WHAT IS THE FUTURE WITH ANTIMICROBIAL STEWARDSHIP?

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ECCMID Workshop 2018
AMS = Hot topic

Fig. 1. Pubmed citations on antimicrobial or antibiotic stewardship over the past 20 years.

Dyar OJ et al. CMI 2017
3 main strategies to curb AMR

Selection

Transmission

Prevention

AMS

Infection control

Environment

Vaccination and Infection prevention

One Health approach
Adverse events of antibiotics

At the patient level

• ‘Classical’ adverse events (allergy, hepatotoxicity...)

• Adverse events related to the microbiota impact:
  1. Diarrhea
  2. *Clostridium difficile* infection
  3. Thrush
  4. Bacterial resistance:
     • Sometimes at the focus of infection
     • Always in the microbiota
  5. More broadly: modification of the microbiota, and its consequences

At the population level

• Transmission of resistant bacteria and *C. difficile*
How can a prescriber reduce the risk of bacterial resistance?

**Use antibiotics only when needed!**

**Focus of infection**
- Sometimes happens, in particular in ICU patients
- Avoid long durations
- Optimised PK/PD
- Control the source of infection / reduce bacterial load
- Combination therapy?
- Certain antibiotics carry a higher risk of selection (e.g. fluoroquinolones)

**Microbiota**
- Always happens
- Risk factors:
  - Long durations (be careful of long half-lives, e.g. azithromycin)
  - Broad spectrum
  - Good diffusion in the microbiota

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To know you better. Are you? (multiple replies possible)

1. a Clinical Microbiologist
2. an Infectious Diseases specialist
3. a Clinical Pharmacist
4. a Trainee
5. a member of an AMS team
POLITICS
Political momentum

March 2017: Interagency Group
Advocacy +++

CARA: The Conscience of Antimicrobial Resistance Accountability, and the next big thing for CDDEP

15 Nov 2016
Author: Hellen Gelband

A UN Declaration is a great thing.

This includes the “political declaration of the high-level meeting of the General Assembly on antimicrobial resistance,” which, this September, gave the world its marching orders to do what’s necessary to ensure that everyone in the world has access to effective antibiotics for the long term. It provides a role for everyone to play, building on the World Health Organization’s Global Action Plan for antimicrobial resistance (AMR), which already has buy-in from the UN’s Food and Agriculture Organization (FAO) and World Organization for Animal Health (OIE) for a One Health front.

+ WHO indicators and framework
Funding allocation

Innovation

• New antibiotics
• New diagnostics

Lack of priority: Conservation

• Existing antibiotics
• Human resources for AMS teams
Changing the social norm

• Societal perspective, with ethical debate and societal optimum to define responsible antibiotic use (sustainable perspective)
• Everyone’s business: public good
• Patients not wanting antibiotics unless absolutely necessary

=> (Innovative) education and information, on a continuous basis
WORDS
Meaning of AMS and AMR in your country?

1. Most people understand ‘antimicrobial resistance’ in my country, and it is easy to translate

2. Most people understand ‘antimicrobial stewardship’ in my country, and it is easy to translate
Common understanding and common language

Antibiotic resistance has a language problem

A failure to use words clearly undermines the global response to antimicrobials’ waning usefulness. Standardize terminology, urge Marc Mendelson and colleagues.

Clinicians have long known that microbes such as bacteria, viruses and fungi are becoming alarmingly resistant to the medicines used to treat them. But a global response to this complex health threat — commonly termed ‘antimicrobial resistance’ — requires engagement from a much broader array of players, from governments, regulators and the public, to experts in health, food, the environment, economics, trade and industry. People from these disparate domains are talking past each other. Many of the terms routinely used to describe the problem are misunderstood, interpreted differently or loaded with unhelpful connotations.

On 16 March, the United Nations formed an interagency group to coordinate the fight against drug resistance¹. We urge that, as one of its first steps, this group coordinate a review of the terminology used by key actors. Such an effort could improve understanding across the board and help to engender a consistent and focused global response.

BLINDED BY SCIENCE

A 2015 survey by the World Health Organization (WHO) in 12 countries highlighted people’s unfamiliarity with the language of antibiotic resistance². Fewer than half of the nearly 10,000 respondents had heard of the term ‘antimicrobial resistance’. Only one-fifth were aware of its abbreviated form ‘AMR’.

4 MAY 2017 | VOL 545 | NATURE | 23
Review

What is antimicrobial stewardship?

O.J. Dyar 1,*, B. Huttner 2, J. Schouten 3, C. Pulcini 4, on behalf of ESGAP (ESCMID Study Group for Antimicrobial stewardship)
Problems

- ‘Stewardship’ is now widely used
- But people do not understand it the same way
- Difficult to translate
Definition of stewardship

- Merriam-Webster dictionary:
  1: the office, duties, and obligations of a steward;
  2: the conducting, supervising, or managing of something; especially: the careful and responsible management of something entrusted to one's care

- When stewardship first appeared in English during the Middle Ages, it functioned as a job description, denoting the office of a steward, or manager of a large household.
- Over the centuries, its range of reference spread to the oversight of law courts, employee unions, college dining halls, Masonic lodges, and many other organizations.
- In recent years, the long-established “management” sense of stewardship has evolved a positive meaning, “careful and responsible management”
What is AMS?

• As antimicrobial stewards, we need to carefully and responsibly manage antimicrobials.
• We suggest that it is best to view the collective daily actions within antimicrobial stewardship as a strategy.

• A coherent set of actions which promote using antimicrobials responsibly
• Antimicrobial stewardship is a coherent set of actions which promote using antimicrobials in ways that ensure sustainable access to effective therapy for all who need them
Definition of ‘responsible antibiotic use’

• Best for the patient and the population
• With a long-term perspective

• A more comprehensive description of responsible use has been developed through an expert consensus procedure within the DRIVE-AB project, producing 22 separate domains
• Soon to be published in JAC (Monnier A et al.)
PERSPECTIVE

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Using antibiotics responsibly: are we there yet?

Oliver James Dyar\(^1\), Celestino Obua\(^2\), Sujith Chandy\(^3\), Yonghong Xiao\(^4\), Cecilia Stålsby Lundborg\(^1\) & Celine Pulcini\(^3\)
Main ideas

• Two dimensions:  
  • responsible individual practices  
  • and a broad societal obligation centered on sustainability
• Potential tensions between an individual optimum for antibiotic use and the societal optimum / part of an ethical debate
• Antibiotics are a public good

• (Short to long-term) negative externalities of antibiotic prescribing (at individual and collective levels) should be taken into account
• Tragedy of the commons analogy
Additional comments

• This AMS definition can be applied from individual level actions to global level actions, and across human health, animal health and the environment

• Placing less emphasis on individual prescriptions helps to emphasize a broader concept of antimicrobial management that values the contributions of non-prescribers

• This definition recognizes that both the coherent set of actions and their objective (using antimicrobials responsibly) are inherently context-specific and will vary depending on who is doing them
Fig. 2. Examples of actors and actions within antimicrobial stewardship. AMS, Antimicrobial stewardship.
### How we can be good antimicrobial stewards

<table>
<thead>
<tr>
<th>Actor</th>
<th>What it means to be good antimicrobial stewards</th>
<th>Example actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescriber</td>
<td>I use antimicrobials responsibly by</td>
<td>• Making accurate diagnoses</td>
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<td></td>
<td></td>
<td>• Following local antimicrobial guidelines</td>
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<td></td>
<td>• Regularly reviewing the need for therapy</td>
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<tr>
<td>Nurse</td>
<td>I help ensure antimicrobials are used responsibly by</td>
<td>• Taking cultures at appropriate times</td>
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<td></td>
<td></td>
<td>• Ensuring patients understand how to take antimicrobials on discharge</td>
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<tr>
<td>Patient</td>
<td>I use antimicrobials responsibly by</td>
<td>• Taking antimicrobial courses as recommended by the prescriber</td>
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<tr>
<td></td>
<td></td>
<td>• Not storing or using leftover antimicrobials</td>
</tr>
<tr>
<td>Antimicrobial stewardship team</td>
<td>We help others in our institution use antimicrobials responsibly by</td>
<td>• Developing guidelines for antimicrobial use</td>
</tr>
<tr>
<td>Hospital governance</td>
<td>Our institution uses antimicrobials responsibly by</td>
<td>• Supporting audit and feedback for prescribers</td>
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<td></td>
<td></td>
<td>• Educating prescribers</td>
</tr>
<tr>
<td>Producer/farmer</td>
<td>I use antimicrobials responsibly by</td>
<td>• Ensuring sufficient sustainable and dedicated funding for antimicrobial stewardship teams</td>
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<tr>
<td>Pharmaceutical company</td>
<td>Our company ensures antimicrobials are used responsibly by</td>
<td>• Monitoring antimicrobial use and resistance</td>
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<td>National policy maker</td>
<td>Our country uses antimicrobials by</td>
<td>• Investing in a Clinical Decision Support System</td>
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<td></td>
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<td>• Enabling formulary restrictions</td>
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<td></td>
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<td>• Diagnosing selectivity</td>
</tr>
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<td></td>
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<td>• Not using antimicrobials as growth promoters</td>
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<td></td>
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<td>• Limiting advertising of antimicrobials, especially broad spectrum</td>
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<td>• Helping ensure there is a continuous supply of antimicrobials</td>
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<td>• Prioritizing and funding antimicrobial stewardship activities</td>
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<td>• Supporting the use of quality metrics and pay for performance</td>
</tr>
</tbody>
</table>

Multiple actors and holistic approach: system / prescriber / other professionals / patients / public
’Misuse’ of the term « stewardship »

• Diagnostic stewardship:
  • We do not ‘steward’ diagnostics
  • And promoting an appropriate diagnostic process and adequate reporting is a pre-requisite to appropriate antimicrobial prescribing
  • Diagnosis is not only microbiology

• Diabetic drug stewardship:
  • Antimicrobials are the only class of drugs with potential clinical impact on both the treated individual and the community
Don’t lose the clinical perspective

• Diagnostic process
  • tests won’t solve everything
  • viral-bacterial paradigm vs clinical value (prognosis)

• Communication skills
Review

Antibiotic stewardship: does it work in hospital practice? A review of the evidence base

M.E.J.L. Hulscher 1, *, J.M. Prins 2
Keypoints

- **No magic bullet**, anything might work or not depending on the context and the way the intervention is implemented
  => **menu of options**

- Two intrinsically different aspects of stewardship: the ‘what’ and the ‘how.’

- **WHAT** (to aim for?): recommendations describing appropriate antibiotic use regarding indication, choice of drug, dose, route or duration of treatment (same for diagnostics)

- **HOW**: behavioural change interventions that either directly or indirectly (i.e. by changing the system or organization) target the professional and overall promote appropriate antibiotic use
Recommended appropriate antibiotic use
- Streamlining or de-escalation of therapy.
- Parenteral to oral conversion.
- Dose optimization.

Recommended behavioural change interventions
- Prospective audit with intervention and feedback.
- Education.
- Antimicrobial order forms.

The WHAT
The HOW
SYSTEM APPROACH
Review
Managing responsible antimicrobial use: perspectives across the healthcare system

O.J. Dyar 1,4, G. Tebano 2,4, C. Pulcini 3,* on behalf of ESGAP (ESCMID Study Group for Antimicrobial stewardship)
Changing the system = most powerful driver for change

• Governance
  • Priority
  • Resources and appropriate structure/organisation
  • Leadership
  • Accountability

• Regulation
  • E.g. antibiotic prescribing, availability
  • Accreditation
  • Pay-for-performance and other incentives (with clear targets)

• Multidisciplinary (and cross-sectoral) networks and systems
Sharing ideas and resources

• Community of practices

• Networks (local, regional, national and international)

• AMS Observerships
UNIVERSAL TRAINING
Question for you

Have you had some formal training in AMS (strategy, not antimicrobial prescribing) as part of your postgraduate curriculum?

1. Yes
2. No
3. I don’t know
Student-Prepare

• Most medical students feel insufficiently prepared
  To be published soon in JAC

• Similar findings in the literature (under- + postgraduates)
  See #P1708
Absolutely needed

• Training of all professionals, prescribers and non-prescribers, with core competencies adapted to each curriculum

• Antimicrobial management and not only prescriptions
  + Antimicrobial stewardship

• Multidisciplinary training (teamwork should be taught in professional schools)
Core competencies

• All health professionals, including AMS stewards
• Adapt curricula

• ESCMID generic core competencies for all prescribers in Europe
  See #P1711

• WHO Competencies framework
• UEMS
• Ongoing ESGAP/EUCIC/TAE survey
Some useful resources
Good research, on unmet needs
AMS IMPLEMENTED EVERYWHERE
Core elements and checklist items project

• Literature and website review, followed by a structured consensus procedure
• Group of 15 international AMS experts
• Goal: set of globally relevant essential core elements and checklist items for hospital AMS programmes
• Recently published in CMI
One example

Box 1. Core element 1: Senior hospital management leadership towards antimicrobial stewardship

Accompanying comment: This section relates to governance of the programme by hospital executives, and specifies how senior hospital management supports the antimicrobial stewardship programme.

Checklist item 1.1:
Has your hospital management formally identified antimicrobial stewardship as a priority objective for the institution and included it in its key performance indicators?

Checklist item 1.2:
Is there dedicated, sustainable and sufficient budgeted financial support for antimicrobial stewardship activities (e.g., support for salary, training, or IT (information technology) support)?

Checklist item 1.3:
Does your hospital follow any (national or international) staffing standards for antimicrobial stewardship activities (e.g. number of full-time equivalent (FTE) per 100 beds for the different members of the antimicrobial stewardship team)?

Accompanying comment: These staffing standards should ideally be set at national level.[56]
Commentary

Human resources estimates and funding for antibiotic stewardship teams are urgently needed

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Clear synergy between AMS and IPC

- Clear governance
- Same hospital department?
- Different expertise but many common points
- + clarify the place of vaccination

- Ongoing ESGAP/EUCIC/TAE survey
I had a dream…

• Core elements defined for all settings
• Necessary resources, with some dedicated funding

• AMS programmes, cross-sectoral, networks, mandatory everywhere, involving the public, ideally One Health

• Large use of IT tools: CDSS, AI
EVERYBODY IS A STEWARD!
Interested in AMS... Join ESGAP!
Any question?

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