Antimicrobial Stewardship
Menino Osbert Cotta, University of Melbourne, Australia
A Webber Training Teleclass

Antimicrobial Stewardship

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Hosted by Jane Barnett
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www.webbertraining.com

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Objectives

* Appreciate the immediate threat of antimicrobial resistance and the importance of antimicrobial stewardship
* Outline the main principles for good stewardship of antimicrobials
* Describe practical strategies and activities that form the basis of a hospital's antimicrobial stewardship program
* Formulate an antimicrobial stewardship implementation plan for healthcare facilities

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Antimicrobial resistance

• WHO has identified antimicrobial resistance to be one of five major global threats to mankind
  1. Microbial resistance to current antimicrobial artillery is growing at an alarming rate: MRSA, VRE, CREs
  2. Dwindling novel antimicrobial agents in the development pipeline


Antimicrobial resistance: Staphylococcus aureus and VRE

Waves of Resistance: Staphylococcus aureus in the Antibiotic Era


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Antimicrobial resistance: Carbapenem resistant Enterobacteriaceae

Gram-negative resistance: can we combat the coming of a new “Red Plague”? Coordinated action is urgently needed to tackle a looming public health crisis


Dissemination of NDM-1 positive bacteria in the New Delhi environment and its implications for human health: an environmental point prevalence study.

Deaths Attributable to Carbapenem-Resistant Enterobacteriaceae Infections

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Antimicrobial Stewardship

* Antimicrobial Stewardship (AMS) term coined in 1997
“help optimise therapy;
- ensuring the best clinical outcome for the patient
  (right choice of antibiotic at the right dose)
- while endeavouring to lower the risk of
subsequent development of antimicrobial resistance”


Antimicrobial Stewardship

* Simple definition, however -->
complex and broad issue

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Estimated Annual Antibiotic Use in the United States.

Preserving antibiotics, rationally.

Antimicrobial Stewardship in Hospitals

* Hospitals: up to 59% of patients are prescribed antimicrobials at any one time.

The European surveillance of antimicrobial consumption (ESAC) point-prevalence survey of antibacterial use in 20 European hospitals in 2006.

* Studies in the hospital setting estimate that up to 40% of these drugs may be inappropriate.


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Antimicrobial Stewardship in Hospitals

<table>
<thead>
<tr>
<th>Treatment prescriptions</th>
<th>Total (n = 683)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>Range (%)</td>
</tr>
<tr>
<td>Treatment prescriptions as appropriate</td>
<td>549 (80.4)</td>
</tr>
<tr>
<td>Treatment prescriptions assessed as inappropriate</td>
<td>99 (14.3)</td>
</tr>
<tr>
<td>Treatment prescriptions that could not be assessed</td>
<td>35 (5.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAP prescriptions</th>
<th>Total (n = 471)</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>Range (%)</td>
</tr>
<tr>
<td>SAP prescriptions assessed as appropriate</td>
<td>191 (40.6)</td>
</tr>
<tr>
<td>SAP prescriptions where indication was documented</td>
<td>204 (43.3)</td>
</tr>
</tbody>
</table>

Using periodic point-prevalence surveys to assess appropriateness of antimicrobial prescribing in Australian private hospitals.

Principles of AMS

Microbiology guides therapy wherever possible
Indications should be evidence based
Narrowest spectrum required
Dosage appropriate to the site and type of infection
Minimise duration of therapy
Ensure monotherapy in most situations

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Persuasive AMS strategies: formulation of guidelines

* Based on national guidelines.
  * eg in Australia Therapeutic Guidelines: Antibiotic

* Local Guidelines may be adapted from these
  * Incorporating local susceptibility data eg hospital antibiograms

* Specialist unit protocols: eg Haematology, Transplant unit etc.
* Surgical prophylaxis
* ‘Consultant/specialist based protocols’

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Guideline formulation/revision

Collate evidence based information
Engage units eg. Expert opinion
Draft guidelines
Feedback from stakeholders
Ratify

Examples of Guidelines

Vancomycin dosing and monitoring Guidelines
Gentamicin usage Guidelines
Community Acquired Pneumonia Guidelines
Febrile Neutropenia Guidelines
Surgical Prophylaxis Guidelines
Epidural Abscess Management
Pyelonephritis Guidelines
Management of cellulitis
An#microbial	
  
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Antimicrobial Stewardship

* Review of antimicrobial prescriptions by an experienced assessor
  * eg Infectious Diseases physician, Clinical microbiologist, Pharmacist with experience in AMS/Infectious Diseases
  * Some national consensus statements have recommended an ‘AMT’ - Multi-disciplinary team consisting of an ID physician or clinical microbiologist/ specialist ID pharmacist


* Feedback directly to prescribers (preferably face-to-face).
  * Provides a mechanism of dialogue with opportunity for ‘academic detailing’
  * May lead to a reduction of unnecessary antimicrobial use

AMT Recommendations – data from my hospital for first 6 months

* 22% of therapy was judged to be inappropriate by AMT

Recommendations were made in 104 referrals with 86% of recommendations accepted by the parent unit

- Cease antimicrobial: 28%
- Decrease spectrum of cover: 24%
- Increase spectrum of cover: 17%
- Change therapy due to safety: 5%
- Dosage change: 10%
- Switch to oral: 23%
- Further investigation required: 3%
Restrictive AMS strategies: antimicrobial formulary

- Closed antimicrobial formulary that is regulated by a governing body --> eg Drugs and Therapeutics Committee
- Some antimicrobials are completely restricted and require pre-approval from expert group within the hospital eg Infectious Diseases Unit
- Others may have duration and/or indication restrictions (+/- exemptions)
- Should be well communicated to all prescribers and AMS stakeholders --> perhaps use visual queues
Restrictive AMS strategies: pre-approval systems

* Surveillance
  - Concordant with Guidelines
* Education
  - Algorithm based advice
  - Linked to Local and National Guidelines
* Phone, Paper or Electronic based

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Hospital Antimicrobial Stewardship Programs

* Cochrane Collaboration review supports ‘restrictive’ for immediate impact, however
  
  **Persuasive = Restrictive**

  **Time**

* Diversity in AMS programs reported in literature
* Hospitals adopt a combination of different types of strategies


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Key performance indicators

* **Process measures**

  * Antimicrobial consumption


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Key performance indicators

* **Process measures**
  * Periodic point-prevalence surveys

Using periodic point-prevalence surveys to assess appropriateness of antimicrobial prescribing in Australian private hospitals.

* **Structural indicators**
  * Can be a simple checklist and allow AMS personnel to ensure that ‘the basics’ of the stewardship program are in place
  * Use validated indicators rather than reinventing!

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Development and validation of potential structure indicators for evaluating antimicrobial stewardship programmes in European hospitals.


Outcome indicators

Perhaps the most difficult to quantify and attribute (given the potential confounders) eg Hospital mortality, readmission rates and length of hospital stay may be too indirectly related to appropriate antimicrobial prescribing to be an accurate reflection of the performance of AMS programs.
Successful use of feedback to improve antibiotic prescribing and reduce Clostridium difficile infection: a controlled interrupted time series.


AMS implementation plan for hospitals

* Essential elements for AMS ‘naïve’ facilities

WHERE SHOULD THEY START??
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Establish sustainable governance structures through a dedicated committee that oversees AMS throughout the hospital (and is formally endorsed by hospital administration).

Endorse a hospital-wide antimicrobial prescribing policy and ensure prescribers acknowledge their awareness of and commitment to those at the time of giving or renewing patient admitting rights.

Introduce a hospital-wide antimicrobial formulary that includes criteria for which antimicrobials may be prescribed and for what indication.

Recruit ‘AMS champions’ from core medical and surgical specialties and nursing groups who are leaders among their peers.

Nominate experts to provide individual pre- or post-prescription advice to ensure appropriate oversight.

Prioritize regular assessment of antimicrobial use. This will identify areas that may benefit from interventions, and assess the impact of implementing an AMS program.

Integrate nurses into the AMS program through targeted awareness campaign and provide education regarding their role.

Use multi-faceted education strategies for prescribers, pharmacists and nurses. Strategies should be both visual and electronic and suggestions include emails, webinars, online learning modules and face-to-face meetings.

Market the benefit of AMS in improving patient care to all health professionals in the hospital.


Thank you

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October 29  AIR TRAVEL AND INFECTION TRANSMISSION
Dr. Paul Edelson, CDC JFK Quarantine Station, New York
Sponsored by GOJO (www.gojo.com)

November 5 (Free Teleclass)  DEMYSTIFYING THE CIC® CERTIFICATION EXAMINATION
Roy Boukidjian, Northridge Hospital Medical Center
Linda Goss, Nurse Practitioner, Global Health Center

November 12  SALMONELLA - TRENDS, PREVALENCE AND CONTROL
Prof. Keith Warriner, Guelph University, Canada

November 17  (FREE British Teleclass … Denver Russell Memorial Teleclass Lecture)
THE ROLE OF WATER AS A VECTOR IN THE TRANSMISSION OF
INFECTIONS IN HOSPITALS
Dr. Jimmy Walker, Public Health England, Biosafety Unit

November 19  CLOSTRIDIUM DIFFICILE INFECTION IN RURAL HOSPITALS
Dr. Nasia Safdar, University of Wisconsin

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