With Great Power Comes Great Responsibility: Antimicrobial Stewardship in the Age of Super Bugs

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Disclosures

• The speaker has no actual or potential conflicts of interest to disclose.

Objectives

• Define the burden of antimicrobial resistance.
• Recognize factors contributing to the development of antimicrobial resistance.
• State recommendations for antimicrobial stewardship across the continuum of care based on available data and guidelines.

Superbug:

• a pathogenic microorganism, especially a bacterium that has developed resistance to the medications normally used against it

ANTIMICROBIAL RESISTANCE

Impact

Annual Impact- United States

- 2 million infections
- 23,000 deaths
- $20 billion in direct healthcare costs
- $35 billion in additional costs to society
CONTRIBUTING FACTORS

Bacterial Resistance Mechanisms

Mutated or acquired bacterial genetic material
New or altered gene products
Functional proteins that confer antimicrobial resistance

Discovery of Antibiotic Classes

Beta Lactam
Oxazolidinones
Glycopeptides
Straploplins
Sulfonamides
Quinolones
Aminoglycosides
Tetracyclines
Macrolides
Lipopeptides
Spectinomycin
Chloramphenicol
Streptogramins
Sulfonamides
Glycopeptides

Antimicrobial Use in U.S. Acute Care Hospitals

Antibiotic Use in Agriculture


Multistate Point-Prevalence Survey of Health Care–Associated Infections

- 11,282 Patients (183 Hospitals)
- 4504 Patients Receiving ABX for Active Infection or No Documented Reason
- 452 Patients had at Least 1 Health Care Associated Infection

Discussion Question

- Approximately what percentage of US antibiotic expenses for humans are related to outpatient care?
  - A. 20%
  - B. 40%
  - C. 60%
  - D. 80%

Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care Visits

Ambulatory visits resulting in antibiotic prescriptions: 12.6%

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Antibiotic Prescriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinusitis</td>
<td>56/1000</td>
</tr>
<tr>
<td>Suppurative Otitis Media</td>
<td>47/1000</td>
</tr>
<tr>
<td>Pharyngitis</td>
<td>43/1000</td>
</tr>
<tr>
<td>Acute Respiratory Conditions (Combined)</td>
<td>221/1000</td>
</tr>
<tr>
<td>All Conditions (Combined)</td>
<td>506/1000</td>
</tr>
</tbody>
</table>

Estimated appropriate prescriptions: 362/1000

Broad-Spectrum Agents in Ambulatory Setting

Antimicrobial Stewardship

- Improve prescribing by clinicians
- Improve use by patients
- Minimize missed or delayed diagnoses leading to underuse
- Ensure correct drug, dose, duration
Discussion Question

• In what settings have you seen antimicrobial stewardship activities?
  A. Acute Care Hospital
  B. Nursing Care Center
  C. Ambulatory Surgery Center
  D. Ambulatory Care Center

Required Antimicrobial Stewardship

• CMS Proposed Condition of Participation
  – Pending Publication
• The Joint Commission Accreditation Standard
  – Effective January 1st, 2017
• Missouri Senate Bill 579
  – Effective August 28th, 2017

What is required?

Organizational priority with budget plans
Multidisciplinary stewardship
Documentation of activities
Data collection, analysis, and reporting
Communication and collaboration on antimicrobial-use issues
Continuous improvement & strategic planning
Provider training and education
Patient and Family Education
Infection Prevention

Antimicrobial Stewardship: General Approaches

Front-End Stewardship Activity ➔ Antimicrobial Prescription ➔ Back-End Stewardship Activity

Infectious Disease Society of America Stewardship Guidelines

• Evidence based guideline for acute care hospitals

Education
Guideline/Clinical Pathways
Combination Therapy
Streamlining or De-escalation
Dose/Duration Optimization
IV to PO
Pharmaceutical Monitoring
Reduce Use of Agents w/ High Risk of CDI
Routine Prescriber Review of Regimens
Alternative Dosing Strategies
Clinical Decision Support
Development of Antibiotics
Selective Susceptibility Reporting
Beta-Lactam Allergy Testing
Rapid Diagnostic Testing
Procalcitonin Testing*

Core Elements of Outpatient Antibiotic Stewardship

• Centers for Disease Control and Prevention
• November 2016
• Recommendations and Reports
• Clinics, Emergency Departments, Urgent Cares, Dental Clinics

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Procalcitonin Testing*
Core Elements of Outpatient Antibiotic Stewardship

1. Identify high priority condition(s)
2. Identify barriers leading to deviations from best practices
3. Establish standards for antibiotic prescribing
4. Reinforce or modify strategies
5. Audit and feedback
6. Implement stewardship strategies

Commitment
- Display public commitments
- Include in job descriptions/evaluations
- Communicate to all staff

Action for policy and practice
- Evidenced-based diagnostic and treatment criteria
- Delayed prescribing
- Communication skills training
- Written justification for prescribing when not recommended
- Clinical decision support
- Pharmacist/nurse consultations to triage

Tracking and reporting
- Self-evaluation for prescribers
- Quality improvement activities
- Assess and share performance on quality measures

Education and expertise
- Patient education on appropriate use and potential harm
- Patient education materials
- Academic detailing
- Continuing education
- Access to person with expertise


Stopping Antibiotic Overprescribing: What Works?

"Doctors already know that every antibiotic prescription increases the chances of developing resistance. But when faced with a suffering patient, they disregard concerns for the population and...

Desire to Help Patients
Fear of Hurting Patients
Patient Satisfaction Scores

Behavior Modification

Baseline: Prescribing Antibiotics at 20-24% of Visits

<table>
<thead>
<tr>
<th>Control Group</th>
<th>Alternatives suggested by e-prescribing software</th>
<th>Prompt to enter justification for prescribing</th>
<th>Periodic emails comparing prescribing rates among colleagues</th>
</tr>
</thead>
<tbody>
<tr>
<td>11% Decline in Prescribing</td>
<td>16%</td>
<td>18%</td>
<td>16%</td>
</tr>
<tr>
<td>Not Statistically Significant</td>
<td>Not Statistically Significant</td>
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Alternatives suggested by e-prescribing software increased to 64% Not statistically significant

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Multiple Approaches

Patient Education + Prescriber Education = Reduction in Prescribing?

Denver Health Medical Center Walk-in Clinic
1-Hour Physician Education on Antibiotic Use in URI
Posters in Clinic Exam Rooms Explaining Lack of Effectiveness of Antibiotics for Certain Diagnoses
Computer Based Patient Education (~17min)

% of Bronchitis Patients Given Antibiotics Decreased from 58% to 24%

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1-Hour Physician Education on Antibiotic Use in URI
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Systematic Review of QI Strategies

9.7% reduction in prescribing rates
No significant differences between strategies
Slightly stronger effects of active clinician education
Targeting all ARIs led to a greater reduction than focusing on specific ARIs
Systematic Review

Medium-Strength Evidence

- Communication Skills Training
- Laboratory Testing

Patient-Centered Outcomes

- Not adversely affected
- Rarely reported


American Academy of Family Physicians Suggested Approach

Tentative Diagnosis

Determine if Antibiotic Therapy is Needed

Select Individual Agent Based On: spectrums of activity, clinical trial results, side effect profiles

American Academy of Family Physicians Suggested Approach

When Antibiotics Are Withheld

Shared Decision Making

- Explain viral nature and lack of benefit from antibiotics
- “Negative treatment recommendations”
- Explain potential for harm from antibiotic therapy
- Prescribe therapies for symptoms
- “Positive treatment recommendations”
- Provide education materials
- Contingency plan or delayed prescription
- Empathize with patients about their symptoms


Knowledge Question

- Antimicrobial resistance leads to approximately how many infections annually in the US?
  A. 1 million
  B. 1.5 million
  C. 2 million
  D. 3 million

Knowledge Question

- In what decade was a novel class of antimicrobial agents last discovered?
  A. 1970's
  B. 1980's
  C. 1990's
  D. 2000's
Knowledge Question

• Prescribing or recommending therapies for symptom treatment in viral respiratory tract infections is an example of a:
  A. Delayed prescription
  B. Audit and feedback
  C. Negative treatment recommendation
  D. Positive treatment recommendation

Action Items

• Help educate patients and the public on when antibiotics are not appropriate.
• Provide recommendations for treatment of symptoms for viral illness.
• Review treatment guidelines and provide resources and education for prescribers.

References