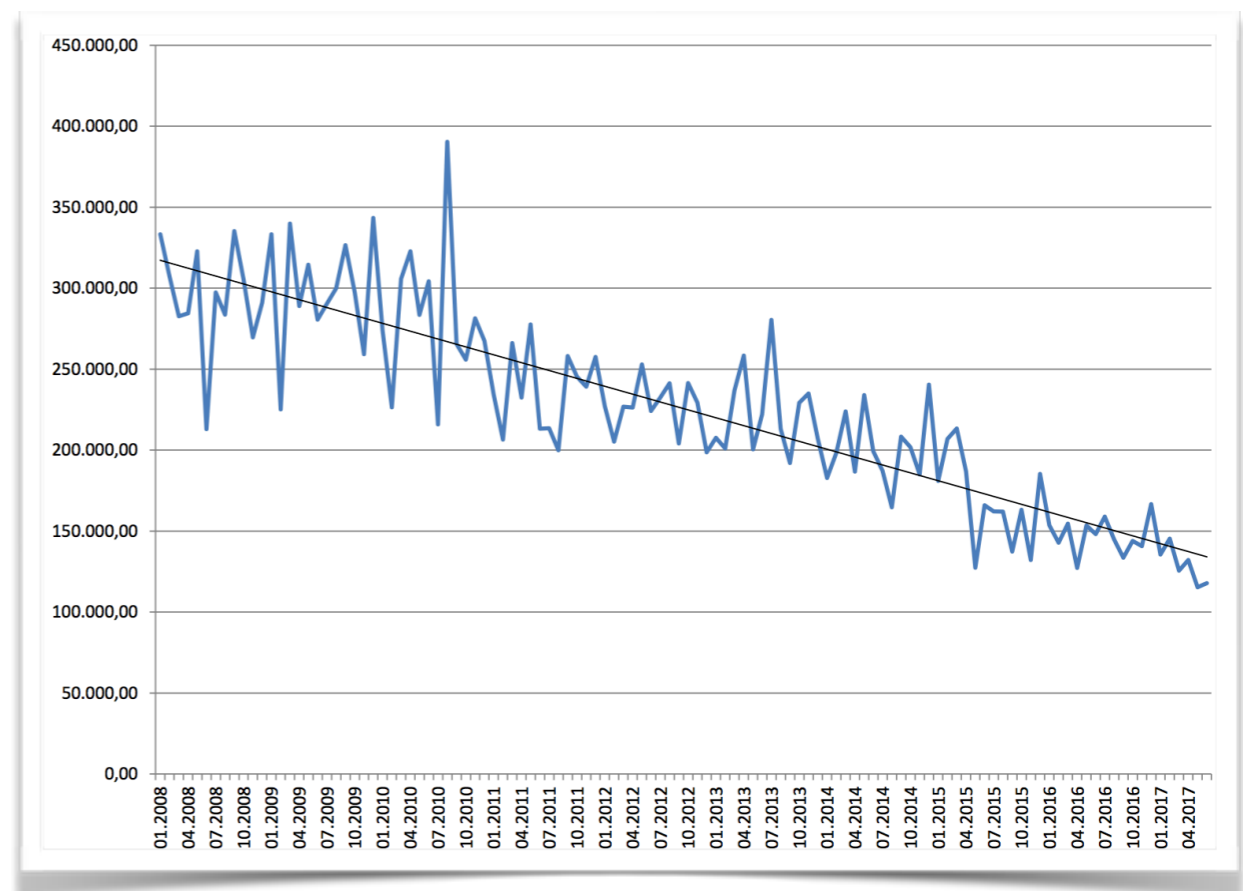
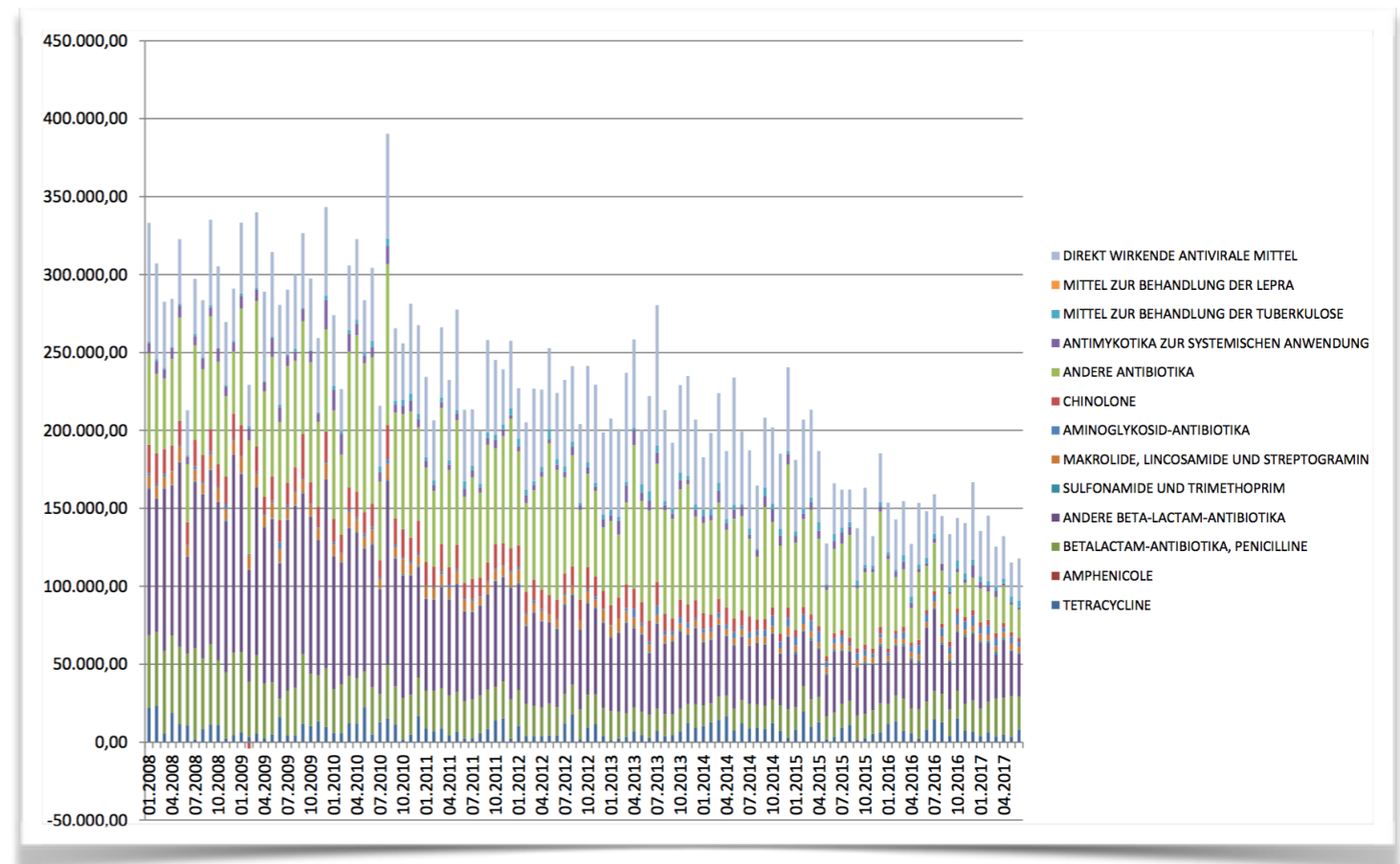
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„rural hospital“, 141 beds

What do you need to start?

... a point for discussion

- 13 persons (!)
  - 8 pharmacists
    - including director
  - 1 physician
    - microbiology
    - ID
    - hygiene, epidemiology
- chief medical officer

Table 1. Antimicrobial Stewardship (AMS) Team Members, Roles, and Responsibilities

Member Type (No. Participants)	Role	Responsibilities
Infectious diseases physician (1)	Expert consultant	Participate remotely in weekly AMS rounds, provide information and suggestions, consult with onsite physicians via telephone when necessary, provide education to hospital staff
Chief medical officer (1) <sup>a</sup>	Physician champion	Represent AMS team at medical executive committee and medical staff meetings, provide program oversight, participate in AMS rounds, provide physician leadership and support
Pharmacy residency director (1) <sup>b</sup>	Program manager and educator	Provide program oversight, data monitoring and tracking, and pharmacist and hospital staff education; generate reports; participate in AMS rounds
Quality-improvement staff member (1)	Project oversight	Represent AMS team at hospital administrative meetings, occasionally participate in AMS rounds
Director of pharmacy (1)	Project leader	Represent AMS team at health-system level, occasionally participate in AMS rounds
Pharmacy practice resident (2)	Participant	Review AMS patient profiles daily during clinical rotations, work with residency director in program oversight, participate in AMS rounds
Pharmacist (4)	Participant	Review AMS patient profiles daily when assigned to clinical duties and when resident not on clinical rotation, participate in AMS rounds
Microbiologist (1)	Participant	Identify quality-improvement processes in the microbiology department that affect AMS, serve as consultant on individual patient cases, participate in AMS rounds
Infection-control staff member (1)	Participant	Identify quality-improvement processes in infection control that affect AMS, serve as consultant on individual patient cases, participate in AMS rounds

<sup>a</sup>Physician is a pulmonologist and intensivist, with previous non-board-certified infectious diseases training.  
<sup>b</sup>Pharmacist is residency-trained, board-certified pharmacotherapy specialist with extensive clinical leadership background.



# What do you need to start?

- train at least one pharmacist in infectious diseases
  - training programs, specialization, congresses, ... ..
- IT!
  - consumption data → €, DDD, PDD
  - electronic health record (→ data from microbiology, blood levels from antibiotics, etc.)
- start with projects
  - . . . . .

- Preauthorization and/or prospective audit with feedback;
- Implementation of interventions designed to reduce the use of antibiotics with a high risk for *Clostridium difficile* infection;
- Interventions to reduce antibiotic therapy to the shortest effective duration;
- Implementation of pharmacokinetic monitoring with dose adjustment for aminoglycosides; and
- Promotion of switching from intravenous to oral administration when clinically feasible.

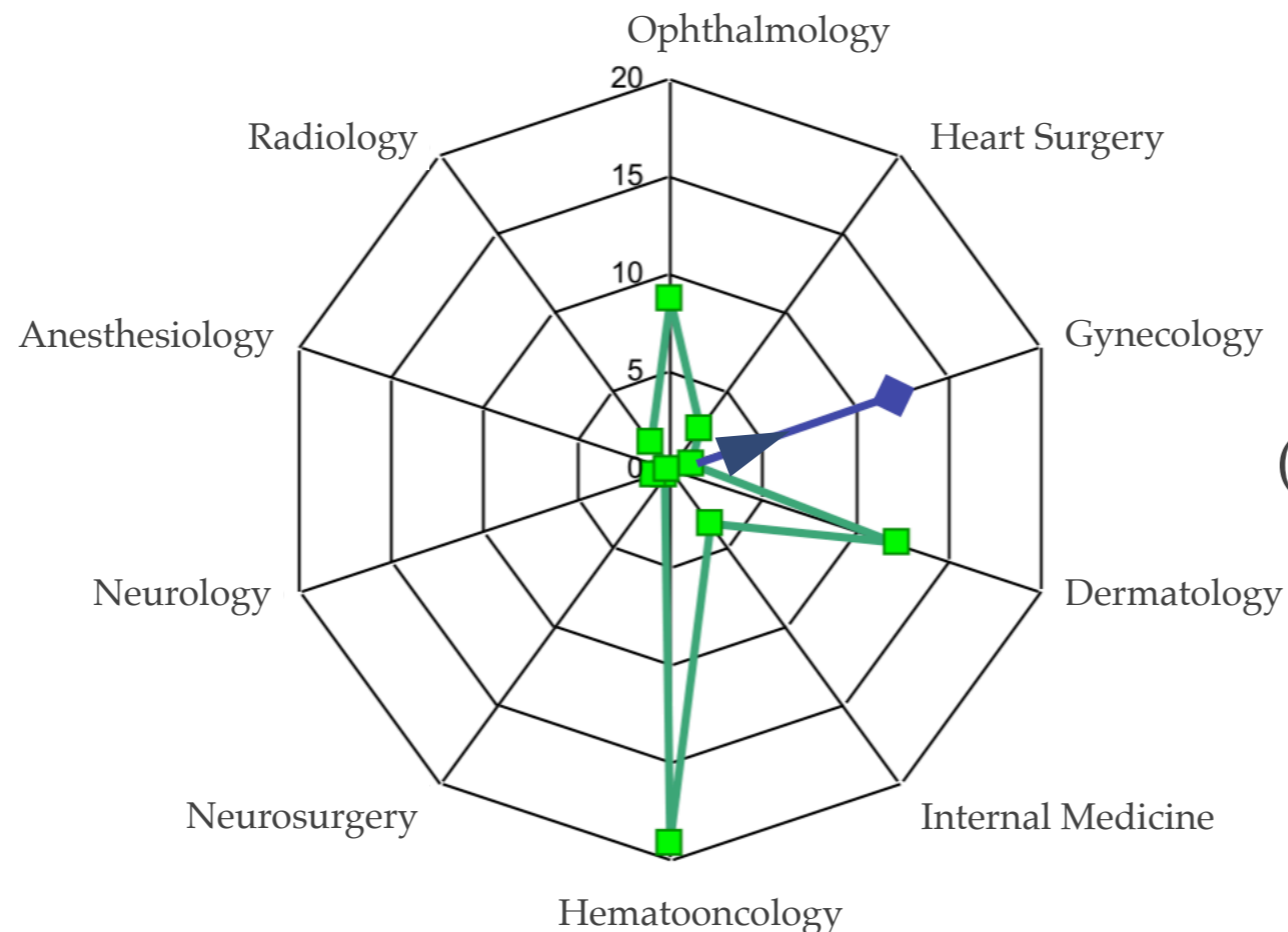
- Sinusitis: no antibiotics until at least 7 days of symptoms<sup>[2]</sup>;
- Pharyngitis: antibiotics only with a positive group A Streptococcus test<sup>[3]</sup>;
- Acute bronchitis: no sputum culture and no antibiotics unless chest x-ray shows pneumonia<sup>[3]</sup>;
- Asymptomatic urinary tract infection (UTI): no antibiotics<sup>[4]</sup>; and
- Upper respiratory infection (URI): no antibiotics, ever.<sup>[3]</sup>

# Possible activities

- main question →  
*„decide on where best to focus efforts to improve antibiotic prescribing“*
- evaluation of the baseline
  - point-prevalence-analysis of right / wrong (appropriate / non-appropriate) antibiotic therapy
  - indication, type of antibiotic, dose, route of administration (i.v., oral)
  - can be expanded to *„in line with existing guidelines“*, length of therapy, etc.

# Possible activities

- do not concentrate on antibiotic cost and usage only
- measure improvement in antibiotic prescribing appropriateness also
- build up an internal and external benchmark
- always monitor compliance with existing or new policies



oral / i.v. quinolone ratio  
 (internal benchmark UKHD)  
*[old data!]*

# Possible interventions

- create clinical guidelines
  - for common syndromes (UTI, SSTI, C. diff., etc.)
  - on the basis of existing guidelines or common practice
  - consider local resistance rates
- influence length of ABx-Tx by implementing ABx time-out rules (e.g. 48h) or by running PPA on ABx length-of-therapy
- define basic ABx vs. last-resort ABx
  - „no ABx without proper indication“
    - predefine approval processes (pharmacist, microbiologist, ABS-team-member)
- streamline ABx-Tx during ward rounds
  - narrow spectrum, unnecessary combinations, right LOTx

# Measure your interventions!

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- interventions (by pharmacists) after review of ABx-Tx
- streamlining (narrow spectrum ABx-Tx after review of microbiology results)
- elimination of redundant ABx-Tx (also unnecessary combination Tx)
- physicians agreement with pharmacists recommendations
- changes in cost of ABx-Tx
- changes in DDD / RDD consumption data
- changes in C. diff. rates
- changes in resistance rates
- rate of compliance with given (local) guidelines

## Possible interventions

# advantages vs. disadvantages

• „Many great achievements can be traced back to overcoming disadvantages.“

„Many great failures can be traced back to a lack of disadvantages.“

([https://www.thecoughlincompany.com/cc\\_vol10\\_5/](https://www.thecoughlincompany.com/cc_vol10_5/))

TABLE 2

Potential Advantages and Disadvantages of IDSA/SHEA Core Strategies and Supplemental Elements of Antimicrobial Stewardship Programs<sup>11,22-25</sup>

Core Strategies	Advantages	Disadvantages
Prospective audit with direct intervention and feedback	<ul style="list-style-type: none"> <li>May reduce inappropriate antimicrobial use</li> <li>May serve an educational purpose to modify future prescribing</li> <li>Allows prescribers to maintain autonomy</li> </ul>	<ul style="list-style-type: none"> <li>Difficulty identifying patients with inappropriate therapy and communicating with prescribers</li> </ul>
Formulary restriction and preauthorization requirements	<ul style="list-style-type: none"> <li>May result in immediate and substantial reductions in antimicrobial use and costs</li> </ul>	<ul style="list-style-type: none"> <li>May increase staffing requirements</li> <li>May delay order implementation while approval is obtained from an authorized prescriber, with the potential for adverse patient outcomes</li> <li>May increase use of and resistance to alternative antimicrobial agents</li> <li>Perceived loss of prescriber autonomy</li> </ul>
Education	<ul style="list-style-type: none"> <li>May influence prescribing behavior and promote acceptance of ASP strategies</li> </ul>	<ul style="list-style-type: none"> <li>Only marginally effective in modifying prescribing behavior when used without active intervention</li> </ul>
Evidence-based guidelines and clinical pathways	<ul style="list-style-type: none"> <li>May improve antimicrobial use and eliminate practice variations</li> </ul>	<ul style="list-style-type: none"> <li>Adherence may be poor</li> </ul>
Antimicrobial cycling <sup>a</sup>	<ul style="list-style-type: none"> <li>May minimize resistance by providing diversity in antimicrobial use</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient data available demonstrating long-term effectiveness in reducing antimicrobial resistance</li> <li>Many patients excluded because of drug allergies, toxicity, or other concerns</li> <li>Potential for nonadherence due to prescriber lack of awareness of currently scheduled agent</li> <li>May increase antibiotic costs</li> </ul>
Antimicrobial order forms	<ul style="list-style-type: none"> <li>May reduce inappropriate antimicrobial use</li> <li>May facilitate implementation of guidelines and clinical pathways</li> </ul>	<ul style="list-style-type: none"> <li>Potential for inappropriate interruption in therapy due to automatic stop orders</li> </ul>
Combination therapy <sup>a</sup>	<ul style="list-style-type: none"> <li>May improve clinical outcomes and prevent resistance in certain types of patients and situations</li> </ul>	<ul style="list-style-type: none"> <li>Often redundant and unnecessary</li> <li>Insufficient data available demonstrating improved clinical outcomes and prevention of resistance</li> </ul>
Streamlining or de-escalation of therapy	<ul style="list-style-type: none"> <li>Reduces antimicrobial exposure, selection of resistant pathogens, and health care costs</li> </ul>	<ul style="list-style-type: none"> <li>Prescriber reluctance to de-escalate therapy when cultures are negative and clinical improvement has been observed</li> </ul>
Dose optimization	<ul style="list-style-type: none"> <li>Tailors therapy to patient characteristics, causative organism, site of infection, and pharmacokinetic and pharmacodynamic characteristics of the antimicrobial agent</li> </ul>	<ul style="list-style-type: none"> <li>Nursing staff concerns about incompatibilities when prolonged infusions are used based on pharmacokinetic considerations</li> </ul>
Parenteral-to-oral conversion	<ul style="list-style-type: none"> <li>May decrease length of hospital stay and health care costs</li> <li>May reduce the risk of complications from intravenous access</li> </ul>	<ul style="list-style-type: none"> <li>Difficulty identifying patients in whom conversion is appropriate</li> </ul>

ASP = antimicrobial stewardship program; IDSA = Infectious Diseases Society of America; SHEA = Society for Healthcare Epidemiology of America

<sup>a</sup> Not routinely recommended in IDSA/SHEA guidelines

## *Possible interventions*

# The role of the pharmacist

- promoting multidisciplinary approach also means to actively demand multidisciplinary approach
- make recommendations, (try to) intervene
- network with P&T committee (and with other ABS-teams in other hospitals)
- generate quantitative and qualitative data

TABLE 4

## Pharmacist Functions that Promote Optimal Use of Antimicrobial Agents<sup>37</sup>

- Promoting multidisciplinary collaboration in the institution to ensure optimal patient outcomes from prophylactic, empiric, and therapeutic uses of antimicrobial agents
- Making recommendations for appropriate antimicrobial agent selection, dose optimization, timely initiation of therapy, therapeutic monitoring, and de-escalation of therapy
- Working with the pharmacy and therapeutics committee or its equivalent to develop policies and procedures for restricted antimicrobial use and therapeutic interchange, treatment guidelines, and clinical care plans
- Generating and analyzing quantitative data on antimicrobial drug use for use in performing analyses of clinical and economic outcomes
- Collaborating with microbiology laboratory and infectious diseases personnel to ensure the timely reporting of microbial susceptibility test results for individuals and hospital-wide and unit-specific microbial susceptibility data to prescribers
- Using information technology for surveillance of antimicrobial resistance, preparation of reports on antimicrobial use and outcomes, and developing clinical decision support tools
- Encouraging safe medication management practices for antimicrobial agents using efficient and effective systems to reduce the risk for errors and adverse effects

# There are lots of reasons not to start

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- physicians don't want me to tell them what to do because they know better
- pharmacists are not responsible for the outcome of patients but physicians are
- it's not my budget
- broad spectrum ABx-Tx is better for the patient
- ABx prophylaxis has no risks
- I cannot influence physicians decisions
- I have so much other things to do, I have to concentrate on pharmacy stuff
- ....

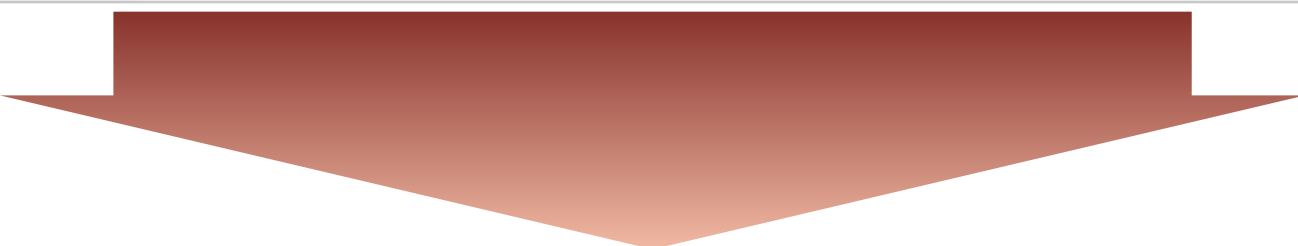


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**Don't hide behind those „reasons“**

# Start now!

- 
- Hospitals that delay starting an ASP until all components and resources are available will fail to meet the needs of their patients in the short and long term.
  - Programs that begin with limited monetary support can grow and improve if early successes are achieved and then leveraged to secure more financial support.
  - Although there are many barriers to overcome, this is an exciting time and a rich opportunity for ID specialists and pharmacists who dare to become pioneers in this currently underserved and largely ignored practice setting.

# Questions to the audience (Yes/No)

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- Is it promising to work on topics of antimicrobial stewardship without having the structures published in several guidances? → YES
- Is there a must for having a budget for a group working in antimicrobial stewardship? → NO
- Can a pharmacy department build up an antimicrobial stewardship group without getting staff for this? → YES
- Is it possible to have a positive outcome for antimicrobial consumption without having an ABS-Team according to the published guidances? → YES