The International Collaborative Conference in Clinical Microbiology & Infectious Diseases

PLUS: Antimicrobial stewardship in hospitals: Improving outcomes through better education and implementation of effective interventions

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Bahrain Defence Force Hospital
Manaf Alqahtani
Antimicrobial Stewardship in BDF Hospital
Local Recommendations and activities

Where are we now and why?
Disclosures

- No financial disclosures
New ideas pass through three periods

- It can't be done
- It probably can be done, but it's not worth doing
- I knew it was a good idea all along
Success Factors for Change

- Clear goal
- Belief in the need for change
- Participation in planning
- Visible progress and results
Five Goals

- Reduce antibiotic consumption and inappropriate use
- Reduce Clostridium difficile infections
- Increase adherence/utilization of treatment guidelines
- Reduce adverse drug events
- Decrease or limit antibiotic resistance
Antimicrobial Prescribing Facts

- ~ 1/3 of all hospitalised inpatients at any given time receive antibiotics
- ~ up to 1/3 to 1/2 are inappropriate
- ~ up to 30% of all surgical prophylaxis in inappropriate
- Antimicrobials account for upwards of 30% of hospital pharmacy budgets. Stewardship programmes can save up to 10% of pharmacy budgets.

Why So Many Mistakes?

- High number and complexity of drugs
- High number and complexity of syndromes and pathogens
- Poor training in antibiotic use
- Variability over time and place in
  - pathogen prevalence
  - antibiotic susceptibilities
  - antibiotic formularies

Unnecessary Antimicrobials
Where Do We Go Wrong?

Unnecessary” Antimicrobial Therapy study

- 33% Duration of Therapy Longer than Needed
- 32% Noninfectious/Nonbacterial Syndrome
- 16% Treatment of Colonization/Contamination
- 10% Redundant

Why So Much inappropriate therapy?

Local Provider Beliefs

- Fear of error or missing something
- Not believing culture data available
- “Patient is really sick, they should have ‘more’ antibiotics”
- Myth of “double coverage” for gram-negatives e.g. pseudomonas
- “They got better on drug X, Y, and Z so I will just continue those”
What are the Factors that Influence Antimicrobial Prescribing/Use?

Outpatient:

• Expectation for antibiotics

Inpatient:

• Teaching facilities—prescribing by trainees
• Inpatient are more acutely ill and complex
• Pressure to keep LOS short (less watch and wait)
• Underestimate the downside to inappropriate antimicrobials (one patient at a time and in aggregate—Medical/Family)

Cultural and Economic Factors That (Mis)Shape Antibiotic Use: The Nonpharmacologic Basis of Therapeutics

Jerry Avorn, M.D., and Daniel H. Solomon, M.D., M.P.H

The use of antibiotics in both ambulatory and inpatient settings is heavily shaped by cultural and economic factors as well as by microbiological considerations. These nonpharmacologic factors are relevant to clinicians and policymakers because of the clinical and fiscal toll of inappropriate antibiotic prescribing, including excessive use, preventable adverse effects, and the increasing prevalence of resistant organisms. An understanding of the determinants of antibiotic consumption is critical to explain current patterns of use and to devise programs to reduce inappropriate use. Patient motivations include the desire for a tangible product of the clinical encounter coupled with incorrect perceptions of the effectiveness of antibiotics, particularly in viral infections. Physician behavior can be explained by such factors as lack of information, a desire to satisfy patient demand, and pressure from managed care organizations to speed throughput. Marketing campaigns directed at both physicians and patients further serve to increase demand, especially for newer, costlier products. Studies of antibiotic use patterns in inpatient and outpatient care consistently demonstrate considerable inappropriate prescribing, which is likely to exacerbate the emergence of resistant organisms.

Several approaches have been shown to improve the rationality of antibiotic use. Computer-based algorithms or reminders can prompt physicians to improve antibiotic choices at the time of prescribing; paper-based order entry forms can achieve the same goal. Interactive educational outreach (“academic detailing”) is a practical implementation of social marketing principles to improve antibiotic use. Public education programs directed at consumers can help to reduce the inappropriate patient demand that helps to drive much improper antibiotic prescribing.

Components of Antimicrobial Stewardship Programs

Core Activities

- Stewardship team-multidisciplinary*
- Formulary restrictions and preauthorization*
- Prospective audit with intervention and feedback*

Supplemental Strategies

- Streamlining or de-escalation of therapy*
- Dose optimization*
- Parenteral to oral conversation*
- Guideline and clinical pathways*
- Education
- Antimicrobial order forms
- Antimicrobial cycling
- Combination therapy

*Activities with the strongest data and support by IDSA

• IDSA and SHEA Guidelines for Developing an Institutional Program to Enhance Antimicrobial Stewardship CID 2007:44; 159-177.
Guidelines, Not one size fits all

“Tailor to your own reality (needs, size and resources)”
Interventions to improve antibiotic prescribing practices for hospital inpatients

Components of Antimicrobial Stewardship Programs in BDF Hospital

Manaf Alqahtani
1-Formulary restrictions and preauthorization

Antimicrobial order forms

<table>
<thead>
<tr>
<th>Previous Antibiotics</th>
<th>Weight</th>
</tr>
</thead>
</table>

**Allergies**

**In Patient Anti-Microbial Kardex**

- **Antibiotic Name**: 
- **Dose**: 
- **Route**: 
- **Frequency**: 
- **Order Date**: 
- **Physicians Signature**: 

- **Empiric Therapy**: 
- **Therapeutic**: 
- **Diagnosis**: 
- **Isolated Pathogen**: 
- **Prophylactic(P)**

**Surgery**

- **D1 dose**: 
- **D3 dose**: 

**Non Surgical Prophylaxis**: 

**Pharmacists Signature**

**Antibiotic Name**: 

**Dose**: 

**Route**: 

**Frequency**: 

**Order Date**: 

**Physicians Signature**: 

- **Empiric Therapy**: 
- **Therapeutic**: 
- **Diagnosis**: 
- **Isolated Pathogen**: 
- **Prophylactic(P)**

**Surgery**

- **D1 dose**: 
- **D3 dose**: 

**Non Surgical Prophylaxis**: 

**Pharmacists Signature**

- **Antibiotic Name**: 
- **Dose**: 
- **Route**: 
- **Frequency**: 
- **Order Date**: 
- **Physicians Signature**:

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(1) Restricted Antimicrobial requires Consultant Approval

(2) One of the 3 choices has to be selected, either Empiric, Therapeutic or Prophylactic.

(3) Valid for 3 days

(4) Valid for 10 days
2-Local Antibiotic Susceptibility
Antibiogram
### IV – PO Substitution Policy

Intravenous to Oral Conversion policies apply to medications with excellent oral bioavailability and an area under the curve (AUC) similar to the intravenous route. The literature shows that for such drugs, a switch can be made from IV to PO without compromising the efficacy of the medication. The list of medications fulfilling these criteria is specified in the following Table.

<table>
<thead>
<tr>
<th>IV Drug and Dose</th>
<th>Switchover Regimen</th>
<th>Approximate Daily Cost Savings Compared to IV Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin 1 g q8h IV</td>
<td>Amoxicillin 500 mg PO q8h</td>
<td>1 BD</td>
</tr>
<tr>
<td>Azithromycin IV any dose</td>
<td>Clarithromycin XL 1000 mg po daily for total 10 day course (IV + PO) if CrCl&lt;30 mL/min: Clarithromycin XL 500 mg po DAILY for total 10 day course (IV + PO)</td>
<td>6 BD</td>
</tr>
<tr>
<td>Cefazolin 1 g q8h IV</td>
<td>Cephalexin 500 mg PO q6h</td>
<td>1 BD</td>
</tr>
<tr>
<td>Cefuroxime sodium 750 mg q8h IV</td>
<td>Cefuroxime axetil 500 mg PO q12h</td>
<td>2.6 BD</td>
</tr>
<tr>
<td>Ciprofloxacin 200 mg q12h IV</td>
<td>Ciprofloxacin 250mg PO q12h</td>
<td>12.5 BD</td>
</tr>
<tr>
<td>Ciprofloxacin 400 mg q12h IV</td>
<td>Ciprofloxacin 500mg PO q12h</td>
<td>25 BD</td>
</tr>
<tr>
<td>Clindamycin 300 mg q6 to 8 h IV OR 600 mg q8h IV</td>
<td>Clindamycin same dose PO over 24 hours given in 3 to 4 divided doses. e.g. 450 mg PO q6h for 600 mg IV q8h.</td>
<td>2 BD</td>
</tr>
<tr>
<td>Fluconazole any dose IV q24h</td>
<td>Fluconazole same dose PO q24h</td>
<td>6 BD</td>
</tr>
</tbody>
</table>

*Cost savings do not include cost of minibags, tubing, or professional services. Prices are approximate and in effect at time of publication.*
4-Guideline and clinical pathways

- General information
- Treatment guidelines – 19 guidelines
- Antimicrobial Dosage guidelines
  - Aminoglycoside Dosing Guidelines
  - Vancomycin Dosing Guidelines
- Dosing Guidelines in Renal Dysfunction
- Antibiogram
5- Antibiotics audit with intervention and feedback

Antibiotic Consumption (2009-2011)
Antibiotics audit with intervention and feedback

Antibiotic Consumption Cost (2009-2011)
Antibiotics audit with intervention and feedback

After 2 years Formulary restriction and Preauthorization

Antibiotic Consumption (2012-2014)
6- Education

Antimicrobials Awareness Day Campaign

Prescriber Education
Course Title

Antimicrobial Awareness Workshop

Course Objectives:

Upon completion of the program, the participant should be able to:

1. To explore awareness and knowledge about antibiotic usage
2. To reinforce some infection control statistics such as

Workshop Dates:

- 31st January 2013
- 25th April 2013
- 26th September 2013
- 26th December 2013
Number of MDRBs per Year

![Number of MDRBs per Year](image-url)
Frequency of Methicillin Resistant Staphylococcus (MRSA) per year

Rate of (ESBL) Organisms among MDRBs per year

Data

Rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>61.1%</td>
</tr>
<tr>
<td>2010</td>
<td>67.6%</td>
</tr>
<tr>
<td>2011</td>
<td>49.3%</td>
</tr>
<tr>
<td>2012</td>
<td>51.9%</td>
</tr>
<tr>
<td>2013</td>
<td>54.8%</td>
</tr>
</tbody>
</table>

Manaf Alqahtani
CURRENT PRACTICE IMPROVEMENT IN PREVENTION OF CATHETER ASSOCIATED URINARY TRACT INFECTION (CAUTI) IN MEDICAL ADULT PATIENTS IN A MILITARY HOSPITAL

RESEARCH PROTOCOL

CONFIDENTIAL

DOCTOR'S NAME
Ala Omar Dawazir, M.D.

SERVICE NO.
44091

JOB TITLE
Physician / resident

DEPARTMENT

SUPERVISOR
Manaf M Alqulaihi MD, MMM, FACP, FRCPC
Internist and Infectious Diseases Consultant & Medical Microbiologist

DATE OF SUBMISSION
25 April 2011
Healthcare associated infections (HAI) are a major problem that is developing in healthcare facilities worldwide. In a previous study conducted under the World Health Organization in 25 countries, the following were reported:

Europe, Eastern Mediterranean, South-East Asia and the Western Pacific: 13.6% and 12.7% respectively.

In this study, we investigated if healthcare associated infections (HAIs) are associated with urinary tract infections (UTIs).

We conducted a cohort study involving 100 patients admitted to our hospital. Patients were divided into two groups: those who had UTIs and those who did not. The incidence of UTIs was compared between the two groups.

The results showed that the incidence of UTIs was higher in the group with HAIs (25%) compared to the group without HAIs (10%). This difference was statistically significant (p < 0.05).

We conclude that HAIs are associated with an increased risk of UTIs. Further studies are needed to confirm these findings and to explore potential mechanisms.

References


Manaf Alqhtani, Mustafa Al-Ani
Department of Medicine, Bahrain Defense Forces Hospital, RCSI-Medical College of Bahrain.
7-OPAT Stewardship

The OPAT Experience in
Transition from Hospital to Home

- Encourage ID referrals for abx choices
- Facilitate early discharge
- Optimum dosage, duration and spectrum
- Avoid hospital readmission
- Provide safe, effective, and cost-effective therapy
- Improve patient satisfaction
- Reduction in nosocomial infections
- Reduction in readmission rate by 12.6 % in 2013
March 2012 – Big Day

Delivering a new mode of care service
OPAT

Delivering a new mode of care service
8-Work Closely With the Microbiology
Work Closely With the Microbiology

Role of our Microbiology lab

- Provides patient-specific culture and susceptibility data to optimize individual antimicrobial management
- Assists infection control efforts in the surveillance of resistant organisms and in the molecular epidemiologic investigation of outbreaks
- Critical role in the timely identification of microbial pathogens and the performance of susceptibility testing

Responsibilities

- Analyze and present data at least once per year
- Use a sufficient number of isolates to assure accurate data
- Perform and report quantitative and qualitative susceptibility testing
9- Procalcitonin to guide discontinuation of antibiotic

Serial PCT measurements can be used to guide discontinuation of abx

Duration of Antibiotics for CAP

Christ-Crain M et al. Am J Respir Crit Care Med. 2006 Apr 7;
10- Molecular Rapid Diagnostic

*Clostridium difficile*

- Testing *C- diff* in all inpatients with watery diarrhea and on abx
- Provide a good knowledge of our own *C-diff* rate
- Enable our IC to promptly isolate cases
- Better antibiotic stewardship to combat *c-diff* associated mortality
Local Barriers to Implementing ASP

- Lack of understanding the problem
  - Antimicrobial resistance is a Quality and Safety issue

- Time and effort
  - Staff may not want to assume “added” responsibility without compensation

- Lack of compensation
  - Hospital administration may not pay for antibiotic management without guaranteed pharmacy savings

- Fear of antagonizing colleagues in other specialties
  - Damaged relations could lead to decreased request for consultation and lost income
Antimicrobial Stewardship Team
Learning lessons

- Dedicated personnel
- Multi-disciplinary
  - Infectious Disease
  - Pharmacy (PharmD with Infectious Diseases /Antimicrobial Expertise)
- Support from Administration
- Strong liaisons
  - Pharmacy and Therapeutics Committee
  - Infection Control/Healthcare Epidemiology
  - Microbiology
  - Safety (others involved in Quality)
  - Health Information Technology
Future activities for successful ASP

- **ASM Rounds**
  - ASM team carry out once weekly clinical round
    - review antimicrobial in targeted area: ICU, GIM, Surgical ward
    - ASM team is authorized to make point of care intervention such as adjusting abx according to micro results in discussion with treating team.

- **Effective local physician champion**

- **Targeted intervention**
  - ASM awareness campaign at nursing staff and medical students
  - Abx prescribing tutorials for physicians
Acknowledgment

Every ounce of stewardship counts – start small, think big

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Questions or comments?

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Our Dad says, “Antibiotics--Don’t over use them or you’ll lose them!”
<table>
<thead>
<tr>
<th>Stewardess</th>
<th>Antimicrobial Stewardship</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Security and boarding to start your course</td>
<td>• Approval for restricted antibiotics to start antibiotic course</td>
</tr>
<tr>
<td>• Passport</td>
<td>• Antibiograms is a passport to our local microbiology</td>
</tr>
<tr>
<td>• Sees the world at 35,000 ft</td>
<td>• See the hospital’s use and resistance in aggregate (“35,000 ft” vs. just one patient at a time)</td>
</tr>
<tr>
<td>• Your safety is their priority</td>
<td>• Your patient’s safety and outcome is our priority</td>
</tr>
<tr>
<td>• Recent airplane crash in NY—“miracle” vs. flight crew attributed to careful systems in place and exercise by a skilled team</td>
<td>• Developing systems using a specialized team to promote antibiotic use</td>
</tr>
</tbody>
</table>