Infection Control: Reducing Antibiotic Overuse

May 26, 2016
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# TABLE OF CONTENTS

Program Summary ................................................................................................................................................................. 4  
Program Outline ....................................................................................................................................................................... 5  
Continuing Education (CE) Credit ....................................................................................................................................... 6  
Joint Commission Joins White House Effort to Reduce Antibiotic Overuse ................................................................. 7  
Antimicrobial Stewardship Toolkit Module 3: Initiating an Antimicrobial Stewardship Program ........................................... 9  
Antimicrobial Stewardship Toolkit Module 4: Creating Change: Using an Antimicrobial Stewardship Program to Improve Antimicrobial Usage .................................................................................................................. 27  
Speak Up: Antibiotics Infographic ........................................................................................................................................ 45  
Get Smart for Healthcare and Get Smart About Antibiotics Week ..................................................................................... 47  
Checklist for Core Elements of Hospital Antibiotic Stewardship Programs ........................................................................ 49  
CDC Vital Signs: Making Health Care Safer-Antibiotic Rx in Hospitals: Proceed with Caution ........................................... 52  
Appendix A: Additional Resources ........................................................................................................................................ 56  
Appendix B: Faculty Biographies ........................................................................................................................................ 57  
Appendix C: Continuing Education (CE) Accrediting Bodies .............................................................................................. 59  
Appendix D: Discipline Codes Instructions ......................................................................................................................... 60  
Appendix E: Post-Test ............................................................................................................................................................. 61  
Appendix F: JCRQSN Contact Information ......................................................................................................................... 63
Program Summary

This page provides an overview of the program content and learning objectives. Please refer to the Table of Contents and Program Outline for a detailed list of the topics covered. The information included in this Resource Guide is intended to support but not duplicate the video presentation content. There may be additional information available online for this topic.

Program Description

The Joint Commission joined representatives from more than 150 major healthcare organizations, food companies, retailers, and animal health organizations at the White House Forum on Antibiotic Stewardship to announce their commitment to implementing changes over the next five years to slow the emergence of antibiotic-resistant bacteria, detect resistant strains, preserve the efficacy of existing antibiotics, and prevent the spread of resistant infections.

This issue is a high priority for The Joint Commission because the rise of antibiotic-resistant bacteria represents a serious threat to public health. The Centers for Disease Control and Prevention (CDC) estimates at least 2 million illnesses and 23,000 deaths in the United States (U.S.) each year are caused by antibiotic-resistant bacteria, and 20% to 50% of all antibiotics prescribed in acute care hospitals in the U.S. are either unnecessary or inappropriate. Inappropriate use of antibiotics includes, but is not limited to:

• Prescribing antibiotics for viral infections.
• Using broad-spectrum antibiotics instead of narrow-spectrum antibiotics.
• Prescribing antibiotics in response to pressure from patients/family.

The Joint Commission currently has 16 standards and 1 National Patient Safety Goal (NPSG) related to antimicrobial stewardship, and has begun reviewing these standards and will be working with accredited organizations and others to identify where new standards may be needed to promote effective antibiotic stewardship. The Joint Commission will develop any new standards as rapidly as possible and simultaneously provide new tools to help providers use antibiotics judiciously.

This 60-minute program features Joint Commission experts who share the new and revised standards, as well as the accreditation process revisions—with practical, up-to-date information to help all levels of hospital staff to maintain a state of constant survey readiness.

Program Objectives

After completing this activity, the participant should be able to:

1. Explain the issues that led The Joint Commission to focus on reducing antibiotic overuse.
2. Identify the standards and NPSG related to antimicrobial stewardship.
3. Provide strategies to meet these standards.

Target Audience

This activity is relevant to those responsible for the prevention and control of infections, including managers and supervisors, along with pharmacists, training, infection control, patient safety, and quality improvement professionals.
Program Outline

Infection Control: Reducing Antibiotic Overuse
May 26, 2016

I. Introduction
   A. Program Content
   B. Objectives
   C. Faculty
II. The Issue: Antibiotic Overuse
III. Joint Commission Expectations
IV. Improving Antimicrobial Stewardship
V. Roundtable Discussion and Case Studies
VI. Conclusion
VII. Post-Program Live Question and Answer Session
   A. Audio only telephone seminar with program faculty – for 30 minutes following the program.
   B. Call 1-888-206-0090; enter conference code: 7925428.
      Or e-mail your questions or comments to: Questions@jcrqsn.com

<table>
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<tr>
<th>Program Broadcast Time</th>
<th>Eastern: 2:00 p.m. to 3:00 p.m.</th>
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<td>Mountain: 12:00 p.m. to 1:00 p.m.</td>
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<td>Pacific: 11:00 a.m. to 12:00 p.m.</td>
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Program Question and Answer Session

During the live airing of this program on May 26, 2016, you may be able to talk directly with the faculty when prompted by the program’s host. After this date, your message will be forwarded to the appropriate personnel. Immediately following the program, we invite you to join in a live discussion with the program presenters. Call 1-888-206-0090 and enter Conference Code: 7925428 to be included in the teleconference.

To submit your question ahead of time or for additional details, please send an e-mail to questions@jcrqsn.com. If you submit your questions after this date, your message will be forwarded to the appropriate personnel.

You can also receive answers to your questions by calling The Joint Commission’s Standards Interpretation Hotline at 630-792-5900, option 6.
Continuing Education (CE) Credit

After viewing the JCR Quality & Safety Network presentation and reading this Resource Guide, please complete the required online CE/CME credit activities (test and feedback form). The test measures knowledge gained and/or provides a means of self-assessment on a specific topic. The feedback form provides us with valuable information regarding your thoughts on the activity’s quality and effectiveness.

NOTE: Effective April 1, 2012, the Learning Management System web site URL changed as noted below.

Prior to the Program Presentation Day
1. Login to the JCRQSN Learning Management System web site at http://twnlms.com/
2. Enroll yourself into the program
   Note: Your administrator may have already enrolled you in the program
   • Select All Courses from the courses menu.
   • Select the course category for the current year, 2016 Programs.
   • Select the course for this program, Infection Control: Reducing Antibiotic Overuse
   • When prompted, choose Yes to confirm that you would like to enroll yourself.
3. Display and print the desired documents (Resource Guide, etc.).

Online Process for CE/CME Credit
1. Read the course materials and view the entire presentation.
2. Login to the JCRQSN Learning Management System web site at http://twnlms.com/
3. Select Infection Control: Reducing Antibiotic Overuse from the courses menu block.
   Note: This assumes you have already been enrolled in the program as described above.
4. If you didn’t view the broadcast video presentation, view it online.
5. Complete the online post test (see Appendix E).
   • You have up to three attempts to successfully complete the test with a minimum passing score of 80%.
   • Physicians must take the post test to obtain credit.
6. Complete the program feedback form.
7. On the top right corner of the main course page, you will see your completion status in the Status block.
8. Select Print Certificate from within the Status block to print your completion certificate.
Joint Commission Joins White House Effort to Reduce Antibiotic Overuse

By: Elizabeth Eaken Zhani, Media Relations Manager, The Joint Commission

As part of the White House Forum on Antibiotic Stewardship today, The Joint Commission announced its commitment today to increase its efforts to promote effective antibiotic stewardship within health care facilities.

The Joint Commission joined representatives from more than 150 major health care organizations, food companies, retailers, and animal health organizations at the forum to announce their commitment to implementing changes over the next five years to slow the emergence of antibiotic-resistant bacteria, detect resistant strains, preserve the efficacy of existing antibiotics, and prevent the spread of resistant infections.

As part of its commitment, The Joint Commission will begin by reviewing its current standards and work with accredited organizations and others to identify where new standards may be needed to promote effective antibiotic stewardship. The Joint Commission will develop any new standards as rapidly as possible and simultaneously provide new tools to help providers use antibiotics judiciously. This issue is a high priority for The Joint Commission because the rise of antibiotic-resistant bacteria represents a serious threat to public health. The Centers for Disease Control and Prevention (CDC) estimates at least 2 million illnesses and 23,000 deaths in the United States each year are caused by antibiotic-resistant bacteria, and 20 to 50 percent of all antibiotics prescribed in acute care hospitals in the United States are either unnecessary or inappropriate. Inappropriate use of antibiotics includes, but is not limited to:

- Prescribing antibiotics for viral infections
- Using broad-spectrum antibiotics instead of narrow-spectrum antibiotics
- Prescribing antibiotics in response to pressure from patients/family

“The Joint Commission knows that antibiotic stewardship is a proven method of reducing the inappropriate use of antibiotics and improving patient safety,” said Mark R. Chassin, MD, FACP, MPP, MPH, president and CEO, The Joint Commission. “We are committed to helping health care providers improve their ability to practice effective stewardship in order that the nation can both optimize the treatment of infections and reduce adverse events associated with antibiotic use.”

The Joint Commission currently has 16 standards and one National Patient Safety Goal that have a relationship to antimicrobial stewardship.

In order to ensure alignment with stewardship initiatives at the federal level, The Joint Commission will seek the input of government entities charged under President Obama's September 18, 2014, Executive Order focusing on combating antibiotic resistant bacteria. That order requires the Centers for Medicare & Medicaid Services, the Department of Defense and the Department of Veterans Affairs to develop requirements for antibiotic stewardship programs. These and other federal agencies and stakeholder groups will have input into the research associated with the development process for any changes in accreditation standards.

In addition to evaluating its standards, The Joint Commission has committed to develop several publications to raise the level of awareness of providers to the benefit of engaging in stewardship practices, create patient-based materials to engage consumers in this important area, and update its tool kit to support organizations with implementing stewardship programs. More information is available at www.jointcommission.org.
NOTE: The two articles that follow, “Initiating an Antimicrobial Stewardship Program” and “Creating Change: Using an Antimicrobial Stewardship Program to Improve Antimicrobial Usage” are excerpted from Joint Commission Resources’ Antimicrobial Stewardship Toolkit. For more information on this free resource, please visit http://www.jcrinc.com/antimicrobial-stewardship-toolkit/
Antimicrobial Stewardship Toolkit Module 3: Initiating an Antimicrobial Stewardship Program

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This manual is presented to your institution as an informational tool only. JCR is solely responsible for the development and contents of this tool. You are solely responsible for any decision to use the manual as a guideline for assisting your institution in establishing safe infection control practices. Obviously, it is only a guideline and you would have to make the decision as to whether it needs to be tailored to fit the practices and settings at your individual institution. JCR’s production of this manual for Janssen Pharmaceuticals, Inc., is on a non-exclusive basis and is not an endorsement of that company or its products, or a statement that its expertise or products are superior to those of other comparable companies. All material in this manual is available to any party interested in furthering JCR’s efforts to help improve quality and safety.
Case Scenario

The medical director of infection prevention and control at Saint Somewhere Hospital (SSH) is concerned about an increase in cases of carbapenem-resistant enterobacteriaceae (CRE). Initially, these cases appear to have been imported from local long-term care facilities, but closer inspection reveals that some transmission is occurring within SSH. As part of a larger initiative to control CRE, the medical director wants to address antibiotic overuse, especially carbapenem use. Strategies that are presently in place include restricting a few expensive antibiotics for infectious-disease use only and the presence of a clinical pharmacist who works part-time with intensive care units (ICUs) and part-time with the infectious diseases (ID) section but who is not involved in approvals or other stewardship activities. The medical director discusses antimicrobial stewardship with the chair of the ID section and discovers that there is support for the idea, but presently, funding for clinician time does not exist. The chair presents the idea of antimicrobial stewardship to hospital leadership, and they are interested particularly in how this approach can help reduce pharmacy costs. The leadership team recommends that a formal proposal be developed, so they can consider the project. The chair of ID recommends you, a new physician in the ID section, to develop the proposal because you had shown interest in administrative work and antimicrobial stewardship during your interview.

Introduction

An antimicrobial stewardship program (ASP) is an institutional antimicrobial management program—usually led by a pharmacist and a physician—that seeks to optimize antimicrobial use. Starting such a program can be a daunting task. From gaining administrative support and funding to winning over clinicians, the politics alone can stymie the development of an ASP. The tasks of setting goals, determining tactics, and choosing metrics can be equally challenging, despite help from guidelines.

Rationale for Antimicrobial Stewardship

Many clinicians used to see penicillin as a “silver bullet” that would eradicate most infections. This view is no longer held. Shortly after the introduction of antimicrobial therapy, resistance began to emerge, as did the knowledge that using antimicrobial agents encourages and selects for resistant bacteria. Antimicrobial resistance results in high costs, long hospital stays, and increased morbidity and mortality.1-5 Despite these facts, antibiotics are routinely overused or misused, and it is estimated that approximately 50% of antimicrobial use in hospitals is unnecessary or inappropriate.6,7 For example, Figure 3-1 on page 11 shows the correlation between increasing rates of fluoroquinolone-resistant *Pseudomonas* and increased use of levofloxacin.8 Module 1 presents additional information about antimicrobial resistance.

This example suggests that less antimicrobial use may reduce resistance, and there is evidence to support this relationship. Figure 3-2 below shows that hospitals that restricted carbapenems used lower quantities of this class of drugs and had lower rates of carbapenem resistance than hospitals that did not restrict carbapenem use.9 With fewer and fewer antimicrobials being developed by pharmaceutical companies, protecting antimicrobial resources becomes even more important (see Figure 3-3 on page 12).

This graph shows the number of new antimicrobials approved by the US Food and Drug Administration. Currently, there are only two new antimicrobials expected to be released between 2008 and 2012.


In addition to slowing antimicrobial resistance, ASPs that improve antimicrobial prescribing and use patterns also have been shown to reduce *Clostridium difficile*-associated diarrhea and to decrease the risk of antimicrobial-resistant infections in hospital patients.10-13 ASPs also have been shown to decrease antimicrobial utilization.6,14-16 ASPs do not merely prevent bad outcomes, they also help increase cure rates by optimizing antimicrobial use and may also help reduce the cost of patient care.14 For example, Figure 3-4 below shows the cost of parenteral antibiotics in 14 hospitals based on the presence or absence of an ASP. Finally, unnecessary antimicrobial use has its risks, as demonstrated by the 142,000 visits that were made to emergency rooms in 2008 for adverse reactions attributed to antimicrobials.17
Antimicrobial stewardship also helps physicians balance their desire to do the right thing for their individual patients with the needs of the entire community of patients. Clinicians are familiar with the risk-benefit ratio and use it to help decide the course of action they should take when performing diagnostic testing or administering therapy. For example, when clinicians consider the needs of the patients they are treating, they may believe that using broader spectrum antimicrobial coverage than is indicated presents very low risks and high potential benefits. This problem is magnified by non-ID clinicians who have limited knowledge of antimicrobial therapy and ID. The clinicians’ view of the risk-benefit ratio may change as they gain a better understanding of optimal antimicrobial therapy and as they consider the needs of the larger community. These are the goals of antimicrobial stewardship.

Antimicrobial agents are a category of medication that clinicians of all specialties feel comfortable prescribing, often without seeking consultation. Furthermore, failure to recognize the potential harm that can result from the overuse of antibiotics and failure to realize the urgency of this problem are real phenomena. ASPs can address many of the problems associated with the use of antimicrobial agents by helping clinicians apply specialized, evidence-based knowledge to treat infections, optimize doses, and minimize toxicity, as well as by providing a community context for their use.

**Initiating an Antimicrobial Stewardship Program**

*Identify Strategies to Improve Antimicrobial Stewardship*

In 2007, the Infectious Diseases Society of America (IDSA) and the Society for Healthcare Epidemiology of America (SHEA) published guidelines to help hospitals develop ASPs. The guidelines focus on presenting core and supplemental strategies that hospitals can use to optimize antimicrobial use. These strategies are based on evidence when possible and are based on expert opinion when there is little to no published evidence available. Table 3-1 on page 14 provides a summary of the core and supplemental recommendations in the guidelines, and Module 4 provides additional discussion about these strategies. It is important for ASP teams to consider which core and supplemental strategies they want to include in an ASP before they initiate this program, because the strategies the team chooses will impact the goals and resources needed to start the program. Furthermore, the clinical information and the means by which it can be accessed may significantly impact which strategies are employed in a program (see Module 4 and Module 5 for more information).

The core strategies make up the majority of the day-to-day workings of ASPs and are central to these programs. The core strategies include two methods to impact antimicrobial use in hospitals: a front-end approach, which is implemented before an agent is prescribed, and a back-end approach, which is used after an agent is prescribed. Module 5 contains additional discussions on the two approaches.
<table>
<thead>
<tr>
<th>Table 3-1. Core and Supplemental Strategies from the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines</th>
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<td><strong>CORE STRATEGIES</strong></td>
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<td><strong>Strategy</strong></td>
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| Antimicrobial Restriction (to ASP or infectious diseases approval only) | • Can lead to immediate and significant reductions in use and cost of antimicrobials  
• Role of preauthorization requirements has not been established and may shift use to other antimicrobial agents leading to increased resistance  
• Where preauthorization is used – monitoring is necessary | A-II |
| Table 3-1. Core and Supplemental Strategies from the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America Guidelines | • Performed by infectious diseases physician or clinical pharmacist with infectious diseases training  
• Can assist in reducing inappropriate use of antimicrobials  
• Effective but time intensive | A-I |
| **SUPPLEMENTAL STRATEGIES**                                   |
| **Strategy** | **Rationale** | **Recommendation** |
| Education | Provides foundation to influence prescribing behaviors and accept antimicrobial stewardship | A-III |
| Guidelines and Clinical Pathways | Develop using multidisciplinary approach and local microbiological information (eg, resistance patterns to improve utilization); implement through education and provider feedback | A-I  
A-III |
| Antimicrobial Order Forms | Can be an effective component of a stewardship program and assist with practice guidelines | B-II |
| Streamlining or De-escalating Therapy | Used on the basis of microbiology culture reports and pharmacokinetic and pharmacodynamic drug characteristics; can result in decreased antimicrobial exposure and cost savings | A-II |
| Optimizing Antibiotic Dose | Based on the individual patient characteristics, causative organism, site of infection, and characteristics of the drug | A-II |
| Converting from Parenteral to Oral | Determined by patient condition; can decrease length of stay and costs | A-I |

The front-end approach—often termed formulary restriction—refers to antimicrobial agents that have not been included on a hospital formulary or that require approval prior to prescription (preauthorization). ID physicians or ASPs develop a formulary and decide which drugs will require preauthorization. The front-end strategy is advantageous because it is relatively easy to implement after the agents on the formulary have been selected. Several studies have shown that this approach can reduce expenditures. However, formulary restriction and preauthorization programs may have little effect on resistance because there is no follow-up after the antimicrobial is approved. Therefore, ASPs have little control over the duration of therapy and streamlining or de-escalation activities. In addition, clinicians often view this strategy as an infringement on their autonomy, especially in nonacademic settings. See Module 4 for more information about formulary restriction and preauthorization.

The back-end approach is often referred to as prospective audit and feedback. This strategy uses more resources than a front-end approach because it requires ASP clinical pharmacists or physicians to review prescriptions for targeted agents after they have been prescribed and to provide feedback to prescribers regarding the appropriateness of their use. This feedback usually is based on clinical-use criteria that have been approved previously by a Pharmacy and Therapeutics (P&T) Committee and/or the ID section. The back-end method is useful particularly for de-escalation and promotion of appropriate duration of therapy, which impacts resistance to a greater degree than formulary restriction alone. The obvious drawback to this approach is that it is more resource-intensive than a front-end approach. Formulary restriction and preauthorization requires ASP team members to answer inquiries requesting approval, and they can usually perform this duty while completing other tasks. Prospective audit and feedback, however, usually require dedicated time, which is proportional to the size and complexity of the hospital. For this reason, the net monetary gain for these programs is often less than that for formulary restriction and preauthorization. Module 4 presents additional information about prospective audit and feedback.

ASPs can consider using a hybrid program that implements both approaches. Formulary restriction and preauthorization may be better at saving money and optimizing doses, whereas a prospective audit and feedback program addresses resistance problems and improves overall antimicrobial use. Because each approach offers its own benefits, ASPs may find it worthwhile to restrict expensive and higher-risk drugs but to use prospective audit for selected drugs on specific units. For example, if daptomycin is being overutilized in the hematology/oncology unit, and carbapenem resistance is increasing in the surgical ICU, it may not be practical to perform a hospitalwide review of these agents, particularly if a real-time list of patients who are receiving these drugs cannot be obtained easily. Instead, ASPs can review carbapenem use in the surgical ICU and daptomycin use in hematology/oncology patients. A hybrid program may be useful for some hospitals; however, it is not standard practice at this time.

In addition to the front-end and back-end core strategies described previously, the IDSA/SHEA guidelines also provide supplemental strategies to help hospitals optimize antimicrobial use, and these strategies should be viewed as partners to the core strategies. For example, dose optimization is a supplemental strategy that can be incorporated into the formulary restriction or prospective audit core strategies. Another supplemental strategy focuses on interventions that transition patients from parenteral to oral drugs, which helps reduce costs, shortens length of stay, and allows clinicians to remove intravenous and peripheral catheters from patients more quickly. Other supplemental strategies are education based; for example, clinical pathways and order sets help clinicians optimize antimicrobial choices, and antibiograms based on recent local susceptibilities help guide empiric therapy. In addition, standardized prophylaxis regimens can promote appropriate antimicrobial use, prevent resistance, and help meet Surgical Care Improvement Project requirements.
Perform a Needs Assessment/Gap Analysis

To understand which of the strategies (front-end, back-end, or a combination) will work best for an ASP, team members should perform a needs assessment or gap analysis. These concepts may be familiar to many individuals, but they may not have encountered these tools in the context of antimicrobial stewardship. A needs assessment/gap analysis allows individuals to assess actual performance against potential performance or the present state compared to a desired state. This analysis should be performed at the planning stages of an ASP—prior to its implementation—and periodically thereafter. The main goals of this review are to identify key stakeholders in an ASP and their expectations, to identify the resources available to an ASP, and to understand the current state of antimicrobial use in the hospital.

Identify Key Stakeholders

Key stakeholders are individuals who have a vested interest in an ASP, whether they stand to benefit from the program, participate in the program, or provide funding for the program. ASP stakeholders typically include patients, hospital leaders, pharmacists, and physicians. ASP teams can identify stakeholders by starting with the individuals who will provide the resources to support the ASP, such as the finance staff. It is important for ASP teams to be aware of the expectations of finance staff. Module 2 describes how ASP team members can collaborate with the Finance Department when starting or implementing an ASP. Patients should also be considered as key stakeholders. Although patients do not contribute to improving the hospital’s fiscal bottom line, they stand to gain the most from improved antimicrobial use.

Identify Resources

The number of full-time equivalents required by an ASP will be determined largely by the core strategies employed in the program. Physicians and pharmacists can perform ASP activities, and the amount of time they devote to a program and team members’ expectations need to be clearly defined.

Consider Data

When planning an ASP, teams also need to consider the data that will be collected and analyzed in the program. Data that help an ASP team understand the current state of antimicrobial prescribing patterns and behaviors include antimicrobial-use metrics (eg, expenditure, dispensing, and administration data), number of patients who receive specific agents, aggregate microbiological data, information on admissions or hospital days, and data on adverse drug events.

Understanding what types of data are available may require contacting information technology services and, most likely, infection prevention and control and the microbiology laboratory. Electronic medical records (EMRs) provide data, and it is necessary to understand what information they do and do not contain. In addition, data mining programs provide consolidated data or alerts that can supplement data in EMRs, and some computer programs are capable of creating an antibiogram.

If a hospital does not have these resources already in place, the ASP team should investigate third-party vendors that provide these services to determine whether their product will provide the information required by the ASP. For example, ASPs need to measure drug utilization. (See Module 5 for information on calculating drug use.) Pharmacies usually can provide expenditure data and sometimes even aggregated dispensing data, but extracting actual administration data from an EMR provides better information. However, if the data are too unwieldy or time-consuming to analyze, using a less precise (and less costly), but simpler data source may be preferable. Knowing how much each drug costs—per day, per dose, and per course of therapy—also is useful data. Infection control can provide information about drug-resistance patterns or current infection prevention and control issues (as described in the case scenario).
Microbiology laboratories are important partners for ASPs, as they control how microbiological data are displayed to clinicians. Microbiology laboratories can help display results for some antimicrobials that are sometimes hidden. For example, it is common to hide results for all extended-spectrum beta-lactamase producers because drug susceptibility found in laboratory testing does not indicate success in clinical use. Microbiology laboratories also can make recommendations regarding therapy for multidrug-resistant pathogens.

**Perform an Antimicrobial Use Evaluation**

ASPs need to understand the patterns of antimicrobial use in a hospital. Formal medication use evaluations are very useful, but time-consuming, and not practical for all antimicrobials. Basic metrics (such as days of therapy [DOT] or defined daily doses [DDD]) can be applied to utilization data instead. (Module 5 provides additional information on antimicrobial stewardship metrics, including how to calculate DOT and DDD.) Arranging these metrics according to floor or clinical service line is useful. If this is not possible, getting a snapshot one day a week for three weeks of the antimicrobials presently in use provides the same type of information. These use patterns begin to reveal the low-hanging fruit that ASPs can address. For example, a concerted and hospitalwide effort to reduce the use of antipseudomonal beta-lactams does not help units where the real problem is overuse of antifungal agents. Focusing on the real problems is a good way to preserve limited resources, and this is possible only if use patterns are mapped first.

**Understand the Current State of Antimicrobial Stewardship**

It is common for hospitals to have bits and pieces of antimicrobial stewardship taking place in different areas of the facility. It is also not unusual for different service lines to have different antimicrobial stewardship needs. A strategy that hospitals can use to understand the current state of stewardship in their organization is to perform an evaluation that provides a grade for each of the key strategies used for stewardship that are described in the IDSA/SHEA guidelines.6

**Identify Priorities**

After an ASP team performs a gap analysis and identifies required resources, it should prioritize the next steps. ASPs need to consider several factors. To implement either one of the core strategies described previously (formulary restriction or prospective audit), the ASP team should develop use criteria. For example, Figure 3-5 on page 18 presents use criteria for colistin. Use criteria documents should be accessible to help curb requests for approvals that are not likely to be successful. Use criteria documents for commonly used or targeted antibiotics should be vetted through ID clinicians, the Antimicrobial Stewardship Committee, the P&T Committee, the Medical Executive Committee, and similar governing bodies. ASPs are more credible when recommended and not-recommended uses for medications have been agreed on prior to their use.

**Set Goals**

Setting goals for a new ASP can be challenging. ASP team members should ask themselves a number of questions: How much can be accomplished in a year? What unexpected resources might be needed? Should the program focus on saving money to satisfy the administrators and pharmacy? Or should the program focus on optimizing patient outcomes and preventing antimicrobial resistance to win over clinicians and benefit patients? Can the program really affect resistance?
When an ASP begins, there will be a lot of low-hanging fruit that are ripe for interventions. For example, improving safety, encouraging responsible antimicrobial use, optimizing duration of therapy, reducing drug expenditures, and preventing resistance should be included as possible goals of an ASP. When deciding on possible objectives, an ASP team should consider the following three questions: (1) Does it address one of my...
program goals? (2) Will I be able to measure outcomes or processes associated with this goal? (3) Do I have sufficient support and buy-in in the target clinical area? Programs that are just starting also should include developing standardization-of-use policies as a goal.

The magnitude of anticipated improvement in each area will depend on the available resources. Therefore, clarifying the specific goals of an ASP is an important tool to set appropriate expectations. For example, reducing the cost of antifungals, optimizing duration of therapy for common clinical syndromes, reducing toxicity due to aminoglycoside dosing, and reducing utilization of carbapenems are more manageable goals than those presented in the previous paragraph. Setting realistic goals also provides the direction necessary to determine the appropriate strategies to reach these goals and the appropriate metrics to monitor whether the goals have been attained. When selecting these metrics and strategies, it is important to revisit the goals to ensure that they are feasible.

**Determine Metrics**

Measuring the progress and success of an ASP is imperative to its longevity. The metrics selected should match the goals, and, to a certain extent, will impact the goals.

The most important priority of an ASP is to determine the method it will use to measure utilization. The two most common methods are DDD and DOT. DDD uses the World Health Organization’s definition of a standard daily dose for an average-size adult with normal renal function. DOT counts the total days of therapy administered for a particular drug. Module 5 contains specific information on how to calculate DDD and DOT. An ASP team needs to decide how such methods will be used in the program.

However, measuring utilization is only part of the picture. Each program goal also needs a metric to ascertain whether it has been reached. For example, a log of near misses and reported adverse drug events can show whether an ASP has succeeded in its goal of promoting medication safety. Using process and outcome measures, such as measuring the proportion of drug levels at an appropriate time and within expected levels, can help an ASP evaluate the goal of optimizing dosing. If valid and easily measured metrics cannot be identified for a particular goal, it should be adjusted.

**Choose Appropriate Tactics**

An ASP team should choose the projects to work on based on the goals of the program, appropriate metrics, and available support. Success in the first year can be used to garner additional support in subsequent years. Therefore, as ASPs succeed, support and buy-in will grow, paving the way for more resource-intensive interventions. If time and resources are limited, an ASP’s goals should be restricted to defined clinical areas or drugs. For example, restricting expensive or broad-spectrum agents combined with prospective audit and feedback on low-performing units maximizes available dedicated stewardship time. And by de-restricting broad-spectrum agents in areas where they are frequently indicated, pharmacists are free to help with other projects. Making the interventions more efficient by targeting them to the key clinical areas where change is needed most can help stretch thin resources.

**Develop a Strategic Plan**

A strategic plan will evolve as an ASP takes shape. Initially, the plan may be a working document or formal proposal to leadership requesting financial support. Eventually, the plan will evolve into a statement that clearly articulates the goals of an ASP and the metrics and tactics that will be used in the program. It also can be used to report the results realized by the program. It is prudent to revisit the strategic plan at each step in the development of the ASP.
The structure of this plan varies; however, it should focus on describing the goals of the ASP, the tactics that will be used to attain these, and the metrics that will be used to measure progress. Some ASPs structure this document like a business plan, starting with an executive summary or overview and following with a description of the ASP team and its role within a hospital. A statement of need justifying the ASP should also be included in the plan, as should a request for initial support and ongoing funding. The audience for this document can range from physicians on the antimicrobial subcommittee of the P&T Committee to chief executives. Module 2 includes additional information about developing an antimicrobial stewardship business plan and presents a sample plan.

Build an Antimicrobial Stewardship Team

The IDSA/SHEA guidelines recommend the personnel who should be tasked with leading an ASP. The guidelines stipulate that it is highly desirable to have a clinical pharmacist and a physician lead the team because they bring different skills to the group. The best-case scenario is for a clinical pharmacist who has advanced training in ID and a physician with extensive experience treating infections, often an ID specialist, to lead the program. However, this arrangement may not always be feasible, particularly in small hospitals in which only part of a clinical pharmacist’s time may be devoted to stewardship. In such situations, it is essential for ASPs to be as efficient as possible and for supporting team members to provide as much help as possible.

Physicians and pharmacists are equal partners in successful ASPs, but they perform different duties. Clinical pharmacists usually perform day-to-day data collection and evaluate antimicrobials. They can provide recommendations regarding antimicrobial use only if criteria are clear and are established by an advisory committee. Physicians usually set goals, supervise interventions, and act as liaisons to medical staff. They also should be members of the P&T Committee or, preferably, leaders of an antimicrobial subcommittee, if one exists.

Medical staff committees, such as the P&T Committee, are usually responsible for creating policies that govern practice within a hospital. In essence, they provide oversight and are the voice of clinicians. An ASP’s policies and initiatives will require the support of the Medical Executive Committee. ASP policies require thorough vetting by key players on the P&T and/or Medical Executive Committee to be successfully adopted and supported.

The core leaders of an ASP team usually are supplemented by additional physicians who serve on a larger Antibiotic Stewardship Committee. Representatives from key utilization areas (often ID, hematology/oncology, transplant, and critical care) should also be on the ASP. It is important for additional physicians to serve on the stewardship committee because their opinions help shape interventions and goals, but requests for their time should be minimal. Furthermore, their support of the ASP in their respective areas of practice helps provide a context for the interventions in these areas, which can lead to greater acceptability. These physicians also can help in the implementation of new policies and procedures because they have insight into the work flow in their areas of practice, and they have relationships with local physician leaders. It is vital for policies and interventions to be integrated into the existing work flow.

Other key members of an ASP may include information technology, infection prevention and control, and clinical microbiology staff; and these individuals should be integrated into the program.

Gain Support

As with any hospitalwide program, leadership support is important for an ASP to achieve success. In other words, if a hospital president or chief medical officer favors antimicrobial stewardship, others will follow, regardless of their own opinions. Leadership support is garnered through individual meetings and regular reporting of metrics. Leadership likes to promote and support successful programs, but they do not know whether a program is successful unless someone tells them. ASP team members should not wait for someone else
to mention their achievements to leaders. To inform leaders about the success of their programs, team members should organize meetings in which they present reports that detail projected savings and evidence that the ASP met or exceeded its goals.

Pharmacies are usually willing to support ASPs and assist with funding efforts because they almost always reduce expenditures. In addition, ASPs can recoup the cost of the full-time equivalents devoted to this project. In addition, one tertiary care center demonstrated that discontinuing its ASP cost the hospital more than $1 million. Multidrug-resistant gram-negatives are becoming more common, and studies have shown that ASPs can reduce the incidence of these bacteria in hospitalized patients over time. ASPs may find it useful to pilot one or more interventions in defined clinical areas to demonstrate that they are effective. However, realistic timetables should be established, as savings on expenditures are realized relatively quickly, but positively affecting resistance can take 12 years to manifest.

Although a glossy report is sure to impress leadership, getting clinicians to support and follow ASP advice is one of the biggest hurdles these programs face. Clinicians want to do what is best for their patients, and this sometimes leads to overly broad antimicrobial coverage and clinical inertia. In addition, clinicians sometimes view ASPs as trespassing on their autonomy. Nonetheless, clinicians often appreciate ASPs helping them to address safety issues and providing them with educational tools at the point of care. ASPs should seek out opinion leaders and ask how they can help these individuals streamline their practice with respect to antimicrobials.

ASPs also should work hard to make the ASP interventions valuable to clinicians by incorporating convenient educational materials and useful advice. For example, formulary restriction programs are often unpopular with clinicians because they add to the work flow and limit antimicrobial choices. However, if use criteria are clearly stated and easily available, and if the approval process is quick and accompanied by evidence-based dosing information and suggestions about alternatives, they can become important sources of information for clinicians and essentially can become immediate curbside consultations.

Therefore, it is important to structure interactions correctly. For example, it is good policy to never “refuse” requested antimicrobials. Instead, an ASP can suggest an alternative agent based on use criteria that, in turn, are based on published literature. The tone used to communicate prospective audit and feedback information also must be considered carefully. The ASP cannot tell clinicians how to care for their patients any more than a consulting physician can. However, recommendations that are backed by evidence and that focus on optimizing therapy can overcome most opposition. ASPs report a very high rate of acceptance for recommendations. For example, one hospital reported an acceptance rate of 91%.  

**Initiating an Antimicrobial Stewardship Program: A Performance Improvement Model**

Although initiating an ASP is not necessarily considered an “improvement” project, it does represent the initiation of a new “design” for a hospital that will require a systematic methodology and implementation process for it to be successful and sustainable. Figure 3-6 on page 22 highlights the steps that a hospital should follow to start an ASP that were discussed in this module.
Following a systematic process enables teams to assess, plan, implement, and evaluate new processes while avoiding the application of a best-practice solution being placed on top of operational systems that may be broken.

**Create a Current-State Process Map for Antimicrobial Use**

The high-level steps required to create an ASP were discussed previously. The following “how to” steps can assist an ASP team to create a current- or present-state map for antimicrobial use within a well-defined area of clinical practice:

1. Assemble a team of eight individuals who are knowledgeable about a process.
2. The team will decide which current clinical area will be assessed and will develop the scope of the process map according to that area and its patient population.
3. Include at least one individual on the team who does not know the antimicrobial stewardship process. This individual is able to ask questions about why things happen in a specific way and can challenge the group to consider the rationale for why things have been created in a particular way.
4. Identify a facilitator who is neutral to the stewardship process who can assist with discussions as opposed to participating in actual discussions.
5. Consider six to eight high-level steps that occur within the stewardship process at least 80% of the time. The following steps provide an example:
   1. A physician admits a patient.
   2. The physician writes orders for an antimicrobial agent.
   3. Medications are administered.
   4. Care and treatment are provided.
   5. Laboratory tests are ordered and analyzed.
   6. Discharge orders are written.
   7. The patient is discharged.
The team should agree on these steps. The first and last steps should be written in a circle, and the process steps should be written between these in a process-rectangle box. Triangles are drawn around areas where decisions need to be made, such as the type of antibiotic ordered. Connect each step with an arrow.

6. Ask each discipline to review and address the subprocesses, potential failures, and risk points that occur in each step.

7. After the process map is completed, the team that developed it should analyze it to determine not only what is working well but also what is not working well. Teams should primarily focus on points within the process that are risk points or potential failures, such as physician handoffs, team reporting, information flow within a medical record, and transfer of information to a community care provider.

Process mapping is a technique that makes work visible. A process map can show who is doing what, with whom, when, and for how long. It also shows the decisions that are made, the sequence of events, and any wait times or delays inherent in a process. There is no right or wrong way to build a process map. The process a team goes through to build the map is the critical success factor rather than what the actual map looks like. Process maps should be developed with paper and pen or flipchart and markers first. If the team attempts to use technical software or graphic programs while they are creating the map, not all the team members will be able to see and learn about the development process. ASP team members should ensure that they make time to plan the meeting; they bring flip charts, markers, and sticky notes; they establish ground rules for focused work; and they have fun!

Create a Project Charter

Because miscommunication can occur during team meetings, it is important for teams to develop a project charter. A project charter serves as an executive summary and is dynamic and ever changing, as new data are discovered about a given process. The charter can act as a source of information when a team member asks, “Why are we doing what we are doing?” A project charter can also help build consensus about the current state of a process, the desired future state of the process, and any other goals of the process. Therefore, the project charter is one of the primary tools that teams can use during the planning phase of a performance improvement project.

To develop a project charter, team members should ask themselves the following questions and should record the answers:

1. What problem are we trying to address?
2. Who are the team members?
3. What is the scope of the problem or the area that we wish to study?
4. What is the current state of the process?
5. What is the dollar-equivalent benefit of the project?
6. Why is the project being done?
7. What are the goals of the project?

While the ASP team creates the project charter, team members also can begin to scope a potential performance improvement project, can think about strategic priorities and operational tactics, and can begin to reach consensus on defining a mission and vision for the project. Scoping a project means that the team will target a specific area, patient population, or antimicrobial agent, so that a pilot test can be run prior to fully deploying a new design for a process throughout a hospital. Figure 3-7 on page 24, presents a sample antimicrobial stewardship project charter.
Performance improvement teams should develop a charter at the initiation of a project and should revise it during the course of the project, as needed.
When thinking about performance improvement, teams might initially focus on using a Plan-Do-Study-Act cycle for each new initiative (see Module 2 for more information about this cycle). If possible, all initiatives should be pilot tested and evaluated before rolling them out to the entire hospital. In addition, the ASP should be monitored constantly to ensure its continued benefit/value. ASP leadership should be able to adjust resources for the program, as needed. For example, a project to switch from intravenous to oral antimicrobial administration may require a lot of work in the beginning but may be scaled back after clinicians become familiar with the idea and have been able to adjust their practices accordingly. Over time, they may be able to anticipate new ASP standards, such as those set by hospital policy, the P&T Committee, and the Infection Control Committee, and they may make changes on their own. For example, they will switch from administering linezolid intravenously to orally of their own accord. A performance improvement team should audit practice changes systematically to monitor whether practices start to falter; however, over time, the team can then begin to transfer resources into rolling out the new initiatives to the entire hospital.

Conclusion

Assembling the financial support, the team, and the plan for a new ASP is a manageable task that can be scaled to meet any hospital’s needs. This module reviewed the key steps to starting an ASP and addressed practical concerns that teams need to consider when initiating such a program. While planning and implementing an ASP, concerns about finances, staffing, resources, and expected outcomes can appear to overshadow the clinical mission of the program; this objective must not be forgotten, however. The benefits of a successful ASP will be reaped by the patients of a hospital that takes on the challenge of antimicrobial stewardship.
References


Antimicrobial Stewardship Toolkit Module 4: Creating Change: Using an Antimicrobial Stewardship Program to Improve Antimicrobial Usage

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Case Scenario

Fantastic Health Care (FHC) is a 350-bed community hospital located in a suburb of a large metropolitan area. There are two infectious diseases (ID) physicians who practice at FHC and three additional community hospitals in the area. Patients at FHC are cared for by a group of hospital-medicine specialists (hospitalists) and various private-practice physicians. The leadership of FHC would like to implement an antimicrobial stewardship program (ASP). However, the ID physicians have said that they do not have time to lead the program and that they are afraid that involvement in the program might decrease their number of consults. Individuals charged with implementing the ASP are wondering how to get all members of the medical staff “on the same page” regarding antimicrobial usage. Also, although they have a general sense that antimicrobial usage at FHC needs to be improved, they do not know how to identify the areas that need the most attention or the interventions and initiatives that would successfully address these areas.

Introduction

A formal ASP can be a very effective means of improving the use of antimicrobials within an institution. The Infectious Diseases Society of America/Society for Healthcare Epidemiology of America (IDSA/SHEA) guidelines provide useful recommendations regarding the structure and activities of ASPs. However, these recommendations need to be adapted to the specific circumstances of individual hospitals. For example, what works best for FHC may not work as well for a large, academic medical center or even for another 350-bed community hospital that has a medical staff with a different approach to patient care.

In addition, the resources available for an ASP, the means to engage individual prescribers, and the key areas needing improvement may vary widely among different institutions. This module reviews the key strategies an ASP can use to positively impact the use of antimicrobials and discusses their applicability to different hospital settings. It also discusses how an ASP can focus its efforts by identifying and selecting the stewardship initiatives that will target the specific needs of their hospital. This module begins by considering a concept that is greatly feared by most clinicians: CHANGE.

Establishing a Culture of Change

The goal of an ASP is to improve the use of antimicrobials; therefore, it is assumed that at least some of the current practices within a hospital will need to change. Because many hospitals and individuals are often less than enthusiastic about embracing change, it is important for leadership to establish a culture that will help facilitate the improvement initiatives proposed by the ASP, particularly those that address changes in antimicrobial prescribing. According to Sbarbaro, “Changing physician behavior is considered by many to be an exercise in futility—an unattainable goal intended only to produce premature aging in those seeking the change. The more optimistic might describe the process as uniquely challenging.” Most individuals would agree that changing physician behavior can be “uniquely challenging”; however, an ASP will have very limited success unless it is able to modify how physicians prescribe antimicrobials in specific situations. Sbarbaro suggests four key elements to generating change in physician behavior, including prescribing practices (see Sidebar 4-1 on page 29). In addition, Module 2 discusses factors that influence physicians’ drug choices.
To help promote acceptance of ASP initiatives, it is important for hospitals to address misconceptions that physicians may have about the program. One common misunderstanding is that the goal of an ASP is to stop clinicians from using antimicrobials. Although eliminating unnecessary antimicrobial use is an important objective of all ASPs, the primary goal of these programs is to improve patient outcomes through optimizing antimicrobial therapy, not by eliminating it. Optimizing therapy may involve reducing antibiotic use in some situations, but it may entail increasing antibiotic use in others. It is important for prescribers to view stewardship activities as helping with patient care rather than as intrusions or infringements on physician autonomy.

Establishing appropriate goals for an ASP and communicating these to the medical staff are essential steps to help address common misconceptions about these programs.

**Role of the Antimicrobial Stewardship Committee**

An Antimicrobial Stewardship Committee can be a valuable tool to help win the support of key physicians for an ASP. This committee is the sounding board for the ASP team members and the conduit for bidirectional communication with the medical staff. The committee usually also serves as a subcommittee of the Pharmacy and Therapeutics (P&T) Committee, providing a mechanism for ASP policies and procedures to become formal recommendations of the P&T Committee. Perhaps more importantly, an Antimicrobial Stewardship Committee meeting can allow ASP team members time to present local epidemiology and other scientific data that can influence treatment decisions and can provide a format to address the various misconceptions that may be held by certain prescribers. The input of physician committee members can also be an effective means of influencing prescribers, particularly outliers. In addition, the committee meeting provides a forum to discuss antimicrobial-use issues in the abstract rather than in connection with the treatment of a specific patient, which can often lead to a more emotional or confrontational interaction. And finally, because physicians on the committee are part of the decision-making process, they have ownership in ASP initiatives and can serve as helpful liaisons to their colleagues who are not committee members. This committee can be a powerful instrument for change, can help develop thought leaders who are respected by their peers, and can serve as a useful advisory board for the staff who participate in the day-to-day antimicrobial stewardship activities.

The committee should be composed of clinician stakeholders who come from diverse areas of the hospital and should include clinical services that have high antimicrobial utilization, including internal and hospital medicine, hematology/oncology, pulmonary/critical care, surgery, transplant surgery, and emergency medicine. In addition, representatives from clinical microbiology, pharmacy, and hospital epidemiology/infection control and prevention should be included on the committee. Other stakeholders may be considered, depending on which services or clinicians need to improve the most.
Members who are asked to participate on the committee should be well versed in evidence-based medicine and quality improvement. It is sometimes useful to include participants who might push back the most against stewardship activities, as they may be persuaded about the need for change more easily if they are active participants in the decision-making process. With time, the committee will bring problems regarding antimicrobial stewardship and potential solutions to these problems to the ASP team rather than vice versa.

**Physician Leadership**

For most hospitals, the support and collaboration of medical staff leadership is vital for the success of an ASP. Although there are stakeholders in ancillary and administrative areas of a hospital who are interested in improving patient care, it is ultimately up to the medical staff to optimize patient care and to modify physician prescribing behavior. In most cases, it is advantageous for a physician to lead the ASP, and programs with physician leadership are more likely to succeed. The IDSA/SHEA guidelines for antimicrobial stewardship indicate that an ID physician should advocate and act as the program leader—and thus the chief champion of change—for the ASP. However, many hospitals that need to improve antimicrobial utilization the most do not have an ID physician available. In addition, many hospitals share their ID consultant physician with other hospitals and organizations, and that physician might not have the time to invest in an ASP.

The physician team leader should have personal qualities that facilitate change (see Sidebar 4-2 below). These qualities should address the following “3 c’s,” which are important when developing, implementing, and operating an institutional ASP:

1. **Conceptualization:** This term deals with understanding what needs to be done, why it needs to be done, and how to do it.
2. **Communication:** This word refers to ensuring that the prescribers of antimicrobials receive and understand the information gathered through conceptualization.
3. **Coercion:** Although this term sounds strong, it refers to exerting the pressure required to get things done within the hospital across all units and departments. It also applies to the necessary assertiveness that is sometimes required to modify physician prescribing behavior.

**Sidebar 4-2. Personal Qualities of a Successful Antimicrobial Stewardship Team Leader**

- Strong leadership skills
- Assertive
- Good politician
- Effective communicator
- Uses evidence-based knowledge
- Respected by the medical staff
- Respected by hospital administration
- Familiar with stakeholder needs
- Experienced clinician who sees patients
Although having an ID physician as a core member and leader of an ASP team is beneficial, it is not absolutely necessary, and these roles can be filled by another member of the medical staff. Hospitalists are well suited for these roles and can be integral to the leadership of the multidisciplinary ASP team. Hospitalists have knowledge of the hospital because they support a wide range of services and may have fewer time constraints than a subspecialty physician. Additional training in anti-infective therapeutics may be useful for hospitalists, and this training is becoming increasingly available through professional societies, quality-improvement organizations, and public-health entities (see Table 4-1 below).

<table>
<thead>
<tr>
<th>Table 4-1. Training Resources for Antimicrobial Stewardship</th>
</tr>
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<tbody>
<tr>
<td><strong>Organization</strong></td>
</tr>
<tr>
<td>Centers for Disease Control and Prevention’s Get Smart for Healthcare: Know When Antibiotics Work</td>
</tr>
<tr>
<td>Society for Healthcare Epidemiology of America</td>
</tr>
<tr>
<td>Infectious Diseases Society of America</td>
</tr>
<tr>
<td>Making a Difference in Infectious Diseases Pharmacotherapy</td>
</tr>
<tr>
<td>Society of Infectious Diseases Pharmacists</td>
</tr>
<tr>
<td>Institute for Healthcare Improvement</td>
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Potential Antimicrobial Stewardship Improvement Initiatives and Interventions

Initiatives or interventions to optimize and improve antimicrobial use fall within three broad activity areas: (1) patient-specific, (2) physician-specific, and (3) general facility or systemwide. Table 4-2 below lists examples of potential activities for each activity area. A successful ASP often uses elements from each area, and each specific activity is chosen to meet the hospital’s stewardship needs.

Potential evidence-based program activities to improve antimicrobial stewardship are listed in Table 4-3 on page 33. The IDSA/SHEA guidelines recommend using two fundamental, or core, strategies that have been implemented at numerous institutions with various levels of success.\(^1\)

The first, prospective audit and feedback—sometimes termed a “back-end” approach to modifying antimicrobial therapy—is based on a prospective audit of antimicrobial use at the level of a single patient, with subsequent intervention and feedback to the provider. The second is a “front-end” approach based on formulary restriction that requires preauthorization to order previously designated antimicrobial agents. In addition to these two core activities, hospitals can use various supplemental strategies, including large-group and patient case–based education, guidelines and clinical pathways, antimicrobial order forms, computerized clinical decision support, and other strategies described in Table 4-3.

<table>
<thead>
<tr>
<th>Table 4-2. Activities That Can Potentially Optimize and Improve Antimicrobial Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category</strong></td>
</tr>
</tbody>
</table>
| Patient-specific | • Prospective audit and feedback  
• Clinical decision support  
• Rapid diagnostic utilization  
• Microbiology laboratory selective reporting of susceptibilities  
• Identifying bug-drug mismatches  
• Culture-specific audit and feedback (eg, asymptomatic bacteriuria and tracheal colonization) |
| Physician-specific | • Formulary restriction/preauthorization  
• Antimicrobial-specific audit and feedback  
• Clinical decision support  
• Medication use evaluations (peer comparison)  
• One-on-one education  
• Antimicrobial order forms |
| General facility or healthcare system | • Education for large groups  
• Guidelines/pathway development  
• Care bundles or change bundles/packages (see page 37)  
• Benchmarking |
Table 4-3. Potential Antimicrobial Stewardship Program Activities or Elements

<table>
<thead>
<tr>
<th>Table 4-3. Potential Antimicrobial Stewardship Program Activities or Elements</th>
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<tbody>
<tr>
<td><strong>Prospective Audit and Feedback</strong></td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
</tr>
<tr>
<td>• Proven in clinical studies to reduce and modify antimicrobial consumption, improve selected clinical outcomes, and decrease antimicrobial expenditures</td>
</tr>
<tr>
<td>• One-on-one patient-centered education</td>
</tr>
<tr>
<td>• Optimization of anti-infective pharmacology</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
</tr>
<tr>
<td>• Proven in clinical studies to reduce and modify antimicrobial consumption, improve selected clinical outcomes, and decrease antimicrobial expenditures</td>
</tr>
<tr>
<td>• One-on-one patient-centered education</td>
</tr>
<tr>
<td>• Optimization of anti-infective pharmacology</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
</tr>
<tr>
<td>• “Back-end” approach</td>
</tr>
<tr>
<td>• Requires identification and intervention for patients already started on antimicrobials</td>
</tr>
<tr>
<td>• Interventions include changing, streamlining, de-escalation, pharmacodynamic/dose optimization, switching from intravenous (IV) to oral (PO) administration, and limiting duration of therapy</td>
</tr>
<tr>
<td><strong>Formulary Restriction and Preauthorization</strong></td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
</tr>
<tr>
<td>• Proven in clinical studies to reduce and modify antimicrobial consumption, improve selected clinical outcomes, and decrease antimicrobial expenditures</td>
</tr>
<tr>
<td>• When coupled with infection prevention and control, effective in controlling outbreaks of resistant or secondary pathogens (such as <em>Clostridium difficile</em>)</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
</tr>
<tr>
<td>• Less appealing to clinicians</td>
</tr>
<tr>
<td>• Loss of prescriber autonomy</td>
</tr>
<tr>
<td>• Potential need for after-hours service</td>
</tr>
<tr>
<td>• Time intensive</td>
</tr>
<tr>
<td>• Potential for delay in administering antimicrobial</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
</tr>
<tr>
<td>• “Front-end” approach</td>
</tr>
<tr>
<td>• Requires formulary restriction or preauthorization to prescribe selected antimicrobial</td>
</tr>
<tr>
<td>• Each intervention is a “mini-consult” and opportunity for an education intervention</td>
</tr>
<tr>
<td><strong>Large-Group Education</strong></td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
</tr>
<tr>
<td>• Can reach a large number of prescribers in a short period of time</td>
</tr>
<tr>
<td>• Effective for communicating the need and rationale for subsequent stewardship interventions</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
</tr>
<tr>
<td>• Not particularly effective in changing prescribing behavior without other interventions</td>
</tr>
<tr>
<td>• Rapid loss of knowledge</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
</tr>
<tr>
<td>• Can take place during grand rounds or clinical staff meetings</td>
</tr>
<tr>
<td>• Provides information to prescribers and clinicians regarding stewardship needs</td>
</tr>
<tr>
<td>• Provides feedback about antimicrobial susceptibility and use data to clinicians</td>
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</tbody>
</table>
## Table 4-3. Potential Antimicrobial Stewardship Program Activities or Elements (cont.)

<table>
<thead>
<tr>
<th>Guidelines and Pathways</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **Guidelines and Pathways**              | • Limit variation in therapy of infectious diseases  
• Are evidence based  
• Assist with adherence to regulatory and third-party payer stipulations                                                                  | • Often not utilized unless combined with other stewardship strategies or elements                                             |                                                                         |
| **Computerized Physician Order Entry and Clinical Decision Support**                       | **Advantages**  
• Shown in limited clinical studies to reduce and modify antimicrobial consumption, improve selected clinical outcomes, and decrease antimicrobial expenditures  
• Once established, can greatly assist with implementation of guidelines and best-evidence therapy  
• Can reduce adverse events related to antimicrobials                                                                                     | **Disadvantages**  
• Resource intensive during design and implementation  
• Expensive  
• Not readily available                                                                                                                   | **Comments**  
• Best if local data and conditions are used to adapt guidelines to a specific hospital                                                   |
| **Microbiology Interventions**            | **Advantages**  
• Potential to improve antimicrobial use and anti-infective therapy for individual patients                                                                 | **Disadvantages**  
• Not well studied                                                                                                                        | **Comments**  
• Includes cascade reporting to “hide” antimicrobial susceptibilities that might promote suboptimal therapy (eg, fluoroquinolone susceptibility for invasive Staphylococcus aureus infections)  
• Assists with choices of automated susceptibility profile, communication about new testing protocols and changes to existing protocols, and preauthorization of susceptibility testing for unconventional antibiotics |
| **Rapid Diagnostics**                      | **Advantages**  
• Provide opportunity for early targeted therapy  
• Assist with de-escalation  
• Shown in very limited studies to decrease antimicrobial consumption and improve clinical outcomes                                           | **Disadvantages**  
• Not readily available  
• Expensive                                                                                                                                  | **Comments**  
• Includes polymerase chain reaction and antigen testing of clinical specimens or early culture growth with rapid turnaround of test results |

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Prospective Audit with Intervention and Feedback

Prospective audit with intervention and feedback is a patient-specific approach that usually involves ASP team members who review initial or ongoing therapy and then intervene to provide feedback and suggested modifications to the medical-care provider to improve therapy. These activities can be performed by an ID physician, a clinical pharmacist, or a hospitalist with expertise in antimicrobial therapy. The aim is to provide patient-specific education and/or suggest changes to antimicrobial utilization to improve, streamline, and optimize therapy. Suggested modifications and interventions include discontinuing or changing one or more drugs (streamlining or de-escalation), switching from intravenous to oral drug administration, and shortening the duration of therapy. When appropriate, suggestions are sometimes made to escalate or intensify therapy to increase therapeutic efficacy.

Identifying patients for prospective audit and feedback efforts typically involves using computer surveillance to single out targeted antimicrobials or problematic usage. Examples include focusing on unnecessary treatment of asymptomatic bacteriuria, excessive duration of therapy for ventilator-associated pneumonia, or overzealous use of certain classes of antimicrobials. Many hospitals develop software that identifies potential patients for intervention. Propriety software that performs this function for the hospital epidemiologist and antimicrobial steward is also available.

Another potential prospective audit and feedback activity is to ensure that reports of patient-specific blood and sterile body fluid culture results are correctly matched to the patient’s current antimicrobial therapy. This task allows the hospital to perform a daily review of the appropriateness of therapy for potentially serious infections.
Some patients seen by the antimicrobial support team may be referred to an ID physician or another expert for a consult if their infections or therapy are too complicated for routine prospective audit and feedback recommendations.

A number of studies have demonstrated that prospective audit with intervention and feedback—as measured by reductions in inappropriate antimicrobial use—can improve antimicrobial stewardship, lower antibiotic consumption, and decrease infections due to \textit{C. difficile} or resistant pathogens.\textsuperscript{5,6} Prospective audit with feedback is an effective core strategy a hospital can use to improve antimicrobial stewardship, particularly when other interventions are cumbersome or not well accepted by the medical staff.

**Formulary Restriction and Preauthorization**

The second major strategy hospitals can use to achieve antimicrobial stewardship goals involves antimicrobial formulary restriction. This physician-specific activity can be carried out in two ways: by omitting a particular antimicrobial agent from a hospital formulary or by requiring medical providers to obtain preauthorization before prescribing a restricted drug. To get authorization, a clinician who wants to prescribe a particular agent contacts a member of the stewardship team to obtain prescribing permission. A pager system, telephone calls, e-mails, or cell phone text messages are used most often to obtain preauthorization. It is important for hospitals to remember that when using a preauthorization system, the individual who grants permission needs to be respected and needs to have clinical experience, because each instance is in fact a “mini-consult” and creates an opportunity for patient-specific one-on-one education. Often, the provider or prescriber is not merely seeking authorization to use a drug that is otherwise restricted but is asking for suggestions as to which antimicrobial should be used. Studies have shown that effective interventions supporting antimicrobial stewardship initiatives were more accurately managed by clinical pharmacists than ID fellows in training.\textsuperscript{7,8}

When deciding which antimicrobials will be restricted on a formulary, ASP team members should choose drugs that are used to treat complex infections or drugs that are—or have the potential to be—overused in certain infections for which there are alternatives. In addition, if local epidemiology or antibiograms show a particular problem pathogen, targeted restriction might be appropriate. For “workhorse” antimicrobials (ie, drugs that are over- or misused for several different infections), prospective audit and feedback may be a more effective strategy than restriction and preauthorization to reduce and modulate consumption.

Numerous studies have demonstrated that formulary restriction and preauthorization can effectively modulate antimicrobial use. These studies have documented reductions in antibiotic drug use—and often lower costs—after hospitals implement formulary restriction or preauthorization as part of antimicrobial stewardship.\textsuperscript{4} It has been difficult to demonstrate additional benefits associated with this approach, although there is some support that it helps improve the antimicrobial susceptibilities of certain gram-negative pathogens.\textsuperscript{8}

**Supplemental Antimicrobial Stewardship Strategies**

As mentioned earlier, Table 4-2 and Table 4-3 present a number of additional options to improve antimicrobial stewardship that supplement the two core strategies described previously.

Education is generally considered to be an essential component of an effective ASP, but it usually does not have a lasting impact on providers’ behavior unless it is incorporated with other active interventions.\textsuperscript{1} In particular, the large-group or grand-rounds type of education, in which an individual describes what needs to be done and why, typically does not engender permanent behavioral change. This educational mode might elicit some short-term behavioral modifications, but long-lasting change at the provider level requires consistent and repeated educational endeavors. Such large-group educational approaches are more effective and appropriate when used as a forum to describe or garner support for a new ASP or intervention rather than teaching a specific practice. One educational strategy that some hospitals have found useful is “academic detailing,” which utilizes antimicrobial stewardship staff or other medical staff to educate physicians individually.\textsuperscript{9}
Using an ASP as a mechanism to adapt national guidelines to local antimicrobial use and resistance patterns, then implementing these local guidelines or critical pathways, is another effective strategy hospitals can implement to improve antimicrobial stewardship. National guidelines generally enjoy widespread support, but they commonly lack specific information about how to implement recommendations at a given hospital or how to incorporate local data to make them relevant for decision making.

Information technology (IT) also can be adapted to healthcare delivery and prescriber support to improve antimicrobial stewardship. IT includes computer decision support and alert systems; computerized physician order entry; electronic medical records; electronic retrieval of treatment guidelines and clinical texts; data mining; and handheld tablet or smartphone applications that provide information on pathogens, diagnoses, medications, and treatments. In addition, computer-based surveillance and Web-based systems for antimicrobial approval, automated clinical decision support, and enhanced real-time communication between prescribers and other members of antimicrobial stewardship teams show promise for ASPs.

One strategy for improving antimicrobial stewardship not mentioned in the IDSA/SHEA guidelines, but which might become increasingly important in the future, is rapid molecular diagnostic testing. This testing method allows physicians to identify causative pathogens and rule out certain pathogens quickly, which should enable better decision making regarding which antimicrobial to administer. Using polymerase chain reaction (PCR) to test for respiratory viruses is one such promising strategy because it can potentially facilitate the discontinuation of antimicrobial therapy for infections due to viruses. PCR or fluorescence in situ hybridization also can allow for more rapid identification of blood culture pathogens, which facilitates antimicrobial streamlining or identification of blood culture contamination.

Using Change Bundles

Another physician-specific approach that can be used to improve antimicrobial therapy involves using a change bundle based on driver diagrams that examine the primary forces that affect antimicrobial decision making. The bundle concept was first proposed by the Institute for Healthcare Improvement and has been used to successfully develop several healthcare-associated infection interventions.10 The change bundle contains a set of interventions that clinicians, nurses, and ancillary staff can follow to correctly administer antimicrobial therapy to individual patients. Examples of antimicrobial interventions include obtaining appropriate cultures prior to therapy, reconciling and adjusting antimicrobials at all care transitions or handoffs, and de-escalating antimicrobials at 72 hours. The goal of using change bundles is for clinicians to follow correct prescribing behavior without intervention from an ASP team member or other staff member. Antimicrobial stewardship change bundles will likely be available in the near future and appear to be promising additions to clinicians’ tool kits to help them improve patient care.

Identifying Potential Targets

There are numerous improvement strategies an ASP may employ to improve antimicrobial stewardship and many areas of practice where these strategies may be employed. It is important for a hospital to select the improvement areas and interventions that are most appropriate to their individual facility. The following sections discuss the various sources of information that can help a hospital identify potential targets to improve its ASP:

- **Drug usage reports:** It is important for antimicrobial stewardship teams to monitor antibiotic usage. Usage reports can identify high-use and high-expense antimicrobials that may benefit from stewardship efforts. They can also identify areas of potential antimicrobial misuse (e.g., an excessive amount of antipseudomonal antibiotics used in orthopedic patients). Module 5 provides additional information about these reports.

- **Microbiologic data:** These data can highlight unusual or increasing resistance patterns.

- **Published reports:** With the increased focus on antimicrobial stewardship, the number of published articles addressing important stewardship issues is growing. A possible area for investigation might be identified from a report of stewardship-program activities at another hospital or from researchers who report an area of
potential antimicrobial misuse. For example, ASP team members who read an article in which a hospital frequently treated skin and soft-tissue infections (SSTIs) with excessively broad-spectrum antibiotics may be inspired to look at the practices associated with treating SSTIs at their own institution.4

- **Professional guidelines:** Various professional organizations periodically publish guidelines for the treatment of different ID. For example, many clinicians find the guidelines published by the IDSA particularly helpful.1 A hospital may want to compare its antimicrobial use to that outlined in practice guidelines and develop initiatives to correct any inconsistencies.

- **Benchmarking:** Stewardship teams can identify potential areas for improvement by comparing antimicrobial use at their hospital to that of other similar facilities. Several hospital and health-system alliances have resources available for antimicrobial stewardship benchmarking. For example, one consortium allows members to compare many different antimicrobial usage measures, such as anti-infective cost by diagnosis-related group and the use of a specific antibiotic or group of antibiotics. Other medical consortiums are developing similar benchmarking resources. Ultimately, the National Healthcare Safety Network database, sponsored by the Centers for Disease Control and Prevention, will allow hospitals across the United States to benchmark their antimicrobial data. This reporting system is also developing an antimicrobial-use database that can integrate electronic hospital antimicrobial utilization data into a national comparative information system.

- **Medication use evaluations and other hospital investigations:** Evaluations that characterize the use of antimicrobials and/or the treatment of particular ID within hospitals often help identify areas that need improvement. Module 5 contains information about the medication use evaluation process.

- **Observations of pharmacists and other clinicians:** Clinicians who work in a hospital can serve as excellent sources of information about antimicrobial use within their facilities, and they should be encouraged to notify members of the ASP team about observations that concern them. These observations may concern potentially inappropriate antimicrobial prescribing habits or abnormal resistance patterns. It also may be informative to ask a clinical pharmacist about how antimicrobials are used in the areas in which they practice. For example, a pharmacist may be asked the following questions:
  - Are the physicians in your area of practice likely to de-escalate therapy based on culture results?
  - How often do these physicians treat asymptomatic bacteriuria?
  - What disease states appear to receive empiric therapy with an excessively broad spectrum of activity?
  - Are there physicians who are in particular need of assistance with these issues?

**Selecting Improvement Initiatives**

An ASP should use the following key factors to determine which initiatives it should pursue:

- **Impact:** An ASP should focus its efforts on initiatives that make a significant positive impact on the quality, safety, and/or cost of patient care. The clinical and economic impacts are sometimes evaluated separately because some interventions may have a huge clinical impact but a negligible financial impact (eg, ensuring that patients with *Staphylococcus aureus* bacteremia receive appropriate therapy), while others may have a significant financial impact but minimal clinical impact (eg, implementing a program to switch from intravenous to oral administration).

- **Political expediency:** Hospitals are political organizations, so individuals must be aware of the ramifications of certain decisions. For example, it is probably not wise for an ASP team to select a project that alienates half the medical staff. Teams instead should look for win-win initiatives—those that achieve the goals of the ASP as well as the goals of others who are involved in patient care. Political astuteness is an important quality of a successful stewardship program (this point is also reinforced in Module 2).
• **Resources required:** An ASP should choose initiatives that are consistent with the resources at their disposal. If a lack of resources is the main deterrent to the implementation of many important initiatives, the ASP should use this fact to try to obtain the necessary resources.

• **Ease of implementation:** Some initiatives are easier to implement than others, regardless of the hospital. An ASP should consider whether the potential benefits of the initiative are worth the effort. Figure 4-1 below provides a tool that can help an ASP decide which initiatives to pursue by assigning each a score, which allows them to be ranked. Although an ASP team does not need to adhere strictly to the prioritization of the initiatives based solely on the total score, the team can ascertain a general sense of the ideas that should be given the strongest consideration.

An ASP team should also realize that the program does not need to begin by implementing the “final version” of an initiative. Some programs may need to start out small and expand as resources and acceptance increase. For example, an ASP initially may include only 3 antimicrobials on its list of drugs that require preauthorization, although it would eventually like to restrict 10, or the team may be able to conduct prospective audit and feedback only for patients in intensive care units rather than for the entire hospital.

<table>
<thead>
<tr>
<th>Figure 4-1. Antimicrobial Stewardship Initiatives Decision Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Factors</strong></td>
</tr>
<tr>
<td><strong>Potential Initiative</strong></td>
</tr>
</tbody>
</table>
| An ASP can use this decision matrix to prioritize potential initiatives to help decide which ones it should implement. Potential initiatives are listed in the left-hand column. Key factors for each initiative are scored on a scale from 0 to 5 in the middle columns. The initiative in each row is then totaled in the right-hand column.
Overcoming Barriers

As with any large, multifaceted, and multidisciplinary initiative that relies on changing clinician behavior in healthcare facilities, barriers and obstacles will emerge. These hurdles usually develop during the planning and early implementation phases of an ASP, but they also can occur at any stage and even challenge well-established programs. Potential barriers to a successful ASP and possible solutions are listed in Table 4-4 below. Community hospitals are more likely to encounter barriers related to financial and human resources, while all medical centers might run into opposition from medical staff that stems from a perceived loss of autonomy. It is important for an ASP team to remember that improving patient care ultimately is in the best interest of the patient, and barriers should therefore be removed. See Module 2 for a discussion of barriers to approvals and implementation of an ASP.

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Possible Solutions</th>
</tr>
</thead>
</table>
| Lack of funding for personnel | • Create a business plan to present to hospital leadership to request additional funds. An ASP saves money and pays for itself (see Module 2 for more information about the business case for an ASP, including a sample business plan).  
• Implement an unfunded pilot for six months using available clinical pharmacist and physician-champion volunteers to show potential cost savings to justify the budget.  
• Use guidelines/clinical pathways or change bundles to affect physician prescribing. Monitor compliance with clinical pharmacists or nurses and communicate this information to medical staff leadership. |
| Inability to recruit an infectious diseases (ID) physician champion team leader | • Contract with an ID physician at another hospital to provide prospective audit and feedback using telemedicine and/or electronic medical records.  
• Contract with a hospitalist or other specialty clinician to fill this role. |
| Inability to recruit an ID clinical pharmacist | • Use or hire a non-ID clinical pharmacist and provide supplemental training.  
• Use clinical pharmacists in other specialty areas as extensions of the physician champion or sole ID clinical pharmacist. |
| Lack of medical staff/clinician support | • Work with medical staff leadership early in the process.  
• Enlist the help of the hospital quality/patient safety officer.  
• Enlist and develop thought leaders from “problem” specialties with help from the antimicrobial stewardship committee.  
• Employ large-group education that highlights problems with antimicrobial resistance or C difficile infections.  
• Rely more on prospective audit and feedback, which may be accepted better than formulary restriction. |
| Outlier physicians | • Measure and audit usage by these physicians.  
• Benchmark antimicrobial utilization by these physicians against other physicians in the practice or group.  
• Work with these physicians to understand their antimicrobial needs and patient usage.  
• Have the physician champion work with the outlier’s medical staff department head or chief medical officer.  
• Work with the outlier’s medical staff credentialing committee. |
It is usually better to avoid barriers than to run into them. Presenting the idea that an ASP serves as a patient advocate to the right audience may help team members succeed in dismantling barriers. Another approach to overcoming barriers is to network and share common problems and solutions with individuals who have developed and have staffed ASPs. ASP team members can network at local and national meetings and workshops and through various professional organizations and online resources, such as listservs, blogs, and online communities. Education and thought-leader development are other strategies that can be implemented prior to initiating an intervention, particularly if there is medical staff opposition. Preparing stakeholders for change before the change actually occurs is important.

**Improving Antimicrobial Stewardship: A Performance Improvement Perspective**

The appendix below, and on the pages following, describes how hospitals can use change management tools (developed by General Electric) to create change in an ASP to improve antimicrobial usage.

**Conclusion**

An ASP is charged with a difficult task: improving the usage of a class of medications that are ubiquitous within health care. To succeed in this critical endeavor, it is important for hospitals to tailor their stewardship efforts to the needs, personnel, and political structure of their institution. Employing a structure that incorporates strong physician leadership and an active Antimicrobial Stewardship Committee can enhance the program’s effectiveness in accomplishing the difficult task of improving antimicrobial use. Interventions, strategies, and their targets should be selected to maximize the benefit within individual hospitals. Barriers will be encountered in most hospitals; therefore, ASPs need to be flexible, adaptable, and resilient to be successful.

**Appendix**

**Change Acceleration Process Model**

The conceptual model presented in Figure 4-2 on page 42 illustrates the various components present in all ASPs and depicts the numerous external and internal factors that can affect all hospitals and that can lead to change (see Module 2 for more information about this model). This module describes how hospitals can “execute” change in a variety of ways.
This model conceptualizes factors that are critical to the success of ASPs and that can engender change.

The following four key factors are necessary to ensure success when implementing change within a hospital:

1. **Pressure for change**: Demonstrates the commitment of leadership and key stakeholders
2. **Clear, shared vision**: Allows individuals to share the need to improve patient care
3. **Capacity for change**: Requires resources, time, and money
4. **Action and performance**: Implemented through the Plan-Do-Study-Act or the Plan-Do-Check-Act cycle (see Module 2 for more information about these cycles)

The following sections describe how an ASP can use change models to improve antimicrobial stewardship.

**Change Management and the Change Effectiveness Equation**

In the 1990s, the General Electric (GE) corporation investigated hundreds of projects and business initiatives to study change management best practices. One of their insights was that a high-quality technical strategy solution is insufficient to guarantee success. An astonishingly high percentage of failed projects had excellent technical plans, but the GE team found that failure was usually due to a lack of attention to the cultural factors that derail a project. GE defined failure as not achieving the anticipated benefits of a project.

The GE team also developed the Change Acceleration Process (CAP) model. As part of CAP, the GE team developed the Change Effectiveness Equation, \( Q \times A = E \), as a simple way to describe change. Translated to English, this equation reads: The effectiveness \( E \) of any initiative is equal to the product of the quality \( Q \) of the technical strategy and the acceptance \( A \) of that strategy. In other words, paying attention to the people side of the equation is as important to the success of an initiative as the technical side. It is interesting to note that the team used a multiplicative relationship, meaning that if the acceptance factor is zero, the total effectiveness of the initiative will be zero, regardless of the quality of the technical strategy. Components of GE’s CAP model can be applied to the creation of an ASP.
The Change Acceleration Process Model

The CAP model consists of the following seven key essential components that can be applied to an ASP12 (see Figure 4-3 below):

1. **Leading change**: Realistic, committed leadership throughout the duration of an initiative is essential for success. From a project management perspective, there is a significant risk of failure if hospital staff perceive a lack of commitment on the part of leadership.

2. **Creating a shared need**: The need for change must outweigh resistance to change. Compelling reasons to change should be present and should resonate not only with leadership but also with all stakeholders interested in antimicrobial stewardship (as identified throughout the modules). An ASP should create this shared need: Companies and healthcare organizations cannot fulfill their commitments or adapt well to change unless all leaders practice the discipline of execution at all levels. Creating a shared need, breaking down tactics operationally, and gaining multidisciplinary support for change enables sustainability and successful execution.

3. **Shaping a vision**: Leadership should provide a clearly articulated vision that is widely understood and shared. This vision may be the single most critical factor ensuring a successful change initiative. Every journey should have a destination; otherwise, participants are merely wandering. The end product of that vision should be described in behavioral terms; ie, observable, measurable terms. The results should be expressed in terms of individual behavior, not financial terms.

4. **Mobilizing commitment**: After an ASP team gains leadership support, develops a compelling logic for change, and articulates a clear vision of the future, the necessary ingredients for success are present. The team can then develop support for the program to build momentum. If the team can leverage “early adopters” and pilot the project in areas with low resistance, it can learn from potential mistakes with partners who are forgiving.
5. **Making change last:** After completing successful antimicrobial stewardship improvement pilot projects, an ASP team should assess the factors that are helping and hindering a new process. The team should leverage early wins by transferring the knowledge and best practices gained in these pilots to the larger organization.

6. **Monitoring progress:** It is important for an ASP team to measure the progress of its change initiatives. The team should ask itself: Is the change real? How will change be measured? The team needs to set benchmarks, realize these, and celebrate success. Similarly, the team needs to establish accountability for a lack of progress in initiatives.

7. **Changing systems and structures:** Every hospital has underlying systems and structures, such as IT systems, training and education programs, systems to allocate resources, organizational design, and standard operating and workflow procedures. These systems are designed to support the current state of the hospital. After a change is implemented, a hospital should ensure that all systems align with the desired, future state of the hospital, so behavioral issues will not push the organization back to old systems and structures. To make change permanent, an ASP should systematically identify how systems and structures influence the behavior that it is trying to change and should modify these appropriately.

In summary, Dwight D. Eisenhower’s quote clearly aligns with the core values and beliefs within the CAP model: “Leadership is getting others to do what you want them to do because they want to do it!” This approach can also be used to help ASPs succeed in their efforts to improve antimicrobial stewardship within hospitals.

**References**


Antibiotics
Know the facts
- Antibiotics are life-saving drugs when used wisely.
- Antibiotics treat infections caused by bacteria. They do not work on viruses that cause colds and flu.
- Each year, almost 2 million people in the U.S. become infected with bacteria that antibiotics can’t treat. These bacteria no longer respond to antibiotics. At least 23,000 people die each year from these infections.
- A reaction to an antibiotic may require a visit to the ER, especially for kids.
- Antibiotics also kill good bacteria in your body. This may lead to other problems like diarrhea or yeast infections.

When do you really need an antibiotic?

<table>
<thead>
<tr>
<th>Illness</th>
<th>Virus</th>
<th>Bacteria</th>
<th>Should you expect an antibiotic?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronchitis (in healthy children and adults)</td>
<td>✓</td>
<td>✓</td>
<td>Maybe be recommended</td>
</tr>
<tr>
<td>Cold or runny nose</td>
<td>✓</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Ear infection</td>
<td>✓</td>
<td>✓</td>
<td>Maybe be recommended</td>
</tr>
<tr>
<td>Flu</td>
<td>✓</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Fluid in the middle ear</td>
<td>✓</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Sinus infection</td>
<td>✓</td>
<td>✓</td>
<td>Maybe be recommended</td>
</tr>
<tr>
<td>Sore throat (except strep)</td>
<td>✓</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Strep throat</td>
<td>✓</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>✓</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Questions to ask when you are given an antibiotic:
- Why do you need it?
- What kind of infection do you have? Is this the best drug for it?
- How long should you take it?
- Will you get better without it?
- What are the side effects?
- Will it interact with other drugs?
- How and when should you take it?

Antibiotic do’s and don’ts

Do
- Take it exactly as your health care provider says
- Take only the drugs prescribed for you
- Prevent infections by washing your hands and getting vaccinated

Don’t
- Skip doses
- Share the drugs with others
- Insist on an antibiotic if your health care provider doesn’t think you should have one

Taking antibiotics when you don’t need them doesn’t make sense!
- How you use antibiotics today will affect how well the drugs work tomorrow for everyone.
- It takes many years to develop new antibiotics. We need to improve the use of the drugs currently available.
- One of the world’s biggest health threats is from bacterial infections that no longer respond to antibiotics. Everyone must work together to use antibiotics wisely.

For more information
Association for Professionals in Infection Control and Epidemiology (APIC)
Centers for Disease Control and Prevention (CDC)

The goal of Speak Up™ is to help patients and their advocates become active in their care.
NOTE: The three articles that follow, “Get Smart for Healthcare and Get Smart About Antibiotics Week,” “Checklist for Core Elements of Hospital Antibiotic Stewardship Programs,” and “CDC Vital Signs: Making Health Care Safer – Antibiotic Rx in Hospitals: Proceed with Caution” are drawn from the Centers for Disease Control and Prevention’s Get Smart for Healthcare initiative. For more information, please visit http://www.cdc.gov/getsmart/healthcare/
Get Smart for Healthcare and Get Smart About Antibiotics Week

Overview
Get Smart for Healthcare is a CDC campaign focused on improving prescribing practices in inpatient healthcare facilities. Studies indicate that 30-50% of antibiotics prescribed in hospitals are unnecessary or inappropriate. There is no doubt that overprescribing and misprescribing is contributing to the growing challenges posed by *Clostridium difficile* and antibiotic-resistant bacteria. Studies demonstrate that improving prescribing practices in hospitals can not only help reduce rates of *Clostridium difficile* infection and antibiotic resistance, but can also improve individual patient outcomes, all while reducing healthcare costs.

Get Smart for Healthcare is focused on improving antibiotic use in inpatient healthcare settings such as acute-care facilities through the implementation of antibiotic stewardship programs designed to ensure that hospitalized patients receive the right antibiotic, at the right dose, at the right time, and for the right duration. Antimicrobial stewardship interventions have been proven to improve individual patient outcomes, reduce the overall burden of antibiotic resistance, and save healthcare dollars. If everyone — healthcare providers, hospital administrators, policy makers, and patients — works together to employ effective antibiotic stewardship programs, we can improve patient care, more effectively combat antibiotic resistance and ultimately save lives.

Fast Facts
- Antibiotics are a shared resource – and becoming a scarce resource.
- 30-50% of antibiotic use in hospitals is unnecessary or inappropriate.
- Antibiotic overuse contributes to the growing problems of *Clostridium difficile* infection and antibiotic resistance in healthcare facilities.
- Reducing unnecessary antibiotic use can decrease antibiotic resistance, *Clostridium difficile* infections, and healthcare costs, and improve patient outcomes.
- Interventions to improve antibiotic use can be implemented in any healthcare setting—from the smallest to the largest.
- Improving antibiotic use is a medication-safety and patient-safety issue.

Get Smart About Antibiotics Week
Get Smart About Antibiotics Week is an annual one-week observance to raise awareness of antibiotic resistance and the importance of appropriate antibiotic prescribing and use.

Each year in the United States, at least 2 million people become infected with bacteria that are resistant to antibiotics and at least 23,000 people die as a direct result of these infections. Many more people die from other conditions that were complicated by an antibiotic-resistant infection.

On September 18, 2014, the White House announced an Executive Order stating that the Federal Government will work domestically and internationally to detect, prevent, and control illness and death related to antibiotic-resistant infections by implementing measures that reduce the emergence and spread of antibiotic-resistant bacteria and help ensure the continued availability of effective therapeutics for the treatment of bacterial infections.

The use of antibiotics is the single most important factor leading to antibiotic resistance around the world. Antibiotics are among the most commonly prescribed drugs used in human medicine. However, up to 50% of all the antibiotics prescribed for people are not needed or are not optimally effective as prescribed. Antibiotics are also commonly used for promoting growth in food animals, one type of use that is not necessary.
Get Smart About Antibiotics Week 2016

During November 14-20, 2016, the annual Get Smart About Antibiotics Week will be observed. The observance is a key component of CDC’s efforts to improve antibiotic stewardship in communities, in healthcare facilities, and on the farm in collaboration with state-based programs, nonprofit partners, and for-profit partners. The one-week observance raises awareness of the threat of antibiotic resistance and the importance of appropriate antibiotic prescribing and use.

The observance is an international collaboration, coinciding with:
• European Antibiotic Awareness Day
• Australia's Antibiotic Awareness Week
• Canada's Antibiotic Awareness Week

Activities and Events

You can participate in Get Smart About Antibiotics Week events, or host your own. CDC’s Get Smart: Know Antibiotics Work program has developed a guidance document to assist you with implementing activities and events.

Activity Ideas

The Get Smart programs offer partners many collaborative opportunities to promote appropriate antibiotic use and prescribing. Below are examples of just a few of our partners’ activities:
• Highlight Get Smart Week on your website
• Use Get Smart Week as a kickoff to begin a stewardship program
• Collaborate with CDC and local-level programs on projects
• Exchange in-kind services with CDC and local-level programs
• Provide assistance to local-level programs in producing educational materials or sponsoring events
• Issue a press release
• Distribute educational materials to the general public
• Distribute tools and guidelines to healthcare professionals and facilities
• Host local-level events
• Deliver presentations to interested parties
• Post social media messages and participate in the annual Twitter chat
• Share information with your organization’s membership through e-mail or newsletters
• Include print materials or information in Explanation of Benefits statements
• Promote placement of matte articles in local media
• Place ads in local or national media (free standing inserts, print ads, television or radio ads, etc.)
• Include content in employee education materials
• Distribute materials at medical conferences and exhibits
• Develop a local government proclamation

In Summary, Get Smart About Antibiotics Week can be an effective tool to increase knowledge about antibiotic resistance and the importance of using antibiotics effectively.
Checklist for Core Elements of Hospital Antibiotic Stewardship Programs

The following checklist is a companion to *Core Elements of Hospital Antibiotic Stewardship Programs*. This checklist should be used to systematically assess key elements and actions to ensure optimal antibiotic prescribing and limit overuse and misuse of antibiotics in hospitals. CDC recommends that all hospitals implement an Antibiotic Stewardship Program.

Facilities using this checklist should involve one or more knowledgeable staff to determine if the following principles and actions to improve antibiotic use are in place. The elements in this checklist have been shown in previous studies to be helpful in improving antibiotic use though not all of the elements might be feasible in all hospitals.

<table>
<thead>
<tr>
<th>LEADERSHIP SUPPORT</th>
<th>ESTABLISHED AT FACILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.</strong> Does your facility have a formal, written statement of support from leadership that supports efforts to improve antibiotic use (antibiotic stewardship)?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td><strong>B.</strong> Does your facility receive any budgeted financial support for antibiotic stewardship activities (e.g., support for salary, training, or IT support)?</td>
<td>□ Yes □ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACCOUNTABILITY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.</strong> Is there a physician leader responsible for program outcomes of stewardship activities at your facility?</td>
<td>□ Yes □ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DRUG EXPERTISE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A.</strong> Is there a pharmacist leader responsible for working to improve antibiotic use at your facility?</td>
<td>□ Yes □ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KEY SUPPORT FOR THE ANTIBIOTIC STEWARDSHIP PROGRAM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Does any of the staff below work with the stewardship leaders to improve antibiotic use?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>B.</strong> Clinicians</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td><strong>C.</strong> Infection Prevention and Healthcare Epidemiology</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td><strong>D.</strong> Quality Improvement</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td><strong>E.</strong> Microbiology (Laboratory)</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td><strong>F.</strong> Information Technology (IT)</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td><strong>G.</strong> Nursing</td>
<td>□ Yes □ No</td>
</tr>
</tbody>
</table>
## ACTIONS TO SUPPORT OPTIMAL ANTIBIOTIC USE

### POLICIES

| A. Does your facility have a policy that requires prescribers to document in the medical record or during order entry a dose, duration, and indication for all antibiotic prescriptions? | □ Yes □ No |
| B. Does your facility have facility-specific treatment recommendations, based on national guidelines and local susceptibility, to assist with antibiotic selection for common clinical conditions? | □ Yes □ No |

### SPECIFIC INTERVENTIONS TO IMPROVE ANTIBIOTIC USE

*Are the following actions to improve antibiotic prescribing conducted in your facility?*

### BROAD INTERVENTIONS

| C. Is there a formal procedure for all clinicians to review the appropriateness of all antibiotics 48 hours after the initial orders (e.g. antibiotic time out)? | □ Yes □ No |
| D. Do specified antibiotic agents need to be approved by a physician or pharmacist prior to dispensing (i.e., pre-authorization) at your facility? | □ Yes □ No |
| E. Does a physician or pharmacist review courses of therapy for specified antibiotic agents (i.e., prospective audit with feedback) at your facility? | □ Yes □ No |

### PHARMACY-DRIVEN INTERVENTIONS

*Are the following actions implemented in your facility?*

| F. Automatic changes from intravenous to oral antibiotic therapy in appropriate situations? | □ Yes □ No |
| G. Dose adjustments in cases of organ dysfunction? | □ Yes □ No |
| H. Dose optimization (pharmacokinetics/pharmacodynamics) to optimize the treatment of organisms with reduced susceptibility? | □ Yes □ No |
| I. Automatic alerts in situations where therapy might be unnecessarily duplicative? | □ Yes □ No |
| J. Time-sensitive automatic stop orders for specified antibiotic prescriptions? | □ Yes □ No |

### DIAGNOSIS AND INFECTIONS SPECIFIC INTERVENTIONS

*Does your facility have specific interventions in place to ensure optimal use of antibiotics to treat the following common infections?*

| K. Community-acquired pneumonia | □ Yes □ No |
| L. Urinary tract infection | □ Yes □ No |
| M. Skin and soft tissue infections | □ Yes □ No |
| N. Surgical prophylaxis | □ Yes □ No |
| O. Empiric treatment of Methicillin-resistant Staphylococcus aureus (MRSA) | □ Yes □ No |
### Joint Commission Resources

#### Infection Control: Reducing Antibiotic Overuse

<table>
<thead>
<tr>
<th>Process Measures</th>
<th>Measure Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Does your stewardship program monitor adherence to a documentation policy (dose, duration, and indication)?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>B. Does your stewardship program monitor adherence to facility-specific treatment recommendations?</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>C. Does your stewardship program monitor compliance with one of more of the specific interventions in place?</td>
<td>□ Yes □ No</td>
</tr>
</tbody>
</table>

#### Antibiotic Use and Outcome Measures

<table>
<thead>
<tr>
<th>Measure Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Does your facility track rates of C. difficile infection?</td>
</tr>
<tr>
<td>E. Does your facility produce an antibiogram (cumulative antibiotic susceptibility report)?</td>
</tr>
</tbody>
</table>

**Does your facility monitor antibiotic use (consumption) at the unit and/or facility wide level by one of the following metrics:**

<table>
<thead>
<tr>
<th>Measure Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>F. By counts of antibiotic(s) administered to patients per day (Days of Therapy; DOT)?</td>
</tr>
<tr>
<td>G. By number of grams of antibiotics used (Defined Daily Dose, DDD)?</td>
</tr>
<tr>
<td>H. By direct expenditure for antibiotics (purchasing costs)?</td>
</tr>
</tbody>
</table>

#### Reporting Information to Staff on Improving Antibiotic Use and Resistance

<table>
<thead>
<tr>
<th>Measure Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Does you stewardship program share facility-specific reports on antibiotic use with prescribers?</td>
</tr>
<tr>
<td>B. Has a current antibiogram been distributed to prescribers at your facility?</td>
</tr>
<tr>
<td>C. Do prescribers ever receive direct, personalized communication about how they can improve their antibiotic prescribing?</td>
</tr>
</tbody>
</table>

#### Education

<table>
<thead>
<tr>
<th>Measure Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Does your stewardship program provide education to clinicians and other relevant staff on improving antibiotic prescribing?</td>
</tr>
</tbody>
</table>
Antibiotics save lives, but poor prescribing practices are putting patients at unnecessary risk for preventable allergic reactions, super-resistant infections, and deadly diarrhea. Errors in prescribing decisions also contribute to antibiotic resistance, making these drugs less likely to work in the future.

To protect patients and preserve the power of antibiotics, hospital CEOs/medical officers can:

◊ Adopt an antibiotic stewardship program that includes, at a minimum, this checklist:

1. **Leadership commitment**:dedicate necessary human, financial, and IT resources.
2. **Accountability**: appoint a single leader responsible for program outcomes. Physicians have proven successful in this role.
3. **Drug expertise**: appoint a single pharmacist leader to support improved prescribing.
4. **Act**: take at least one prescribing improvement action, such as requiring reassessment within 48 hours, to check drug choice, dose, and duration.
5. **Track**: monitor prescribing and antibiotic resistance patterns.
6. **Report**: regularly report to staff prescribing and resistance patterns, and steps to improve.
7. **Educate**: offer education about antibiotic resistance and improving prescribing practices.

◊ Work with other health care facilities to prevent infections, transmission, and resistance.

See page 4

Want to learn more? Visit

www.cdc.gov/vitalsigns
Problem

Antibiotic prescribing practices vary widely and errors are common.

◊ About half of patients receive an antibiotic for at least one day during the course of an average hospital stay.
◊ The most common types of infections for which hospital clinicians wrote antibiotic prescriptions were lung infections (22%), urinary tract infections (14%), and suspected infections caused by drug-resistant *Staphylococcus* bacteria, such as MRSA (17%).
◊ About 1 out of 3 times, prescribing practices to treat urinary tract infections and prescriptions for the critical and common drug vancomycin included a potential error – given without proper testing or evaluation, or given for too long.
◊ Doctors in some hospitals prescribed up to 3 times as many antibiotics as doctors in similar areas of other hospitals. This difference suggests the need to improve prescribing practices.

Poor prescribing puts patients at risk.

◊ Although antibiotics save lives (for example, in the prompt treatment of sepsis, a life-threatening infection throughout the body), they can also put patients at risk for a *Clostridium difficile* infection, deadly diarrhea that causes at least 250,000 infections and 14,000 deaths each year in hospitalized patients.
◊ Decreasing the use of antibiotics that most often lead to *C. difficile* infection by 30% (this is 5% of overall antibiotic use) could lead to 26% fewer of these deadly diarrheal infections. These antibiotics include fluoroquinolones, β-lactams with β−lactamase inhibitors, and extended-spectrum cephalosporins.
◊ Patients getting powerful antibiotics that treat a broad range of infections are up to 3 times more likely to get another infection from an even more resistant germ.

Every time antibiotics are prescribed:

1. Order recommended cultures before antibiotics are given and start drugs promptly.
2. Make sure indication, dose, and expected duration are specified in the patient record.
3. Reassess within 48 hours and adjust Rx if necessary or stop Rx if indicated.

Specific recommendations for common prescribing situations:

**Rx for urinary tract infections**
- Make sure that culture results represent true infection and not just colonization.
- Assess patient for signs and symptoms of UTI.
- Make sure that urinalysis is obtained with every urine culture.
- Treat for recommended length of time and ensure that planned post-discharge treatment takes into account the antibiotics given in the hospital.

**Rx for pneumonia**
- Make sure that symptoms truly represent pneumonia and not an alternate, non-infectious diagnosis.
- Treat for the recommended length of time and ensure that planned post-discharge treatment takes into account the antibiotics given in the hospital.

**Rx for MRSA infections**
- Verify that MRSA is growing in clinically relevant cultures. Do not use vancomycin to treat infections caused by methicillin-susceptible staph (and not MRSA).

SOURCE: CDC Vital Signs, 2014
While in the hospital for surgery, George develops a fever and feels pain when he urinates.

The doctor thinks George has a urinary tract infection (UTI). Following the hospital’s UTI guideline, the doctor orders urine cultures to see if George has bacteria in his urinary tract (bladder, kidneys).

At the same time, the doctor prescribes antibiotics and includes the dose, duration, and indication in the patient record.

In keeping with the antibiotic stewardship policy, the doctor reassesses the prescription 2 days later. Based on test results and patient exam, she puts George on a better antibiotic for a shorter time.

The doctor’s clear notes showing dose, duration, and indication give other doctors and nurses information they need to provide George with the best medical care.

Improving antibiotic prescribing in hospitals

Key moments for improving the cycle of antibiotic prescribing practices

SOURCE: CDC Vital Signs, 2014
What Can Be Done

The Federal government is
◊ Expanding the National Healthcare Safety Network to help hospitals track antibiotic use and resistance.
◊ Sharing prescribing improvement recommendations and tools with clinicians and administrators.
www.cdc.gov/getsmart/healthcare
◊ Supporting networks testing new prescribing improvement strategies.
◊ Helping hospitals and health departments create regional programs to improve antibiotic prescribing.
◊ Improving health care for veterans by launching antibiotic stewardship programs in Veteran's Health Administration hospitals.
◊ Providing incentives for development of new antibiotics.

State and local health departments can
◊ Gain an understanding of antibiotic stewardship activities in the state or area.
◊ Facilitate efforts to improve antibiotic prescribing and prevent antibiotic resistance.
◊ Provide educational tools to facilities to help prescribers improve practices.

Hospital CEOs/medical officers can
◊ Adopt an antibiotic stewardship program that includes, at a minimum, this checklist:

1. **Leadership commitment**: Dedicate necessary human, financial, and IT resources.
2. **Accountability**: Appoint a single leader responsible for program outcomes. Physicians have proven successful in this role.
3. **Drug expertise**: Appoint a single pharmacist leader to support improved prescribing.
4. **Act**: Take at least one prescribing improvement action, such as requiring reassessment within 48 hours, to check drug choice, dose, and duration.
5. **Track**: Monitor prescribing and antibiotic resistance patterns.
6. **Report**: Regularly report to staff prescribing and resistance patterns, and steps to improve.
7. **Educate**: Offer education about antibiotic resistance and improving prescribing practices.
◊ Work with other health care facilities to prevent infections, transmission, and resistance.

Doctors and other hospital staff can
◊ Prescribe antibiotics correctly – get cultures, start the right drug promptly at the right dose for the right duration. Reassess the prescription within 48 hours based on tests and patient exam.
◊ Document the dose, duration and indication for every antibiotic prescription.
◊ Stay aware of antibiotic resistance patterns in your facility.
◊ Participate in and lead efforts within your hospital to improve prescribing practices.
◊ Follow hand hygiene and other infection control measures with every patient.

Hospital patients can
◊ Ask if tests will be done to make sure the right antibiotic is prescribed.
◊ Be sure everyone cleans their hands before touching you. If you have a catheter, ask each day if it is necessary.

For more information, please contact
Telephone: 1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348
Web: www.cdc.gov
Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Publication date: 3/4/2014
Appendix A: Additional Resources

Print Resources

*JCR* periodical articles can be purchased on PubMed via Ingenta (http://www.ingentaconnect.com/).

Electronic Resources

The Joint Commission: http://www.jointcommission.org
Joint Commission Resources: http://www.jcrinc.com/

NOTE: The Internet is an ever-evolving environment and links are subject to change without notice.
Appendix B: Faculty Biographies

**NOTE:** These presenters do not have any financial arrangements or affiliations with corporate organizations that either provide educational grants to this program or may be referenced in this activity. These presenters have also attested that their discussions will not include any unapproved or off-label use of products.

**Don R. Janczak MS, PharmD, BCPS, CPHQ**
Consultant
Joint Commission Resources, Inc.

Don Janczak brings to Joint Commission Resources (JCR) over 30 years of clinical and administrative health system pharmacy experience. Dr. Janczak has held several positions within a variety of healthcare organizations, including roles in the area of clinical pharmacist, clinical coordinator of pharmacy services, pharmacy supervisor, and his current position as System Director of Pharmacy Services for Mercy Rockford Health System, an integrated healthcare delivery system located in Southcentral Wisconsin and Northern Illinois. Dr. Janczak has over 15 years of experience in the academic setting as clinical faculty and lecturer for the University of Wisconsin – Milwaukee College of Nursing. He has lectured in the area of pharmacology for both the undergraduate and graduate level nursing programs. His primary area of responsibility includes organizing and presenting course material for the graduate level nursing program in the area of advanced pharmacology and its application to advanced nursing practice. Dr. Janczak brings to JCR previous experience as a hospital surveyor for The Joint Commission on an intermittent basis for over two years ending in 2014.

Dr. Janczak has experience leading teams in the provision of evidence-based clinical practice decision-making about drug use, controlling pharmaceutical expenses, patient safety and regulatory compliance, formulary management, and maximizing patient and organizational benefit through the use of pharmacy services across a continuum of care. He has a strong knowledge of pharmaceutical supply chain, clinical therapeutics, physician prescribing habits, medication management systems, healthcare quality and patient safety, medication use policy development, and the technology used to deliver and support patient care. As pharmacy executive, he is responsible for overseeing the design, implementation, and management of safe and effective medication management systems in the acute care hospital and retail pharmacy setting.

Dr. Janczak is a graduate of Marquette University and received his Bachelor of Science degree in pharmacy from the University of Wisconsin School of Pharmacy. He earned his Doctor of Pharmacy degree from the University of Illinois – Chicago and is currently a registered pharmacist licensed in both Wisconsin and Illinois. He is recognized through the Board of Pharmacy Specialist (BPS) as a Board Certified Pharmacotherapy Specialist (BCPS) and a Certified Professional in Healthcare Quality (CPHQ) by the National Association for Healthcare Quality (NAHQ). Dr. Janczak received his Master of Science degree in Healthcare Quality and Patient Safety from Northwestern University in Chicago. Dr. Janczak is an active member of the American Society of Health System Pharmacy (ASHP) and the Pharmacy Society of Wisconsin (PSW).
Lisa A. Waldowski, MS, APRN, CIC
Infection Control Specialist
Standards Interpretation Group
The Joint Commission

Lisa Waldowski is the Infection Control Specialist for The Joint Commission Enterprise, under the Standards Interpretation Group (SIG) at The Joint Commission. In her role, Ms. Waldowski advises surveyors with interpretations and education of infection control findings and responds to challenging questions, complaints, and potential threat to life/patient safety infection control related events.

Ms. Waldowski has been with The Joint Commission since January 2013. Prior to joining The Joint Commission, Ms. Waldowski worked with Shriner's Hospitals for Children – Honolulu, the State of Hawaii Department of Health, and Hawaii Pacific Health in paradise, otherwise known as Honolulu, Hawaii.

Ms. Waldowski earned her MSN and PNP from The University of Hawaii – Manoa. She is certified as a PNP and as an Infection Control Practitioner.
Appendix C: Continuing Education (CE) Accrediting Bodies

To be eligible for CE credit from any of the following accrediting bodies, you MUST view the video presentation and read the Resource Guide first. Then, complete the post test at http://twnlms.com/ by the due date listed online. See Appendix E.

Accreditation Council for Continuing Medical Education (ACCMCE)
The Joint Commission is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. JCR takes responsibility for the content, quality, and scientific integrity of this CME activity. JCR designates this educational activity for 1.0 contact hour of AMA PRA Category 1 Credit(s)™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

American Nurses Credentialing Center's Commission on Accreditation (ANCC)
The Joint Commission is also accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation. JCR designates this continuing nursing education activity for 1.0 contact hour.

Joint Commission Resources (JCR) is a provider approved by the California Board of Registered Nursing, provider number CEP 6381 for 1.0 contact hours.

American College of Healthcare Executives (ACHE)
JCR is authorized to award 1.0 contact hour of pre-approved ACHE Qualified Education credit for this program toward advancement, or re-certification in the American College of Healthcare Executives. Participants in this program wishing to have the continuing education hours applied toward ACHE Qualified Education credit should indicate their attendance when submitting application to the American College of Healthcare Executives for advancement or re-certification.

National Association for Healthcare Quality (NAHQ)
This activity has been approved by the National Association for Healthcare Quality (NAHQ) for 1.0 Certified Professional Healthcare Quality (CPHQ) CE credit.

International Association for Continuing Education and Training (IACET)
The Joint Commission has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, JCR has demonstrated that it complies with the ANSI/IACET Standard, which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, JCR is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard. JCR is authorized by IACET to offer 0.1 CEUs for this program.

Certified Joint Commission Professional (CJCP)
This education offering qualifies for 1.0 CJCP credit hours towards CJCP recertification. In order to obtain CJCP credit hours, an individual must first be certified before they start acquiring CJCP credit hours. CJCP credit hours will not be retroactive.

Accreditation Council for Pharmacy Education (ACPE)
The Joint Commission is accredited by the Accreditation Council for Pharmacy Education (ACPE) as a provider of continuing pharmaceutical education. This program is approved for 1 hour (0.1 CEUs) of continuing pharmacy education credit. Proof of participation will be posted to your NABP CPE profile within 4 to 6 weeks to participants who have successfully completed the post-test. Participants must participate in the entire presentation and complete the course evaluation to receive continuing pharmacy education credit.

Live activity ACPE #0573-0000-16-016-L05-P; Enduring ACPE #0573-0000-16-016-H05-P

Successful completion of this CE activity includes the following:

- View the presentation and read the accompanying Resource Guide.
- Complete the online Evaluation Form and Post Test.
- A CE certificate/statement of credit can be printed online following successful completion of the Post Test and the Evaluation Form.

NOTE: This information applies to The Joint Commission Resources Quality & Safety Network program titled, Infection Control: Reducing Antibiotic Overuse, originally presented on Thursday, May 26, 2016 from 2:00 – 3:00 p.m. ET. There is no individual participant fee for this educational activity.
Appendix D: Discipline Codes Instructions

Some of our programs are accredited for more than one discipline. To ensure that we issue each participant a certificate by the appropriate accrediting body, we ask that you supply us with the following information: 1) two-digit discipline code. 2) followed by the position code (example: for a medical doctor, use 10 MD).

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Code</th>
<th>Position Code</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician (CME)</td>
<td>10</td>
<td>MD</td>
<td>Medical Doctor</td>
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<tr>
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<td></td>
<td>MDFP</td>
<td>MD-Family Practice</td>
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<tr>
<td></td>
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<td>MDPS</td>
<td>MD-Psychiatrist</td>
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<td></td>
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<td>MDPH</td>
<td>MD-Public Health Certificate</td>
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<td>MDPFP</td>
<td>MD-Public Psychiatry Certificate</td>
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<td>MDAC</td>
<td>MD-Area Clinical Needs</td>
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<td>MDMF</td>
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<td>MSP</td>
<td>MD-Medical Staff Physician</td>
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<td></td>
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<td>MDLL</td>
<td>MD-Limited License</td>
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<tr>
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<td>DO</td>
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Appendix E: Post-Test

To be eligible for CE credit, you MUST view the video presentation and read the Resource Guide first. Then complete the post-test at http://twnlms.com/ by the due date listed online.

1. How many deaths does the Centers for Disease Control and Prevention (CDC) estimate are caused each year in the United States by antibiotic-resistant bacteria?
   a. 230  
   b. 2,300  
   c. 23,000  
   d. 230,000

2. Inappropriate use of antibiotics includes prescribing antibiotics for viral infections.
   a. True  
   b. False

3. The goals of the White House Forum on Antibiotic Stewardship include _____.
   a. slowing the emergence of antibiotic-resistant bacteria  
   b. preserving the efficacy of existing antibiotics  
   c. preventing the spread of resistant infections  
   d. All of the above.

4. Poor antibiotic prescribing can increase the risk of Clostridium difficile infection, which may cause _____.
   a. the build-up of fluid in the lungs  
   b. urinary tract infections  
   c. severe diarrhea that can result in death  
   d. pneumonia

5. Using broad-spectrum antibiotics instead of narrow-spectrum antibiotics is an effective strategy for reducing the inappropriate use of antibiotics.
   a. True  
   b. False

6. Important elements of an effective Antimicrobial Stewardship Program include _____.
   a. leadership support  
   b. establishing accountability  
   c. drug expertise  
   d. All of the above.

7. The Joint Commission's Speak Up: Antibiotics campaign is aimed at _____.
   a. hospital CEOs  
   b. patients and their advocates  
   c. physicians  
   d. nurses

8. Prescribing antibiotics in response to pressure from patients or families is an inappropriate use of antibiotics.
   a. True  
   b. False
9. When establishing an Antimicrobial Stewardship Program, for hospitals to compare their actual performance against desired performance, which of the following tools is most useful?
   a. Fishbone diagram
   b. Pareto chart
   c. Gap analysis
   d. Ishikawa diagram

10. Key stakeholders in an Antimicrobial Stewardship Program include _____.
    a. pharmacists
    b. infection control practitioners
    c. physicians
    d. All of the above.
Appendix F: JCRQSN Contact Information

General information, customer service issues, or program reception issues
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toll-free 1-888-219-4678

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 Lean Six Sigma Certified Yellow Belt
 Publications and Education Department
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 1-630-792-5428

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