Antimicrobial Stewardship
Building a Program

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My goal today is to provide you with practical, real-world ideas to help you begin or improve your antimicrobial stewardship program (ASP)

Disclosures
- Employee of Cardinal Health

Disclaimer
- This presentation represents my views, opinions, etc. and not that of my employer
Hospitals’ Experience With Implementing a Stewardship Program
Stepwise approach

- Organization Identifies Goal
- Administrative/Prescriber Support
- Resource Inventory/Program Design
- Identify Program Goals
- Implement Program/Measure/Report/Re-Assess
Someone or a group of “someones” has identified that the hospital needs to implement an ASP

Common motivators
- JCAHO is asking about it
- State mandate (California)
- *Clostridium difficile* outbreak
- Reports of poor outcomes among patients with multi-drug resistant Gram negative infections
- Cost savings
Why Stewardship Gets Financial Attention

Percent of Total Spend

- Abx
- Non abx

Percent “Influenceable”

- Abx
- Non abx
Administration

◦ If the C-suite knows what the terms “stewardship”, or “antibiotic resistance” means and, even better, uses it in their daily language, you are off to a great start

◦ Chief Medical Officer
◦ Chief Nursing Officer
◦ Chief Operating Officer
Medical Staff Support

- Identify a physician champion or physician/prescriber groups that will agree to have “peer to peer” discussions with outlying practitioners
- Ideally, it is nice if this includes an ID physician but….
  - What if your ID physician(s) is/are not engaged?
  - What if your ID physician(s) is/are opposed to a program?
What if your ID physician is a Rubik’s cube?

Maybe buy t-shirts?
<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>We do not have ID physicians at our hospital.</td>
<td>42%</td>
</tr>
<tr>
<td>Our ID physicians are in private practice and round on a consultative basis only.</td>
<td>47%</td>
</tr>
<tr>
<td>Some or all of our ID physicians are employed full time by the hospital.</td>
<td>11%</td>
</tr>
</tbody>
</table>

Data on file: Cardinal Health
Prescriber Support

- Hospitalists and Emergency Room physicians
- Nurse Practitioners and Physician Assistants
  - LTACs
- Someone should broach the idea of compensation
  - $ per hour
  - Annual stipend
  - Monthly fee
- Contractual obligation vs “just being nice”?
Resources

• Think about what you have vs. need
  ▫ Personnel
    • The most successful programs are inter-disciplinary
    • Look for program “extenders”
      • Nursing, Case Management, technicians
  ▫ Maximize technology if you can
  ▫ Tools
    • Intervention tracking
    • Other systems within the hospital
      • For example, look at Infection Control tools available
    • Build your own!!
Example Program

- ID physician, ID pharmacist rounds Mondays, Tuesdays, and Thursdays (most weeks)
- ID physician and pharmacist available via pager M–F during normal business hours to address stewardship issues
- Clinical and staff pharmacists available after hours and Friday–Sunday to address immediate patient care needs
- Initial focus: patients on more than 2 antimicrobials, culture and sensitivity results review (focus on de-escalation, discontinuation, and drug–bug mismatches), discharge culture reviews, identification of issues and report back to committee.
## Example Timeline

<table>
<thead>
<tr>
<th>Phase</th>
<th>Duration</th>
<th>Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day one – 4 months</strong></td>
<td></td>
<td>Intensive Care Units</td>
</tr>
<tr>
<td><strong>Phase in additional units; 4 – 8 months</strong></td>
<td>4 – 8 months</td>
<td>ICU step-downs, Oncology, Hemodialysis</td>
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<tr>
<td><strong>Phase in additional units; 8 – 12 months</strong></td>
<td>8 – 12 months</td>
<td>General Medicine and Surgical Floors (1st phase)</td>
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<tr>
<td><strong>Phase in additional units; 12 – 16 months</strong></td>
<td>12 – 16 months</td>
<td>General Medicine and Surgical Floors (2nd phase)</td>
</tr>
<tr>
<td><strong>Phase in additional units; 16 – 20 months</strong></td>
<td>16 – 20 months</td>
<td>Rehab</td>
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<tr>
<td><strong>Any remaining areas; 20 – 24 months</strong></td>
<td></td>
<td>hospital wide within 24 months</td>
</tr>
</tbody>
</table>
Start with the basics
  ◦ Low hanging fruit
  ◦ Set manageable expectations
  ◦ If you already have a program, set your new goals “one level up”

How will you know (objectively) if your program is successful?
  ◦ Wrong answer “I gotta a feeling…”
Examples

◦ Reduction in overall antibiotic utilization by 20%
◦ Antibiotic start and stop dates will be visible at the point of care
  • In 50% of patient charts by xx/xx/11
  • In 80% of patient charts by xx/xx/12
◦ Based on a review of 100 general medical and surgical patients who received $\geq$ 3 antibiotics, only 30% of patients had therapy de-escalated after culture and susceptibility reports were returned.
  • Our goal is to improve this number to 60% by year end
Examples

- Reduction in overall antibiotic utilization by 20%
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  - Our goal is to improve this number to 60% by year end
Identify Program Goals

- Pick stuff you can fix
  - Please don’t make the blanket statement that you are going to decrease ALL antibiotic resistance

http://www.idsociety.org/Content.aspx?id=11840

Emerg Inf Dis 2007;13(6):838-46
Let’s take a brief moment to hear from our sponsor

DATA!!!!!!!
Where to Find Data

- Pharmacy
  - Wholesaler purchase reports
    - Antibiotic cost per patient day or per discharge
  - Utilization data from hospital computer system/finance
    - Defined daily dose per 1000 patient days
  - Order entry data (days of therapy)
- Medication use AND disease state evaluations
- Medication safety and adverse drug reactions
- Infection prevention data
  - Commercial systems
  - Home grown
Where to Find Data

- Lab/Microbiology
  - Blood culture contamination rates
  - MIC trending reports from automated testing system
    - Linezolid, vancomycin, and daptomycin vs MRSA
    - Carbapenem vs *Pseudomonas aeruginosa*
  - Line listings for key resistant organisms
    - ESBLs
    - MRSA
    - CRE
      - Fall 2008 – “Me: I think you have KPCs”
      - “Microbiologist: No we haven’t seen it”
      - Spring 2009 – Pharmacist “ We have a patient with a KPC”
  - Antibiograms
## Critical Review of Antibiogram

- Community hospital in Northeast
- High level of antibiotic resistance

<table>
<thead>
<tr>
<th>Resistance pattern</th>
<th>Original</th>
<th>First isolate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=</td>
<td>% R</td>
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<tr>
<td>Oxacillin resistant <em>S. aureus</em></td>
<td>607</td>
<td>66%</td>
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<tr>
<td>Levofloxacin resistant <em>K. pneumoniae</em></td>
<td>651</td>
<td>75%</td>
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<tr>
<td>Tobramycin resistant <em>P. aeruginosa</em></td>
<td>510</td>
<td>22%</td>
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</tbody>
</table>

- Make sure resistance changes are “real”
- Know where the data is coming from
- Be aware of impact of breakpoint changes
  - Fortunately, there is a lag time with implementation
Kristi’s cliché’s of stewardship implementation
  ◦ Rome wasn’t built in a day
  ◦ Walk before you run
  ◦ That’s a different problem for another day

Complete training and education
  • Most hospitals are more successful in implementing the stewardship program in stages vs. all at once
  • Market your program
Pick measurable but manageable outcomes
Set frequency to report and re-assess
Don’t be afraid to make changes
## Consider a Scorecard

<table>
<thead>
<tr>
<th>Objective</th>
<th>Measure</th>
<th>Goal</th>
<th>Baseline</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
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<th>October</th>
<th>November</th>
<th>December</th>
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<tbody>
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<td>Implement a program for antimicrobial stewardship recommendations</td>
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<td>Percentage of recommendations accepted by physicians</td>
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<td>Improve antibiotic-related Core Measures performance</td>
<td>Appropriate antibiotic selection - non-ICU patient</td>
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<td>Appropriate antibiotic selection - non-ICU patient with pseudomonas</td>
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<td>Appropriate antibiotic selection - ICU patient</td>
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<td>Post op antibiotics discontinued at 24 hours (48 hrs for C/O/C)</td>
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<td>Decrease antibiotic costs (utilization)</td>
<td>Antimicrobial costs per patient discharge</td>
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<td>Decrease frequency of inappropriate antimicrobial drug use</td>
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<td>ADPI - antibiotic-related</td>
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<td>Bacteria - enter quantity</td>
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<td>C. Diff infections rate per 1000 patient days</td>
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<td>Optimize antimicrobial therapy</td>
<td>(Enter drug name) V to PO percentage</td>
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<td>Improve hospital LOS in top 5 Infectious disease related MS-DRGs - based on total cost</td>
<td>MSURG1</td>
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<td>MSURG5</td>
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</table>
Breakdown of Interventions 1st Quarter 2011

Antimicrobial Stewardship Interventions by Class

- PK Evaluation - Vancomycin 12%
- PK evaluation - Aminoglycoside 1%
- Antibiotic Recommendations 4%
- Antibiotic Renal Dosing 11%
- Antibiotic/Microbiology Assessment 72%
Intervention Acceptance Rate

Number of interventions

<table>
<thead>
<tr>
<th>Month</th>
<th>Rejected</th>
<th>Accepted</th>
<th>Total</th>
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<tbody>
<tr>
<td>May</td>
<td>13</td>
<td>29</td>
<td>42</td>
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<tr>
<td>June</td>
<td>20</td>
<td>34</td>
<td>54</td>
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<tr>
<td>July</td>
<td>24</td>
<td>35</td>
<td>59</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>98</td>
<td>155</td>
</tr>
</tbody>
</table>

- Rejected
- Accepted
Results

![Graph showing changes in DDD/1000 pt days and $/patient day from 2008 to 2010.]
Be Aware of Stewardship Killers

- Poor diagnostic practices
- High blood culture contamination rates
- Poor compliance with handwashing
- Increased hospital acquired infections
- Poor compliance with hospital infection control practices
- Relying on one person to "be" the stewardship program
- Antagonists
Stewardship Resources
On the Web

- Society of Infectious Diseases Pharmacists
  - www.sidp.org
- Johns Hopkins Antibiotic Guide
  - http://www.hopkinsguides.com/hopkins/ub
- Nebraska Medical Center ASP Homepage
- University of Kentucky – Chandler Medical Center
  - http://www.hosp.uky.edu/pharmacy/amt/default.html
- WHO DDD
  - http://www.whocc.no/atc_ddd_index/
- CDC Get Smart
- SHEA
  - http://www.shea-online.org/GuidelinesResources/FeaturedTopicsinHAIPrevention/AntimicrobialStewardship.aspx
In Print

- *Clin Infectious Diseases* 2011;53(Supplement 1)
- Antimicrobial Resistance – Problem Pathogens and Clinical Countermeasures (Owens RC, Lautenbach E, editors)
- *Antibiotics Simplified.* (Gallagher JC, MacDougall C, editors)
## Sources of Comparison Data Pharma Sponsored

<table>
<thead>
<tr>
<th>Name (Sponsor)</th>
<th>Data Source</th>
<th>Website</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.E.S.T – Tigecycline Evaluation and Surveillance Trial (Pfizer, Formerly Wyeth)</td>
<td>Isolates are collected from 130 global centers. Microtesting performed on site and then info entered into a proprietary database</td>
<td><a href="http://testsurveillance.com/index.php?view=welcome&amp;template=main">http://testsurveillance.com/index.php?view=welcome&amp;template=main</a></td>
<td>Susceptibility data limited to drugs that have similar spectrum of activity to tigecycline. Access is free but must register.</td>
</tr>
<tr>
<td>Susceptibility of Gram Positive Pathogens (Cubist)</td>
<td>JMI Labs Central Data Repository</td>
<td><a href="http://www.gp-pathogens.com/data/default.cfm">http://www.gp-pathogens.com/data/default.cfm</a></td>
<td>Data is independently maintained by JMI Labs, one of the leaders in antibiotic susceptibility testing. Site only has gram positive info.</td>
</tr>
<tr>
<td>MYSTIC – Meropenem Yearly Susceptibility Test Information Collection (Astra Zeneca)</td>
<td>JMI Labs Central Data Repository</td>
<td>Not available</td>
<td>Data can only be found in published articles. Not searchable.</td>
</tr>
<tr>
<td>TRUST - Tracking Resistance in the US Today</td>
<td>Focus Technologies Central Data Repository</td>
<td>Not available</td>
<td>Website only contains info on S. pneumoniae resistance patterns but TRUST surveillance tracks Gram negative also. May be able to access more info through Ortho McNeil.</td>
</tr>
</tbody>
</table>
## Sources of Comparison Data: Non-Pharma

<table>
<thead>
<tr>
<th>Name (Sponsor)</th>
<th>Website</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>JMI Laboratories</td>
<td><a href="http://jmilabs.com/default.cfm">http://jmilabs.com/default.cfm</a></td>
<td>One of the leaders in antimicrobial testing. Posters and abstracts that they have presented are on this website under the Scientific presentations website but are difficult to search for a particular resistance pattern.</td>
</tr>
</tbody>
</table>
An antimicrobial stewardship can be implemented in any facility regardless of resources
  ◦ May just need to start small

Must be interdisciplinary

If you work through these steps, you will be right on target
Contributors

- Jae Wu Carpenter, PharmD
- Arlette Roques MSN, RN, PHN
- Leigh Ann Keeton, PharmD
- Karen Michaels, PharmD
- Mehran Mahdavi, Pharm D, BCOP
- Brenda Egan, PharmD, BCPS
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