The Alphabet Soup of Antimicrobial Stewardship: Regulatory Update
Jessica Cobian PharmD, BCPS

Disclosure
I do not have (nor does any immediate family member have) a vested interest in or affiliation with any corporate organization offering financial support or grant monies for this continuing education activity, or any affiliation with an organization whose philosophy could potentially bias my presentation.

Objectives
- Describe purpose and importance of antimicrobial stewardship
- Summarize Antimicrobial Stewardship standards and regulations
- Discuss the implementation of TJC Antimicrobial Stewardship Standards
- Examine opportunities for improvement in Sepsis Core Measure compliance

Antimicrobial Resistance
- Centers for Disease Control and Prevention (CDC) estimate that 20%–50% of all antibiotics prescribed in US acute care hospitals are either unnecessary or inappropriate
- CDC states drug-resistant bacteria cause two million illnesses and approximately 23,000 deaths each year
- Carbapenem-resistant Enterobacteriaceae (CRE) lack robust therapeutic options

References

Combating Resistance: Antimicrobial Stewardship Programs (ASP)
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, duration of therapy, and route of administration
Stewards strive for the following:
- Achieve optimal outcomes
- Minimize toxicity
- Decrease resistance
- Minimize healthcare costs

References
CID. 2016; 62(10) 51-77.

Nationwide Efforts to Curb Antimicrobial Use
- 2009: CDC launched “Get Smart Campaign”
- 2014: Obama Executive Order 13676
- 2015: Choosing Wisely, NAP-CARB Presidents Advisory Council
- 2016: Initial assessment of need to re-examine via Secretary of HHS
IDSA-Choosing Wisely Campaign

1. Don’t treat asymptomatic bacteriuria with antibiotics
   - Overtreatment of ASB is costly and can lead to CIID emergence, raising issues of patient safety and quality
2. Avoid prescribing antibiotics for UI
   - UI are due to microbiology and the use of antibiotics is ineffective, inappropriate and potentially harmful
3. Don’t use antibiotics for stasis dermatitis of lower extremities
   - Misdiagnosis or lack of understanding of underlying pathology; leg elevation and compression is primary treatment
4. Avoid testing for C. difficile in the absence of diarrhea
   - C. difficile carriage is increased in patients on antibiotics and hospitalized, therefore standard stool testing
5. Avoid prophylactic antibiotics for mitral valve prolapse

References
http://www.choosingwisely.org/societies/infectious-diseases-society-of-america/

National Action Plan: Scope

- Antibiotic resistance results from mutations or acquisition of new genes in bacteria that reduce or eliminate the effectiveness of bacteria
- Resistance to drugs to treat infections caused by many different types of pathogens
  - Viruses (HIV, Influenza)
  - Parasites (malaria)
  - Fungi such as Candida spp.
- Scope of the National Action Plan: focuses on resistance in bacteria that present an urgent or serious threat to public health

References
http://www.whitehouse.gov/administration/priorities/Combating-resistant-bacteria

CDC: Serious Threats

- Staphylococcus aureus methicillin-resistant
- Neisseria meningitidis
- Acinetobacter baumannii
- Burkholderia cepacia
- Pseudomonas aeruginosa

5 Focus Areas of NAP-CARB

- Strengthen National One-Health Surveillance Efforts
- Accelerate Research and Development for New Antibiotics, Other Therapeutics
- Improve International Collaboration and Capacities for Antibiotic Resistance Prevention, Surveillance, Control, and Antibiotic Research and Development
- Advance Development and Use of Rapid Innovative Diagnostic Tools for Identification and Characterization of Resistant Bacteria
- Slow the Emergence of Resistance and Prevalent Spread of Resistant Infections

References
March 27, 2015 White House Press Secretary
FACT SHEET: Obama Administration Releases National Action Plan to Combat Antibiotic-Resistant Bacteria
White House released a comprehensive plan that identifies critical actions to be taken by key Federal departments and agencies to combat the rise of antibiotic-resistant bacteria. The National Action Plan for Combating Antibiotic-Resistant Bacteria, which was developed by the interagency Task Force for Combating Antibiotic-Resistant Bacteria in response to Executive Order 13676: Combating Antibiotic-Resistant Bacteria, outlines steps for implementing the National Strategy on Combating Antibiotic-Resistant Bacteria

References

CDC: Urgent Threats

- Carbapenem-resistant Enterobacteriaceae
  - Out of 104,000 hospitalizations due to antibiotic-resistant bacteria, over 9,000 are caused by CRE (10%)
  - Out of 104,000 hospitalizations due to antibiotic-resistant bacteria, over 9,000 are caused by CRE (10%)
- Ticks that can transfer between humans and animals, the bacteria of less known
  - CDC estimates at 100,000 infections per year requiring hospitalization or affecting hospitalized patients
- At least 11 billion in excess medical cost per year
- CD-resistant bacteria in humans 10X between 2001 and 2010 due to resistance to common antibiotics
- Almost one-third of infections occur in people younger than 13, but more than 90% of deaths occur in people older than 45
- Half of the 30,000 deaths that show symptoms of hospitalization in nearly 100,000 patients, and that 50% of patients are not treated in doctors' offices and clinics, whereas 90% of patients are
- The majority of patients with CD-resistant bacteria is elderly, which is a bacterial infection that causes severe diarrhea and, potentially, life-threatening, severe diarrhea in the general community
- 37 patients found to be resistant when the same mechanism used to identify patients in doctors' offices for other equipment settings

References
Online Accessed 2017.
2020 Goals: NAP-CARB

- Implement stewardship in all healthcare settings
- Federal facilities will have robust stewardship programs
- CDC and Agency for Healthcare and Research (AHRQ) will expand research
- Reduce inappropriate antibiotic use for monitored conditions
- 95% hospitals will report antibiotic use

References

ASP: Future Directions

HIGH PRIORITY

Joint Commission Standard

References

8 Elements of Performance

1. Leadership establishes ASP as priority
2. Healthcare provider education
3. Educate patients and families
4. Multidisciplinary team
5. Robust ASP with core elements
6. Organization specific protocols
7. Tracking & Reporting
8. Action on improvement opportunities

CDC Core Element 1: Leadership

- Facility provides written statement of support for the ASP
- Leadership should provide financial support and time for training and education on AS
- Executive as “stewardship champion”
- Include ASP in the strategic goals of the hospital
- Create financial incentives to improve antibiotic use
- Outcomes data reported at improvement committees
- Stewardship as part of required provider education

References
CDC Core Element 2: Accountability

- Leader or co-leaders responsible for program outcomes
  - Usually physician and pharmacist with expertise in antibiotic use, training, respect from peers, leadership and mentoring skills
- "Accountability" document
- Clear, measurable goals established
- Performance review and incentivized payment model
- Policy that defines noncompliance with ASP efforts and corrective actions
- Include different disciplines to avoid isolation

CDC Core Element 3: Drug Expertise

- Appoint single pharmacist leader responsible for working to improve antibiotic use
  - PGY1 and PGY2 preferred
  - Board certification
  - ASP certification programs
  - Assists in educating staff

CDC Core Element 4: Actions to Support Optimal Antimicrobial Use

- Implement policies that support optimal use
- Categorize specific interventions:
  - Broad scope
  - Pharmacy driven
  - Infection and syndrome specific
  - Based on needs of facility and resources
- Avoid implementing several policies simultaneously

How to promote optimal use?

- Document dose, duration, indication
  - Mandatory
  - Ensures antibiotics are modified as needed
- Develop facility specific treatment recommendations
  - CAP, UTI, SSTI etc.

Broad Interventions

- Prior authorization
- Antibiotic “time-outs”
- Prospective audit and feedback
Pharmacy-Driven Interventions

- IV to PO conversion
- Dose optimization
- Therapeutic drug monitoring
- Optimizing therapy for MDR
- Achieving CNS penetration
- Extended infusions
- Renal dose adjustments
- Automatic alerts for duplication therapy
- Avoid antibiotic-related drug interactions
- Time sensitive automatic stop orders

PCR Blood Culture ASP Initiative: Pharmacy Driven

<table>
<thead>
<tr>
<th>Blood Culture ASP MTM RECOMMENDATIONS</th>
<th>Organism</th>
<th>Antibacterial Exposure</th>
<th>Clinical Pearl</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Outcome: >60% reduction in time to appropriate therapy

Infection and Syndrome Specific

- Community-acquired pneumonia
  - Improving diagnostic accuracy
  - Ensuring compliance with guidelines
- Urinary tract infections
  - Avoid unnecessary urine cultures
  - Do not treat asymptomatic patients
  - Appropriate therapy based on local susceptibilities
- Skin and soft tissue
  - Avoid overly broad spectrum
  - Treatment of culture proven invasive infections

Clinical Decision Support

**SENTRO Antibiotic Resistance**

**CDC Core Element 5: Tracking and Monitoring of Antibiotic Prescribing**

- Antibiotic utilization
  - Days of Therapy (DOT)
  - Defined Daily Dose (DDD)
  - Acquisition/purchase data
- CDC AUR Initiative
  - Standardized Antibiotic Administration Ratio (SAAR)
- Untold consequences
  - Adverse events
  - C. difficile infection
  - Resistance rates

- Patient outcomes
  - Clinical response
  - 30-day readmission rate
  - Mortality
- Process measures
  - Adherence to protocols/processes
  - Appropriateness of therapy
Levofloxacin DDD 2014 to Present

52% reduction in use

Institution Specific Susceptibility: Antibiogram data

CDC Core Element 6: Reporting Information on Improving Use

- Report information to all stakeholders
  - Healthcare providers, nursing, microbiology, hospital leadership
  - Interventions made and % accepted by providers
  - Report to medical staff committee meetings and health system board
  - Post data on intranet and physician lounge
  - Unit-specific and provider-specific (if available) reports

CDC Core Element 7: Education of Healthcare Providers

- Physician education
  - Upon hire at orientation
  - Gran rounds
  - Lunch and learn w/ CE credit
  - Emails/newsletters
  - ASP website
  - Institution specific stewardship manual

- Nursing education

CDC Core Element 7: Education of Patients & Families

- KEEP CALM AND ANTIBIOTICS AREN'T ALWAYS THE ANSWER

References:
CID. 2016; 62(10) 51-77.
Infection Preventions Role in ASPs

- Insertion bundles/catheter care protocols
- Only perform stool samples on unformed stools
  - Formed stools will be rejected → test cancelled
  - Electronic criteria for use
    - Accounts for recent test ordered
    - Laxative use in 24 hours
    - Bowel movements in the last 24 hours
- Avoid urinalysis/urine culture in asymptomatic patients
  - IT driven UA + criteria
  - UA positive → reflex urine culture

Engaging Other Stakeholders

- Microbiology
  - Rapid diagnostics
  - Culture results and sensitivities
  - Promote proper testing
- Information Technology
  - Assist with orderset creation
  - Clinical decision support tool
- Surgeons
  - Standardized prophylaxis
- Nursing
  - Assessing patient allergies/documentation
  - Coordinate care of patient
  - Use proper collection techniques
- Quality
  - Support standardization
  - Goals aligned with safety
  - Prevent HAI

Determine where you are?

- Perform Gap analysis after thorough review of standards
- Assess current state for each requirement
  - “SWOT” analysis
- Develop Action Plan

TJC/CMS: Sepsis Core Measure

- Adults 18 years and older with a diagnosis of severe sepsis or septic shock
- Addresses:
  - Serum lactate levels to evaluate tissue perfusion
  - Time to obtaining blood cultures
  - Time to initiation of broad spectrum antibiotics
  - Adequate volume resuscitation
  - Vasopressor administration, when indicated
  - Reassessment of volume status and tissue perfusion

2016
25% mortality reduction
**Severe Sepsis**

Documentation of suspected source of clinical infection (UTI, PNA, cSSTI)

2-2 SIRS criteria

Core Measure Criteria

**3 hours**

- Initial lactate
- Blood cultures prior to antibiotics
- Broad spectrum antibiotics
- Fluid resuscitation 30mL/kg crystalloids

**6 hours**

- Repeat lactate level if initial > 4 mmol/L
- Vasopressors initiated if hypotension persists after fluid challenge
- Repeat volume status and tissue perfusion assessment

**References**

N Engl J Med 2014;370 (18);1683-93.

**Bundles**

- Is there an administrator responsible for the success of the initiative?
- Who has something at stake?
- Reduce the number of steps involved in any process
- Bundle → customized clinical protocol
- Adopt standardized routines

**Order Set Optimization**

- Provide administration instructions
- “Cultures MUST be obtained prior to initiating antibiotics unless this will result in a delay of therapy greater than 3 hours”
- Pre-select items frequently omitted

**Order Set CCM: Sepsis Resuscitation**

**Pharmacist Role**

- Ensure appropriateness
  - Spectrum of activity
  - Consider medication allergies
  - Optimize dosing
  - No delays in therapy to adjust frequency
- Expedite preparation and administration
  - Mix at bedside
  - Procurement of pharmacy made products
- Ensure bundle adherence
  - Culture before antibiotics
  - Fluid resuscitation

**References**

Automated Dispensing Systems

- Ensure proper restocking
- All relevant antimicrobials stocked in machines
- Use of frozen pre-mixed bags

Education

**Physician**

- Physician champion
- Ensure usage of order set
- Education on antimicrobial spectrum of activity
- Feedback on core measure failures

**Nursing**

- Ensure understanding of antimicrobial order
- Adhere to bundle components