Integrated Activities and Tools for Antimicrobial Stewardship

INTRODUCTION TO ANTIMICROBIAL STEWARDSHIP

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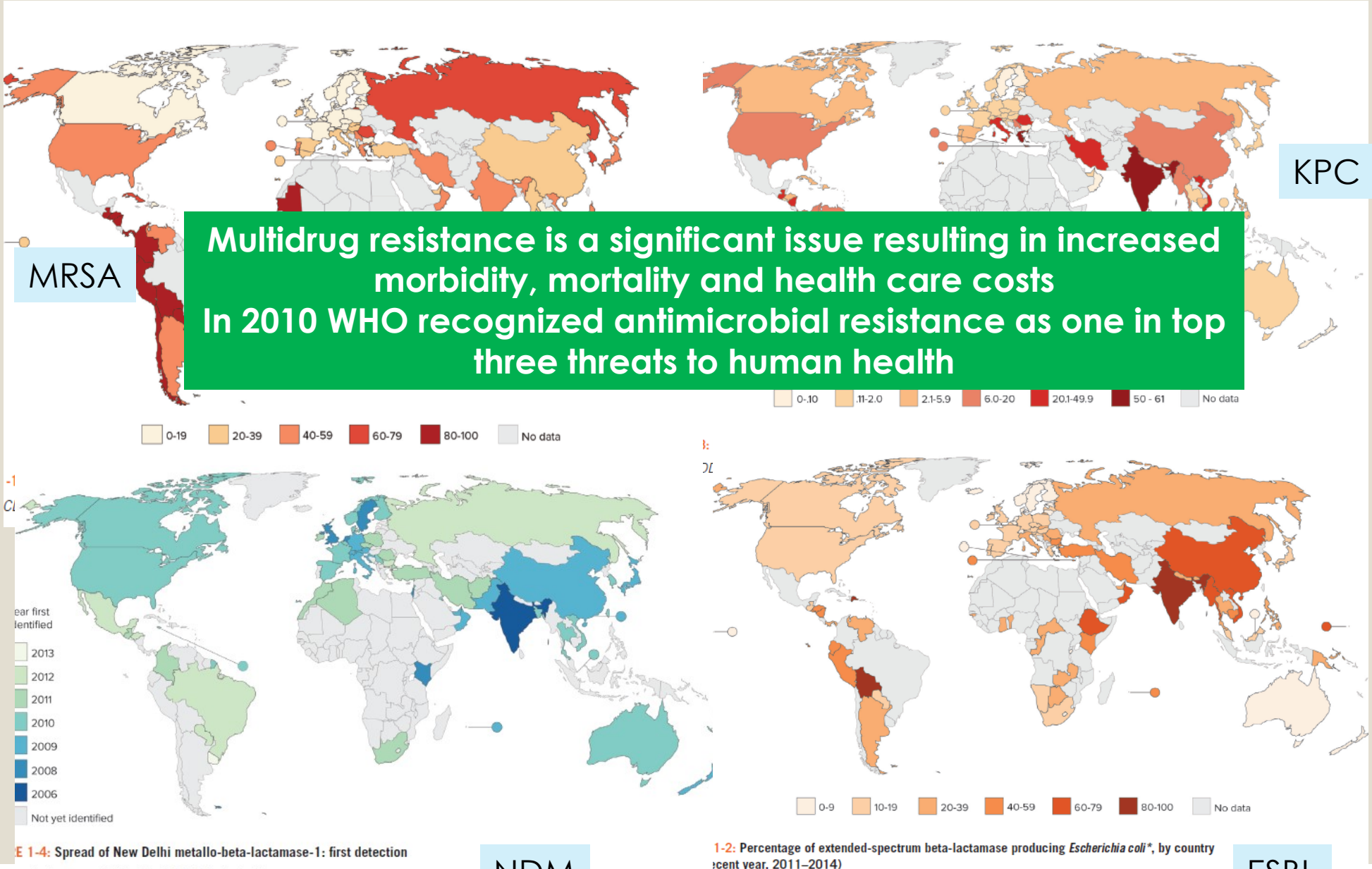
Objectives

1. AMR Epidemiology & Impacts
2. Drivers of AMR
3. Common areas for improving antibiotic prescribing
4. Goals of stewardship
5. Intervention options
6. WHO AWaRe categories
7. Measurement components
8. Antimicrobial use surveillance/ Audits

Global scenario: AMR



Multidrug resistance is a significant issue resulting in increased morbidity, mortality and health care costs
In 2010 WHO recognized antimicrobial resistance as one in top three threats to human health

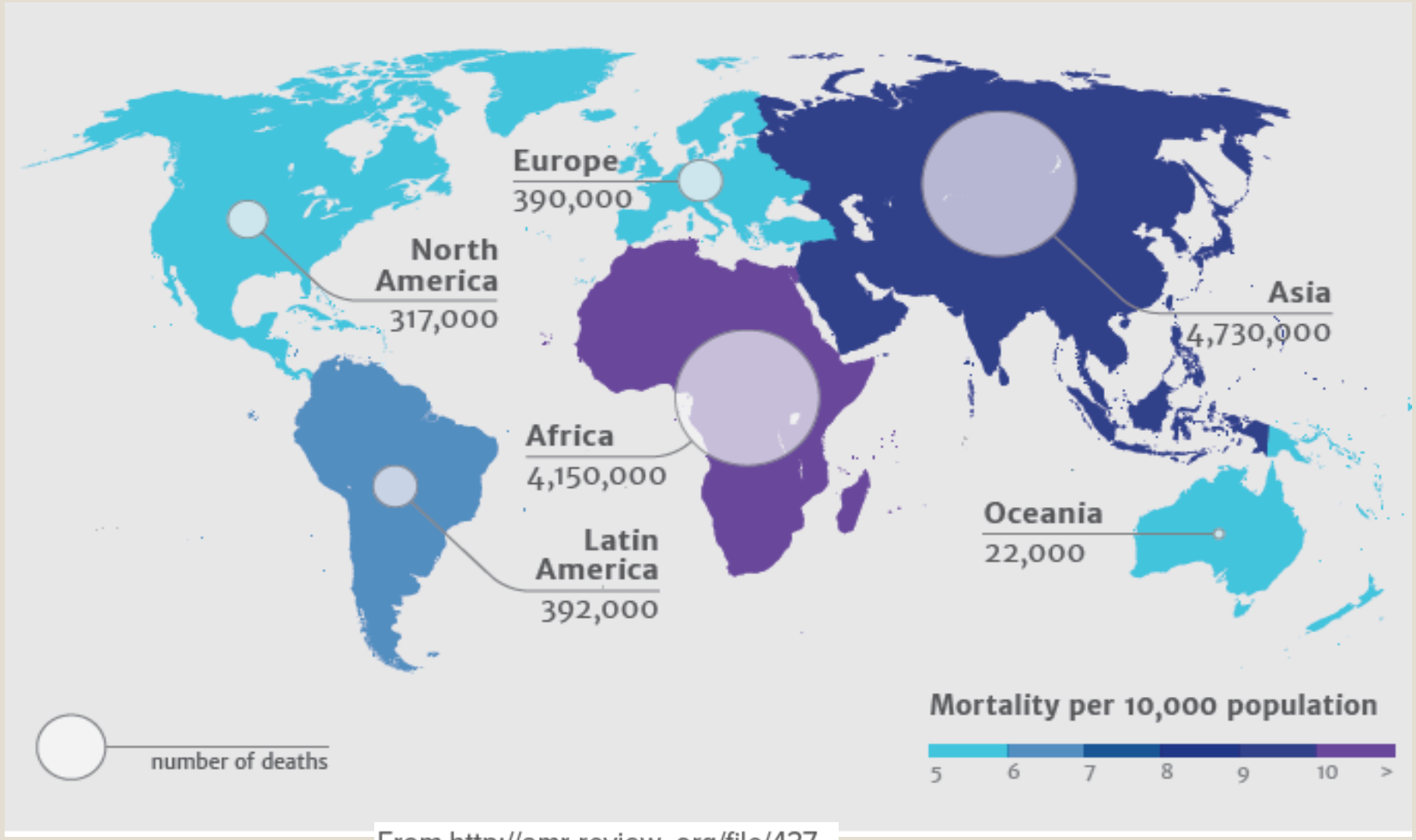
E 1-4: Spread of New Delhi metallo-beta-lactamase-1: first detection
e: Johnson and Woodford 2013 (adapted)

NDM

1-2: Percentage of extended-spectrum beta-lactamase producing *Escherichia coli**, by country
cent year, 2011–2014)
CDDEP 2015, WHO 2014 and PAHO, forthcoming

ESBL

MORTALITY IMPACT



From http://amr-review .org/file/437

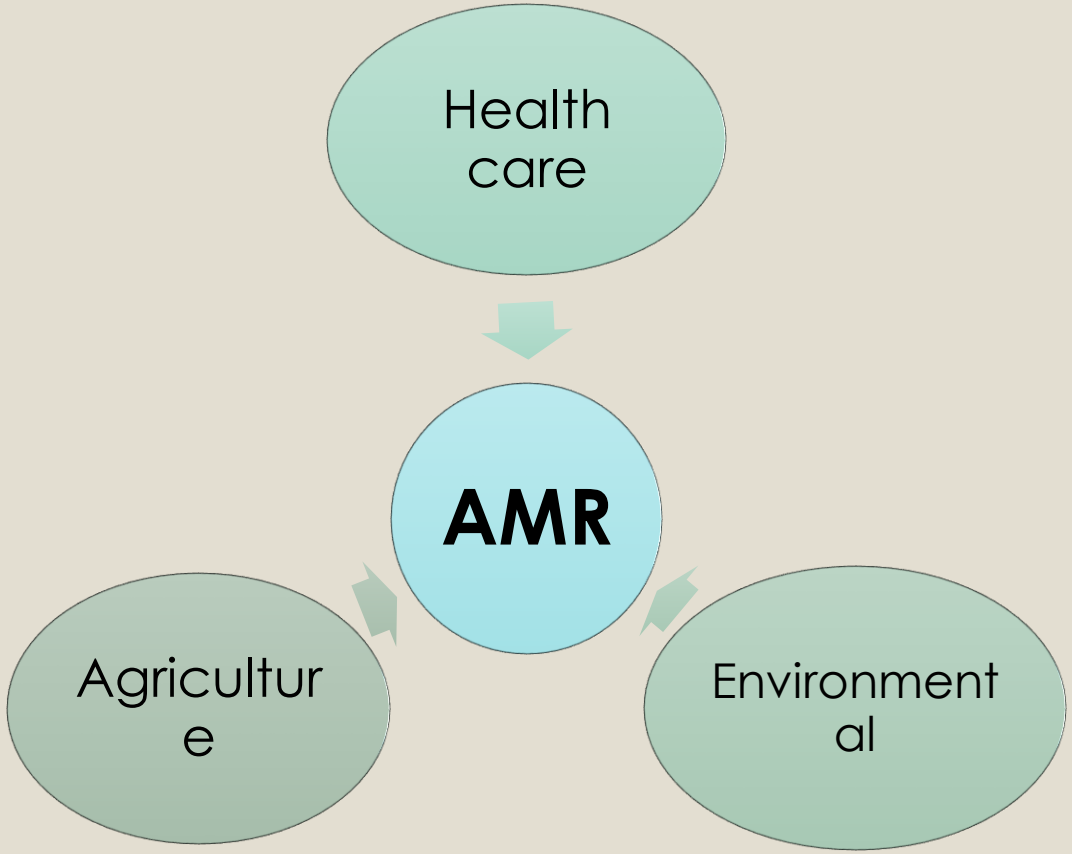
IMPACT OF ANTIBIOTIC RESISTANCE ON PATIENT MORTALITY, LENGTH OF HOSPITAL STAY

INFECTION AND CAUSATIVE ORGANISM	INCREASED RISK OF DEATH (OR)	ATTRIBUTABLE LENGHT OF STAY (DAYS)
MRSA bacteremia	1.9	2.2
MRSA surgical infection	3.4	2.6
VRE infection	2.1	6.2
Resistant *Pseudomonas aeruginosa* infection	1.8 - 5.4	5.7 - 6.5
Resistant *Enterobacter* infection	5.0	9.0
Resistant *Acinetobacter* infection	2.4 - 6.2	5 - 13
ESBL-producing or KPC-producing *Escherichia coli* or *Klebsiella* infection	3.6	1.6-fold increase

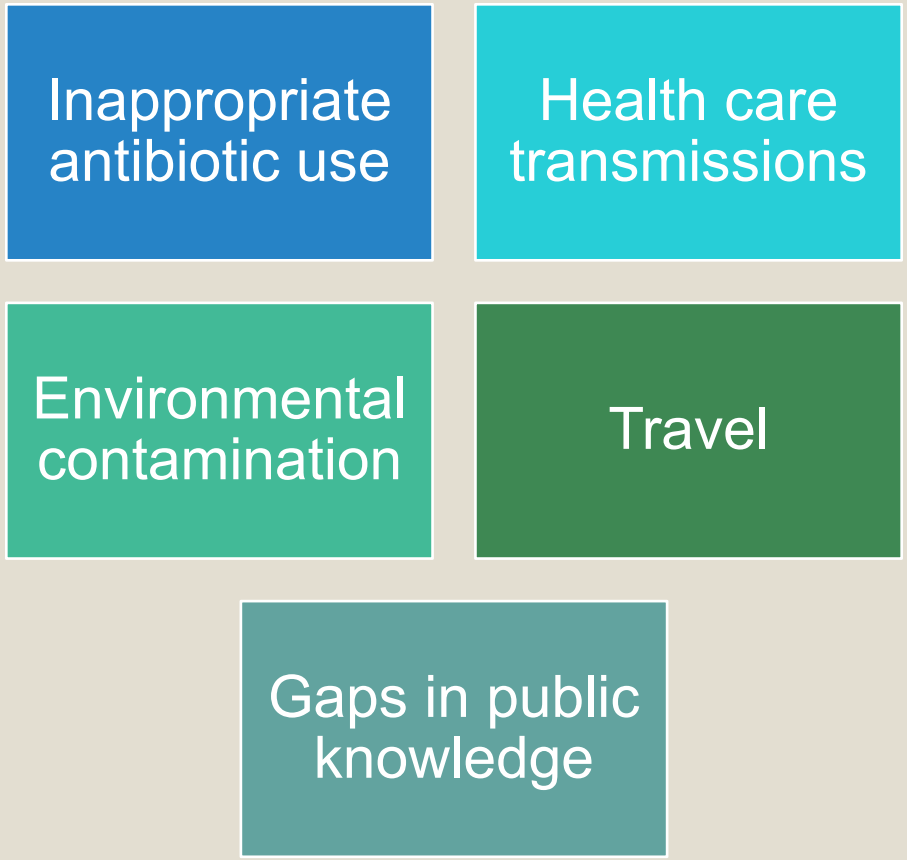
Clin Microbiol Infect 2014; 20: 973-979

Sectors contributing to AMR

At a societal level, complex and interlinking drivers are increasing the prevalence of antimicrobial-resistant microorganisms, predominantly arising from use in human beings and agriculture and the pollution of the environment.

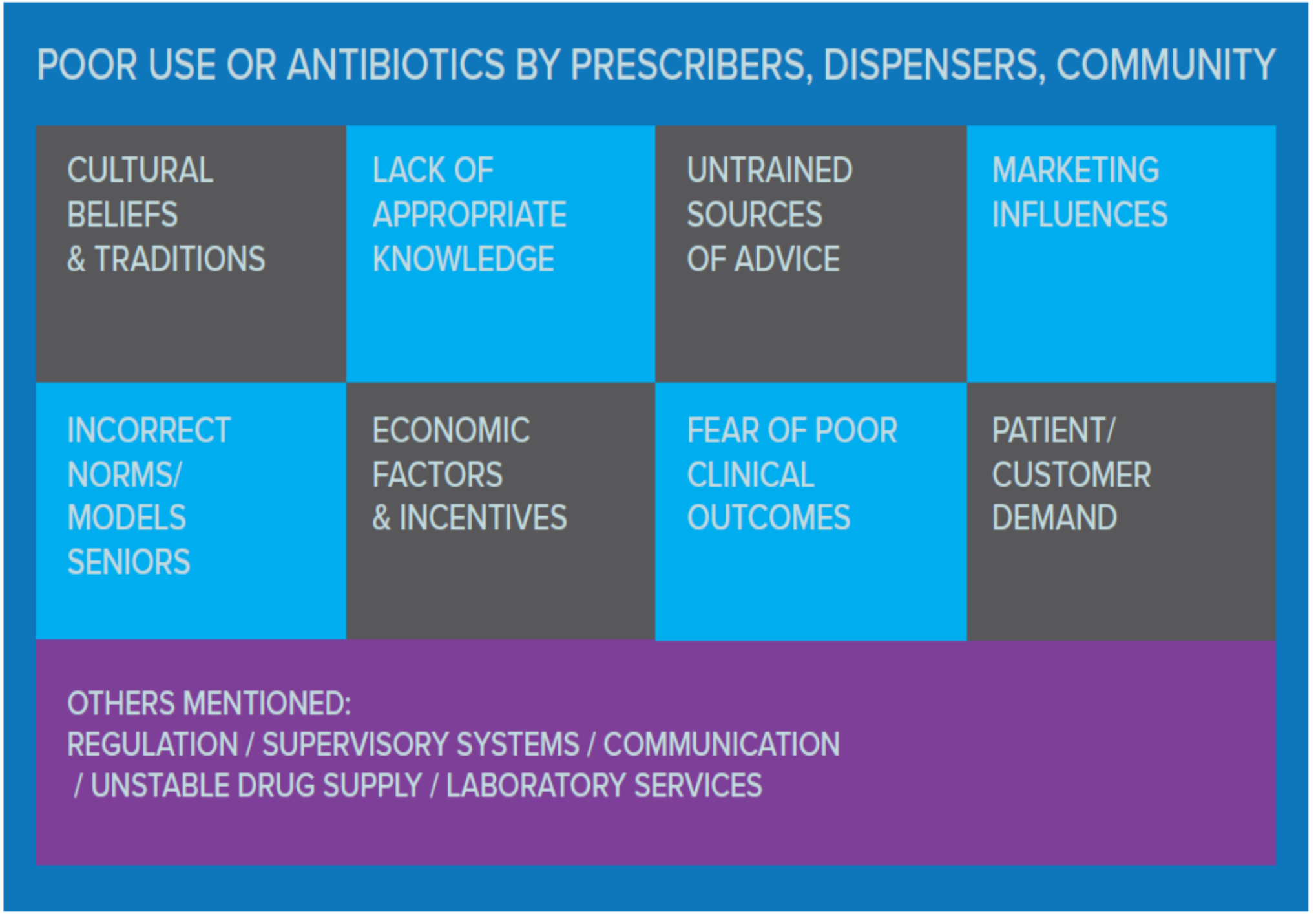


Drivers of AMR



Common areas for improving antibiotic prescribing

- Overprescribing
- Too broad spectrum
- Too many antibiotics or fixed dose combinations
- Wrong dose, wrong interval, wrong route
- Wrong duration
- Too slow (not started soon enough)


POOR USE OR ANTIBIOTICS BY PRESCRIBERS, DISPENSERS, COMMUNITY
CULTURAL BELIEFS & TRADITIONS
LACK OF APPROPRIATE KNOWLEDGE
UNTRAINED SOURCES OF ADVICE
MARKETING INFLUENCES
INCORRECT NORMS/ MODELS SENIORS
ECONOMIC FACTORS & INCENTIVES
FEAR OF POOR CLINICAL OUTCOMES
PATIENT/ CUSTOMER DEMAND
OTHERS MENTIONED:
REGULATION / SUPERVISORY SYSTEMS / COMMUNICATION / UNSTABLE DRUG SUPPLY / LABORATORY SERVICES

6 Core strategies to combat AMR

REDUCE
the need for antibiotics through improved water, sanitation and immunization

IMPROVE
hospial infection control and antibiotic stewardship

CHANGE
incentives that encourage antibiotic overuse and misuse to incentives that encourage antibiotic stewardship

REDUCE
and eventually phase out subtherapeutic antibiotic use in agriculture

EDUCATE
health professionals, policy makers and the public on sustainable antibiotic use

ENSURE
political commitment to meet the threat of antibiotic resistance

◦ANTIMICROBIAL STEWARDSHIP AS ONE SOLUTION TO COMBAT AMR

Definition

- " the optimal selection, dosage, and duration of antimicrobial treatment that results in the best clinical outcome for the treatment or prevention of infection, with minimal toxicity to the patient and minimal impact on subsequent resistance."

- ***Also defined as;***

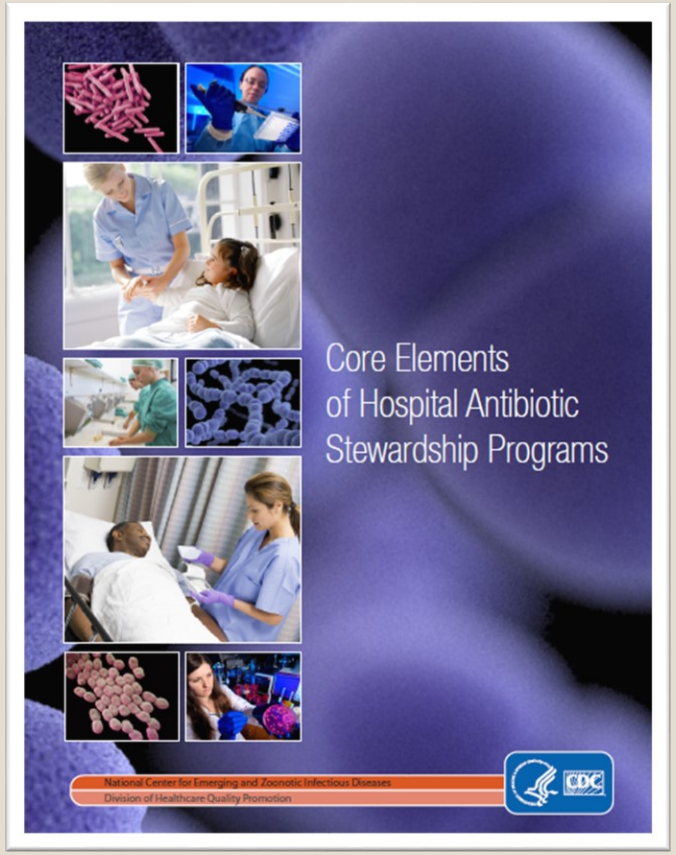
- " Organizational or healthcare system wide approach to promote and monitoring judicious use of antimicrobials to preserve their future effectiveness"

Clinical Definition

- " The Right Antibiotic
- For the Right patient
- At the Right time
- With the Right dose
- And the Right route,
- Causing the least harm to
- The patient and future patients"

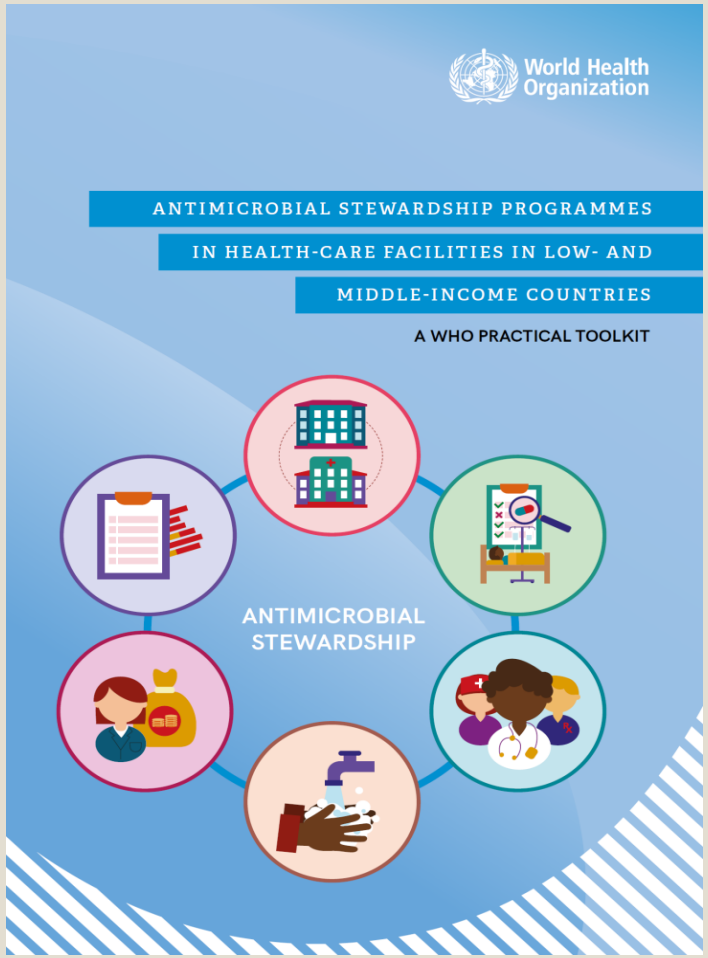
Adapted from http://www.cdc.gov/getsmart/healthcare/inpatient-stewardship

Core Elements of AMSP



- ❑ Leadership Commitment
- ❑ Accountability
- ❑ Drug Expertise
- ❑ Action
- ❑Tracking
- ❑ Reporting
- ❑Education

WHO recent development



Interventions/ Actions

- Development of antibiotic guidelines/ SOPs
  - Local susceptibility/ antibiogram
  - Antimicrobial consumption
  - AWaRe Classifications
- Select and review charts
  - What is current practice? (surgical prophylaxis, antibiotic sensitivity testing)
  - What can we improve upon?
- Involve prescribers

ACTIONS: INTERVENTIONS

- Guidelines, policies, and protocols alone will probably not change practice

- Active interventions are most effective
  - Prospective audit
  - Formulary restriction and preauthorization
  - Antibiotic ‘Time Out’
  - IV to oral switch
  - De-escalation therapy
  - Dose optimization

PROSPECTIVE AUDIT

- An physician reviews orders and intervenes with modification of order and feedback to prescriber
- Results in improved use, decreased costs
- Caveats:
  - Time and labor intensive
  - Many settings do not have capacity
  - Providers may not be receptive

FORMULARY RESTRICTION AND PREAUTHORIZATION

- Specific antibiotics cannot be ordered without authorization
- Useful in response to healthcare-associated outbreak

AN ANTIBIOTIC 'TIME OUT'

- A concrete point in time dedicated to reviewing antimicrobial choice and duration
  - Reappraise therapy when more clinical data are available (usually in 48-72 hours)
  - Decide about continuation, narrowing therapy and specify a duration

- Recommended changes are better received and more likely to be followed at a later time point

PARENTERAL TO ORAL SWITCH

- Antibiotics with similar bioavailability
- Less side effects
- Less cost
- Shorter hospital stay

DOSE OPTIMIZATION

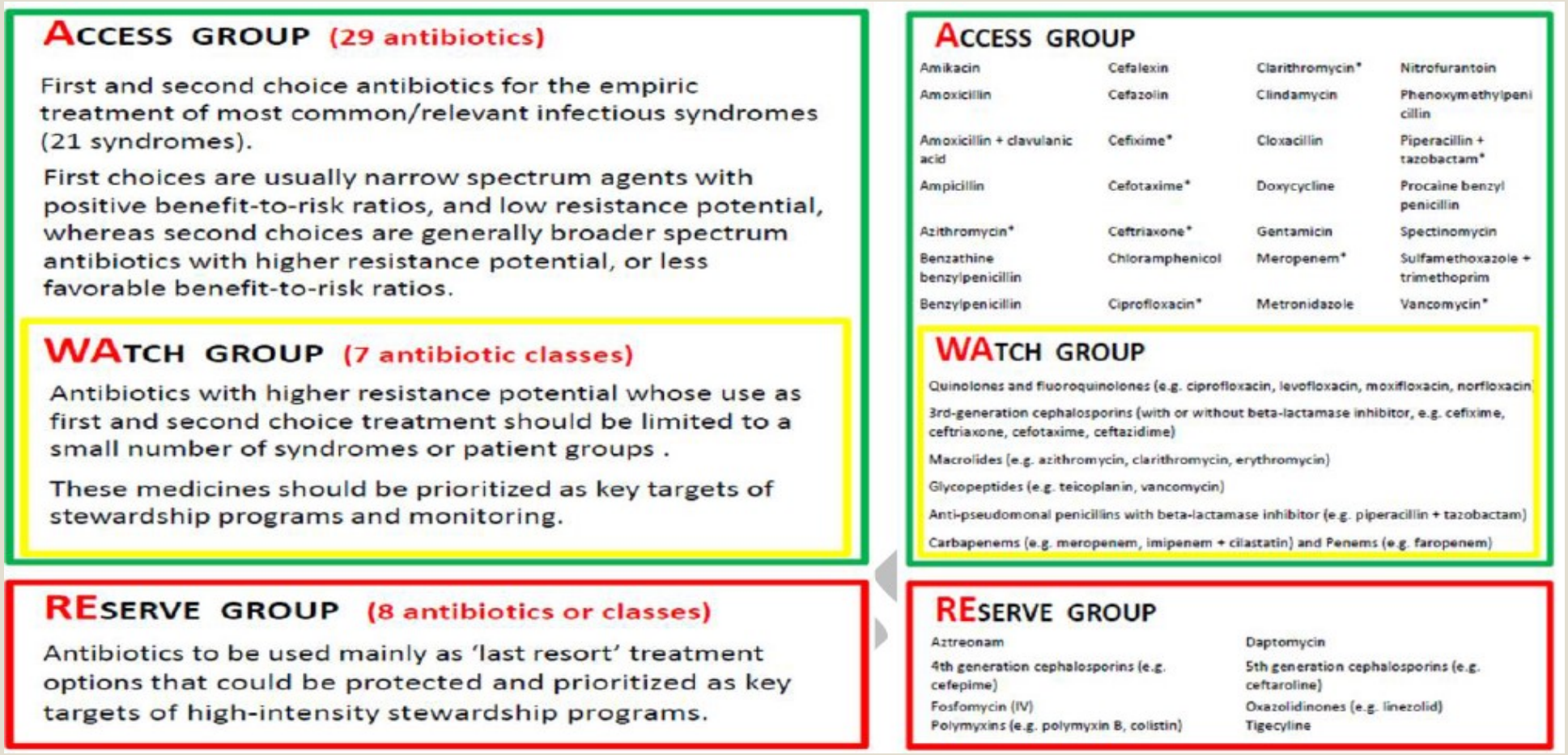
- Optimization of AB dosing based on
  - ✓Individual patient characteristics
  - ✓Causative organisms
  - ✓Site of infections
  - ✓PK-PD characteristics

  TDM is also an AMS strategy

Intervention options

- Education
- Guidelines (include surgical, outpatient)
- Pre prescription review and restrictions
- Post prescription review (48 to 72 hrs)
- The “Time out” (48 to 72 hrs)
- Stop orders
- De escalation, redundant therapy
- IV to oral conversion
- Optimize dosing
- Audit and feedback (Ward rounds)
- Vendor restriction
- Use of EMR/ how IT can be of benefit
- Duration
- Allergy evaluation
- Regulatory

WHO Aware Categorization of Antibiotics



- Percentage of patients attending a primary health care facility receiving an antibiotic should be less than 30%
- Oral Watch antibiotics use globally is increasing
- Reducing the inappropriate use of Watch antibiotics is a critical strategy
- Ensure vulnerable populations have continued or, where appropriate, improved "**access to Access**" antibiotics
- WHO Global Programme of Work includes a target that at least "**60% of total antibiotic prescribing at the country level should be Access antibiotics by 2023**"

Measures of Antimicrobial Use

- DDD per 1000 patient days
- DDD per admission
- Days of Therapy per 1000 patient days
- Proportion of DDD in ACCESS, WATCH, RESERVE and other categories
- Documented indication for use
- Stop/review date
- Compliance with guidelines (including surgical)
- Length of therapy
- 48-72 hour review
- Deescalation
- IV to oral switch

AMU Surveillances/ Audits

- Point prevalence surveys on AMR and AMU
- Surgical Prophylaxis audits
- Prospective audit data collection for analysis and sensitization of staffs
- Guideline compliance

Point Prevalence Surveys

- Snapshot survey
- Twice a year to show seasonal variation
- WHO PPS protocol
- Global PPS protocol
- National antimicrobial prescription survey (NAPs) Australia

Prospective Audits

- *“ Start Smart and Then Focus”*

1. Documentations
2. Culture of Culture
3. Allergy
4. Mismatch “ bug and drug”

Guideline Compliance

a) Appropriate (Optimal & Adequate)

b) Inappropriate (Suboptimal & inadequate)

c) Not assessable

i) **Optimal** : Antimicrobial prescription follows the endorsed local guidelines/ SOP optimally, including antimicrobial choice, dosage, route and duration

ii) **Adequate**: Antimicrobial prescription does not optimally follow the endorsed local guidelines, including antimicrobial choice, dosage, route or duration , however, is a reasonable alternative choice for the likely causative or cultured pathogens OR For surgical prophylaxis, as above and duration is less than 24 hour

Inappropriate

- **i) Suboptimal** : Antimicrobial prescription including antimicrobial choice, dosage, route and duration, is an unreasonable choice for the likely causative or cultured pathogens
- ✓ spectrum excessively broad
- ✓ unnecessary overlap in spectrum of activity
- ✓ dosage excessively high or duration excessively long
- ✓ failure to appropriately de-escalate with microbiological results
- ii) I**nadequate**: Antimicrobial prescription including antimicrobial choice, dosage, route or duration is unlikely to treat the likely causative or cultured pathogens
  - OR
- The documented or presumed indication does not require any antimicrobial treatment
  - OR
- There may be a severe or possibly life-threatening allergy mismatch, or the potential risk of toxicity due to drug interaction OR
- For surgical prophylaxis, the duration is greater than 24 hours (except where local guidelines endorse this)

Not Assessable

- The indication is not documented and unable to be determined from the notes
  - OR
- The notes are not comprehensive enough to assess appropriateness
  - OR
- The patient is too complex, due to multiple co-morbidities, allergies or microbiology results

AMSU+IPC

Antimicrobial stewardship

+

Infection control program

=

LIMITS THE EMERGENCE AND TRANSMISSION OF ANTIMICROBIAL-RESISTANT BACTERIA