Antimicrobial Stewardship Programmes

ESCMID Summer School
Liverpool, 2019

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Review

What is antimicrobial stewardship?

O.J. Dyar, B. Hutner, J. Schouten, C. Pulcini, on behalf of ESGAP (ESCMID Study Group for Antimicrobial stewardship)
## Table 1
Descriptions of antimicrobial stewardship from the literature

<table>
<thead>
<tr>
<th>Types of description of antimicrobial stewardship</th>
<th>Examples from the literature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Descriptions of activities</strong></td>
<td>Antimicrobial stewardship includes optimal selection, dose and duration of treatment, as well as control of antibiotic use [9]. Antimicrobial stewardship refers to the responsible use of antimicrobials by healthcare professionals, and more specifically, to selection of the most appropriate antibiotic, duration, dose and route of administration for a given patient with a demonstrated or suspected infection [36].</td>
</tr>
<tr>
<td><strong>Descriptions of goals</strong></td>
<td>The primary goal of antimicrobial stewardship is to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use, including toxicity, the selection of pathogenic organisms, and the emergence of resistance [15].</td>
</tr>
<tr>
<td><strong>As a programme or set of interventions</strong></td>
<td>Antimicrobial stewardship refers to coordinated interventions designed to improve and measure the appropriate use of antimicrobial agents by promoting the selection of the optimal antimicrobial drug regimen including dosing, duration of therapy and route of administration [16,37]. Antimicrobial stewardship is defined as interventions to improve the appropriate use of antimicrobials through promotion of optimal agent selection, dosing, duration and route of administration [38]. Antimicrobial stewardship refers to a programme or series of interventions to monitor and direct antimicrobial use at a healthcare institution, so providing a standard, evidence-based approach to judicious antimicrobial use [1]. A programme that supports selection, dosing, routes of administration and duration of antimicrobial therapy [39].</td>
</tr>
<tr>
<td><strong>As an approach or method</strong></td>
<td>Antimicrobial stewardship refers to the multifaceted approach (including policies, guidelines, surveillance, prevalence reports, education and audit of practice) that healthcare organizations have adopted to optimize prescribing [40]. Antimicrobial stewardship is a method of overseeing antimicrobial use in healthcare facilities to ensure that every patient requiring antimicrobial therapy receives optimal therapy [22].</td>
</tr>
<tr>
<td><strong>As a means to tackle resistance</strong></td>
<td>Antimicrobial stewardship is a key component of a multifaceted approach to preventing the emergence of antimicrobial resistance [41]. A proposed solution to the combined problems of increasing antibiotic resistance, the dwindling number of antimicrobial agents, and the suboptimal use of antibiotics in clinical practice is the strategy of antimicrobial stewardship [38]. A critical mission of preservation of antimicrobial utility [39].</td>
</tr>
<tr>
<td><strong>As responsible use</strong></td>
<td>Antimicrobial stewardship programmes are a set of interventions that aim to ensure the judicious use of antimicrobials by preventing their unnecessary use, and by providing targeted and limited therapy in situations where they are wanted [42]. [Stewardship] refers to how the judicious use of antibiotics can maximize both their current effects and the chances of their being available for future generations [18].</td>
</tr>
<tr>
<td><strong>Descriptions of good stewardship</strong></td>
<td>Good antimicrobial stewardship is the optimal selection, dose, and duration of an antimicrobial 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. Good antimicrobial stewardship is akin to motherhood and apple pie [24]. Good antimicrobial stewardship involves selecting an appropriate drug and optimizing its dose and duration to cure an infection while minimizing toxicity and conditions for selection of resistant bacterial strains [41].</td>
</tr>
</tbody>
</table>

Dyar et al 2017
Fig. 2. Examples of actors and actions within antimicrobial stewardship. AMS, Antimicrobial stewardship.
Antibiotic Stewardship—Twenty Years in the Making

Review

Esmita Charani * and Alison Holmes
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* Correspondence: e.charani@imperial.ac.uk

Table 1. The evolving definition of antibiotic stewardship.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Appropriate antimicrobial stewardship includes optimal selection, dose, and duration of treatment, as well as control of antibiotic use.</td>
<td>Antimicrobial stewardship programs can increase the frequency of appropriate prescribing, optimize the treatment of infections, and minimize adverse events associated with antibiotic use, including Clostridium difficile infections (CDIs).</td>
</tr>
</tbody>
</table>
| Statement on antibiotic stewardship programs (ASP)                                                                                                                                     | Statement on antibiotic stewardship programs (ASP)  
| The ideal is to have all patients treated with the most effective, least toxic, and least costly antibiotic for the precise duration of time to cure or prevent an infection.       | Strategies for improving antibiotic use and evidence for best practices in antibiotic stewardship are evolving.            |
| The key components                                                                                                                                                                     | The key components  
| Precise definitions of antimicrobial resistance for antimicrobials and organisms;                                               | Leadership commitment: Dedicating necessary human, financial, and information technology resources.                           |
| A system for monitoring the frequency of resistance (clinical and environmental);                                                                                                         | Accountability: Appointing a single leader responsible for program outcomes. Experience with successful programs shows that a physician leader is effective.                                   |
| A determination of which antimicrobial(s) to control;                                                                                                                                  | Drug expertise: Appointing a single pharmacist leader responsible for working to improve antibiotic use.                      |
| A method to achieve usage control;                                                                                                                                                       | Action: Implementing at least one recommended action, such as systematic evaluation of ongoing treatment need after a set period of initial treatment (i.e., "antibiotic time-out" after 48 h).       |
| A determination of who will be responsible for maintaining control;                                                                                                                     | Tracking: Monitoring antibiotic prescribing and resistance patterns.                                                          |
| A method to educate and enroll prescribers in the control process;                                                                                                                    | Reporting: Regular reporting information on antibiotic use and resistance to doctors, nurses, and relevant staff.          |
| A stable system of hospital infection control;                                                                                                                                          | Education: Educating clinicians about resistance and optimal prescribing.                                                    |
| A system to measure use of controlled and uncontrolled antimicrobials;                                                                                                                 |
| Ability to distinguish community from nosocomial isolates;                                                                                                                           |
| Ability to identify isolates by body site and hospital location;                                                                                                                       |
| A method to assure that clinical care will not be harmed by control measures;                                                                                                            |
| Ability to identify known mechanisms of antimicrobial resistance.                                                                                                                      |
Antibiotic Stewardship—Twenty Years in the Making

Esmita Charani and Alison Holmes

National Institute for Health Research Health Protection Research Unit in Healthcare Associated Antimicrobial Resistance, 8th Floor Commonwealth Building, Imperial College London, London SW7 2AZ, UK* Correspondence: e.charani@imperial.ac.uk

Table 1. The evolving definition of antibiotic stewardship.

<table>
<thead>
<tr>
<th>Year</th>
<th>Source</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>Society for Healthcare Epidemiology of America and Infectious Diseases Society of America [2]</td>
<td>Antimicrobial stewardship programs can increase the frequency of appropriate prescribing, optimize the treatment of infections, and minimize adverse events associated with antibiotic use, including Clostridium difficile infections (CDIs).</td>
</tr>
<tr>
<td>2014</td>
<td>Center for Disease Control [14, 15]</td>
<td>Statement on antibiotic stewardship programs (ASP) Strategies for improving antibiotic use and evidence for best practices in antibiotic stewardship are evolving.</td>
</tr>
</tbody>
</table>

Antimicrobial stewardship programs can increase the frequency of appropriate prescribing, optimize the treatment of infections, and minimize adverse events associated with antibiotic use, including Clostridium difficile infections (CDIs).

The key components
- Leadership commitment: Dedicating necessary human, financial, and information technology resources.
- Accountability: Appointing a single leader responsible for program outcomes. Experience with successful programs shows 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 h).
- 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.

Antibiotic resistance has a language problem

Marc Mendelson, Manica Balasgaram, Tim Jinks, Céline Pulcini & Mike Sharland

03 May 2017

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

A method to determine antimicrobial use per geographic area per unit time; Ability to distinguish community from nosocomial isolates; Ability to identify isolates by body site and hospital location; A method to assure that clinical care will not be harmed by control measures; Ability to identify known mechanisms of antimicrobial resistance.
7 core elements and 29 checklist items

Senior hospital management leadership towards AMS
Accountability and responsibilities
Available expertise on infection management
Education and practical training
Other actions aiming at responsible antimicrobial use
Continuous monitoring and surveillance
Reporting and feedback
Competing priorities and messages

AMS – Antimicrobial Stewardship
APP – Smartphone application
CDC – Centre for Disease Control and Prevention (USA)
CQUINS – Commissioning for Quality and Innovation
DH SSTF – Department of Health Start Smart Then Focus
ESPAUR – English Surveillance Programme for Antimicrobial Utilisation and Resistance Report
ID – Infectious Diseases
NCEPOD – National Confidential Enquiry into Patient Outcome and Death
PPS – Point Prevalence Survey
TATFAR – Transatlantic Taskforce on Antimicrobial Resistance
WHO – World Health Organisation
‘We need to attend to complexity, rather than trying to control for it’. Understanding culture and context matter.
Guidelines – practice gap in one organisation

- Documentation of antibiotic stop/review date (surgery) – 25%
- Documentation of antibiotic indication (medicine and surgery) – 17%
- Adherence to local policy or microbiology/infectious disease team recommendation – 84%

Charani et al, 2017 JAC
<table>
<thead>
<tr>
<th>Intervention Function</th>
<th>Cochrane EPOC Interventions</th>
<th>AMS examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>Dissemination of educational materials Meetings</td>
<td>Guidelines Policies Meetings</td>
</tr>
<tr>
<td>Persuasion</td>
<td>Educational outreach</td>
<td>Team/service meetings</td>
</tr>
<tr>
<td>Restriction</td>
<td>Compulsory order form Prior Authorisation Review &amp; make change Stop orders</td>
<td></td>
</tr>
<tr>
<td>Environmental restructuring</td>
<td>Structural</td>
<td>Reminders (posters, pocket policies) New laboratory tests (procalcitonin) Rapid reporting</td>
</tr>
<tr>
<td>Enablement</td>
<td>Audit and feedback Decision support</td>
<td>Feedback of data about performance over time Computerised Decision Support Circumstantial reminders Review &amp; recommend change</td>
</tr>
</tbody>
</table>
What improves the effectiveness of feedback?

- Multivariable meta-regression indicated that feedback may be more effective when:
  1. The source is a supervisor or colleague
  2. It is provided more than once
  3. It is delivered in both verbal and written formats
  4. It includes both explicit targets and an action plan

Ivers N, Jamtvedt G, Flottorp S et al. Audit and feedback: effects on professional practice and healthcare outcomes. *Cochrane database of systematic reviews 2012*
acquisitiveness, rivalry, vanity, and love of power

Goal: How good by when?

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>29 RCT</td>
<td>4</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>91 ITS</td>
<td>9</td>
<td>14</td>
<td>7</td>
</tr>
</tbody>
</table>

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Behavioural motivation amongst healthcare professionals

Healthcare professionals subject to intrinsic motivation and shared norms and values
Understand local culture
Must also consider the wider environment
Antibiotic prescribing as a social process

Table 3. Rules of Antimicrobial Prescribing Etiquette

1. Noninterference with the prescribing decisions of colleagues: reluctance to interfere with the prescribing decisions of colleagues. In the case of antimicrobial prescribing, there is a reluctance to intercept antimicrobial prescriptions started by colleagues. This recognizes the autonomous decision-making process of prescribing.

2. Accepted noncompliance to policy: Deviations from policy recommendations are tolerated and put in the context of the prescriber’s experience and expertise and the specific clinical scenario. This leads to hierarchy and expertise, and not policy as determinants of prescribing practice behaviors.

3. Hierarchy of prescribing: Prescribing as an activity is performed by junior doctors. But it is the senior doctors who decide what is prescribed.

Cultural, social and commercial drivers can confound one-size-fits-all Approach

A need to understand the context

Cannot translate policies from HIC to LMIC

A need for engagement and ownership
Culture
Explicit
Implicit

Uses in Antibiotic Stewardship Programmes

Cultural artefacts
Diagnostic tools, Prescribing and decision making tools, Policy/guidelines

Physical environment
Meetings, ward-rounds, Handover, Teaching and training, Clinical care, Care setting e.g. hospital, ward, operating theatre

Social environment
Meetings, ward-rounds, Handover, Teaching and training, Clinical care, Teams, Clinical specialties, Patient/carers

Cultural behaviour
Macro/meso level ASP antibiotic decision making

Acts
Team work, Infection diagnosis, Antibiotic choices, Duration of therapy, Decision making

Feelings
Identity with team(s), Values, Perceived hierarchies

Cultural artefacts
e.g. Smartphones, Electronic Medical Records/Policy

Based on social norms

Clin Infect Dis 2018
| Study Setting | Firms in acute medicine (8 firms) and acute surgery (6 firms) at one London teaching hospital |
| Inclusion Criteria | All consented staff and patients in the daily ward round |

### Acute Medicine Daily 8.00 Post-Take Ward Round

- **Pharmacist** participation on every ward round, Microbiology and infectious disease input
- **Collectivist** and relaxed; The ward round is the main activity of the team
- Use of medical notes and **verbal face-to-face communication**; phones use rare during
- A central tenet of the ward round; Pharmacist presence reinforces the need to review medication
- Emphasis on: diagnosis of infection; symptom management; de-escalation of therapy; antibiotic choice discussed

<table>
<thead>
<tr>
<th>Key Ward Round Characteristics:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ward Round Participants</strong></td>
</tr>
<tr>
<td>Consultants; Trainee doctors; Patient and carers; Students</td>
</tr>
<tr>
<td><strong>Temporal orientation</strong></td>
</tr>
<tr>
<td><strong>Communication</strong></td>
</tr>
<tr>
<td>Electronic medical records</td>
</tr>
<tr>
<td><strong>Medication Review</strong></td>
</tr>
<tr>
<td>Clinical ward pharmacy service, Electronic medication chart</td>
</tr>
<tr>
<td><strong>Infection Diagnosis and Management</strong></td>
</tr>
<tr>
<td>Temperature; CRP; White Cell Count; Imaging; Culture and Sensitivity</td>
</tr>
<tr>
<td><strong>Antibiotic Prescribing Decisions</strong></td>
</tr>
<tr>
<td>Trust-wide Empirical Policy; Microbiology, Infectious Diseases, and Pharmacist access available to both teams</td>
</tr>
</tbody>
</table>

### Acute Gastrointestinal & General Surgery Daily 7.30 Post-Take Ward Round

- Frequent presence of **locums** at trainee level; **Advanced Practice Nurses** routinely participate on ward rounds
- **Individualistic and focused; emphasis on planning and scheduling due to operating room and clinic duties**
- **Technology heavy** e.g. texting, WhatsApp chat groups, and constant use of mobile phones during consultations
- Not routinely reviewed; Often medication chart not looked up on the computer

| **Emphasis on:** wound care; drain output; CRP, WCC and temperature; focused on prophylaxis and prevention; antibiotic choice not routinely discussed |
| **Individualistic; Surgeon makes surgical antibiotic prophylaxis decisions; loose and complex decision making; complicated infections delegated to a medical consultant; delegation of decision not clarified** |
Surgical teams are **individualistic**. They make **loose and complex decisions** making decisions. **Senior team are often absent from ward**, due to operating room and outpatient needs.

Medical team transition **lack of ownership** between emergency room and inpatient teams, **fear of sepsis**.
Uncertainty and fear of blame – surgery

“If my patient gets a wound infection, my case will be discussed at a Morbidity and Mortality meeting... it affects my data ... and my outcome data will be on a website, so I’m going to practice pretty defensive medicine, absolutely.” — Interview, Surgeon F

The legacy of antibiotic prescribing in Emergency Department – medicine

“There’s probably far too much acceptance that once somebody’s made that decision, and it’s not always a consultant who’s made that decision, that actually everyone might as well carry on... it’s partly the training here... if somebody makes it through ED, makes into medical admission, it’s quite hard to do nothing. It’s hard to justify admitting them if you’re not doing very much. And I think in a younger person that is even more difficult.” — Interview, Consultant A
Results from a prospective cohort study across acute medical and surgical teams (n=364):

Charani et al, Under review 2019
Results from a prospective cohort study across acute medical and surgical teams (n=364):

• There is no difference in the spectrum of antibiotics prescribed across medicine and surgery (p=0.507).

• Surgical patients are significantly more likely to a) receive a greater number of courses of antibiotics (p=0.001); b) have their initial empirical therapy escalated (p=0.0037); and c) be on a course not in line with local policy (p<0.001).

• In surgery, the odds of escalation of therapy significantly increased if the patient has a positive microbiological culture (OR 3 95% CI 0.154 – 6.576 p=0.013); and if the patient has signs of possible infection on chest X-ray (OR 3.38 95% CI 09.42 – 12.089 p=0.004).
We need more evidence from different resource settings

North America: 96 (43%)
Europe: 87 (39%)
Rest of the world: 30 (14%)
South Central America: 8 (4%)
Fig 1. The reported % aminoglycoside resistance in *Escherichia coli* urine isolates in inpatients\(^1,31\) against the investment in healthcare and public hospital beds per 1000 (source: The World Bank [http://data.worldbank.org/indicator/SH.MED.BEDS.ZS](http://data.worldbank.org/indicator/SH.MED.BEDS.ZS)), represented by bubble size.

https://doi.org/10.1371/journal.pone.0208847.g001
## Table 2. Key stewardship activities present across the hospitals in this study by country (*In India, one hospital in this study exhibited positive deviance)*.

<table>
<thead>
<tr>
<th>The 2014 CDC Key components of stewardship</th>
<th>Norway</th>
<th>France</th>
<th>India*</th>
<th>England</th>
<th>Buricina Faso</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing antimicrobial prescribing guidelines</td>
<td>✓ national</td>
<td>✓ local and national</td>
<td>✓ state-wide—not implementable</td>
<td>✓ local and national</td>
<td>✓ local</td>
</tr>
<tr>
<td><strong>Leadership Commitment</strong>: Dedicating necessary human, financial and information technology resources.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Accountability</strong>: Appointing a single leader responsible for program outcomes. Experience with successful programs show that a physician leader is effective.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Drug (Pharmacist) Expertise</strong>: Appointing a single pharmacist leader responsible for working to improve antimicrobial use.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Action</strong>: Implementing at least one recommended action, such as systemic evaluation of ongoing treatment need after a set period of initial treatment (i.e. “antimicrobial time out” after 48 hours).</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Tracking</strong>: Monitoring antimicrobial prescribing and resistance patterns.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Reporting</strong>: Regular reporting information on antimicrobial use and resistance to doctors, nurses and relevant staff.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Education</strong>: Educating clinicians about resistance and optimal prescribing.</td>
<td>✓</td>
<td>✓</td>
<td>✓ state level</td>
<td>✓</td>
<td>✓ limited</td>
</tr>
</tbody>
</table>

[https://doi.org/10.1371/journal.pone.0209847.t002](https://doi.org/10.1371/journal.pone.0209847.t002)
RESEARCH ARTICLE
Investigating the cultural and contextual determinants of antimicrobial stewardship programmes across low-, middle- and high-income countries—A qualitative study

5 countries, 24 hospitals, 54 HCWs
AMS restricted by professional boundaries

Lack of engagement with wider healthcare workforce

Lack of heterogeneity in AMS

Not sufficient engagement with surgical teams in AMS
Implementation of antibiotic stewardship in different settings - results of an international survey

E. Charani, Enrique Castro-Sanchez, S. Bradley, D. Nathwani, Alison H. Holmes and P. Davey

**Fig. 1** Figure presenting the trend in the odds ratios of respondents self-perceived determinants of antibiotic prescribing, relative to culture and practice at specialty level (set as 1).

- Not enough investment in training nurses and pharmacists
- Culture matters
- Poor surveillance
Scope for perioperative antimicrobial stewardship

Causal diagram mapping the relationship between surgery and infection, and the variables that should be considered as part of antibiotic decision making.

Surgery and AMR

• Surgical site infections (SSI) threaten lives of millions each year and contribute to AMR

• In LMICs 11% of patients undergoing surgery get an HAI

• In Africa, up to 20% C-sections contract an SSI (WHO 2018)

• Post op infection is not only SSI, includes HAP, UTI, BSI etc

• In large cohort study (25 countries in Africa; 247 hospitals) 2 x likely to die post-op, compared to global rates (Biccard et al April 2018, The Lancet), infection the most common complication
The ASPIRES Study:

**Antibiotic use across Surgical Pathways - Investigating, Redesigning and Evaluating Systems**

Developing context-relevant preventative measures to reduce the risk of infection and AMR, and optimise the use of antibiotics, coupled with tailored implementation strategies, along the entire surgical pathway.
Multi-disciplinary research leads

Imperial College London

King’s College London

University of Hertfordshire

University of Leicester

Amrita Vishwa Vidyapeetham University

Royal College of Anaesthetists/University College London Hospitals

Butare University Teaching Hospital

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Multi-disciplinary research appointments

International advisory board

**Vrinda Nampoothiri**, Clinical Research Pharmacist, Amrita Institute of Medical Sciences.

**Luchi Mbamalu**, Post-doctoral Researcher Pharmacist UCT

**Pranav Veepanatt**, Quantitative Researcher, pharmacist with epidemiology training, Amrita Institute of Medical Sciences.

**Candice Bonaconsa**, Qualitative Research Nurse UCT

**Surya Surencran**, Qualitative Researcher with anthropology background, Amrita Institute of Medical Sciences.

**Sahalini Ahuja**, Research Associate King’s College London

**Nidhee Jateja**, Medical Research Foundation PhD Student, Imperial College London “Systems Thinking Based Evaluation of Patients and Doctors Behavioural Drivers of Antimicrobial Resistance”

**Nathan Peiffer-Smadja**, PhD Student Internal Medicine Physician Imperial College London
Empirical research

- WP1 Macro level analysis (PESTELI) – outer setting
  - Documentary analysis, literature review and interview with national and international stakeholders

- WP2 Inner setting
  - Ethnography and face to face interviews with key actors
  - Patient participation
  - Investigating how and why culture and team dynamics across specialties influence behaviours
WP3 Consolidated Framework for Implementation Research

5 domains informed by WP1&2:
1. Intervention characteristics
2. Inner setting
3. Outer setting
4. Individuals involved
5. Process of co-design and implementation

ASPIRES Study

WP 1 Macro level
Health System Factors: strategic, social, political, and economic contextual drivers - Includes review of literature, documentary analysis, stakeholder interviews

WP 2 Meso level
Investigating the role of culture and team dynamics and wider context in surgical pathways: Ethnographic research, face-to-face interviews, patient participation

WP 3 Design & implementation of interventions
Co-design

WP 4 Operational and economic evaluation of interventions: System Dynamics – includes a prospective cohort design study of antibiotic prescribing practices across surgical pathways

WP 5 Strategic validation and dissemination of findings (including patients and the public) and bi-directional learning across different health economies
Interdisciplinary Stewardship Committee meeting at AIMS, Kerala coordinated by clinical pharmacists
Understanding the context
Engaging with local stakeholders
Identifying and engaging with the key stakeholders across the surgical pathway

- **Home**
  - **Actors**
    - Patient/carer
    - Community nurse
    - General Practitioner
    - Pharmacist
    - OPAT Staff

- **Hospital Admissions**
  - **Actors**
    - Patient/carer
    - General Practitioner
    - Outpatient clinic staff
    - Surgeon
    - Anaesthetist
    - IP&C

- **Operating Room**
  - **Actors**
    - Anaesthetist
    - Surgeon
    - Operating room nurse
    - Trainee surgeons
    - Recovery team

- **Hospital Ward**
  - **Actors**
    - Ward nurses
    - Surgeon
    - Trainee surgeons
    - Pharmacists
    - Medical microbiologists
    - Medical specialty input
    - IP&C

- **Microbiology Laboratory**
  - **Actors**
    - Laboratory staff
    - Medical microbiologist
    - Pharmacist
    - Surgeons
    - IP&C team
    - General Practitioners

- **Discharge Planning**
  - **Actors**
    - Trainee surgeons
    - Medical microbiologist
    - Pharmacist
    - Surgeons
    - IP&C team
    - Patient

- **Community Pharmacy**
  - **Actors**
    - Pharmacist
    - Patient/carer
    - General practitioner

- **General Practice**
  - **Actors**
    - Patient/carer
    - Community nurse
    - General Practitioner
    - Lab staff
Opportunities for South-South learning
Collaborative AMS Responsibilities
- Establish allergy status
- Prescribe within guidelines (MP & NMP)
- Document indication, dose & duration
- Administer therapy timely
- Monitor therapy duration
- Promote appropriate route of administration
- Monitor therapeutic drug levels
- Contribute to preparing patient for OPAT
- Adhere to infection prevention and control
- Review drug susceptibility
- Educate and involve patients and citizens
- Advocate for AMS programmes & interventions
- Promote integration with other programmes (sepsis, hand hygiene, water & sanitation, IPC)

Pharmacy Influence
- Comprehensive pharmacy assessment
- Awareness of drug-drug, drug-patient interactions, pharmacokinetic/dynamic relationships, co-morbidities
- Provision of essential pharmacy care e.g. med reconciliation, medication chart review, estimated discharge date

Medical Influence
- Comprehensive medical assessment
- Establish diagnosis, source of infection & necessary source control
- Investigations within presenting signs & symptoms

Nursing Influence
- Comprehensive nursing assessment
- Provision of essential nursing care e.g. nutrition, fluids, pressure area
- Appropriate biological and tissue sampling

Nurses are biggest workforce in healthcare

Slide courtesy of Dr Enrique Castro-Sanchez
INTERDISCIPLINARY AMS MODEL

Passing the baton to pharmacists and nurses: New models of antibiotic stewardship for South Africa?

Antimicrobial stewardship across 47 South African hospitals: an implementation study

Adria J Brink, AngelikiP Nassima, Charles Feldman, Guy A Richards, Piot J Becue, Debra A Gaff, Gari A Boorer, Dilip Nathwani, Damen van den Bergh, on behalf of the Nericse Antimicrobial Stewardship Study Alliance*

Non-specialist pharmacists co-ordinating prospective audit and feedback
Process measures introduced following extensive consultations with stakeholders
Included behaviour change techniques

Lancet Infect Dis 2016; 16: 1017–25
INTERDISCIPLINARY AMS MODEL

Pharmacy and Surgeon led AMS Uganda, Mulago Hospital
Is it all about ID teams?

What about where there are no ID teams?
Main barriers to effective and interdisciplinary AMS:

- Lack of insight into potential expertise
- Limited provision of services
- Communication – forms and logistics

‘The advice you get is as good as The information you provide’
Main barriers to effective and interdisciplinary AMS:

Lack of insight into potential expertise
Limited provision of services
Communication – forms and logistics

1731 admissions
Mean compliance with microbiology testing recommendations 89%
Unnecessary testing
9% of admissions informed by microbiology lab results!

The picture varies across Private/public and high and low income settings
Laboratory capabilities
Access to laboratories
Correct use of laboratories
Conclusions

• Developing effective AMS programmes requires strong leadership and operational support

• There needs to be an interdisciplinary approach that recognizes the critical role of pharmacists and nurses

• Improvements in how microbiology laboratories are used can bring about significant improvements in AMS

• Measurement and implementation is a social process that needs to take into account context and complexity
  • Positive deviance
  • Champions
  • Lines of influence

• Culture and context have the power to shape antibiotic prescribing behaviours
  • We need to develop contextually fit interventions
Thank you

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All the staff and patients at participating hospitals