Houston Antimicrobial Stewardship Symposium

Acute Care
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Infectious Diseases Pharmacist, Gulf Coast Division
Parallon®
Overview

• Why antimicrobial stewardship is needed
• Guidelines for implementing ASPs in hospitals
• Survey results: State of ASPs in US hospitals
• Barriers to implementing ASPs
• HCA® enterprise wide launch of AMP
  – Experience in Gulf Coast Division
Why ASPs Are Needed

• Antibiotics are commonly misused
• Misuse of antibiotics is associated with negative consequences
• Antimicrobial stewardship programs aim to improve antibiotic use
• Plenty of resources on implementing ASP
• Many barriers still exist
## ASP Implementation

### Multidisciplinary antimicrobial stewardship team

<table>
<thead>
<tr>
<th>Core Strategies</th>
<th>Supplemental</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Prospective audit with interventions and feedback</td>
<td>• Education</td>
</tr>
<tr>
<td>• Formulary restriction and preauthorization</td>
<td>• Guidelines and clinical pathways</td>
</tr>
<tr>
<td></td>
<td>• Antimicrobial order Forms</td>
</tr>
<tr>
<td></td>
<td>• Streamlining (de-escalation)</td>
</tr>
<tr>
<td></td>
<td>• Dose optimization</td>
</tr>
<tr>
<td></td>
<td>• IV to PO conversion</td>
</tr>
</tbody>
</table>

# CDC Core Elements of Hospital ASP

<table>
<thead>
<tr>
<th>Element</th>
<th>Role/Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership commitment</td>
<td>Dedicating necessary resources</td>
</tr>
<tr>
<td>Accountability</td>
<td>Physician leader</td>
</tr>
<tr>
<td>Drug expertise</td>
<td>Pharmacist leader</td>
</tr>
<tr>
<td>Action</td>
<td>Implement at least one recommended action</td>
</tr>
<tr>
<td>Tracking</td>
<td>Monitoring prescribing and resistance</td>
</tr>
<tr>
<td>Reporting</td>
<td>Regular reporting</td>
</tr>
<tr>
<td>Education</td>
<td>Educate clinicians about resistance and optimal prescribing</td>
</tr>
</tbody>
</table>

http://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html
Implementation of ASP in US Hospitals

<table>
<thead>
<tr>
<th>Time</th>
<th>IDSA EIN</th>
<th>IDSA EIN</th>
<th>NHSN Hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responses</td>
<td>502 (73%)</td>
<td>522 (50%)</td>
<td>1,015 (30%)</td>
</tr>
</tbody>
</table>

Clin Infect Dis. 2004;38:934-8
Infect Control Hosp Epidemiol. 2011;32:367-374
Infect Control Hosp Epidemiol. 2014;00:1-4
Implementation of ASP in US Hospitals

% of US Hospitals with Activity

- Antibiograms: 83%
- Restricted agents: 65%
- Stop orders: 51%
- Indication required: 23%
- Prior approval: 35%
- Audit and feedback: 34%

Adapted from Infect Control Hosp Epidemiol. 2014;00:1-4
## Implementation of ASP in US Hospitals

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Yes (N = 652)</th>
<th>No (N = 363)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beds (n = 984)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 200</td>
<td>296 (47)</td>
<td>241 (69)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>201-500</td>
<td>260 (41)</td>
<td>86 (25)</td>
<td></td>
</tr>
<tr>
<td>&gt; 500</td>
<td>79 (12)</td>
<td>22 (6)</td>
<td></td>
</tr>
<tr>
<td><strong>Setting (n = 1,009)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>202 (31)</td>
<td>61 (17)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Suburban</td>
<td>234 (36)</td>
<td>100 (28)</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>213 (33)</td>
<td>199 (55)</td>
<td></td>
</tr>
<tr>
<td><strong>Teaching status (n = 725)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>204 (44)</td>
<td>64 (25)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No</td>
<td>262 (56)</td>
<td>195 (75)</td>
<td></td>
</tr>
<tr>
<td><strong>Shares/pools IP resources (n = 1,002)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>207 (32)</td>
<td>88 (24)</td>
<td>0.009</td>
</tr>
<tr>
<td>No</td>
<td>435 (68)</td>
<td>272 (76)</td>
<td></td>
</tr>
<tr>
<td><strong>Full time MD Epidemiologist (n = 934)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>198 (33)</td>
<td>78 (23)</td>
<td>0.001</td>
</tr>
<tr>
<td>No</td>
<td>395 (67)</td>
<td>263 (77)</td>
<td></td>
</tr>
</tbody>
</table>

Adapted from Infect Control Hosp Epidemiol. 2014;00:1-4
Barriers

- Lack of resources
  - Administrators want to see a return on investment
  - Physician and pharmacist availability
  - MD willingness to participate
    - Lack of time
    - Lack of compensation
    - Fear of antagonizing colleagues
  - Others members of ASP team
    - Infection control practitioners and microbiologist less frequently included (33%) as core members
  - Funding
  - IT resources

Infect Control Hosp Epidemiol 2011;32:367-374
### Opposing Priorities

Data that would be most useful in convincing clinicians and administrators to support antimicrobial stewardship programs

![Graph showing criteria for review by ASP](image)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>N, (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High cost</td>
<td>215 (87)</td>
</tr>
<tr>
<td>Potential for misuse</td>
<td>166 (67)</td>
</tr>
<tr>
<td>Broad spectrum</td>
<td>141 (57)</td>
</tr>
<tr>
<td>High-use agents</td>
<td>128 (52)</td>
</tr>
</tbody>
</table>

Infect Control Hosp Epidemiol 2011;32:367-374
Barriers

• Clinical/Knowledge Base
  – Consistency between stewardship and ID recommendations
  – Lack of appreciation for development of drug resistance

• Diagnostics
  – Cultures are not always helpful
  – Perception that there are greater risks in using targeted therapy
  – Need more sensitive and specific tests
Barriers

• Fragmented healthcare system
  – Influx of patients from other healthcare settings
  – Medical information does not follow the patient

• Culture
  – Antimicrobial stewardship is not a priority
  – Perceived loss of prescriber autonomy
  – Opposition to change from administrators and/or prescribers
Barriers for Community Hospitals

- Less support than university hospitals
- Less likely to report that any type of outcomes data would help convince administrators
- Less likely to pay pharmacists and physicians
- Community hospitals more likely to use audit and feedback
- Most studies of ASPs have been conducted at larger academic centers

Infect Control Hosp Epidemiol 2011;32:367-374
## Resources at Community Hospitals

<table>
<thead>
<tr>
<th>Resources</th>
<th>Respondents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection control committee</td>
<td>80.0</td>
</tr>
<tr>
<td>Microbiology laboratory</td>
<td>78.3</td>
</tr>
<tr>
<td>Hospitalists</td>
<td>73.4</td>
</tr>
<tr>
<td>ID specialist</td>
<td>58.8</td>
</tr>
<tr>
<td>Clinical pharmacy program</td>
<td>55.0</td>
</tr>
<tr>
<td>Pharmacy clinical coordinator</td>
<td>44.1</td>
</tr>
<tr>
<td>Intensivists</td>
<td>39.0</td>
</tr>
<tr>
<td>Antimicrobial subcommittee</td>
<td>15.4</td>
</tr>
<tr>
<td>ID pharmacist</td>
<td>7.0</td>
</tr>
<tr>
<td>Other</td>
<td>5.7</td>
</tr>
<tr>
<td>Point person for program</td>
<td></td>
</tr>
<tr>
<td>Pharmacist</td>
<td>64.0</td>
</tr>
<tr>
<td>Physician</td>
<td>5.2</td>
</tr>
<tr>
<td>Nurse</td>
<td>1.7</td>
</tr>
<tr>
<td>Other</td>
<td>0.4</td>
</tr>
<tr>
<td>None identified</td>
<td>28.3</td>
</tr>
<tr>
<td>Antibiogram</td>
<td>92.7</td>
</tr>
<tr>
<td>Unit breakout</td>
<td>12.1</td>
</tr>
<tr>
<td>Antimicrobial restriction program (at least 1 agent)</td>
<td>60.0</td>
</tr>
<tr>
<td>Intravenous to oral program</td>
<td>72.0</td>
</tr>
<tr>
<td>Dose-optimization program</td>
<td>55.7</td>
</tr>
</tbody>
</table>

Clin Infect Dis. 2011;53(S1):S8-S14
Company Background

• Hospital Corporation of America® (HCA®)
  – 165 hospitals in 20 states and England
  – 200K employees
  – 14 Divisions within the States
  – Partners with Parallon® for shared services
  – Gulf Coast Division
    • 3 markets
      – Houston, Corpus Christi, Rio Grande Valley
    • 10 acute care hospitals
    • 2 specialty hospitals
## AMP Implementation Phases

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Getting Started</strong></td>
<td><strong>Foundational Work</strong></td>
<td><strong>Clinical Care Competencies</strong></td>
<td><strong>Advancing the Program</strong></td>
</tr>
</tbody>
</table>

### Phase 1: Getting Started
- MD/ PharmD Champion
- Pharmacist lead
- Multidisciplinary team
- Gap Assessment
- Assess staff resources
- Complete Action Plan
- Sample AMP policy
- Competency/Training Planning
- Communication Plan for facility
- CEO support for AMP by approval of gap and action plan

### Phase 2: Foundational Work
- Antimicrobial formulary review
- Review metrics (DDD Spreadsheet)
- Review CAP and SCIP core measure
- Dose optimization
  - Weight-based dosing
  - Renal dosing
  - IV to PO
- Kinetic dosing
- Approve institutional guidelines
- Microbiology
- Appropriate use of antibiotics based on approved institutional guidelines
  - Optimize duration based on EBM
  - Evaluate use based on local needs (front/back-end approach)
- Clinical pharmacy rounding with team

### Phase 3: Clinical Care Competencies
- De-escalation
  - Suggestions: review charts with positive blood cultures, 3 or more antibiotics for ≥72 hours, drug-bug mismatches, or antibiotics without a positive culture
- Rapid diagnostics
- Procalcitonin
- Ongoing antibiogram development (e.g. unit specific)
- Report approved metrics to all stakeholders on a regular basis
Welcome to the AMP Implementation Resource Center

Antimicrobial misuse undermines effective patient outcomes, increases antimicrobial resistance, and increases pharmacy cost. In response, the Antimicrobial Management Program combines active medication management with infectious disease prevention for decreased development and transmission of multi-drug resistant organisms.

This page will serve as a checklist to follow as you implement AMP at your facility. Follow the steps as you progress through each phase, using the links where necessary to access facilitation resources along the way. Resources in the orange sections provide general reference throughout the Program.

Where Do I Start?

- Read the AMP Coaching Call Summary to review agendas and materials for previous coaching calls.
- Review the AMP Introduction to learn more about AMP goals and methodology.
- Review the AMP Process Diagram.
- Review the AMP Phases and Timeline presentation for a phase-level process overview.
- Open and print the implementation checklist to follow as you advance through the Program.
- E-mail the AMP Group Mailbox with any questions or suggestions.

Phase 1 – Getting Started Steps and Resources

- Identify Physician Champion and Pharmacy Lead
- Multidisciplinary Team Responsibilities
- Complete Gap Assessment

Phase 3 – Clinical Care Optimization Steps and Resources

- Complete Kinetic Dosing Training
- Approve Institutional Guidelines
- Timely and Appropriate Antibiotic Use Based on Approved Institutional Guidelines
- Microbiology and Infection Prevention Metrics
- Optimize Duration per FCM
- Evaluate Antimicrobial Use Based on Local Needs
  - Evaluate Stewardship Strategy
  - Clinical Pharmacy Rounding with Team
  - Toolkit for Implementing CLSI 2011 MEC Breakpoints (bps)

Phase 4 – Advanced Program Steps and Resources

- De-escalation
- Review and/or Implement Rapid Diagnostics, Point of Care Testing, and Biomarkers for Appropriate Use
- Pneumococcal
- Ongoing Antibiotic Development
- Report Approved Metrics to all Stakeholders on Regular Basis

Surveys and Results

- Director of Pharmacy Survey – April, 2011
- Microbiology Survey – 2011
- AMP July 2011 Dashboard

Other Resources

- MIP ID
- Society of Infectious Diseases Pharmacists
- IDSA Guidelines
- ASHP Antimicrobial Stewardship
- CDC Antimicrobial Resistance
AMP in Gulf Coast Division: 2012-present

Challenges

- **Culture/Awareness**
  - Administrators
  - Medical staff

- **Personnel**
  - Pharmacist time
  - RX expertise in ID
  - AMP MD

- **Operational**
  - AMP committees lacking
  - Core strategies lacking
  - PD dosing lacking
  - Guidelines lacking

Strategies

- Presentations to C-suites
- Presentations to Medical Staff
- Remote AMP reviews
- Education/training
- Moved pharmacist to the floors
- New job descriptions and expectations
- Recruited new pharmacists
- ID MD in consultant roles
- Utilized non-ID MD as proponents
- Antibiograms & resistance trends
- Formulary reviews
- Division support to implement PD dosing and treatment guidelines
- Antibiotic use monitoring at all sites
- AMP report at P&T and other committees
- Review and feedback on select drugs
GCD Antibiotic Use 2013 vs 2014

Antibiotic Use/1K Acute Patient Days

Defined Daily Doses

- MMC
- BSEH
- KWMC
- VRMC
- CRMC
- RGRH
- CLRMC
- CCMC
- WHMC

2013 | 2014
---|---
MMC | BSEH | KWMC | VRMC | CRMC | RGRH | CLRMC | CCMC | WHMC
1400 | 1200 | 1100 | 1000 | 900 | 800 | 700 | 600 | 500
AMP: The Road Ahead at HCA®

• Alignment with company goals and national PCAST direction
  – Regular updates to leadership
• Enterprise multidisciplinary continuing education
• Real time clinical surveillance
  – Patient-centric/clinical metrics
• Rapid diagnostics
• Data sharing and benchmarking
  – CDC NHSN AUR
  – Point prevalence study
Conclusion

• Antimicrobial stewardship is imperative
• Guidance on implementation is available
• Resources are often lacking and many barriers exist
• Have to find ways to improve antibiotic use with the resources we have
• City wide antimicrobial stewardship initiative can help breakdown barriers
Gulf Coast Division Successes
West Houston Medical Center

- Full service community hospital, in 2014:
  - ER visits
    - 48,686 (133/day)
  - Admissions
    - 12,866 (35/day)
  - Surgeries
    - 8,484 (23/day)
  - Daily census
    - 190

- Medical Staff
  - Hospitalist program
  - Private practitioners

- Barriers to ASP
  - 1 clinical pharmacist
  - No PG or ID training

- Positives
  - CMO is ID MD
    - Upon initiation of AMP
  - Chosen as pilot site for corporate ASP initiative
  - Strong P&T
  - Strong micro lab
  - Strong infection control
AMP pilot site
1 RX and CMO

RX ID certification

CMO leaves
+2 RX ID certifications

35% decrease

New ICU group pro AMP
+4 RX on units
Focus on duration and transition from ICU

IV to PO, renal dosing

Prospective review and feedback

18% decrease

2009  2010  2011-2012  2013  2014
Conroe Regional Medical Center

- Full service hospital & regional tertiary referral center (level III trauma), in 2014
  - ER visits
    • 53,854 (148/day)
  - Admissions
    • 15,335 (42/day)
  - Surgeries
    • 8,674 (24/day)
  - Daily census
    • 213
- Medical Staff
  - Community teaching
    • Residency program
  - Hospitalist program
  - Private MD
- Barriers
  - No ID RX
  - 1 PGY1 trained RX
  - Several ID MD’s but no ASP MD
- Positives
  - Engaged P&T chair (head of residency program)
  - Engaged senior intensivist
  - Strong infection control and micro
Conroe Regional Med Center

- IV to PO, Renal dosing, PK consults
- ABX use decreased 15% in 2014 vs 2013
- 2 Unit based RX (ICU, IMU)
- Remote ASP reviews
- AMP at Med Staff & Family Practice
- AMP policy approved
- ICU MD unofficial ASP MD
- PCT algorithm ICU

Graph showing interventions over time with key interventions and decreases in ABX use.
Rio Grande Regional Hospital

• Full service hospital & level III trauma center, in 2014
  – ER visits
    • 56,084 (154/day)
  – Admissions
    • 14,323 (39/day)
  – Surgeries
    • 12,180 (33/day)
  – Daily Census
    • 168

• Medical staff
  – Hospitalist program
  – Private practitioners

• Barriers
  – No ID trained RX
  – 1 PGY1 trained RX
  – Difficult to recruit region
  – Competing ID MD groups
  – No paid ASP ID MD
  – Proximity to border with Mexico
    • Over the counter access to antibiotics

• Positives
  – P&T chair is ID MD
Remote ASP reviews (non-ICU)

ASP Report at all Med Staff meetings +1 Unit based RX

ABX Use decreased 15% in 2014 vs 2013

IV to PO, Renal dosing, PK Consults

DDD/1K APD

Interventions (#)
Rio Grande Regional Hospital

Piperacillin/tazobactam 24% decrease in 2014 vs 2013

DDD/1K APD

2013
2014
2015

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec