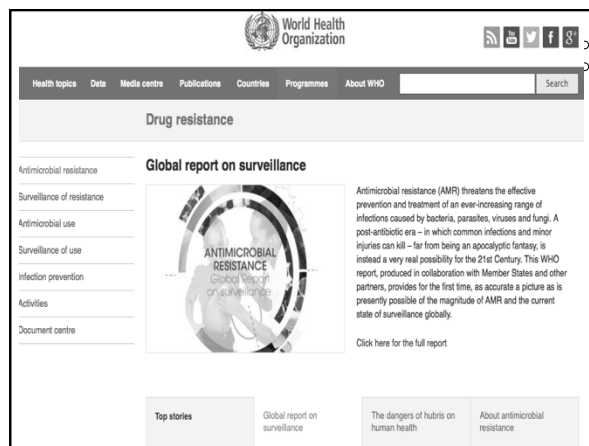


Antimicrobial Stewardship: Can we Prevent a 'Post Antibiotic Era'?

Adil Virani, Pharm D, FCSHP
 Director, Lower Mainland Pharmacy Services
 Associate Professor, UBC

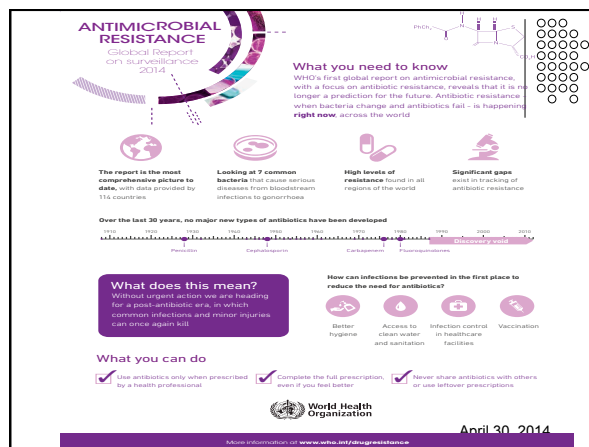


WHO Report: Antimicrobial resistance: global report on surveillance

- “Effective antibiotics have been one of the pillars allowing us to live longer, live healthier, and benefit from modern medicine. Unless we take significant actions to improve efforts to prevent infections and also change how we **produce, prescribe and use antibiotics**, the world will lose more and more of these global public health goods and the implications will be devastating.”

<http://www.ctvnews.ca/health/world-headed-for-dangerous-post-antibiotic-era-who-warns-in-landmark-report-1.1799018#ixzz312y6VB8V>

April 30, 2014



Selected Bacteria/Resistance Combinations

Bacterium	Resistance/ decreased susceptibility to:
<i>Escherichia coli</i>	3 rd generation cephalosporins, fluoroquinolones
<i>Klebsiella pneumoniae</i>	3 rd generation cephalosporins, carbapenems
<i>Staphylococcus aureus</i>	Methicillin (beta-lactam antibiotics) i.e. MRSA
<i>Streptococcus pneumoniae</i>	Penicillin
Nontyphoidal <i>Salmonella</i> (NTS)	Fluoroquinolones
<i>Shigella</i> species	Fluoroquinolones
<i>Neisseria gonorrhoeae</i>	3 rd generation cephalosporins

| Antimicrobial Resistance
 Global Report on Surveillance 2014

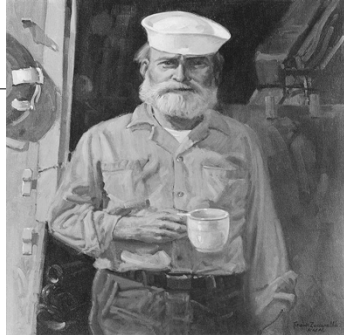


Outline

1. What is antimicrobial stewardship (AMS) and why do we need it?
2. Evidence based AMS interventions
3. AMS in action...



What is Antimicrobial Stewardship?

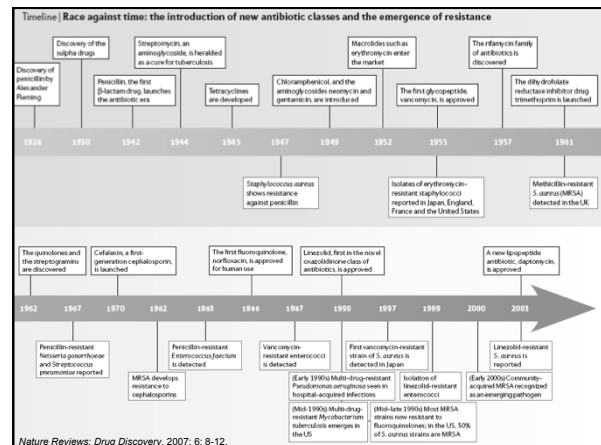


What is antimicrobial stewardship?

- Antimicrobial stewardship (http://www.idsociety.org/Stewardship_Policy/)
- Definition:
 - "...Antimicrobial stewardship refers to coordinated interventions designed to improve and measure the **appropriate use of antimicrobials** by promoting the selection of the optimal antimicrobial
 - **drug** regimen,
 - **dose**,
 - **route** of administration,
 - **dosing interval**, and
 - **duration** of therapy..."

"...Antimicrobial stewards seek to achieve **optimal clinical outcomes** related to antimicrobial use, **minimize toxicity** and other **adverse events**, **reduce the costs** of health care for infections, and **limit** the selection for **antimicrobial resistant** strains."

http://www.idsociety.org/Stewardship_Policy/



Why do we need antimicrobial stewardship?

- Multi-drug resistant organisms
 - MRSA, VRE, ESBL, Carbapenem-resistant *Enterobacteriaceae* (CRE), *Klebsiella pneumoniae* carbapenemase (KPC)
- Antibiotic prescriptions inappropriate 30-50% (Hecker et al. Arch Int Med, 2003;163:972-8.)
 - Broad-spectrum agent
 - Longer than necessary
 - Treatment of non-infectious syndromes
 - Treatment of colonization (i.e., lab report)

Evidence Based Antimicrobial Stewardship Interventions

- Grade A (Dellit et al. CID, 2007;44:159-77.)
 - Prospective audit and feedback (A-I)
 - Guidelines and clinical pathways (A-I)
 - Formulary restriction and pre-authorization (A-II/BII)
 - Streamlining and de-escalation (A-II)
 - Dose optimization (A-II)
 - Parenteral-oral conversion (A-III)

Evidence Based Antimicrobial Stewardship Interventions

- **Grade B** (Dellit et al. CID, 2007;44:159-77.)
 - Education (B-II)
 - Antibiotic order forms (B-II)
 - Physician order entry and clinical decision support (B-II)

Role of the pharmacist in antimicrobial stewardship

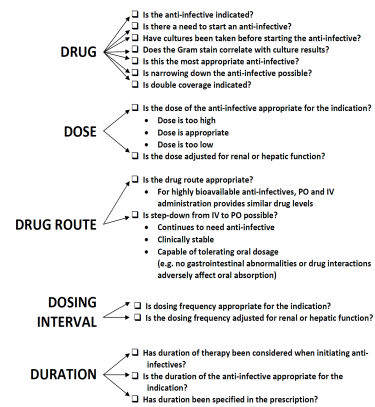
- Reviews antimicrobials for appropriateness
 - Indication, drug choice, dose, route, interval, and duration
 - Monitors efficacy and adverse reactions
- Makes recommendations to MRP to optimize therapy
 - Clinical status, indication, allergies, culture results, and potential drug interactions
- Performs antimicrobial stewardship interventions
 - TIPS, IV to PO step-down, CDI monitoring, etc.
- Orders and interprets drug levels for antimicrobials
- Provides medication teaching
- Facilitates discharge planning
 - Home IV and Special Authority from Pharmacare
- Consults for complex cases

Role of the pharmacist in antimicrobial stewardship

- Right diagnosis
- Right drug
- Right time
- Right dose
- Right route
- Right interval
- Right duration
- Targeted therapy
- Least invasive therapy
- Optimal duration of therapy



THE 5 D'S OF ANTIMICROBIAL STEWARDSHIP



Examples of what is occurring in the Lower Mainland...

- I. Antimicrobial Consumption
- II. Audit & Feedback
- III. Other initiatives
 - *Clostridium difficile* Infection monitoring and PPOs
 - Urinary Tract Infection
 - Community-acquired Pneumonia
 - Cardiac Surgical Prophylaxis
 - VCH/PHC/ FH Surgical Prophylaxis Guidelines
 - Ventilator-associated Pneumonia
 - Pharmacist-managed IV to PO Conversion Service
 - Antibigrams
 - Automatic stop orders

Inventory of antimicrobial stewardship activities

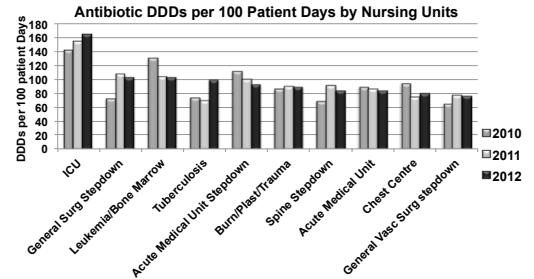
Program	Description	Metrics (Outcome Data, Cost Savings, Impact)	Comments
Antimicrobial and Vaccines Dosing Cards	Antimicrobial and vaccine dosing cards to optimize appropriate use	Ongoing study evaluating high-dose vancomycin dosing strategies and impact on concordance and length of stay	Available as pocket reference card and in the printed and online formulary; regional pharmacy vancomycin monitoring guidelines available
Antibiogram	Hospital-specific antibiogram data for antibiotic use	Antibiogram and resistance trends over time	Published annually by Medical Microbiology. Available in the Anti-infective Comparison Card. Reviewed annually by ALOS.
Anti-infective Comparison Card	Reference with list of anti-infectives, antibiogram, and guidelines/policies	Updated every 2-3 years, most recent June 2011, antibiogram 2007-2008	Reviewed annually by ALOS
Antifungal Guidelines for Invasive Candidiasis and Aspergillosis	Invasive candidiasis and aspergillosis treatment guidelines	N/A	Developed by Leukemia/BMT and Pharmacy
Antimicrobial Utilization Subcommittee	Review anti-infective usage and develop anti-infective guidelines and policies	N/A	Stakeholders from ID, Pharmacy, Med Micro, Critical Care, BMT, Internal Medicine, Respiratory, Family Practice, and Surgery
Automatic Anti-infective Stop Date (7 days)	Automatic stop date for anti-infectives	N/A	Extends prolonged anti-infective use; pharmacist reviews all patients
CDI Management Policy	CDI treatment guidelines and PPO	Continuation of treatment, colonization, LOS, and mortality	Pharmacy and Infection Control collaboration

Antimicrobial Consumption

Indicators	2010	2011	2012
Vancouver General Hospital*			
Antibiotic DDDs**/100 Patient Days	50.5	52.2	50.4
Antibiotic Costs	\$1,870,253	\$1,749,977	\$1,868,260
Richmond Hospital*			
Antibiotic DDDs/100 Patient Days	39.5	44.8	46.8
Antibiotic Costs	\$320,365	\$337,037	\$369,552
Lions Gate Hospital*			
Antibiotic DDDs/100 Patient Days	59.2	58.0	65.1
Antibiotic Costs	\$511,005	\$511,287	\$564,009

*Acute Nursing Units/Wards
**Defined daily dose

Antibiotic Utilization VGH



CDI Quality Assurance Initiative

- 3-year experience

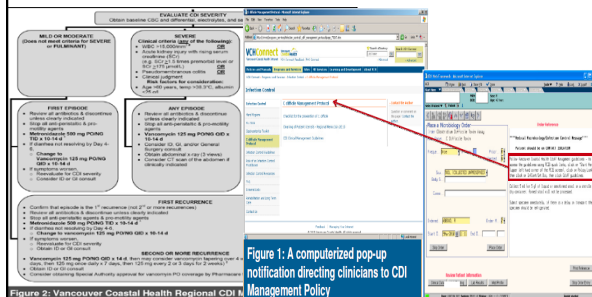
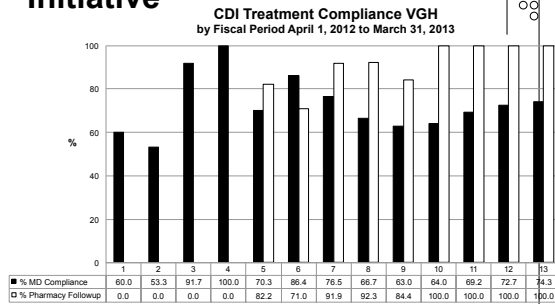


Figure 2: Vancouver Coastal Health Regional CDI N

CDI Quality Assurance Initiative



Antimicrobial Stewardship Program Innovative Research Education Safety

Smart Prescribing of Antimicrobials

Systems Improvement
Lab Processing
Information Systems

Best Clinical Practice
Engagement of Practitioners
Sustained Improvements

Improved Patient Outcomes
Successful treatment
Decreased adverse events
Less selection of multi-drug resistant organisms

Decreased Costs
Reduced antibiotic consumption

Antimicrobial Stewardship Responsibilities

- **ASPIRES**
 - Reviews selected target antimicrobials and provides audit and feedback to the MRP or clinical pharmacist if interventions required
 - Responds to queries from physicians and clinical pharmacists about optimization of antimicrobials (e.g. drug dosing and duration, narrowing of spectrum, etc.)
 - Responds to queries from pharmacists regarding Therapeutic Interchange Programme, clinical management pathways, and stewardship interventions
 - Communicates with MRP to recommend ID or MM involvement if more in-depth consultation is required
 - Communicates with ID or MM (if these services are already consulted for the patient) and an ASPIRES intervention is recommended
- **ID**
 - Responds to requests from clinicians to aid in the diagnosis and management of patients with suspected infections
 - Provides recommendations on anti-infective therapy based on clinical status, indication, allergies, culture and susceptibility results, and potential drug interactions
 - Communicates with ASPIRES (if desired) for narrowing of antimicrobial spectrum or educating of health care providers on stewardship practices regarding individual patient cases or observed practice patterns
 - Assesses potential home IV patients for management recommendations, and follows-up their clinical progress after discharge

Accreditation Canada



National Consultation on
Required Organizational Practices
– September 2009

8 New Required Organization Practice	Guidelines and Tests for Compliance
Antimicrobial stewardship The organization has a program for antimicrobial stewardship to appropriately and properly use antimicrobial resources.	<p>Use of antimicrobial agents is an important health intervention but may contribute to development of organisms resistant to antimicrobial agents. Antibiotic resistant organisms may have a substantial impact on health and safety of clients and resources of health care system. Antimicrobial stewardship programs focus on proper use of antimicrobials to achieve best patient outcomes, reduce risk of infections, and reduce or stabilize levels of antibiotic resistance. Studies indicate that antimicrobial stewardship programs are cost effective and provide savings through reduced drug costs and avoidance of microbial resistance.</p> <p>Test for compliance:</p> <ol style="list-style-type: none"> 1. The organization has program for antimicrobial stewardship. 2. The antimicrobial stewardship program is a shared responsibility involving physicians, nursing staff, pharmacist, microbiology staff, and hospital administrators, as appropriate. 3. The program includes education, and a formulary of targeted antimicrobials and approved indications. 4. The organization collects and uses information to make improvements to the antimicrobial stewardship program, and shares results with other organizations or programs, as

Please take 5 min to discuss:

6. What currently happens (and/or doesn't happen) at your site?
7. What is the most effective antimicrobial stewardship strategies at your site?

Summary

- Antimicrobial stewardship outcomes
 - Improve patient care
 - Improve patient safety
 - Decrease length of stay
 - Decrease antibiotic resistance
 - Decrease drug costs
 - Preserve antibiotic armamentarium

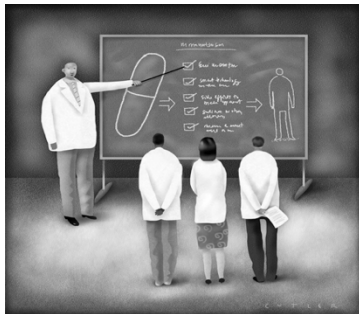
27

Provincial Antimicrobial Stewardship Committee Initiatives

- BC Ministry of Health Clinical Care Management initiative
 - Antimicrobial stewardship
- Environmental scan
- Definition of best practice
- Allocation of resources
- Develop and measure interventions

28

QUESTIONS?



29