Antimicrobial Stewardship Overview

- **Definition**
  - Activities to advocate for and enhance the appropriate utilization of antimicrobial agents
  - Activities that include the appropriate selection, dose, route, frequency, and duration of antimicrobial agents

- **Goals**
  - Optimize patient outcomes while minimizing the unintended consequences of antimicrobial use
  - Decrease healthcare costs without negatively impacting the quality of patient care provided

- **The Antimicrobial Stewardship Team/Program**
  - Infectious diseases trained physician and pharmacist
  - Clinical microbiologist
  - Infection control personnel
  - Hospital epidemiologist
  - Information system specialist
  - Institution administration
  - Medical staff leadership and providers

The Rationale for Stewardship

- **Antimicrobial Therapy: The Double-Edged Sword**

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<thead>
<tr>
<th>Antimicrobial Therapy Benefits</th>
<th>Unintended Consequences of Antimicrobial Use</th>
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<td>Reduction in infection-related morbidity</td>
<td>Allergy</td>
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<td>Reduction in infection-related mortality</td>
<td>Adverse effects</td>
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<td>Drug interactions</td>
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<td>Increased healthcare costs</td>
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<td>Selection of pathogenic organisms</td>
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<td>Emergence and spread of bacterial resistance</td>
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- **Antimicrobial Use is Directly Associated with Bacterial Resistance**
  - “Antibiotics are the most commonly prescribed drugs used in human medicine”
  - It is estimated that up to 50% of antibiotic prescribing is inappropriate or unnecessary
  - Food-producing animal antibiotic use impacts bacterial resistance in humans
  - Increased utilization of antimicrobial agents is associated with a decrease in future utility due to antimicrobial resistance

- **The Current State of Bacterial Resistance**
  - *Clostridium difficile* infection (CDI)
  - Carbapenem-resistant Enterobacteriaceae (CRE)
  - Drug-resistant *Neisseria gonorrhoeae*
  - Extended spectrum beta-lactamase producing Enterobacteriaceae (ESBLs)
  - Multi-drug resistant *Acinetobacter spp.* and *Pseudomonas aeruginosa*
  - Methicillin-resistant *Staphylococcus aureus* (MRSA)
  - Drug-resistant *Streptococcus pneumoniae*
The Impact of Bacterial Resistance

- Patient outcomes
- Decreased treatment options
- Increased time to effective therapy
- Necessity to utilize older, more toxic agents

Antimicrobial Drug Development

- The number of newly developed antimicrobial agents has significantly decreased over the past 3 decades
- Limited incentives exist for pharmaceutical companies to invest in the discovery of new entities

Antimicrobial Stewardship Program Strategies/Interventions

Roundtable Discussion: Please describe/discuss your institutions’ Antimicrobial Stewardship program and/or efforts

Prospective audit with intervention and prescriber feedback
Formulary management and restriction/pre-authorization
Parenteral to oral conversion
Antimicrobial order forms
Education
Automated alerts

Stewardship Program Outcome Measures

- Structure vs. process vs. outcome measures
- Antimicrobial utilization
  - Days of therapy (DOT)
  - Define daily dose (DDD)
  - Benchmarking antimicrobial use
- Antimicrobial cost savings

Stewardship Program: Current & Future Considerations for Saving Lives

- The Centers for Disease Control and Prevention (CDC) recommends four core actions to help combat infections caused by resistant bacteria
  - Infection prevention and prevention of the spread of bacterial resistance
  - Tracking bacterial resistance rates
  - Improve antimicrobial utilization (antimicrobial stewardship)
  - Promote the development of new antibiotics and diagnostic testing to treat and identify resistant bacterial organisms
- National and global organization awareness of the significant threat of bacterial resistance and advocacy for antimicrobial stewardship
- Enhanced legislative support and action
  - Generating Antibiotic Incentives Now (GAIN) Act
  - Strategies to Address Antimicrobial Resistance (STAAR) Act

References