Ready to Launch: Antimicrobial Stewardship for All!
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Disclosures
Consultant for Merck Health and Healthcare Solutions – ILUM

Conflicts were resolved through peer review

Objectives
• Explain the need for antimicrobial stewardship in today’s healthcare environment.
• Name organisms that have been identified as particularly concerning to public health.
• List strategies to achieve the CDC core elements and address resistant organisms.
Why do we need antimicrobial stewardship?

What is Antimicrobial Stewardship?

• Antimicrobials are social drugs and need everyone to use appropriately

• Antimicrobial stewardship is a coordinated program that promotes the appropriate use of antimicrobials (including antibiotics), improves patient outcomes, reduces microbial resistance, and decreases the spread of infections caused by multidrug-resistant organisms.
  - Association for Professionals in Infection Control and Epidemiology

Why is it important?

A PERFECT STORM

As bacteria become more resistant to antibiotics, companies are pulling out of antibiotics research and fewer new antibiotics are being approved.

- Association for Professionals in Infection Control and Epidemiology
Name organisms that have been identified as most concerning to public health by the CDC

1. *Clostridium difficile*, carbapenem-resistant *Enterobacteriaceae* (CRE) and drug-resistant *Neisseria gonorrhoeae*

2. Vancomycin resistant *Enterococcus* (VRE), penicillin-resistant *Streptococcus pneumoniae*, *Clostridium difficile*

3. Methicillin-resistant *Staphylococcus aureus* (MRSA), CRE, and VRE

**Background**

- 2 million people annually in the U.S. acquire serious infections from bacteria with resistance to 1 or more drugs
- 23,000 of these people die each year
- Estimates of $20 billion are spent in excess direct healthcare costs each year due to antibiotic resistance

**Emerging Threats**

**Urgent**

- Carbapenem-resistant *Enterobacteriaceae*
- Drug-resistant *Neisseria gonorrhoeae*

**Serious**

- *M. tuberculosis*, *Pseudomonas*, *Salmonella*, *Shigella*, *Shigella*
- *E. coli*
- *MRSA*
- Drug-resistant *Group Polaves*

**Concerning**

- *Staphylococcus aureus* durets
- *Penicillin-resistant Staphylococcus Group A*
- *Chloramphenicol-resistant Staphylococcus Group B*
What can health care practitioners do?
- Improved testing to promote rapid detection and isolation of patients
- Infection control policies re: cleaning and hand washing
- Prescribe antibiotics wisely
- Wash hands with soap and water

Is this a real threat?
- Resistant to nearly ALL antibiotics
- CDC has confirmed CRE in 44 states (including WI)
- Most infections in the urine
- Bloodstream infections have 50% mortality

Carbapenem Resistant Enterobacteriaceae
- What can health care practitioners do
  - Know regional microbiology
    - Service/Unit specific antibiograms
    - Caution in interpreting national databases
  - Notification of patient transfer
  - Improve microbiology lab identification
  - Prescribe antibiotics wisely
    - This is the reason for antimicrobial restrictions
Gonorrhea is 2nd most commonly reported notifiable infection in the US
• 25% of infections per year are with drug-resistant strains!
• If cephalosporin resistance becomes widespread, this will result in ~75,000 new PID cases per year, 15,000 cases of epididymitis, and 222 HIV cases

CDC Antibiotic Resistance Threats in the United States, 2013
Why is antimicrobial stewardship important?

**A PERFECT STORM**

As bacterial infections grow more resistant to antibiotics, companies are pulling out of antibiotic research and fewer new antibiotics are being approved.

![Graph showing antimicrobial resistance trends](image)

Photos from cnnmoney.com and GAO report: antimicrobial resistance 2011

Financial impact of stewardship

![Bar chart showing financial impact](image)

106 patients accounting for 47.8% of the budget ($1,886,599)

Who has stewardship programs?

- What constitutes a stewardship program?
  - Comprehensive stewardship?
7 Core Elements of Hospital Stewardship

- Leadership Commitment
- Accountability
- Drug Expertise
- Action
- Tracking
- Reporting
- Education

[Link to CDC's implementation page]

Antimicrobial Stewardship Program

Established 2001
0.5 FTE MD, 0.5 FTE Pharmacy

2008
0.5 FTE Pharmacy

2008
ADD 0.5 FTE PGY2 ID resident

2010
ADD 0.5 FTE Pharmacy

2011
ADD 1.0 FTE PGY2 Infectious Diseases Pharmacy Resident

2016
ADD 2.0 FTE Pharmacy, 1.0 FTE MD

Stewardship Stakeholders:
Hospitalist, Surgeon, Microbiology, Infection Control, Information Technology, Clinical Pharmacists, Infectious Diseases Physicians

PurPOSE: To provide a collaborative, interdisciplinary system for the optimization of antimicrobial use within the University of Wisconsin Hospital and Clinics to improve drug selection, slow the emergence of antimicrobial resistance, reduce antimicrobial expenditures, and improve patient outcomes.

Leadership Commitment, Accountability, Drug Expertise

- Continued support of hospital leadership
- Recent expansion for Pediatric, Outpatient, Outreach stewardship activities
- Adoption/Implementation the Epic ICON module

Chief, Division of Infectious Diseases – David Andes, MD
Antimicrobial Stewardship Medical Directors – Barry Fox, MD and Alex Lepak, MD
Pediatric Antimicrobial Stewardship Director – Sheryl Henderson, MD, PhD

Infectious Diseases Clinical Coordinator – Lucas Schulz, PharmD, BCPP AQ-ID
Infectious Diseases Clinical Pharmacist – Tyler Liebenstein, PharmD, BCPP
Action – Systematic evaluation of antibiotics

- Post-prescriptive audit/review all antimicrobials, all patients every day, every hospital
  - ~300 patients per day
  - “Low-hanging fruit” to clinical pharmacists
- Focus on de-escalation and duration – discuss cases with ID physician
- “Minimally-invasive” intervention mechanism
- Restrictive antimicrobial drug monitoring 16 hours per day
  - 27 restricted antimicrobials
  - 0700 – 2300 coverage by ID physician or ID fellow

Post-prescriptive Audit and Review
"Minimally Invasive" Interventions

Antimicrobial Stewardship: Recommendations

- Patient: [Patient Information]
- Admission Date: [Date]
- Admission Diagnosis: [Diagnosis]
- Antibiotics: [Antibiotics Prescribed]
- Other Treatments: [Other Treatments]

Recommendations:
- Dose adjustment: [Adjustment Details]
- Allergic reactions: [Allergy Information]
- Drug interactions: [Interaction Details]
- Laboratory results: [Results]
- Patient education: [Education Topics]

Note: [Additional Notes]
Tracking Prescribing and Resistance Patterns

- Data integrity is key!
- Easy data – dose, route, prescriber, unit
- Hard data – INDICATIONS!

Fluoroquinolone use and HA-CDI cases

<table>
<thead>
<tr>
<th>HA-CDI case rate (Cases/1000 PD)</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Hospital</td>
<td>p=0.05</td>
<td>8.36</td>
</tr>
<tr>
<td>Pilot Units</td>
<td>p=0.12</td>
<td>16.8</td>
</tr>
</tbody>
</table>
Reporting to administration

- Focus on patient improvement projects in annual report
- 85% acceptance rate of interventions
- Fiscal reports summarized as cost per admission and % of total inpatient drug cost

Keys to Successful Stewardship

- Engage anyone and everyone you can!
- Decentralize stewardship!
- Focus on systems and processes!
- Share your programs successes!

Engage Everyone!

- Nurses
  - Patient education
  - Question antibiotic route
  - Participate in 48-72 hour antimicrobial timeout
  - Critically assess need for lab testing (i.e. Clostridium difficile)
  - Medication reconciliation
- Laboratory
  - Test only if clinical presentation is consistent with infectious etiology
  - Optimize sample collection and transport (i.e. blood culture policies)
  - Rapid diagnostics (i.e. PNA-FISH, MALDI-TOF, PCR-based testing)
- Providers
  - Engage local ID experts
  - Clinical guidelines, delegation protocols
  - Report back to all on successes!
- Administration
  - The Joint Commission standard
  - Annual Report
What strategies could you apply at your institution to achieve at least 1 of the CDC core elements?

The Joint Commission Antimicrobial Stewardship Standard

• Elements of Performance
  • Leaders establish stewardship as organizational priority
  • Hospital educates staff and practitioners upon hire and periodically thereafter
  • Hospital educates patients and families regarding appropriate use of antimicrobials
  • Antimicrobial stewardship composed of multidisciplinary team
  • Antimicrobial stewardship meets CDC’s 7 core elements
  • Organizational multidisciplinary protocols are in use
  • Program collects, analyzes, and reports data
  • Takes action identified by the antimicrobial stewardship program

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Panel Discussion

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• Margaret Heger, Pharm.D., BCPS, BCPPS
• Jennifer Pisano, M.D.
• Radhika Polisetty, Pharm.D., BCPS AQ-ID, AAHIVP

Panelists have no conflicts of interest to disclose

Questions?