Antimicrobial Stewardship Programs: Establishing Best Practices
Activity No. 0217-0000-10-053-L01-P
This is a knowledge-based activity.
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Are We Overusing Medications for Prevention of Stress-Related Mucosal Bleeding in Critically Ill Patients?

10:15 a.m.–12:15 p.m.
Convention Center: 213 A

10:15 a.m.–12:15 p.m.  Antimicrobial Stewardship Programs: Establishing Best Practices
Con venti on Center: 211 & 212

Program No. 217-000-10-053-L01-P
This is a knowledge-based activity.

Clinical Administration and Infectious Diseases PRN Focus Session

Moderator: Morton P. Goldman, Pharm.D., FCCP, BCPS
Director, Pharmacotherapy Services, Cleveland Clinic, Cleveland, Ohio

10:15 a.m.  Justification of a Stewardship Program
Morton P. Goldman, Pharm.D., FCCP, BCPS

10:45 a.m.  Measuring Success: Stewardship Metrics
Elizabeth Dodds-Ashley, Pharm.D., MHS, BCPS
Clinical Pharmacy Specialist Infectious Diseases University of Rochester Medical Center, Rochester, New York

11:15 a.m.  The Stewardship Toolbox: Available Resources for Clinicians
Conan MacDougall, Pharm.D., MAS, BCPS
Assistant Professor of Clinical Pharmacy, University of California San Francisco, School of Pharmacy, San Francisco, California

11:45 a.m.  Panel Discussion

Faculty Conflict of Interest Disclosures

David R. Foster: no conflicts to disclose.
Robert MacLaren: no conflicts to disclose.
Geoffrey C. Wall: no conflicts to disclose.

**Learning Objectives**

1. Review the pathophysiology of SRMB.
2. Review which patients are at the highest risk for SRMB.
3. Discuss which outcomes are to be measured when comparing efficacy of SRMB prophylaxis.
4. Discuss the evidence that proton pump inhibitors, H-2 receptor antagonists and sucralfate prevent SRMB.
5. Review studies using a placebo and comparative studies for SRMB prophylaxis.
6. Provide an assessment of the effectiveness of these agents in critically ill patients.
7. Discuss the risk of patients at risk for development of SRMB.
8. Review current use of medications for prevention of SRMB.
9. Provide an assessment of whether we are overusing medications for prevention of SRMB.

**Self-Assessment Questions**

Self-assessment questions are available online at www.accp.com/sf
Measuring Success: Stewardship Metrics

Elizabeth Dodds Ashley, PharmD, MHS, BCPS
Associate Director of Clinical Pharmacy Services
Antimicrobial Stewardship Pharmacist
University of Rochester Medical Center

Objectives

• Discuss metrics typically used to report outcomes from antimicrobial stewardship programs
• Describe strategies to incorporate collection of metric data into daily practice

Participant Response: Measuring Success

• What is the primary measure of antibiotic utilization at your institution?
  o DDD (defined daily doses)
  o Days of therapy
  o Antimicrobial Durations
  o Cost
  o Combination of above
  o I’m not sure, that’s why I came to this talk

Financial Data

• Target audience: Administrators
  o Most common measure of antibiotic use
  o Must choose between purchases vs. billing data

    • Pros:
      o Easily available data
      o Often tied to institutional goals for stewardship programs
      o Likely to be a “win” given historical effect of stewardship on this measure

    • Cons/Limitations:
      o Must remember to consider changes in contract pricing
      o Non-administrators less likely to be influenced by results

Defined Daily Dose

• Target Audience: Administrators and Epidemiologists
  o Standardized definition of daily antibiotic dose
  o Created by the World Health Organization
  o Correction factor: Total Units (i.e. mg) Drug

    DDD Correction Factor

    • Pros:
      o Attempts to convert raw purchasing data into utilization data
      o Allows comparisons with other institutions
      o Easy to calculate

    • Cons:
      o Not everyone agrees with the DDD correction factors
      o Does not give information about actual patients

http://www.whocc.no/atc_ddd_index/
Example Calculation of Days of Therapy from eMAR

<table>
<thead>
<tr>
<th>Antimicrobial Agent</th>
<th>Days of Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meropenem</td>
<td>Meropenem Days = 3</td>
</tr>
<tr>
<td>Amikacin</td>
<td>Amikacin Days = 2</td>
</tr>
</tbody>
</table>

Example Calculation of Days of Therapy from eMAR

<table>
<thead>
<tr>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meropenem 1 gram IV intravenously every 8 hours</td>
<td>Given: 2000</td>
<td>Given: 0700</td>
</tr>
<tr>
<td>Amikacin 1000 mg IV intravenously every 24 hours</td>
<td>Given: 2300</td>
<td>Given: 2300</td>
</tr>
</tbody>
</table>

DDD vs. DOT

DDD (Defined Daily Dose vs Days of Therapy)

- **Pros:**
  - Standard comparisons using aggregate utilization data
  - Will change estimate of drug use if high doses are used, but standard is not changed

- **Cons:**
  - Not a surrogate for DOT when dose is different than standard:
    - Cannot be used for children, renal dysfunction
    - DDD can change with time

DOT

- **Pros:**
  - Can be used in children
  - Not influenced by changes in the DDD standards
  - Not subject to differences in institutional preference

- **Cons:**
  - Overestimates use for drugs given multiple times per day
  - More difficult to measure without computerized records

Outcomes by the Guideline

- Both process measures and outcome measures are useful in determining the impact of antimicrobial stewardship on antimicrobial use and resistance.

What Does the Literature Say?

- 36 published studies on effect of antimicrobial stewardship
  - Majority looked at cost of drug
  - Fewer looked at utilization
  - Few looked at more objective PATIENT outcomes


Clinical Outcomes

2.4 day reduction in length of stay

Impact on Resistance

<table>
<thead>
<tr>
<th>Organism-antibiotic</th>
<th>SICU</th>
<th>MICU</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. aeruginosa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>67 (64)</td>
<td>92 (42)</td>
</tr>
<tr>
<td>Imipenem</td>
<td>80 (64)</td>
<td>70 (42)</td>
</tr>
<tr>
<td>Piperacillin</td>
<td>78 (64)</td>
<td>92 (42)</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>80 (64)</td>
<td>76 (42)</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>71 (64)</td>
<td>76 (42)</td>
</tr>
</tbody>
</table>

Outcomes Data: ICUs

- Of 1,185 patients, 26.3% received empiric antibiotics
  - 25.6% ultimately had infection
  - Average empiric duration was 3.1 days
- Costs of empiric antibiotics when none were needed:
  - Increase in resistant organisms (p=0.051), STICU length of stay (p<0.05), ventilator days (p<0.05), develop renal failure (p<0.001) and die in the STICU (p<0.001)

Benchmarking Antimicrobial Usage

- Comparisons of intra-facility antimicrobial usage
  - Risk-adjusted
  - Standardization in numerator and denominator
- Provides direction for further evaluation and potential areas of quality improvement
  - Does not assess appropriate use

Collection and Analyses: Antimicrobial Usage Metrics in Practice Today
Pharmacist Survey

• **Purpose**
  o Snapshot of antimicrobial drug utilization surveillance at the facility-level

• **Survey**
  o 15 questions
  o Distributed via email to SIDP membership
  o July 2009

SIDP Survey

• **Survey Response**
  o 95 of 470 members (20%) responded to survey
  o Unknown denominator for members with hospital practice
    • Estimate ~ 300 members with hospital practice
  o 72 respondents work at institution that measures ABX consumption

SIDP Survey Summary

• Antimicrobial use data is most often utilized to assess and monitor cost at facility level
• Data source utilized is often pharmacy purchase data derived from pharmacy or hospital administrative databases
  o Data often imported into Excel
• DDD/patient volume is most frequently utilized metric
• Lack access to data for external benchmarking but have great interest in receiving these data

Antimicrobial Usage Surveillance: Future National Effort

National Healthcare Safety Network (NHSN)

• Secure, internet-based surveillance system
• Currently enrolling all types of healthcare facilities
• Purpose includes:
  o Collect data to estimate magnitude of HAIs/ADRs
  o Conduct research

States with Facilities Using NHSN (total=2466)

www.cdc.gov/nhsn/about.html

Antimicrobial Use and Resistance (AUR)

Medication-associated Module

Antimicrobial Use-Pharmacy Option

Antimicrobial Resistance-Microbiology Option

www.cdc.gov/nhsn/psc_ma.html
Conclusions

- There is no wrong way to measure the effect of an antimicrobial stewardship program
- We need to push for more clinically based stewardship outcomes studies
- External benchmarking will be coming!!

Acknowledgements

- Duke Stewardship team:
  - Keith Kaye, MH, MPH
  - Richard Drew, PharmD, MS
  - Melissa Johnson, PharmD, MHS
  - Members of the Antibiotic Evaluation Team
- Duke SICU team:
  - Michelle Sharpe, PharmD
  - Travis Dick, PharmD
  - Keith Kaye, MD, MPH
  - Kyle Bennett, MD
  - John Scarborough, MD
  - Timothy Hayward, MD
  - Steven Vaslef, MD
- Melinda Neuhauser, PharmD, MPH, FCCP
- SMH Stewardship team:
  - Erica Dobson, PharmD
  - Lisa Saubermann, PharmD
  - Members of the SMH Antibiotic Subcommittee
Learning Objectives

- Discuss available electronic surveillance tools for antimicrobial stewardship programs.
  - Differentiate between “front end” and “back end” electronic tools for stewardship.
  - Evaluate studies of the impact of electronic stewardship systems
  - Identify key questions for institutions evaluating electronic tools for stewardship.

- Describe available resources that can be implemented with minimal financial expenditures.
  - Identify “high return-on-investment” interventions
  - Evaluate the benefits and limitations of these interventions

Case Study: UCSF Medical Center

- 600-bed tertiary-care facility
- Interdisciplinary Antimicrobial Management Program (AMP)
  - “Effector arms” of AMP
    - ID Pharmacist
    - PGY-2 ID specialty resident
    - PGY-1 resident rotation on ID
    - 2-3 pharmacy students rotating on ID

AMP Components

- Restriction of selected antimicrobials
  - 24-hr pager coverage by ID PharmD
- Audit and feedback
  - Targeted antimicrobials
    - Vancomycin, cefepime, carbapenems, aminoglycosides
    - Any antimicrobial order-entry RPh would like f/u
  - Adult ICU patients – weekly review
- IV-PO switch program

Microbiology
- Clinical labs
- Progress notes

Antimicrobial orders
- University Lab database aggregator
- UCare EMR
- WORS pharmacy order-entry system

IV-PO switch
- WORS pharmacy order-entry system
- University Lab database aggregator

Audit and feedback: ICU review
- Physically walking around ICUs
- Audit and feedback: Targeted antimicrobials, orders of concern

Notification Info Flow
- Calls from MDs or PharmDs

Assessment Info Flow
- Institutional guidelines & dosing recs

Decision Support Flow
- AMP website
- Dosing cards

Isn’t there a better way? (Sure, but it costs money)
Electronic surveillance systems for stewardship

“Back end”
- Capture data relevant for stewardship processes
  - Pharmacy, micro, clinical lab
- Aggregate into user-friendly format
  - Basic data reporting
    - Ex. all patients on carbapenems, all Staph aureus positive cultures, all gentamicin levels
  - Apply rules to “flag” certain combinations
    - Ex. patients on carbapenems for more than 3 days, Staph aureus positive cultures with drug-susceptibility mismatch, gentamicin levels out of range

“Front end”
- Incorporate real-time data to drive antimicrobial decisionmaking & reporting
  - Require categorizing justification for drug choice
  - Require contacting authorizer for specific drugs
  - Link to institutional guidelines for drug choice
  - Suggest patient-specific dosing (estimated CrCl)
  - Suggest drug selection based on culture & susceptibility

Electronic surveillance systems for stewardship

Electronic systems
- Institution-specific, custom-built
- Commercially available
  - Premier SafetySurveillor
  - TheraDoc
  - The Advisory Group: QualityCompass
  - RL Solutions iMPG
  - 3M ClinTrac
  - BD Connect

ES3: Evidence

Noncomparative study of custom “back end” system
- Intervention: identification of patients receiving potentially redundant antimicrobial therapy
  - Daily generation of list of all patients receiving >1 antimicrobial
  - Rules algorithm to identify potentially redundant combinations
  - Follow-up by ID PharmD to confirm appropriateness
  - Recommendations by ID PharmD to modify therapy

Patient-days 6969
- Any antimicrobial 3857 (52%)
- >1 antimicrobial/day 1189 (17%) 1189
- Potentially redundant combos 431 (54%)
- Eligible for review 792 (100%) 792
- Combination inappropriate 137 (71%) 137
- PharmD rec accepted 134 (93%) 134
- Estimated antimicrobial-days avoided, study period 584
- Estimated antimicrobial-days avoided, annualized 3500
- Estimated antimicrobial cost avoidance, annualized $60,000

ES3: Evidence

**ES3: Evidence**

- RCT of “back end” commercial system
  - **Setting:** 684-bed university hospital
  - **Personnel:** ID PharmD (0.8 FTE) + ID MD (0.5 FTE)
  - **Group assignments:** even-numbered patient MRNs use standard care, odd-numbered use intervention
  - **Control:** Daily review of 23 restricted antimicrobials generated from pharmacy database
  - **Outcomes:**
    - Primary: hospital antimicrobial costs
    - Secondary: mortality, LOS, time spent on stewardship


<table>
<thead>
<tr>
<th></th>
<th>Control arm</th>
<th>Intervention arm</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions</td>
<td>2270</td>
<td>2237</td>
<td></td>
</tr>
<tr>
<td>Alerts generated</td>
<td>(574 (25.3%)</td>
<td>570 (26.5%)</td>
<td>0.88</td>
</tr>
<tr>
<td>Interventions</td>
<td>180 (7.9%)</td>
<td>359 (16.0%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Antimicrobial cost</td>
<td>$370,006</td>
<td>$285,812</td>
<td></td>
</tr>
<tr>
<td>LOS</td>
<td>3.99</td>
<td>3.84</td>
<td>0.38</td>
</tr>
<tr>
<td>Hospital mortality</td>
<td>67 (2.9%)</td>
<td>73 (3.3%)</td>
<td>0.55</td>
</tr>
<tr>
<td>Person-hours/day</td>
<td>4.1</td>
<td>3.2</td>
<td></td>
</tr>
</tbody>
</table>


**ES3: Evidence**

- RCT study of “front end” custom system
  - **Setting:** 720-bed university hospital
  - **Personnel:** Housestaff
  - **Group assignments:** MDs randomized to usual CPOE or CPOE with vancomycin guidelines
  - **Control:** CPOE without vancomycin guidelines
  - **Outcomes:**
    - Physician-level: vancomycin prescribing by group
    - Hospital-level: vancomycin prescribing before/after


**Physician-level**

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of physicians</td>
<td>174</td>
<td>171</td>
<td></td>
</tr>
<tr>
<td>Patients receiving vancomycin</td>
<td>10.3</td>
<td>7.4</td>
<td>0.02</td>
</tr>
<tr>
<td>Total vancomycin days</td>
<td>41.2</td>
<td>26.5</td>
<td>0.05</td>
</tr>
<tr>
<td>Duration of therapy</td>
<td>2.0</td>
<td>1.8</td>
<td>0.05</td>
</tr>
</tbody>
</table>

**Hospital-level**

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital census</td>
<td>20,879</td>
<td>21,069</td>
<td></td>
</tr>
<tr>
<td>Patients receiving vancomycin</td>
<td>2,715 (13.0%)</td>
<td>2,341 (11.1%)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Grams of vancomycin/patient</td>
<td>1.3</td>
<td>1.1</td>
<td>0.01</td>
</tr>
</tbody>
</table>

ES³: Evidence

QE study of “front end” custom system
- Setting: 12-bed shock-trauma ICU 520-bed community referral hospital
- Personnel: ICU clinicians
- Group assignments: 2-year pre-, 1-year post-
- Control: Usual care
- Outcomes: adjusted for age, sex, severity of illness
  - Process & cost: use of system, antimicrobial duration, hospitalization & antimicrobial costs
  - Clinical: dose- or pathogen-mismatch, mortality, LOS


ES³: Evidence

Computer rec followed Computer rec overridden
 ICU admissions 766 203 195
 Any antimicrobial 766 (67%) 398 (73%) <0.05
 Duration of therapy 8.9 days 4.3 days 13.4 days <0.01 <0.01
 Antimicrobial cost $340/pt $102/pt $427/pt <0.01 <0.01
 Excess dose days 5.4 1.4 3.6 <0.01 <0.01
 LOS 12.9 days 10.0 days 16.7 days <0.01 <0.01
 Hospital mortality 172 (22%) 88 (22%) <0.01
 Total hospital cost $35,283 $26,315 $44,865 <0.01 <0.01


ES³: Evidence

QE study of “front end” custom system
- Intervention: computerized point-of-care decision-support system
- Data integrated from ADT, pharmacy, micro, clinical laboratory, bedside vitals, radiology systems
- Incorporates institutional antibiogram data for empiric recommendations
- Driven by consensus rules from fleshbots (ID specialists)
- Makes antimicrobial recommendations including drug/dose/route/frequency/durations
- Clinicians choose to accept or override recommendations


Considerations for creating/buying/implementing ES³

- What functionalities do I need now?
  - Can it be “scaled up” in the future?
  - How customizable is it?
- Can other users share use/cost?
  - Infection control, quality improvement, etc
- Integrated into existing workflow or separate system?
- Easy data output for reporting/QI?

Reality check: what about me?

- Comprehensive stewardship programs require some combination of:
  - Dedicated, full-time ID-trained personnel
  - User-friendly electronic surveillance systems
  - Institutional commitment
- Most healthcare institutions in U.S. aren’t going to go “from zero to 100”
  - How can I start a program and scale up?
  - Need effective, practical, high-ROI interventions

High-ROI Interventions

- “High-ROI Interventions”
  - Run with minimal expert judgment required once criteria established, <1 FTE PharmD to operate
  - Guidelines & pathways for care
  - IV-to-PO conversion
  - Positive culture follow-up & streamlining
- NOT necessarily most effective (especially at slowing resistance): “foot in the door”
High-ROI Interventions: Clinical Guidelines

- Start with national consensus guidelines
  - Modify to local circumstances
  - Approve by stakeholders/“thought leaders”

- Dissemination
  - Present at practice group meetings
  - Make widely available (print, web)
  - Incorporate into order sets/practice algorithms

- Follow-up
  - Audit compliance & reinforce if necessary

High-ROI Interventions: IV-to-PO Conversion

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequential</td>
<td>Change to highly bioavailable oral formulation of same agent</td>
<td>Levofloxacin IV → PO</td>
</tr>
<tr>
<td>Switch</td>
<td>Change to highly bioavailable oral agent with similar or greater spectrum</td>
<td>Ceftriaxone IV + azithromycin</td>
</tr>
<tr>
<td></td>
<td>of activity</td>
<td>PO → levofloxacin PO</td>
</tr>
<tr>
<td>Step-down</td>
<td>Change to oral agent with similar spectrum but resulting in</td>
<td>Ampicillin IV → amoxicillin PO</td>
</tr>
<tr>
<td></td>
<td>substantially lower drug exposure or change to highly bioavailable oral</td>
<td>Ceftriaxone IV + doxycycline</td>
</tr>
<tr>
<td></td>
<td>agent with narrow spectrum</td>
<td>PO → doxycycline PO</td>
</tr>
</tbody>
</table>

High-ROI Interventions: Streamlining For + Cultures

- Most antimicrobial use entirely empiric
- “Streamlining” = changing from broad spectrum to narrow-spectrum antimicrobials
  - Streamlining/discontinuing with negative cx is complex/controversial
  - Streamlining therapy when culture/sensit known more straightforward
  - “Win-win”: generally lower cost, less risk of resistance, less superinfection, equal or greater efficacy

Clinical Guidelines: Evidence

IV-PO Conversion: Evidence

<table>
<thead>
<tr>
<th>CAP Treatment</th>
<th>Period 1: No Intervention</th>
<th>Period 2: Negotiated switch</th>
<th>Period 3: Automatic sequential</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV Therapy</td>
<td>79</td>
<td>81</td>
<td>91</td>
</tr>
<tr>
<td>Cephalosporin-based</td>
<td>75</td>
<td>78</td>
<td>0</td>
</tr>
<tr>
<td>Fluoroquinolone</td>
<td>1</td>
<td>3</td>
<td>91</td>
</tr>
<tr>
<td>PO Therapy</td>
<td>42 (53%)</td>
<td>57 (70%)</td>
<td>89 (96%)</td>
</tr>
<tr>
<td>B-lactam or</td>
<td>18</td>
<td>21</td>
<td>1</td>
</tr>
<tr>
<td>Fluoroquinolone</td>
<td>20</td>
<td>33</td>
<td>86</td>
</tr>
<tr>
<td>Clinical success EOT</td>
<td>98.7%</td>
<td>98.8%</td>
<td>97.8%</td>
</tr>
<tr>
<td>Length of stay</td>
<td>4.23</td>
<td>4.57</td>
<td>4.39</td>
</tr>
<tr>
<td>Total antibacterial cost</td>
<td>$230*</td>
<td>$233*</td>
<td>$119*</td>
</tr>
<tr>
<td>Total hospital cost</td>
<td>$3409</td>
<td>$3631</td>
<td>$3547</td>
</tr>
</tbody>
</table>

VAP Treatment

<table>
<thead>
<tr>
<th>All Patients</th>
<th>No Streamlining</th>
<th>Streamlined Regimen</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>740</td>
<td>320 (78%)</td>
<td>92 (22%)</td>
<td>0.16</td>
</tr>
<tr>
<td>Patients w/+ Culture</td>
<td>92 (22%)</td>
<td>320 (78%)</td>
<td>0.41</td>
</tr>
<tr>
<td>Total antimicrobial duration</td>
<td>13.0 days</td>
<td>12.0 days</td>
<td>0.001</td>
</tr>
<tr>
<td>Carbapenem duration</td>
<td>6.0 days</td>
<td>3.0 days</td>
<td>0.22</td>
</tr>
<tr>
<td>Microbiologic resolution</td>
<td>81 (68%)</td>
<td>213 (96%)</td>
<td>0.44</td>
</tr>
<tr>
<td>Clinical resolution</td>
<td>30 (33%)</td>
<td>79 (25%)</td>
<td>0.53</td>
</tr>
<tr>
<td>28-day mortality</td>
<td>13 (14.1%)</td>
<td>55 (72%)</td>
<td>0.53</td>
</tr>
</tbody>
</table>

Streamlining: Evidence
Justification of a Formalized Antimicrobial Stewardship Program

Mort Goldman, PharmD, BCPS, FCCP
Director, Pharmacotherapy Services, Cleveland Clinic
Assistant Professor of Medicine, Cleveland Clinic Lerner College of Medicine
April 27, 2010

Objectives

1. Identify the components of Antibiotic Stewardship Programs
2. Determine outcome measures for these programs
3. Convince administrators of the value of these programs
   a) Regulatory
   b) Improvement of resistance profiles
   c) Cost justification

Components of Antimicrobial Stewardship Programs (IDSA)

- Prospective audit with intervention and feedback
- Formulary restriction and prior authorization
- Education
- Guidelines and clinical pathways
- Streamlining/de-escalation programs
- Dose optimization
- Antimicrobial order sets (pre-printed order forms)
- IV to PO
- Computer surveillance and decision support
- Microbiology susceptibility testing/surveillance
- Clear outcomes measures

Components of Antimicrobial Stewardship Programs (IDSA)

- Personnel
  - ID Physician(s) (Medical Director)
  - Clinical Pharmacist with ID training*
  - Microbiology
  - Information technology
  - Infection control
  - Hospital Epidemiologist

Justification - Homework

- Identify your issues
  - Prescriber
  - Drug specific
  - Drug class
  - Antibiogram
    - Lack/presence
    - Unit specific
    - Resistance issues/tracking

* Pharmacotherapy 2009;29:482-8

Disclaimer

- Speakers bureaus/advisory boards:
  - Wyeth, Enzon, Astellas
Justification - Homework

- Identify the model or combinations of components that would work in your institution
  - Team
  - Individuals
  - All patients on particular drug
  - Consultative
  - Guidelines
  - Restrictions

Justification - Homework

- Identify existing resources
  - Information technology
  - Personnel
  - Other health-system resources (if applicable)
- Go through the AMS Component checklist (you may be further along than you thought)

Justification – Measures

Later discussion

- Cost
- Outcomes
  - Patient outcome
  - Resistance patterns
  - Superinfection
  - Adverse reaction
- Joint Commission/National Patient Safety Goals/Core Measures

Justification - Measures

- NPSG.07.03.01: Implement evidence-based practices to prevent health care-associated infections due to multidrug-resistant organisms in acute care hospitals
- NPSG.07.05.01.7: Administer antimicrobial agents for prophylaxis for a particular procedure or disease according to evidence-based best practices

Justification - Homework

- Understand the language of your administration
  - How do new programs get approved
  - What level of justification is required
  - Personnel vs. other resources
    - package vs. components
  - Who “presents” the information
    - You? Pharmacy Director? VP?

Justification - Lobbying and Marketing

- Identify key stakeholders
  - Finance
  - ID department
  - Quality institute
  - Infection control
- Build buy-in
  - Be able to discuss the problem and solution
  - This is a national and local issue
Other resources

12 Steps to Prevent Antimicrobial Resistance: Hospitalized Adults

- Prevent transmission
- Use antimicrobials wisely
- Diagnose & treat effectively
- Prevent infections

Business plan

- Clear, concise executive summary
- History/background
- Current conditions, resources, issues, problem
- Proposal
  - Resource requirements
  - Operational plan
  - Outcome measures (including financial impact)
  - Timeline
  - Risk of inaction
  - Champions
- Summary

Chapter 5: Antibiotic Stewardship

is antibiotic resistance promoting the spread of MDRIs and unnecessarily increasing costs at the institution?

- Examines the structure, functions, and benefits of implementing an Antibiotic Stewardship Program (ASP)

- Promotes guidelines for antibiotic stewardship by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America stating that one of the critical elements for reducing antibiotic resistance is an ASP

Antimicrobial Stewardship: Aims

- Improve clinical outcomes by optimizing:
  - Antimicrobial selection
  - Dose and duration of therapy
- Minimize unintended consequences of antimicrobial use, including:
  - Toxicity
  - Emergence of resistance
  - Excess costs

Chapters and Authors

Chapter 1: Antimicrobial Resistance: Patients and Hospitals in Parallel

- C.R. Archibald, M.D., and W.L. Scheld, M.D.

Chapter 2: The Clinical Consequences of Antimicrobial Resistance

- W.L. Scheld, M.D.
- S. LeDrap, M.D.

Chapter 3: The Financial Impact of Antimicrobial Resistance

- J. Dougherty, M.D., and W.L. Scheld, M.D.
- S. LeDrap, M.D.

Chapter 4: Transmission Control to Prevent the Spread of MDRIs

- R. H. McDonald, M.D.
- W.L. Scheld, M.D.
- S. LeDrap, M.D.

Chapter 5: The Path to Higher Performance

- D.M. Schiebler, M.D., and W.L. Scheld, M.D.
- S. LeDrap, M.D.

Chapter 6: Challenges on the Path to Higher Performance

- J. Dougherty, M.D.
- W.L. Scheld, M.D.
- S. LeDrap, M.D.

Chapter 7: Antimicrobial Stewardship

- J. Dougherty, M.D.
- W.L. Scheld, M.D.
- S. LeDrap, M.D.
Justification

Business plan - lite

- Description of the problem/initiative
- What we are currently doing/not doing
- How we know we have a problem
- How we propose to address this problem
- What is the risk of not addressing this problem
- What are the expected outcome measures

Description of the problem/initiative

In conjunction with the Department of Infectious Diseases, develop an Antimicrobial Stewardship Program to improve the utilization of antimicrobial agents, decrease antimicrobial resistance rates, and assist in compliance with CMS Core Measures for Community Acquired Pneumonia and Surgical prophylaxis.

What we are currently doing/not doing:

We presently have 1 FTE Pharmaceutical Care Specialist who rounds with the Infectious Diseases Consult Services, performs research and drug use evaluation, assists with the restricted drug program, is Residency Director for the Infectious Diseases Pharmacy Residency, teaches at the Cleveland Clinic Lerner College of Medicine, and provides student rotations for the University of Toledo and Ohio Northern University. The formation of an Antimicrobial Stewardship Program would allow the development of the appropriate approach to more carefully monitor all antimicrobial therapy throughout the institution, and in conjunction with the Department of Infectious Diseases.

How we know this is a problem:

Over the past 8 years we have been able to keep antimicrobial expenditures to less than 26% of our inpatient pharmaceutical expenditures. However, we have begun to see a slight increase over time due to some new antifungal and antibacterial agents introduced in the US market. In addition we have seen in increase in antibacterial resistance over the past decade that has increased the requirement for more expensive agents to be utilized.

Antimicrobial stewardship programs generally consist of a formalized process of education, guideline utilization, formulary management, restricted drug programs, prior approval programs, antimicrobial review and feedback, computer assistance, and clinical pathways (1,2,3). Although we already have many of these functions in place, they are performed for very specific drugs or indications, with out a comprehensive formalized approach. This is similar to the observation made by Lawton, et al (2) that most hospitals have activities to improve antimicrobial use but are inadequate based on recommendations by the Society for Healthcare Epidemiology of America and the Infectious Diseases Society of America (4) (a new position paper on Antimicrobial Stewardship is scheduled for publication in the fall of 2006).


How we propose to address this problem:

With a comprehensive, multidisciplinary approach to antibiotic use, we believe that we can improve antimicrobial resistance and the appropriate use of antibiotics. The Chair, Department of Infectious Diseases, is in full support of this program and is working in conjunction with the Department of Pharmacy in its development. We will begin by careful evaluation of our high cost/use drugs for appropriate utilization and determine initiatives for improvement. We will also evaluate the need for computerized screening tools.

What the risk is of not addressing this issue:

The risks of not implementing this program would be a further creep of antimicrobial expenditure and further increases in antimicrobial resistance, resulting in and even further increase in expense, length of stay, and untoward outcomes.

In a review of Antimicrobial Stewardship programs, Patel found that comprehensive programs produce a reduction in antimicrobial expenditure, decreases in length of stay and antibacterial resistance for selected pathogens. Cost savings ranged from 0 to more than $1 million over a 3 year period (3)

What the expected outcomes or measures are: With continuous monitoring we should expect to see an improvement in antibacterial susceptibility and a decrease in drug costs of more than $100,000 in the first full year. We will also be able to meet all requirements for CMS core measures involving antimicrobials and new National Patient Safety Goals.

BE CAREFUL
Under promise and over deliver

Resources
Later discussion
- Don’t reinvent the wheel
  - On-line resources
  - ASHP
  - ACCP ID PRN
  - SIDP
  - IDSA
- But no two models will be exactly the same
  - Don’t use cost savings estimates that you cannot achieve
  - Don’t commit to programs that you cannot implement

Justification of ASP
- Do your homework
  - Identify the issues
  - Identify the resources
- Lobby and Market
- Know your players
  - Business plan-lite
- Don’t over commit
  - Outcomes should include other things besides cost
  - Don’t (completely) re-invent the wheel