CE IN THE MIDDAY

Improving Patient Outcomes with Effective Antimicrobial Stewardship Programs

Kevin W. Garey, Pharm.D., M.S., FASHP
Professor and Chair
Department of Pharmacy Practice and Translational Research
University of Houston College of Pharmacy
Houston, Texas

Developed in collaboration with Ed Septimus, M.D., FACP, FIDSA, FSHEA, Medical Director, Infection Prevention and Epidemiology, Clinical Services Group, HCA Healthcare System; Professor, Internal Medicine, Texas A&M College of Medicine, Houston, Texas

This activity is sponsored and planned by the American Society of Health-System Pharmacists (ASHP).

Supported by an educational grant from Merck

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Learning Objectives

• Select specific clinical areas that Antimicrobial Stewardship Programs (ASPs) are useful for combating antimicrobial resistance and decreasing the spread of resistant infections.
• Outline national initiatives that are directly influencing the role of ASPs.
• Provide specific examples of the bundled approach to ASPs.
• Recommend clinical interventions for ASPs that can be implemented in various pharmacy practice models.

Disclosures

• All faculty and planners report no financial relationships relevant to this activity.

Background

• President’s Executive Order and National Strategy (Sep 2014)
• PCAST Report to the President (Sep 2014)
• National Action Plan for Combating Antibiotic-Resistant Bacteria (CARB) (Mar 2015)

Proposed Policy Changes

• Strengthen antibiotic stewardship in inpatient, outpatient, and long-term care settings
  – Alignment with CDC Core Elements
  – Compliance with Conditions of Participation and The Joint Commission (TJC) Accreditation requirements
• Implement annual reporting of antibiotic use in inpatient and outpatient settings and identify variation at geographic, provider, and patient levels
• Establish and improve antibiotic stewardship programs across all healthcare settings
• Reduce inappropriate antibiotic use by 50% in outpatient settings and 20% in inpatient settings
• Establish State Antibiotic Resistance (AR) Prevention (Protect) Programs in all 50 states
Core Elements for Antibiotic Stewardship Programs

- Leadership commitment from administration
- Single leader responsible for outcomes
- Single pharmacy leader
- Antibiotic use tracking
- Regular reporting on antibiotic use and resistance
- Educating providers on use and resistance
- Specific improvement interventions

Leadership Commitment

- There should be a formal expression of support for the stewardship program from the facility administration.
- Leadership must ensure that staff have necessary time, education/competencies and resources to implement the stewardship program.

Program Leadership

- There should be a designated leader of the antibiotic stewardship program.
- Physicians have proven very effective in this role.
  - Prescribing is a medical staff function
  - Often an ID physician, but others have filled this role, especially in hospitals with no ID physicians.
- Leadership by committee is not as effective.

Pharmacy Leadership

- Pharmacy leadership is consistently identified as a must for stewardship in hospitals.
- Pharmacists often play a lead role in implementing improvement interventions and monitoring antibiotic use. Should have some training in infectious diseases. (e.g. MAD-ID)
- Many programs are co-lead by a physician and pharmacist.

Question
What core element do you think has made the most difference?

a. Leadership commitment from administration.
b. Educating providers on use and resistance.
c. Single leader responsible for outcomes.
d. Regular reporting on antibiotic use and resistance.
e. None of the above.
Policy Changes continued

- Creation of a regional public health network for resistance testing
- Routine reporting of antibiotic use and resistance data to NHSN by 95% of Medicare-eligible hospitals, DOD, and VA healthcare facilities
- Enhance reporting infrastructure and provide incentives
  - Require reporting to NHSN as part of CMS IQR (Inpatient quality report)
  - CDC has new measure SAAR (Standard Antimicrobial Administration Ratio)- NQF endorsed
- Add electronic reporting of antibiotic use and resistance data to Stage 3 Meaningful Use for EHR systems
  - CDC and partners will submit an antibiotic utilization (AU) electronic clinical quality NHSN-reporting measure to NQF and CMS

NHSN AU Measure Proposal – Patient Care Locations

Measure proposal covers antimicrobial use in 6 specified groupings of adult and pediatric patient care locations:
- Adult medical, surgical, and medical/surgical intensive care units
- Pediatric medical, surgical, and medical/surgical intensive care units
- All adult medical, medical/surgical, and surgical intensive care units and wards
- All pediatric medical, medical/surgical, and surgical intensive care units and wards

Measure proposal combines each of the 6 patient care location groupings with specified categories of antimicrobial agents. A separate SAAR is calculated for each patient care location-antimicrobial agent combination.

NHSN AU Measure Proposal: Five Antibacterial Agent Categories

High value targets for antimicrobial stewardship programs:
- Broad spectrum agents predominantly used for hospital-onset/multi-drug resistant bacteria – aminoglycosides, some carbapenem, some cephalosporins, some fluoroquinolones, penicillin β-lactam/β-lactamase inhibitor combinations, and other agents
- Broad spectrum agents predominantly used for community-acquired infection – ertapenem, some cephalosporins, and some fluoroquinolones
- Anti-MRSA agents – ceftaroline, dalbavancin, daptomycin, linezolid, oritavancin,quinupristin/dalfopristin, tedizolid, telavancin, and vancomycin (IV route only)
- Agents predominantly used for surgical site infection prophylaxis – cefazolin, ceftotetan, ceftoxitin, cefuroxime (IV route only)

Policy changes and ASP

- A LOT of attention is going to be paid to ASP in the coming years
- How should we implement these ASPs and affect change?

ASP interventions and bundled approaches
Team success

• “The ultimate difference between a company and its competition is, in fact, the ability to execute.”
- Larry Bossidy

Getting Started

• Establish a core planning committee
  – Subcommittee of Pharmacy and Therapeutics (P&T) Committee?
  – Subcommittee of Infection Control Committee?
  – Other interested stakeholders
• Establish goals and mission statement
• Draft an idea
  – Program structure
  – Program elements
• Identify existing and needed resources

Getting started (2)

• Present ideas to pharmacy director
• Vet your ideas with Chief Medical Officer (CMO) and/or key medical staff leadership
• Meet with VP for patient safety/quality
• Establish a working budget
• Write a strategic (business plan)-work with Chief Financial Officer (CFO)
• Meet with Chief Executive Officer (CEO)/Chief Operating Officer (COO) when above complete
• Present to key medical staff committees and get approval from the Executive Committee*

Antimicrobial Management Team

Multidisciplinary Team Approach to Optimizing Clinical Outcomes*

*Antimicrobial stewardship team should be physician directed or supervised

Antimicrobial Stewardship

Goals

• Improve patient outcomes
• Optimize selection, dose and duration of Rx
• Reduce adverse drug events including secondary infection (e.g., C. difficile infection)
• Reduce morbidity and mortality
• Limit emergence of antimicrobial resistance
• Reduce length of stay
• Reduce health care expenditures

How best can we achieve these goals?

Efforts to Control Resistance

- Develop new drugs and vaccines
- Improved diagnostics
- Infection prevention
- Reduced resistance reservoirs
- Research & public policy
- Education

Common Misconceptions

- If ID consultant approves or uses an antibiotic, it must be appropriate
- Retrospective data collection and analysis can result in change in behavior
- The adoption of information technology (IT) will automatically make data collection, analysis and change in behavior easy
- Restricting use of certain antibiotics will reduce antibiotic misuse and overuse

Antimicrobial Stewardship Framework

- Antimicrobial Formulary Restriction
- Order Sets
- Prospective Audit with Feedback
- IV to PO conversion
- Dose Optimization
- De-escalation/streamlining
- Duration of Therapy
- Audits & Reports
- Education
- Guidelines

Measurement

- Clinical
  - Length of stay
  - Clinical cure/failure rates
  - Adverse events rates (all labs)
  - Resistant rates
  - Infection related mortality
  - C. Diff infections
- Process
  - Dose optimization
  - Adherence to hospital specific guidelines
  - Appropriate de-escalation/streamlining
  - Appropriateness of therapy
  - Cultures before antibiotics
- Outcomes
  - Humanistic
    - Adverse drug events avoided
    - Time to receipt of appropriate antimicrobials
    - Duration of antimicrobial therapy
    - IV/PO conversion rates
    - Inpatient intravenous therapy rates
  - Economic
    - Antimicrobial utilization (DDD or DOT)
    - Hospital wide antimicrobial expenditures
    - Relative consumption
    - Rate of nonformulary antimicrobial use
    - Nonformulary agents avoided

Challenges

- Literature often not clear in Infectious Diseases
- Everyone thinks they know how to use antibiotics
- Providers perceive autonomy is lost
- Medicolegal implications of responsibility for patients
- Difficulty proving impact of program (national measures)
- Financial pressures dictating decisions
  - Pharmaceutical manufacturers
  - Hospitals
  - Payers (insurance companies/centers for medicare & medicaid services (CMS))
  - Patients

The Challenge

- How to initiate and improve antibiotic stewardship efforts
- Proving that it works
  - Clinical outcomes
  - Decrease resistance
- Changing the antibiotic prescribing culture
- Hardwiring the process
- Continuing to show financial benefit to maintain funding and support of efforts
**Physician Barriers**
- Physician accountability and acceptance of need for improvement
- Misperceptions
- Misalignment of incentives
- Lack of definition of appropriate use of antimicrobial agents
- Lack of standardized, risk-adjusted measures
- Adaptive/behavioral changes needed to change prescribing practices

**Changing Prescriber Behavior**
- Engagement of senior physician leadership (clinical and administrative) is critical
- Address stewardship message to the clinical leadership within existing clinical groups (rather than just the trainees or the ID doctors) physician to physician
- ID should not be excluded from stewardship process
- Understand local culture and patient population

**The Approach to the Problem Prescriber**
- Carefully plan your approach:
  - Pick your battles
  - Timing is important
  - Want home field advantage
  - Avoid heat of the moment confrontations (generate light not heat)
- Do your homework
  - Gather as much data as possible
    - DUE: Service and physician specific for several drugs
    - Interview Clinical PharmDs and discreetly other MDs
    - Discuss with CMO/Chief of staff
  - Understand the MD’s Practice and Patient Population
  - Look into the MD’s own professional literature

**IDSA/SHEA Antimicrobial Stewardship Guidelines**
- A multidisciplinary ASP team should include an ID physician and pharmacist and other key stakeholders as determined by the institution
- Two core strategies were recommended
  - Prospective audit with intervention and feedback
  - Formulary restriction and preauthorization
- Other recommended strategies
  - Education
  - Guidelines and clinical pathways
  - Order forms
  - De-escalation
  - Dose optimization
  - IV to PO conversion

**Antibiotic Time Out**
- Trigger tool to stop and reassess antibiotic therapy
- Targeted at all providers for Med/Surg patients
- Guided assessment at 72 hr
- Treatment duration recommendations included for key infections

**Design of a ‘day 3 bundle’ to improve the reassessment of inpatient empirical prescriptions**

1. Review diagnosis
2. Antibiotic plan including duration
3. Adaptation to microbiology
4. IV to PO switch


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De-escalation of Therapy

**Advantages**
- Allows initial use of broad-spectrum therapy
- Narrows therapy when appropriate
- May influence future prescribing behavior
- Decreases inappropriate use of antimicrobials
- Reduces adverse events
- May save money overall

**Disadvantages**
- Prescribers may be reluctant to change therapy if the patient is doing well
- If not done correctly, may narrow therapy “inappropriately”

De-escalation: Lessons learned

The most common reasons for not de-escalating:
- Lack of conclusive microbiology results
  - Continued use of broad-spectrum antimicrobial therapy
- Diagnostic uncertainty
  - Treatment of fever, colonization and/or contamination
- Insecurity
  - Treatment of noninfectious syndrome associated with fever
- Duration longer than necessary

Microbiology Stewardship

Obtain Cultures Prior to Starting Antibiotics!

- Develop a process to ensure cultures are properly and consistently ordered
- Develop a process to ensure cultures are properly and consistently obtained
- Develop processes to ensure cultures are properly and promptly transported and processed
- Develop standards for and assess reliability of processes for ordering and obtaining a culture

Case

- 64 y/o female admitted for weakness, fever, incontinence, and syncope. 10 days PTA patient was seen by local MD for flank pain and dysuria. She was diagnosed with probable pyelonephritis and started on PO ciprofloxacin. Over the week she became weaker, had decreased appetite, and developed fever. She was triaged on 8-17 at 1900
- PMH of recurrent UTIs-last hospitalized 6 months earlier with pyelonephritis. She has DM, HTN, and hyperlipidemia (HLD)

Case continued

- On admission she was hypotensive with BP 60/40 mm Hg, T 101°F , Pulse 140, RR 24, weight 60 kg
  - HEENT normal
  - Lungs CTA, no murmur
  - Left sided CVA tenderness, BS+
  - Neuro intact
- Laboratory
  - WBC 21,000/µL, 40B, platelets 274,000/µL, HB 8.5 g/dL
  - PT/PTT 24.6/51.7
  - Creatinine 6.2 mg/dL (was 1.2mg/dL 6 months ago), HCO3 16mmol/L, pH 7.2
  - u/a pyuria and bacteriuria, nitrite negative, negative ketones
  - ALT 28 U/L, alb 2 g/dL, lactate 4 mg/dL, glucose 48 mg/dL
- Imaging
  - CXR clear

Question

What antimicrobial would you prescribe?

- a. Aminoglycoside.
- b. Broad-spectrum cephalosporin.
- c. Carbapenem.
- d. Fluoroquinolone.
- e. None of the above.
Case: And now the rest of the story

- First 8 hours:
  - Given 2 liters in first hour still hypotensive and norepinephrine was started
  - Blood cultures drawn 2120 on 8:17
  - Urine culture sent 2150 on 8:17
  - Ciprofloxacin given at 2130 on 8:17
  - Repeat glucose 127 mg/dL, plat ↓ 83,000, WBC ↓ 9900
  - Lactate 4 → 7.6 → 15.9 mg/dL
  - Platelet 83,000 → 45,000 → 13,000/µL
  - ALT 57 → 2518 U/L
- Blood and urine *E. coli* R-amp, amp/sulb, fluoroquinolones (FQ) at 48 hours

Risk Factors for FQ Resistance

- Hospitalization in previous 12 months  OR
- FQ use in previous 12 months  OR
- Prior documented FQ-resistant organism

Key Takeaways

- CMS and TJC are developing guidance for accreditation related to demonstrating an effective ASP, including developing publicly reportable measures
- Antimicrobial resistance is an urgent public health and patient safety concern
- Know your local epidemiology
- All stakeholders need to be engaged across the continuum of care, including consumers

A pessimist sees the difficulty in every opportunity, an optimist sees the opportunity in every difficulty

Winston Churchill

What is the best use of pharmacists for ASP activities?

There is without a doubt going to be a lot of attention paid to antimicrobial stewardship!
There are two ways pharmacy is adapting to the need for more ASP

Congratulations, you are all now doing ASP activities!!

I am an ASP superhero

Pros and Cons of both approaches

1. Lots of personnel (interventions)
2. Usually not specialty trained
3. High-level interventions may not be possible

1. Limited number of personnel (limited interventions)
2. Usually specialty trained (PGY2/3)
3. High-level interventions possible

So, I just hired my superhero, new ID pharmacist. What should they do?

• You should take inspiration from James Bond, of course

The United Kingdom was very serious about controlling MRSA and CDI during the last decade

• Mandatory reporting of MRSA and CDI rates with financial penalties
• 12 million pound investment in pharmacy to monitor and control anti-infectives
• 77% reduction in CDI cases (41% reduction in MRSA infections)
• How did they spend this money?
  – Pharmacy personnel!

UK Antimicrobial resistance strategy

<table>
<thead>
<tr>
<th>Number</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Better access to and use of surveillance data</td>
</tr>
<tr>
<td>2</td>
<td>Optimizing prescribing practice</td>
</tr>
<tr>
<td>3</td>
<td>Improving infection prevention and control</td>
</tr>
<tr>
<td>4</td>
<td>Improving professional education, training, and public engagement</td>
</tr>
<tr>
<td>5</td>
<td>Improving the evidence base through research</td>
</tr>
<tr>
<td>6</td>
<td>Developing new drugs, vaccines, and diagnostics</td>
</tr>
<tr>
<td>7</td>
<td>Strengthening UK and international collaborations</td>
</tr>
</tbody>
</table>

National Groups Responsible for Stewardship

Scottish Antimicrobial Prescribing Group (SAPG)
English Surveillance Program Antimicrobial Utilization and Resistance (ESPAUR)
Welsh Antimicrobial Resistance Program Surveillance Unit (WARP SU)
Antimicrobial Resistance Action Committee (ARAC)

Hospitals then report to each respective national group

What were the resulting job responsibilities of these ID pharmacists?

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence-based prescribing guidelines and prescribing policies (use technology/smartphone ‘apps’, others)</td>
<td>1</td>
</tr>
<tr>
<td>Education (prescribers, pharmacy and nursing staff). Mandatory induction training for all staff</td>
<td>2</td>
</tr>
<tr>
<td>Providing a clinical advice service (pager or app) and input on multidisciplinary infection ward rounds</td>
<td>3</td>
</tr>
<tr>
<td>Advising on therapeutic drug monitoring for antimicrobials</td>
<td>4</td>
</tr>
<tr>
<td>Monitoring and feedback of trends in antimicrobial prescribing to clinical teams and governance structures.</td>
<td>5</td>
</tr>
<tr>
<td>Managing entry of new antimicrobials onto hospital formularies</td>
<td>6</td>
</tr>
<tr>
<td>Clinical research both in drug registration studies and consolidating the evidence base around antimicrobial stewardship</td>
<td>7</td>
</tr>
</tbody>
</table>

Approximately one Full Time-ASP pharmacist per 7.76 inpatient beds (approximately 3% of all pharmacists).

Ok, I can model my ID Pharm.D. off of the UK model. What evidence exists in the U.S. that the superstar ID Pharm.D. is worth the money?

Multicenter study recommending discontinuation of inappropriate antibiotics

![Antibiotic use went down](image1)

<table>
<thead>
<tr>
<th>Antibiotic use went down</th>
<th>Antibiotic use went up</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASP-hospital 1</td>
<td>ASP-hospital 2</td>
</tr>
<tr>
<td>No ASP-hospital 1</td>
<td>No ASP-hospital 2</td>
</tr>
</tbody>
</table>

Pre-intervention | Post-intervention


Why did intervention work at some hospitals but not others?

<table>
<thead>
<tr>
<th>Antibiotic use went down hospitals</th>
<th>Antibiotic use went up hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID physician evaluation of selected broad spectrum antibiotics</td>
<td></td>
</tr>
<tr>
<td>Researcher from academia and hospitals with active ASP</td>
<td>Researcher from academia and hospitals without active ASP</td>
</tr>
<tr>
<td>Improved results in hospitals with &quot;stewardship program, might support the common belief that changing antimicrobial use in hospitals may take months as prescribers &quot;buy into&quot; the process.&quot;</td>
<td></td>
</tr>
<tr>
<td>Number of cases identified for interventions were higher</td>
<td>Number of cases identified for interventions were lower</td>
</tr>
<tr>
<td>&quot;For example, intervention on broad-spectrum agents may not be the best target for stewardship programs that are just getting started if their goal is to show a reduction in antimicrobial use&quot;</td>
<td></td>
</tr>
<tr>
<td>ASP included &quot;money for ID physician and pharmacists salary&quot;</td>
<td>No active ASP at these hospitals</td>
</tr>
</tbody>
</table>

Supported and led by CDC Prevention Epicenter group


However, let’s not totally drink this Kool-aid! Still lots of work to be done:

Qualitative study of 19 Australian pharmacists with ASP activities

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes toward significance of antibiotic use in hospitals and the threat of resistance</td>
<td>Divergent views on significance of antibiotic use and resistance Optimizing antibiotics relatively low priority in day to day work flow</td>
</tr>
<tr>
<td>Capacity for pharmacy to influence is limited</td>
<td>Divergent perspectives on pharmacy's responsibilities Lack of capacity to enforce given prescribing power of others</td>
</tr>
<tr>
<td>Inter-professional and organizational barriers to enact change</td>
<td>Junior prescribers present, senior prescriber advisors not</td>
</tr>
</tbody>
</table>


My hospital has not invested in an ASP pharmacist. What should I do?

My advice: Bundle!
• Every good intervention needs a champion.
• Without the ID champion in pharmacy, you will need to find your champion outside the pharmacy department most likely!
• A bundle that includes infection control / infectious diseases / environmental services could provide you with that champion.

Clinical studies examining CDI bundles

<table>
<thead>
<tr>
<th>Study</th>
<th>CDI setting</th>
<th>Population</th>
<th>Control bundle</th>
<th>Effect size (Before/after)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bishop 2013</td>
<td>Endemic</td>
<td>Surgical inpatients (17,145)</td>
<td>Resident rounding, hand hygiene, stop PPI, ASP</td>
<td>1.8/1000 pd 1.8/1000 pd</td>
</tr>
<tr>
<td>Koll, 2013</td>
<td>Endemic</td>
<td>Adult inpatients (14,591)</td>
<td>Contact precautions, hand hygiene, isolation, environmental cleaning</td>
<td>12/10,000 hosp 8/10,000 hosp</td>
</tr>
<tr>
<td>Abbott, 2009</td>
<td>Endemic</td>
<td>Adult inpatients (881)</td>
<td>Contact precautions, hand hygiene, EVS, vancomycin for Rx</td>
<td>1.1/1000 pd 0.66/1000 pd</td>
</tr>
<tr>
<td>Salgado, 2009</td>
<td>Epidemic</td>
<td>Adult inpatients</td>
<td>Contact precautions, EVS, hand hygiene</td>
<td>1.8/1000 pd 1.2/1000 pd</td>
</tr>
<tr>
<td>Weiss, 2009</td>
<td>Epidemic</td>
<td>Adult inpatients</td>
<td>EVS, contact isolation, ASP</td>
<td>37.3/1000 pd 14.5/1000 pd</td>
</tr>
<tr>
<td>Muto 2007</td>
<td>Epidemic</td>
<td>Adult inpatients</td>
<td>EVS hand hygiene, contact isolation, ASP</td>
<td>7.2/1000 pd 1.0/1000 pd</td>
</tr>
</tbody>
</table>

PPI=proton pump inhibitor; EVS=Environmental services

A lot of studies have investigated CDI rates after an intervention to control anti-infectives

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Stewardship method</th>
<th>*Pre-intervention</th>
<th>*Post-intervention</th>
<th>Reduction in CDI rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>US</td>
<td>Restrictive use</td>
<td>15.4</td>
<td>1.9</td>
<td>88%</td>
</tr>
<tr>
<td>1997</td>
<td>UK</td>
<td>Restrictive use</td>
<td>5.3</td>
<td>2.3</td>
<td>57%</td>
</tr>
<tr>
<td>1998</td>
<td>US</td>
<td>Restrictive use</td>
<td>11.5</td>
<td>3.3</td>
<td>71%</td>
</tr>
<tr>
<td>2001</td>
<td>UK</td>
<td>Restrictive use</td>
<td>14.6</td>
<td>3.4</td>
<td>77%</td>
</tr>
<tr>
<td>2003</td>
<td>US</td>
<td>Prospective audit and feedback</td>
<td>2.2</td>
<td>0.3</td>
<td>86%</td>
</tr>
<tr>
<td>2004</td>
<td>UK</td>
<td>Restrictive use</td>
<td>46</td>
<td>22</td>
<td>52%</td>
</tr>
<tr>
<td>2004</td>
<td>US</td>
<td>Restrictive use</td>
<td>1.32</td>
<td>0.51</td>
<td>61%</td>
</tr>
<tr>
<td>2007</td>
<td>UK</td>
<td>Prospective audit and feedback</td>
<td>NR</td>
<td>NR</td>
<td>65%</td>
</tr>
<tr>
<td>2007</td>
<td>Canada</td>
<td>Restrictive use</td>
<td>2.03</td>
<td>0.82</td>
<td>60%</td>
</tr>
<tr>
<td>2011</td>
<td>UK</td>
<td>Restrictive use</td>
<td>2.22</td>
<td>0.45</td>
<td>80%</td>
</tr>
<tr>
<td>2012</td>
<td>Canada</td>
<td>Prospective audit and feedback</td>
<td>1.12</td>
<td>0.71</td>
<td>37%</td>
</tr>
<tr>
<td>2013</td>
<td>UK</td>
<td>Restrictive use</td>
<td>2.4</td>
<td>1.2</td>
<td>50%</td>
</tr>
</tbody>
</table>

*Rate per 10,000 patients day

Meta-analysis of ASP and CDI

16 quasi-experimental or observational studies to assess relative reduction in CDI rates after implementation of an ASP

Meta-analysis of ASP and CDI

**Methods to control antimicrobial use**

- Restrictive use (formulary control)
- Prospective audit and feedback

* Somewhat draconian but takes less person power
* Any evidence to suggest it is better

Meta-analysis of ASP and CDI

When in doubt, go with a bundle!

- Task force on the management of *Acinetobacter baumannii* infection in the ICU
  - Healthcare worker (HCW) task force (microbiology, ID, and ICU) to diagnose and treat *Acinetobacter baumannii*
- Infectious disease specialist guided ASP
  - HCW task force (guided by ID specialist) reviewed all patients given antibiotics twice weekly
- ASP-led intervention for *Staphylococcus aureus* bacteremia
  - ASP-driven comprehensive care bundle reduced re-admission rates


Pharmacists don’t have to do all the same thing!

Evaluation of 290 cases of parenteral antibiotic use from two hospitals that used different ID models

<table>
<thead>
<tr>
<th>Percent of Cases</th>
<th>Infectious disease pharmacist</th>
<th>Geographic model pharmacist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empiric therapy adhered to local guidelines</td>
<td>80</td>
<td>70</td>
</tr>
<tr>
<td>Therapy modified within 24 hr if possible</td>
<td>90</td>
<td>85</td>
</tr>
<tr>
<td>Antibiotics DC’d if not needed</td>
<td>40</td>
<td>50</td>
</tr>
</tbody>
</table>

Remember though: Geographic model RPh will generally outnumber ID RPh by 97:3. I would have geographic RPh evaluate empiric therapy and ID RPh DC antibiotics that were not needed!


Including pharmacy generalists in ASP care bundles leads to good outcomes

Six-month, prospective study of 286 patients before and after a prospective audit and feedback by pharmacy generalists trained in ASP by an ID specialist.


I’m new to the ASP initiatives

- Is there a checklist I can use to help guide my set-up?

A prospective audit and feedback approach significantly decreased broad-spectrum antibiotic use in the ICU

If you are doing an audit and feedback
ASP: Include secondary outcomes!

A checklist for setting up your ASP intervention

<table>
<thead>
<tr>
<th>Rule #</th>
<th>Rule description</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Find sound innovations</td>
<td>If your stewardship team is the ‘early innovators’, give them the resources to make good decisions.</td>
</tr>
<tr>
<td>2</td>
<td>Find and support innovators</td>
<td>Provide time and resources for innovators to seek out new ideas (travel, professional meetings). Remember, innovators may not be the easiest individuals to deal with.</td>
</tr>
<tr>
<td>3</td>
<td>Invest in early adopters</td>
<td>This will usually be your ID physician and pharmacist champions.</td>
</tr>
<tr>
<td>4</td>
<td>Make early adopter activity observable</td>
<td>This is better done through a social network than formal processes (curbside consult).</td>
</tr>
<tr>
<td>5</td>
<td>Trust and enable reinvention</td>
<td>All innovations will require new local processes requiring reinvention of the innovation.</td>
</tr>
<tr>
<td>6</td>
<td>Create slack for change</td>
<td>Adoption requires energy. Make sure you give your innovation enough time to disseminate.</td>
</tr>
<tr>
<td>7</td>
<td>Lead by example</td>
<td>Leaders must be prepared to begin change with themselves.</td>
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Print this out for your next ASP intervention and fill in the blanks

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Let’s start wrapping this up!

- Antimicrobial stewardship programs are going to get more and more attention
  - Maybe not as much money as the UK but likely just as much attention
- Regardless of generalist vs. specialist pharmacy practice model, multiple interventions will work
  - Ideally, best results use specialists and generalists
- Use an ASP checklist and multidisciplinary approach to assure success

Key Takeaways

- The highest levels of government have shined the spotlight on ASP
  - This will affect boots on the ground pharmacists
- Use the practice model that works best for you to get best results!
- Get the best use of your ASP by engaging in a multidisciplinary approach