Evaluation of an Antibiotic Timeout Process as Part of Antimicrobial Stewardship within a Community Hospital

Rob VanTreese, Pharm.D.
PGY-1 Resident
Bozeman Health Deaconess Hospital
Bozeman, Montana
Disclosures

• IRB exempt

• Co-Investigators:
  • Amanda V Woloszyn, Pharm.D., BCPS
  • Jennifer M Schultz, Pharm.D., FASHP
  • Mark Winton, MD, FACP

• No conflicts of interest

• No external funding
Learning Objective

• At the end of this presentation, participants will be able to:

Identify components of antimicrobial stewardship that comprise institutional accreditation and conditions of participation standards
Project Objectives

• Characterize baseline prescribing of broad spectrum antibiotics at our institution

• Establish interdisciplinary support to foster adherence and address concerns regarding additions to workflow

• Design and implement a timeout template and workflow

• Evaluate adherence and effectiveness with respect to duration of broad-spectrum antibiotic therapy
Bozeman Health Deaconess Hospital (BHDH) Bozeman, MT

- 86 bed DNV accredited community hospital and level 3 trauma center; part of a comprehensive healthcare campus:
  - Primary and urgent care clinics
  - Surgical services, family birth center
  - Anticoagulation clinic
  - Diabetes management
  - Infusion/ cancer center
  - Ambulatory surgical services
  - Wound clinic & hyperbaric medicine
  - Interventional cardiology, cardiopulmonary rehabilitation

- Bozeman Health Big Sky, MT Hospital
- Bozeman Health Belgrade Clinic

- Serving the Gallatin valley (population 100,000) and Southwest Montana
Background:

- Antimicrobials: Only class of medications that become less effective the more they are used

- Timeline of events leading to Antimicrobial Stewardship Program (ASP) formalization:
  - 2004: Infectious Disease Society of America (IDSA) call to action regarding potential “post antibiotic era”
  - September 2014: Presidential executive order required Government agencies to outline action plans for ASP in 2015
  - 2016: IDSA publishes evidence based recommendations and guideline for successful ASP
  - 2016: National Quality Forum: ASP playbook published
  - 2017: Joint Commission establishes ASP core measures
  - Centers for Medicare and Medicaid Services (CMS) conditions of participation (CoP) by end of 2017
Background:

• Stewardship Definition:
  • Coordinated interventions to improve the appropriateness of antibiotic prescribing to optimize patient outcomes and avoid adverse reactions

• Broad Goals: Improve Patient Safety and Outcomes
  • Reduce the emergence of resistant organisms
  • Avoid antibiotic associated complications (e.g. *C. difficile* infection)

• Strategies Seem Simple, Right?
  • Nationally, implementation has been challenging
  • In 2016, the Infectious Disease Society of America (IDSA) estimated 20-50% of inpatient antibiotics were inappropriate or unnecessary

Brief History of ASP at Bozeman Health

2012-2013: Infectious Disease (ID) physician and ID trained pharmacist rounded on patients, intervened, and collected outcome data.

2015: A previous PGY-1 resident expanded the program to all Clinical Pharmacists, which included ID training, weekly ID-rounds, and:

**Interventions:**
- frequency and descriptive stats (e.g. de-escalation, ID consult, dose optimization, allergy clarification, IV to PO) were recorded in a manual database.

**Outcomes:**
- IV antibiotic use, defined as Defined Daily Dose (DDD), was significantly reduced: (-30.2%) p<0.001
- Total antibiotic use and average duration of stay were not significantly effected.
- Data courtesy of Alexa Lockwood, PharmD, Bozeman Health Clinical Pharmacist.

2016-2017: ASP continues to evolve at BHDH
• **Leadership Commitment**

  • “Formal written statement of support from leadership that supports efforts to improve antimicrobial use”

• **Medical and drug expertise/accountability**

  • Identify single Physician and Pharmacist leaders

• [https://www.cdc.gov/getsmart/healthcare/pdfs/checklist.pdf](https://www.cdc.gov/getsmart/healthcare/pdfs/checklist.pdf)
• **Tracking, Reporting, and Education**
  - Distribution of local bacterial resistance profiles (Antibiogram)
  - Reporting of antimicrobial prescribing and use
  - Institution-based education for clinicians

• **Actions and Interventions to Improve Antimicrobial Use**
  - \(\sqrt{}\) = currently implemented at BHDH
  - IV/PO Interchanges
  - Restricted formulary
  - Pharmacokinetic service
  - Renal adjustment
  - Guideline-based order sets \(\sqrt{}\) (partially implemented at BHDH)
  - **Structured review/timeout process for reassessment of therapy**

• [https://www.cdc.gov/getsmt/healthcare/pdfs/checklist.pdf](https://www.cdc.gov/getsmt/healthcare/pdfs/checklist.pdf)
Methods

• ERX (drug product identifier)-based report was generated within the electronic health record (EPIC)

• 60 day retrospective review of adult (>18 years) medical floor discharges for patients receiving target antibiotics: vancomycin, meropenem, cefepime, and piperacillin/tazobactam

• Administration and durations of therapy were validated via chart review of each patient. Defined Daily Dose (DDD) was used to quantify antibiotic usage

• Post- Implementation (to be completed):
  • 60 day reassessment to compare drug utilization post timeout
Preliminary Results:

- Over a 60 day period (1 Sept-30 Oct 2016), 73 patients received 602 doses of targeted antibiotics.
- Average duration of therapy: 61.25 +/- 41.9 hours.
- Range (min/max): single dose / 207.1 hours (8.6 inpatient days).
- Duration >72 hours: 29 patients (45%).
- 48-72 hours 6 patients (8%).
Evaluation of Preliminary Results:

- Culture results supported continuation of target antibiotics (definitive therapy) in 41% (n=12) cases

- Of the remaining 59% (n=17), the clinical picture was less clear and may represent opportunities for de-escalation that could be highlighted by a timeout process
## Results: Target Antibiotic Use at BHDH

<table>
<thead>
<tr>
<th></th>
<th>Average DDD (gram/day)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pre-2015 ASP</td>
<td>post-2015 ASP</td>
<td>2016 &quot;baseline&quot;</td>
</tr>
<tr>
<td><strong>Vancomycin</strong></td>
<td>1.58</td>
<td>0.13</td>
<td>1.58</td>
</tr>
<tr>
<td><strong>Cefepime</strong></td>
<td>0.22</td>
<td>0.35</td>
<td>0.74</td>
</tr>
<tr>
<td><strong>Piperacillin/Tazobactam</strong></td>
<td>0.74</td>
<td>0.35</td>
<td>1.09</td>
</tr>
<tr>
<td><strong>Meropenem</strong></td>
<td>0</td>
<td>0.07</td>
<td>0.86</td>
</tr>
</tbody>
</table>
In Progress: BHDH Timeout Note

Timeout should address the following questions:

- Does the patient have an active infection?
- What is the likely source?
- Are reliable culture and sensitivity data available?
- What is the clinical status/trend of patient?
- Based on this information, what is the plan?
- Prospective data collection is ongoing
Workflow within our EHR:

- Pharmacists open an Ivent (intra-departmental note In EPIC) upon verification of provider order.
  - Organized by type: Antimicrobial Stewardship
  - Searchable by type, author, date, patient, etc.
  - Remain in EHR after patient discharges; adjunct to patient’s chart

- Decentralized pharmacists reviews Ivents early in shift to identify candidates for de-escalation

- Pharmacist-driven completion of timeout note with provider feedback/cosign regarding plan

- Evaluation: Ivents are searchable, but currently lack automatic reporting of antibiotic prescribing
Discussion:

- Nomenclature: “day 3” vs “48 hour” timeout
  - Lag time obtain definitive culture and sensitivity information to guide empiric therapy
  - Accreditation/government sources refer to “48 hours” ²,⁵,⁶
  - Day 3-4 described in literature from institutions publishing timeout evaluations ³,⁴,⁸

- Timeout linked to automatic stop orders for antibiotics?
  - Risk of lapse in therapy
  - Provider autonomy

- Pharmacist vs Physician led

- Evaluation benchmarks?
  - Two multicenter studies published indicate a potential discontinuation or narrowing of spectrum in 20-30% of cases ³,⁴,⁸
Strengths:

- Relatively streamlined process to incorporate into workflow once participants are vested into the process

- Tool to focus pharmacist’s clinical management and positively and efficiently impact patient care

- Demonstrated to reduce duration of therapy with broad spectrum antibiotics

Challenges / Limitations:

• Inertia for change at Institution-level can be slow

• Physician and Pharmacist buy-in:
  • Value added vs time spent
  • Hesitance to change / cancel orders of a colleague “prescribing etiquette”
  • Project improvement fatigue

• Complexity of infectious disease and lack of definitive, evidence-based guidelines for de-escalation

• Functionality within EMR leads to challenges in reporting and monitoring:
  • Manual chart review unsustainable long term
Assessment of Learning Objective:

- The Joint Commission stewardship standards, which became active as of January 2017, include all of the following performance measures EXCEPT:

  - **A:** Tangible institutional support and leadership commitment (accountability documentation, budgeted financial investment and periodic reporting)
  - **B:** Identification of a single Pharmacist leader responsible for improving antibiotic use.
  - **C:** Demonstration of at least 25% reduction of antimicrobial prescribing within 2 years of implementation.
  - **D:** Systematic re-evaluation of treatment need after an initial period of antibiotic use; (e.g. through antibiotic time out processes).
Questions?

Contact Information:

Rob VanTreese
jvantreese@bozemanhealth.org
References:


