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

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Disclosures

- IRB exempt
- Co-Investigators:
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  - 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 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 1 trauma center, part of a comprehensive healthcare campus
  • Primary and urgent care clinics
  • Surgical and family birthing center
  • Anticoagulation and diabetes management
  • Infusion cancer center
  • Ambulatory surgical services
  • Wound clinic & hyperbaric medicine
  • Interventional Cardiology, cardiolipulmonary 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
  • 2015: 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:

• 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

• 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)


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: (-31.4%) 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

Seven Core Elements:

• 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
• 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
  • R/PCI Interchanges ✗ = (currently implemented at BIDH)
  • Restricted formulary ✓
  • Pharmacokinetic service ✓
  • Renal adjustment ✓
  • Guideline-based order sets ✓ (partially implemented at BIDH)
  • Structured review/timeout process for reassessment of therapy

• 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

Methods

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: Antibiotic use over time at our hospital**

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Pre-2015 ASP</th>
<th>Post-2015 ASP</th>
<th>2016 &quot;Baseline&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancomycin</td>
<td>1.58</td>
<td>0.13</td>
<td>1.58</td>
</tr>
<tr>
<td>Cefepime</td>
<td>0.22</td>
<td>0.35</td>
<td>0.74</td>
</tr>
<tr>
<td>Piperacillin/Tazobactam</td>
<td>0.74</td>
<td>0.35</td>
<td>1.09</td>
</tr>
<tr>
<td>Meropenem</td>
<td>0.07</td>
<td>0.86</td>
<td></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; adjacent to patient’s chart.

- Decentralized pharmacists review 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.
  - Accreditations government sources refer to “48 hours” 3,5,6
  - Day 3+ described in literature from institutions publishing timeout evaluations 3,5,7

- 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 4,7

Strengths:

- Relatively streamlined process to incorporate into workflow once participants are vested into the process 4

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

- Demonstrated to reduce duration of therapy with broad spectrum antibiotics 9,4
**Challenges / Limitations:**

- Inertia for change at institution-level can be slow
- Physician and Pharmacist buy-in:
  - Value added vs time spent
  - Resistance 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:

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References:


