Antimicrobial Stewardship: Panel Discussion

Matt Miller, PharmD, BCPS (AQ-ID)
Infectious Diseases Clinical Pharmacist
University of Colorado Hospital
Matthew.Miller@UCHealth.org

Kati Shihadeh, PharmD
Infectious Diseases Clinical Pharmacist
Denver Health Medical Center
Katherine.Shihadeh@dhha.org

Colorado Pharmacists Society
Annual Meeting
January 15th & 16th, 2017

Disclosures
- Matt Miller:
  - I have the following conflicts to disclose
  - Allergan Speaker Bureau

- Kati Shihadeh:
  - I have no conflicts to disclose

Objectives
1. State new Center for Medicare and Medicaid Services (CMS) and The Joint Commission (TJC) standards for Antimicrobial Stewardship
2. Discuss core elements of an antimicrobial stewardship program
3. Identify potential barriers to implementation, as well as strategies to overcome these
4. Evaluate effective antimicrobial stewardship strategies, and determine the applicability of these to your current practice

New Joint Commission Antimicrobial Stewardship Standards
1. Leaders establish antimicrobial stewardship as an organizational priority.
2. The hospital educates staff and licensed independent practitioners involved in antimicrobial ordering, dispensing, administration, and monitoring about antimicrobial resistance and antimicrobial stewardship practices.
3. The hospital educates patients, and their families as needed, regarding the appropriate use of antimicrobial medications, including antibiotics.
4. The hospital has an antimicrobial stewardship multidisciplinary team that includes the following members, when available:
   - Infectious disease physician
   - Pharmacist(s)
   - Infection preventionist(s)
   - Practitioner

New Joint Commission Antimicrobial Stewardship Standards
5. The hospital’s antimicrobial stewardship program includes the CDC core elements
6. The hospital’s antimicrobial stewardship program uses organization-approved multidisciplinary protocols.
7. The hospital collects, analyzes, and reports data on its antimicrobial stewardship program.
8. The hospital takes action on improvement opportunities identified in its antimicrobial stewardship program.
Most Challenging Standards

- Standard #2: Education to practitioners
- Standard #3: Education to patients

Education to Practitioners at Denver Health

- New Employee Orientation
- 15 min PowerPoint, overview of ASP
- Antimicrobial Stewardship intranet subsite
  - Treatment algorithms, antibiogram, antimicrobial renal dosing table, formulary
- Annual competency for Infection Prevention and Antimicrobial Stewardship
- Smartphone app
- Presentations to physicians, pharmacists, nurses

Smartphone App

What are other hospitals doing to educate practitioners?
Education to patients at Denver Health

- Informational flyers posted in patient care areas
- Educational flyer provided to patients discharging on an antibiotic

Education to Patients – Future State

- Include information on antimicrobial stewardship in patient admission or discharge packets
- Counsel patients discharging on an antibiotic
  - Floor nurse, discharge pharmacist, inpatient pharmacist, transitions of care pharmacist

What are other hospitals doing to educate patients?

Objective 2

Discuss core elements of an antimicrobial stewardship program
Core Elements

Inpatient/Nursing Home
- Leadership Commitment
- Accountability
- Drug Expertise
- Action
- Tracking
- Reporting
- Education

Outpatient
- Commitment
- Action
- Tracking and Reporting
- Education and expertise

https://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html

Leadership

- Dedicating necessary human, financial, and information technology resources
  - Formal and written statement of support
  - Critical to success of programs
  - Seeks to ensure adequate time, funding, and educational support
  - Outlines relevant duties and goals


Accountability and Expertise

- Program Leader
- Pharmacy Leader
- Key Support:
  - Clinicians
  - Infection Prevention
  - Laboratory
  - Information Technology
  - Nursing
  - Quality Improvement


Action

- Policies
  - Document dose, duration, indication
  - Facility specific guides
- Broad Interventions
  - Prior authorization
  - Time-outs
  - Prospective audit with feedback
- Pharmacy-Driven Interventions
  - Dose optimization
  - IV to PO switch
- Diagnosis and Infection Specific Interventions

Tracking

- Days of Therapy (DOT)
  - Sum of days that specific agent is administered
  - Ceftriaxone 2g q12h + Ampicillin 2g q4h x 3 days, DOT = 6
- Defined Daily Dose (DDD)
  - Total grams of an antibiotic divided by WHO assigned standard
  - Ceftriaxone 2g q12h + Ampicillin 2g q4h x 3 days, DDD = 24
- Expenditures
- Resistance rates and *Clostridium difficile* infections
- Figures normalized using patient days and/or admissions

http://www.cdc.gov/getsmart/healthcare/ implementation/core-elements.html

Tracking

**DOT per 1000 patient days**

<table>
<thead>
<tr>
<th>Year</th>
<th>FY2011</th>
<th>FY2012</th>
<th>FY2013</th>
<th>FY2014</th>
<th>FY2015</th>
<th>FY2016 YTD</th>
<th>FY 17 YTD</th>
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<tr>
<td>DOT</td>
<td>450</td>
<td>450</td>
<td>450</td>
<td>450</td>
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</table>

**DDD Cost per patient day**

<table>
<thead>
<tr>
<th>Year</th>
<th>FY2011</th>
<th>FY2012</th>
<th>FY2013</th>
<th>FY2014</th>
<th>FY2015</th>
<th>FY2016 YTD</th>
<th>FY 17 YTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
</tbody>
</table>

Is Anyone Submitting AU Data to National Healthcare Safety Network (NHSN)?


Tracking

- Next Stage – Appropriate Use
  - Current benchmarks based on usage (DOT vs DDD)
  - Use is inevitable, antimicrobials are necessary
  - Need for unifying definitions of “appropriate” use

Reporting

- Actionable Feedback
  - Aggregated prescribing
  - Frequent
  - Non-punitive
  - Brief, de-identified case
- Behavioral Interventions
  - Accountable justification
  - Suggested alternatives
  - Peer comparison


Patel SJ, et al. *Interdiscip Perspect Infect Dis*. 2012; *pub*

Daptomycin Use Skyrocketing

- Daptomycin is restricted
- ID providers were the main reason for the increase in use
- **Action**: Developed guidance for use of daptomycin vs linezolid vs vancomycin and shared with ID physicians

**Objective 3**

Identify potential barriers to implementation, as well as strategies to overcome these

**Common Barriers to Antimicrobial Stewardship Implementation**

- Lack of support from hospital leadership
- Lack of provider buy-in
- Lack of IT or personnel resources

**Lack of Support from Hospital Leadership**

Strategies to overcome:

- Clearly state the regulatory standards that require implementation
  - TJC standards
  - CMS conditions of participation soon to come
- Effectively convey the importance of stewardship
  - Patient, hospital, and society importance
  - Better publically reported data
- Develop a business plan
  - Address cost savings
  - Provide detailed job descriptions and descriptions of planned interventions


**Lack of Provider Buy-In**

Strategies to overcome:

- Identify and work with peer champions
- Engage resistant providers in development and implementation of interventions
- Provide education and evidence behind recommendations
- Listen to their concerns
- Peer comparison


**Increasing Antibiotic Use in the MICU**
Peer Comparison

Lack of IT resources

Prioritize effective, low-tech interventions
- Develop treatment algorithms for common infections (i.e. SSTI and CAP)
- Pre-authorization of protected antibiotics
- Utilize pharmacy purchase data to target interventions around high $$$ items
- Pharmacy-driven IV to PO conversion

Denver Health UTI Intervention

- Clinical Pharmacists review all patients on their unit on an antibiotic
- For patients on an antibiotic for a UTI, pharmacists compare current treatment with DH UTI treatment algorithm
- If current treatment and algorithm are discordant, pharmacist makes recommendation to provider

Lack of Personnel Resources

Empower pharmacists to be effective stewards
- Free antibiotic stewardship CE opportunities
- Antibiotic stewardship certifications
- Provide pharmacists with education and resources
  - ID/antibiotic stewardship in-services
  - Treatment algorithms and guidelines

Denver Health UTI Intervention

- INDICATION: SIMPLE CYSTITIS OR COMPLICATED OR PYELONEPHRITIS
- ANTIMICROBIAL: AMCOXETINE
- WAY OF THERAPY: ORAL
- URINE CULTURE:
- DISCUSSION WITH PROVIDER (IF APPLICABLE)
<table>
<thead>
<tr>
<th>Drug</th>
<th>Tier</th>
<th>Exceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anidulafungin</td>
<td>2</td>
<td>Restricted except BMT, SOT, hepatology, CF, and ICUs</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>2</td>
<td>Restricted except BMT, lung transplant, and CF</td>
</tr>
<tr>
<td>Ertapenem</td>
<td>2</td>
<td>Restricted except BMT</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>2</td>
<td>Restricted except BMT, lung transplant, and CF</td>
</tr>
<tr>
<td>Meropenem</td>
<td>2</td>
<td>ICU/3 floors</td>
</tr>
<tr>
<td>Moxifloxacin</td>
<td>2</td>
<td>Restricted except BMT, lung transplant, and CF</td>
</tr>
<tr>
<td>Piperacillin/tazobactam</td>
<td>2</td>
<td>Restricted except BMT, CF, SOT, and ICUs</td>
</tr>
<tr>
<td>Antibiotic lock</td>
<td>3</td>
<td>Restricted except renal</td>
</tr>
<tr>
<td>Ceftaroline</td>
<td>3</td>
<td>Restricted to antibiotic approval pager (ALL services)</td>
</tr>
<tr>
<td>Ceftazidime/avibactam</td>
<td>3</td>
<td>Non-formulary; ID only – consideration for MDROs</td>
</tr>
<tr>
<td>Ceftolozane/tazobactam</td>
<td>3</td>
<td>Restricted; ID only – consideration for MDROs</td>
</tr>
<tr>
<td>Daptomycin</td>
<td>3</td>
<td>Restricted to antibiotic approval pager (ALL services)</td>
</tr>
<tr>
<td>Imipenem</td>
<td>3</td>
<td>Non-formulary; Ok in non-TB mycobacterial infections</td>
</tr>
<tr>
<td>Inhaled amphotericin</td>
<td>3</td>
<td>Restricted except lung transplant</td>
</tr>
<tr>
<td>Inhaled colistin, tobramycin, amikacin</td>
<td>3</td>
<td>Restricted except CF and lung transplant</td>
</tr>
<tr>
<td>Isavuconazole</td>
<td>3</td>
<td>Restricted except lung transplant</td>
</tr>
<tr>
<td>Linezolid</td>
<td>3</td>
<td>Restricted except BMT, lung transplant, and CF</td>
</tr>
<tr>
<td>Polymyxin B (IV)</td>
<td>3</td>
<td>Restricted; ID only</td>
</tr>
<tr>
<td>Posaconazole</td>
<td>3</td>
<td>Restricted except BMT, SOT, and hem/onc</td>
</tr>
<tr>
<td>Tedizollid</td>
<td>3</td>
<td>Non-formulary; ID only</td>
</tr>
<tr>
<td>Tigecycline</td>
<td>3</td>
<td>Restricted to antibiotic approval pager except CF</td>
</tr>
<tr>
<td>Voriconazole</td>
<td>3</td>
<td>Restricted except BMT, SOT, and hem/onc</td>
</tr>
</tbody>
</table>

Pre-Authorization

- **Protected Antibiotics**
  - Agents that are broad-spectrum, high cost, and/or high risk for side effects, interactions, and/or abuse
  - Agents (previous slide) need to be discussed with unifloor-based clinical pharmacist (Tier 2) or Antibiotic Pager (Tier 3) prior to use
  - Pager: 303-266-6966
  - Operating hours: M-F, 8am-8pm
  - Outside operating hours may approve, with follow-up within 12 hours of pager service availability

What barriers and/or solutions have you experienced?

**Objective 4**

Evaluate effective antimicrobial stewardship strategies, and determine the applicability of these to your current practice

**Stewardship Strategies**

- Prospective Audit and Feedback (PAF)
  - Engages provider after antibiotic is prescribed
  - Usually pharmacist(s) and physician champion involved
  - Reduces antimicrobial use → Decreased C. difficile, resistance, and costs

- Pre-Authorization/Restriction
  - Approval required before antibiotics prescribed
  - Usually ID experienced pharmacist(s) and physician(s)
  - Significant and rapid reductions in antimicrobial use


**Comparison – PAF vs. Restriction**

- **PAF**
  - Advantage
    - Visibility and Flexibility
    - More data available
    - Fewer resources
    - Built in education
  - Disadvantage
    - Voluntary compliance
    - Labor intensive
    - Information technology
    - Longer time to reduction

- **Restriction**
  - Advantage
    - More rapid onset
    - Empiric choices
    - Unnecessary antibiotics
    - Direct control
  - Disadvantage
    - Limited impact
    - Prescriber autonomy
    - Skill required
    - Real-time resources
    - Squeezing balloon effect

**Lasting Effects of PAF**
- ICU A – had PAF implemented July 2013
- ICU B – no direct PAF, but providers exposed in ICU A
- ICU C – no PAF or exposure
- ICU A and B had significant reduction in antibiotic DOT


**Stewardship Strategies**
- Facility specific guidelines
- Electronic and/or hard copies of guidelines
- Incorporation of recommendations into order sets
- Decreased antibiotic use


**Stewardship Strategies**
- Dose Optimization
  - Decreased cost
  - Improved outcomes


**Rapid Diagnostics - the Future**
- Microbiology Partnership
  - Collaborate with lab on new/rapid testing methods
  - Improve time to detection, identification, and/or sensitivities
  - Reduce time to effective antimicrobial therapy
  - Rapid de-escalation
  - Decrease mortality, LOS, CDI
  - Communicate


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