

# MITIGATE ANTIMICROBIAL STEWARDSHIP TOOLKIT

*A guide for practical implementation in adult and pediatric emergency department and urgent care settings*



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## ABOUT THIS GUIDE

This guide is written for healthcare providers and administrators interested in designing quality improvement programs in antimicrobial stewardship.

This guide outlines how facilities can implement individualized, effective, and practical antimicrobial stewardship programs in acute care (emergency department and urgent care) settings.

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**BE  
ANTIBIOTICS  
AWARE**

**SMART USE, BEST CARE**

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**\*\*Disclaimer:** The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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# INTRODUCTION

Inappropriate antibiotic use is a major public health concern. Excessive exposure to antibiotics results in the emergence and spread of drug-resistant bacteria, potentially avoidable adverse drug reactions, and increased healthcare utilization and cost. According to the Centers for Disease Control and Prevention, antibiotic-resistant bacteria cause two million illnesses and approximately 23,000 deaths each year in the United States.<sup>1</sup> National professional organizations including the Infectious Diseases Society of America (IDSA) and the Society for Healthcare Epidemiology (SHEA), and an Executive Order from the President of the United States, recommend expansion of antimicrobial stewardship to these ambulatory care settings.

In 2016, CDC released the Core Elements of Outpatient Antibiotic Stewardship which provide a recommended framework for implementing stewardship in these outpatient settings, including urgent care and emergency departments.<sup>19</sup> **The goal of antimicrobial stewardship is to effectively promote judicious antibiotic use in all healthcare settings.**

Each year, 10 million antibiotic prescriptions are written from the emergency department (ED). Unnecessary antibiotics are frequently prescribed for known viral infections, including 75% of adults with acute bronchitis<sup>2,3</sup> and 45% of children with viral URI.<sup>4</sup> As annual ED visits across the U.S. continues to rise,<sup>5</sup> strategies are

desperately needed to reduce inappropriate antibiotic use, associated adverse events,<sup>6</sup> and development of local resistance in acute care outpatient settings.<sup>7-9</sup>

We know a “one size fits all” approach is not feasible for ED- and urgent care-based

## CDC CORE ELEMENTS FOR OUTPATIENT ANTIBIOTIC STEWARDSHIP PROGRAMS

### Commitment:

Demonstrate dedication to and accountability for optimizing antibiotic prescribing and patient safety.

### Action for policy & practice:

Implement at least one policy or practice to improve antibiotic prescribing, assess whether it is working, and modify as needed.

### Tracking & reporting:

Monitor antibiotic prescribing practices and offer regular feedback to clinicians, or have clinicians assess their own antibiotic prescribing practices themselves.

### Education & expertise:

Provide educational resources to clinicians and patients on antibiotic prescribing, and ensure access to needed expertise on optimizing antibiotic prescribing.

implementation of antimicrobial stewardship; **effective stewardship strategies need to be adapted to these settings.** Providers in settings like yours are faced with unique challenges to rational decision making such as frequent interruptions,<sup>10</sup> high-volume care, the need for rapid decisions with limited information, variation in staff over different shifts, and concerns with immediate patient

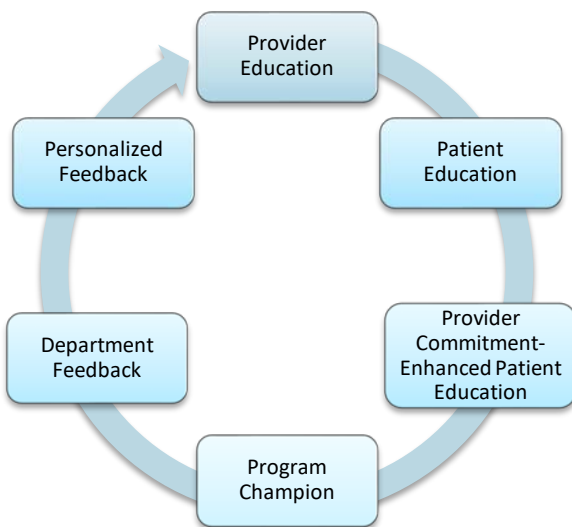
satisfaction.<sup>11-14</sup> While emergency providers understand the problem of antibiotic resistance, practice change is difficult.<sup>15,16</sup>

The MITIGATE Tool Kit (*A Multifaceted Intervention to Improve Prescribing for Acute Respiratory Infection for Adults and Children in Emergency Department and Urgent Care Settings*) is a systematically adapted antibiotic stewardship program developed for use in emergency department and urgent care settings in collaboration with physicians, administrators, nurses, and patients. MITIGATE also includes specific strategies for pediatric settings. Implementation of this toolkit will meet the CDC’s [Core Elements of Outpatient Antibiotic Stewardship](#), click for more detailed information.

# OVERVIEW

The goal of MITIGATE is to provide a feasible and effective system for implementing antimicrobial stewardship and reducing inappropriate prescribing in emergency department (ED) and urgent care settings. Using materials from the CDC [Antibiotic Stewardship Toolkit](#) campaign, strategies have been enhanced in collaboration with administrators and clinicians. This toolkit provides methods to individualize strategies to different settings.

**MITIGATE consists of six specific components:**



**Provider Education:** Clinicians learn about antibiotic resistance and alternative options for patient care through educational presentations, electronic reminders of Acute Respiratory Infection (ARI) guidelines, and *Be Antibiotics Aware* brochures.



**Patient Education:** Patients learn about the need for judicious use of antibiotics through strategically placed CDC *Be Antibiotics Aware* posters, educational materials, and discharge handouts.



**Provider Commitment-Enhanced Patient Education:** Personalized posters in exam rooms, including modified *Be Antibiotics Aware* content

directed at patients, are enhanced with clinicians' signed public commitment to antibiotic stewardship. Clinicians, nurses, and staff can also wear or use items, such as badge reels and pins, which encourage patients to ask about antibiotic stewardship.



**Program Champion:** A designated champion (physician, other healthcare professional, and staff) at the site leads provider education and advocates for antimicrobial stewardship.



**Departmental Feedback:** Each month the antibiotic prescribing practices for ARIs are aggregated from the electronic health record data and provided to departmental leadership. *More details in Action Step 5.*



**Personalized Feedback:** Personalized monthly performance rankings are provided to each physician by email. Each physician receives the designation of being a “top performer” (top decile) or “not a top performer” for appropriate antibiotic prescribing for ARI. Designations are made by looking at performance at the site. *More details in Action Step 5.*

## In summary

MITIGATE consists of simple strategies to engage patients and providers in understanding appropriate antibiotic prescribing. These strategies can be individualized to each site to ensure they fit within the culture and workflow of the organization.

# PRE-IMPLEMENTATION PLANNING


## *Your How-To Preparation Guide*



We focus on “supply-side” interventions that target providers to change prescribing behavior—an approach well matched to the goal of encouraging uptake of effective evidence-based treatments in healthcare. You will learn about “nudges,” a behavioral science strategy focused on positive reinforcement and suggestions, which have the advantage of being designed to improve care decisions, without limiting the choices available to physicians.<sup>17</sup> They are also scalable and do not require much extra time to improve quality of care.<sup>18</sup> We extend proven approaches to the outpatient setting by obtaining stakeholder feedback to

adapt current methods. We aim to achieve the greatest public health impact on antimicrobial use in ED and urgent care settings consistent with CDC [Core Elements of Outpatient Antibiotic Stewardship](#): *commitment, action for policy and practice, tracking and reporting, and education and expertise*, using implementation tools found to be feasible in the ED and accepted by ED providers.

A **study worksheet** found in the appendix will help guide you through this toolkit. Pause to review when

you see this icon  .

### **Pre-implementation Assessment:**

During the preparatory phase of the trial, it is important for key personnel at each location to work closely together in order to localize each of the intervention procedures to ensure they are consistent with local workflows, policies, and standards. Your team will develop a plan for implementing and monitoring each of the implementation steps. You will learn to refine standard operating procedures and share those with staff. You will also develop clinician enrollment procedures for electronic and in-person enrollment with clinical champions and departmental leads. You can consider risk analysis with a monitoring plan to ensure that interventions are delivered with fidelity to the original design and deviations are recorded (e.g. lapse in feedback to departmental lead after management turnover).

Preparation for implementing your antibiotic stewardship program will encompass the following:

1. Identify key stakeholders and potential champions

2. Conduct stakeholder interviews and engagement







3. Conduct surveys

4. Compile data

## STEP 1: IDENTIFY KEY STAKEHOLDERS AND POTENTIAL CHAMPIONS

Emergency and urgent care healthcare professionals are ideally suited to lead antibiotic stewardship programs in ED and urgent care settings given their team-based approach to patient care, the nexus of emergency care settings between the community and hospital, and general willingness to take on new tasks and learn. Identifying key team members will help make implementation a success (see Figure 1).

**Figure 1: Key Personnel and Key Tasks**

	<p><b>Clinical Champion</b></p> <p>The "face" of the intervention. Lead the interventions, serve as a resource for education, serve as liaison between the department and</p>		<p><b>Institutional Leadership (Chief Quality Officer or Chief Medical Officer)</b></p> <p>Sponsor the program and provide institutional administrative and programmatic support for implementation and evaluation.</p>
	<p><b>Departmental Director</b></p> <p>Refine standard operating procedure and develop provider enrollment procedures (electronic, in-person).</p>		<p><b>Information Technology Specialist</b></p> <p>Data extraction for performance reports.</p> <p>Framework for regular personalized feedback for peer comparison.</p>
	<p><b>Nursing Leadership</b></p> <p>Guide clinical workflow review and refine standard operating procedure.</p>		<p><b>Program Manager</b></p> <p>Develop monitoring plan to ensure interventions are delivered with fidelity, and record modifications.</p>

- a. Engage Leadership: While the MITIGATE program has been developed to be as simple as possible, the program does require time and effort. Broader support from the institution beyond the ED is necessary, and time should be spent at the outset obtaining buy-in from department and institution leaders to ensure antibiotic stewardship, as a quality improvement initiative, is aligned with institutional operational goals. MITIGATE can be framed as a patient safety and quality improvement initiative that meets the [CDC Core Elements of Antibiotic Stewardship](#), but will also benefit patients, improve communication, and contribute to avoidance of healthcare associated infections such as *Clostridium difficile*. In this way, the leadership can help individualize the program and help identify any potential challenges. For example, external factors such as EHR upgrades and staffing may slow down the process despite clinical importance, and leadership will be aware of these issues and may help support antibiotic stewardship through the process.
- b. Identify Program Champion: Characteristics of a good program champion include enthusiasm for patient safety and quality improvement, being trusted by leadership and colleagues, the ability to engage a variety of stakeholders, and having an understanding of data analysis and reporting. Protected effort of at least four hours a week is essential for the program champion and demonstrates institutional commitment to antibiotic stewardship.

- c. Information Technology (IT) Support: Determination of who will assist with report writing, data collection, and program evaluation should be established ahead of time. For intervention-heavy programs, several weeks should be spent in the planning of the program. This could be a report writer or data analyst housed in the department/practice, quality division, or in pharmacy services.
- d. Nursing Leadership: Inclusion of nurse stakeholders is critical to program success. Nurses interact directly with patients, provide education, and understand workflow processes from patient triage to discharge.
- e. Program Manager: If additional resources are available, a program manager can facilitate many of the programmatic tasks to ensure success. The program manager has a vital role in assisting the champion with coordination of stakeholder meetings, data preparation and distribution of feedback, and program evaluation.

**Take a moment**



## **STEP 2: CONDUCT INTERVIEWS**

*Key Stakeholder Interviews*: The local champion is best suited to conduct these semi-structured interviews; they will survey a range of people (e.g. emergency medicine administrators, various clinical providers, nurses, and support staff) with knowledge of workflow and practices at the site. The pre-implementation interviews (see Appendix) include an assessment of current knowledge, attitudes and beliefs on antibiotic prescribing, resources currently available to help make prescribing decisions, and barriers and facilitators to antibiotic stewardship at the site. Vignettes can be included to facilitate discussion. At this time, physicians, nurses, and administrator stakeholders can also review a wide range of educational materials (pamphlets, info sheets, posters, etc.) and provide feedback on usability and desirability for the site.

If possible, interviews should be audio recorded and comprehensive notes collected for later review and comparison. Pre-implementation interviews are shared in Appendix.

Sample educational materials can be found here: <https://www.cdc.gov/antibiotic-use/>

**Take a moment**



## **STEP 3: CONDUCT SURVEY**

*Participant Knowledge and Use Survey*: Diverse backgrounds among clinicians are frequent, therefore an assessment of all clinicians in the ED and urgent care system is important for understanding how to adapt the intervention. Because interviewing everyone is not feasible, clinicians of all types (physicians and advanced practice providers) can complete a survey prior to implementation of the intervention, and after the intervention has been implemented (at least six months). Here, providers will be asked about attitudes toward antibiotic use and stewardship programs, as well as knowledge of appropriate antibiotic use and education. Additionally, to test the success of the program and obtain feedback about any needed adaptations, the survey can be re-administered. In the follow-up survey, providers will be asked about the stewardship intervention, their opinions of the program, specific components of the program, and barriers



and benefits of the intervention. Data can be used to make needed changes to ensure ongoing success. See Appendix for ongoing surveys you can use directly with your team.

Facilities and staff with access to platforms such as [REDCap](#) or [Qualtrics](#) can use them to create and disseminate the survey. Alternatively, [Survey Monkey](#) can be used for sites with limited resources to administer and collect responses before and after implementation.

**Take a moment**



**STEP 4: COMPILE DATA TO DETERMINE INTERVENTION STEPS**

Based on the pre-implementation interviews, practice champions can begin selection of appropriate patient and clinician educational materials. However, other important factors to consider are: site size, site layout, feasibility, acceptability, and department policies. Gather all this data to help determine feasibility and acceptability of stewardship materials and methods. Key information to obtain at baseline includes: stakeholder demographics (what types of clinicians need to be reached out to, experienced vs new practitioners, level of education and training), baseline attitudes towards antibiotic prescribing, knowledge of antibiotic use and guidelines, preferences regarding commitment tools, preferences regarding patient and clinician educational tools, and identified gaps. In the case of limited programmatic support, the minimum amount of information to obtain should be preferences regarding commitment and educational tools, and existing gaps in supporting antibiotic stewardship efforts.

**Optional:** Sites that wish to measure success over time require IT support staff can develop initial and subsequent monthly reports capturing prescribing rates of providers. A detailed list of conditions and exclusions can be found in the Appendix.

**Take a moment**



# IMPLEMENTATION PREPARATION ACTION STEPS

Specific interventions for each site will depend upon available resources and the pre-implementation assessment. See Table 1 for a summary of potential intervention components for local ED and urgent care site adaption.

**Table 1. Intervention Components**

Component	Definition
<b>Provider Education</b>	Educational presentations, <a href="#">smartphone</a> apps, CDC <i>Be Antibiotics Aware</i> brochures.
<b>Patient Education</b>	CDC <i>Be Antibiotics Aware</i> posters in waiting rooms, <i>Choosing Wisely</i> brochures, discharge handouts.
<b>Provider Commitment</b>	Physician-worn “flair” (pens, pins, badge reels, etc.) that are thematically consistent with the CDC <i>Be Antibiotics Aware</i> posters and brochures.
<b>Departmental Feedback</b>	Monthly aggregate of antibiotic prescribing practices for ARI from electronic health record data provided to departmental leadership.
<b>Provider Feedback and Education</b>	Case-based educational rounds with a stewardship consulting service (if available). Alternatively, ED pharmacists can provide consultations for patient-related issues.
<b>Peer Comparison using Personalized Audit and Feedback</b>	Personalized monthly performance rankings with each physician receiving a designation of being a “top performer” (top decile) or “not a top performer” for appropriate antibiotic Rx for ARI delivered by email. <sup>18*</sup>

\*Peer comparison will be distinct from traditional audit-and-feedback interventions in its comparison with top-performing peers instead of group performance, and its validated benefit of delivery of positive reinforcement to top performers. Norms will be computed within each setting within each site.

## 1. SELECTION OF PATIENT AND CLINICIAN EDUCATIONAL MATERIALS: Choose your information!



Given that clinicians know when antibiotics are not indicated, strategies to help nudge providers to making the right decision may be helpful. These include tools and materials to communicate risks versus benefits of antibiotics, including the possibility of patient harm from inappropriate use. Nudges can be selected based on stakeholder input for likelihood of uptake. For example, the CDC Viral Prescription Pad is an innovative tool to provide patients with reasons why an antibiotic prescription is not needed, as well as suggested alternative treatments (see Figure 6). However, sites that heavily rely on electronic discharge instructions may have lower uptake of this tool or may consider implementing the tool as a smart phrase or custom discharge instruction. Additional examples of patient and provider education materials are referenced below.

Evidence suggests that written and verbal communication messages that educate patients on the difference between viral and bacterial infections may not be as effective.





# BE ANTIBIOTICS AWARE

SMART USE, BEST CARE

#BeAntibioticsAware

## Center for Disease Control and Prevention - Be Antibiotics Aware:

*Be Antibiotics Aware* features targeted messaging and relevant materials to meet the increasing demand for resources and information about antibiotics. The new initiative provides resources to help improve antibiotic prescribing among healthcare professionals, focusing on

prescribing antibiotics only when needed, and at the right dose for the right duration and at the right time. *Be Antibiotics Aware* features a number of resources including social media messages, communication tools, graphics, posters geared at patients, and videos to help healthcare professionals (in both outpatient and inpatient settings) educate patients and families about antibiotic use and risks for potential side effects.

For more information visit: [www.cdc.gov/antibiotic-use](http://www.cdc.gov/antibiotic-use)

## U.S. Antibiotic Awareness Week

U.S. Antibiotic Awareness Week is an annual one-week observance to raise awareness of the threat of antibiotic resistance and the importance of appropriate antibiotic prescribing and use. 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. Champions can take advantage of the resources provided by the CDC during this week to send out additional messaging via social media, and to hold activities centered around antibiotic stewardship such as grand rounds focused on stewardship, celebratory activities around accomplishments, and community engagement activities.

### 8 WAYS TO BE ANTIBIOTICS AWARE

**1** Antibiotics save lives, but they aren't always the answer when you're sick.

**2** Antibiotics do not work on viruses.

**3** Antibiotics are only needed for treating certain infections caused by bacteria.

**4** An antibiotic will NOT make you feel better if you have a virus.

**5** Any time antibiotics are used, they can cause side effects.

**6** Taking antibiotics creates resistant bacteria.

**7** If you need antibiotics, take them exactly as prescribed.

**8** Stay healthy: clean hands, cover coughs, and get vaccinated, for the flu, for example.

Additional information: <https://www.cdc.gov/antibiotic-use/week/overview.html>

## Symptom Relief for Viral Respiratory Infections

Since viral respiratory infections are non-responsive to antibiotics, the focus of treatment for these patients should be on symptom relief. The Centers for Diseases Control and Prevention has published suggested treatments for common complaints related to viral respiratory infections, such as rhinorrhea and congestion, sore throat, and cough (Table 2). **It is important to note that over-the-counter (OTC) cough and cold medicines are NOT recommended for children under the age four years** and are associated with substantial side effects. For children over four years of age, consultation with a health professional is recommended before OTC cough and cold medications are administered. Furthermore, patients and parents who choose to administer these OTC medications should be counseled that they are not curative for viral respiratory infections and should be advised regarding potential side effects.

Additional information:

<https://www.cdc.gov/antibiotic-use/community/for-patients/symptom-relief.html>

**Table 2. Suggested Treatments**

**Rest and plenty of fluids**

**Acetaminophen, ibuprofen, or naproxen to relieve pain or fever**

**Gargle with salt water and eat popsicles for sore throat**

**Non-medicated lozenges (do not give lozenges to young children)**

**2. Clinician Commitment: Choose your nudges!** 

Research suggests that behavioral nudges including public commitment and peer comparisons reduce inappropriate prescribing in primary care, ED, and urgent care settings. Physician commitment is an evidence-based strategy for antibiotic stewardship in primary care settings. For example, signing a commitment log (Figure 2) indicates a personal commitment and accountability to appropriate prescribing and can be made public in department staff areas. Providing options for visible commitment in the emergency department or urgent care clinical areas may increase acceptability. For example, the use of badge reels or pins with a logo for the campaign serve as a reminder to clinicians and to patients about the commitment to avoid inappropriate antibiotic prescribing and avoidance of patient harm (Figure 5). Posters can be signed by clinicians to remind both patients and providers of the site’s commitment to appropriately prescribe (Figure 4).

In some cases, providers may be reluctant to put their signature on posters for fear patients may use their signature. Most providers are receptive to either signing the posters or wearing the flair, however some are not interested in wearing pins or badge reels due to having their own or feeling it is an additional burden. Thus, having multiple options allows the public commitment to be personalized based on provider choice. Your pre-implementation survey will help you determine comfort level with different options.

**Figure 2: Sample Log**

MITIGATE STUDY COMMITMENT LOG				
By signing below you commitment to the department to prescribe antibiotics only when they are needed, and will avoid giving antibiotics when they might do more harm than good.				
Please refer to the CDC letter/poster for additional reading.				
Printed Name	Signature	Badge Reel	Pin	Commitment Poster Signature
John Doe	<i>John Doe</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for your participation and commitment to the MITIGATE study.

**Figure 3: Sample options for commitment logo and flair**



### 3. Posting of Clinical Provider Commitment to Antibiotic Stewardship: Share your

#### antibiotic knowledge!

Once you have chosen your educational materials and methods of sharing provider commitment, it is time to choose ways to share the information. For example, commitment letters that can be given to patients or posted in waiting rooms, clinician workstations, or patient care areas. Placement and delivery of materials to patients and providers should be determined with clinician and administrator stakeholders based on survey and/or interview results. Be sure to include your facility and maintenance teams in the discussion, as specific sites may require institutional approval to post materials in patient care areas (see below). Delivery will depend on site setup and configuration. Potential venues for patient education include posters and handouts in waiting room areas or at triage locations. Given the unique challenges of emergency departments and urgent care centers who are faced with rapid patient turnover, crowding, and multiple providers with potentially different levels of training working in shift-based formats, these posters may be placed in areas that are visible to both patients and clinicians. External factors, such as janitorial cleanup of areas, can keep posters from staying up, and supporting staff should routinely check materials during early stages. If possible, laminating and having different sized commitment letters can help reduce loss and make them noticeable. Additional physician and advanced care practitioner commitment such as signing a commitment log and wearing visible flair are alternative strategies.

#### **A note about facility flair and materials:**

When selecting flair and education materials, it is very important to take into account the local guidelines that govern each ED and urgent care setting. Consulting with local ED and UC administrations, including medical or operational directors, plant operations, or departmental nursing and business managers will save time and guide the selection of materials that are allowed to be used. This key step will also aid in the process of selecting areas that are “off limits,” but more importantly bring to light what and how materials can be placed in the different areas of a facility.

### 4. Launching the program:

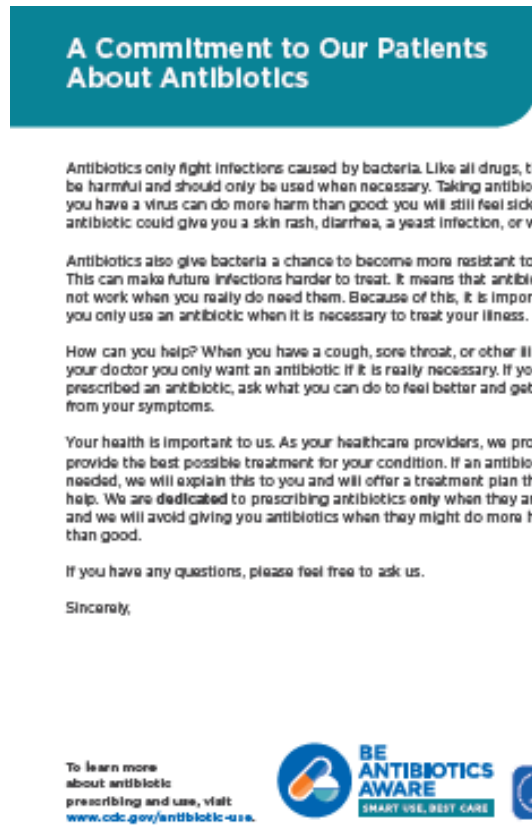
Selecting a good start date can have some profound effects on the initial success of the program. It is important to select a date or dates where this project can have the direct attention of providers. At least two months prior to the planned start date, make a decision about your commitment and educational materials. These should be ordered at least four weeks prior to your target start date so that you can work with your stakeholders to determine best placement, how to reach and engage clinicians, and provide sufficient time for signing and printing of commitment letters and posters. If possible, during the weeks leading up to the launch date, the local champion can bring awareness to the project via presentations at staff meetings or by holding education sessions. A simple email sent to all participating providers can be an excellent way to answer any last-minute questions. See tips below.

Launch Do's and Don'ts	
Do send out announcement email letting staff know when program will be starting	Don't pick a week where staff might be out (conferences, retreats, etc.)
Do bring awareness to the program by presentations or holding information sessions	Don't start on a weekend

Do have extra flair and materials

Don't begin activities without prior announcement and engagement of stakeholders

**Figure 4: Sample Commitment Letter**



**Figure 5: Examples of distributed material from Previous CDC Get Smart Campaign**



Figure 6: CDC Viral Prescription Pad

## Symptom Relief for Viral Illnesses



### 1. DIAGNOSIS

- Cold or cough
- Middle-ear fluid (with Meds with amoxicillin, DMG)
- Flu
- Viral sore throat
- Bronchitis
- Other: \_\_\_\_\_

You have been diagnosed with an illness caused by a virus. Antibiotics do not work on viruses. When antibiotics aren't needed, they won't help you, and the side effects could still hurt you. The instructions prescribed below will help you feel better when your body fights off the virus.

### 2. GENERAL INSTRUCTIONS

- Drink extra water and fluids.
- Use a cool mist vaporizer or saline nasal spray to relieve congestion.
- For sore throats in older children and adults, use ice chips, sore throat spray, or lozenges.
- Use honey to relieve cough. Do not give honey to an infant younger than 1.

### 3. SPECIFIC MEDICINES

- Fever or aches: \_\_\_\_\_
- Ear pain: \_\_\_\_\_
- Sore throat and congestion: \_\_\_\_\_

Use medicines according to the package instructions, or as directed by your healthcare professional, stop the medicine when the symptoms get better.

### 4. FOLLOW UP


- If not improved in \_\_\_\_\_ days/hours, if new symptoms occur, or if you have other concerns, please call or return to the office for a recheck.
- Phone: \_\_\_\_\_
- Other: \_\_\_\_\_

Signed: \_\_\_\_\_

To learn more about antibiotic prescribing and use, visit [www.cdc.gov/antibiotic-use](http://www.cdc.gov/antibiotic-use).



## What Is Delayed Prescribing?



### WAIT. DO NOT FILL YOUR PRESCRIPTION JUST YET.

Your healthcare professional believes your illness may resolve on its own.

First, follow your healthcare professional's recommendations to help you feel better without antibiotics. Continue to monitor your own symptoms over the next few days.

- Rest.
- Drink extra water and fluids.
- Use a cool mist vaporizer or saline nasal spray to relieve congestion.
- For sore throats in adults and older children, try ice chips, sore throat spray, or lozenges.
- Use honey to relieve cough. Do not give honey to an infant younger than 1.


If you do not feel better in \_\_\_\_\_ days/hours or feel worse, go ahead and fill your prescription.

If you feel better, you do not need the antibiotic, and do not have to risk the side effects.

Waiting to see if you really need an antibiotic can help you take antibiotics only when needed. When antibiotics aren't needed, they won't help you, and the side effects could still hurt you. Common side effects of antibiotics can include rash, dizziness, nausea, diarrhea, and yeast infections.

Antibiotics save lives, and when a patient needs antibiotics, the benefits outweigh the risks of side effects. You can protect yourself and others by learning when antibiotics are and are not needed.

To learn more about antibiotic prescribing and use, visit [www.cdc.gov/antibiotic-use](http://www.cdc.gov/antibiotic-use).



## Taking Your Antibiotics



You have just filled a prescription for antibiotics.

### READ THIS IMPORTANT INFORMATION.

- Take it exactly as your healthcare professional tells you.
- Do not skip doses.
- Do not share it with others.
- Do not save it for later. Talk to your pharmacist about safely discarding leftover medicines.

### WHY IS THIS CHECKLIST SO IMPORTANT?


All medicines can have side effects. Antibiotics save lives, and when a patient needs antibiotics, the benefits outweigh the risks of side effects. You can protect yourself and others by learning when antibiotics are and are not needed.

**If you have questions about your antibiotics, talk with your healthcare professional.**

To learn more about antibiotic prescribing and use, visit [www.cdc.gov/antibiotic-use](http://www.cdc.gov/antibiotic-use).



## What Is Watchful Waiting?



### GOOD NEWS!

Your healthcare professional believes your illness will likely go away on its own.

You should watch and wait for \_\_\_\_\_ days/hours before deciding whether to take an antibiotic.

In the meantime, follow your healthcare professional's recommendations to help you feel better and continue to monitor your own symptoms over the next few days.

- Rest.
- Drink extra water and fluids.
- Use a cool mist vaporizer or saline nasal spray to relieve congestion.
- For sore throats in adults and older children, try ice chips, sore throat spray, or lozenges.
- Use honey to relieve cough. Do not give honey to an infant younger than 1.


If you feel better, no further action is necessary. You don't need antibiotics.

If you do not feel better, experience new symptoms, or have other concerns, call your healthcare professional \_\_\_\_\_ discuss whether you need a recheck or antibiotics.

It may not be convenient to visit your healthcare professional multiple times, but it is critical to take antibiotics only when needed. When antibiotics aren't needed, they won't help you and the side effects could still hurt you. Common side effects of antibiotics can include rash, dizziness, nausea, diarrhea, and yeast infections.

Antibiotics save lives, and when a patient needs antibiotics, the benefits outweigh the risks of side effects. You can protect yourself and others by learning when antibiotics are and are not needed.

To learn more about antibiotic prescribing and use, visit [www.cdc.gov/antibiotic-use](http://www.cdc.gov/antibiotic-use).







## 5. DEVELOP PROCESSES FOR DATA EXTRACTION: Gather the data!

In order to provide feedback on prescribing to clinicians and measure outcomes as accurately as possible, we developed a conservative approach (based on feedback from stakeholders) to increase validity and acceptance of individual feedback data for peer comparisons. The first step in developing a feedback process is figuring out how to access the data.

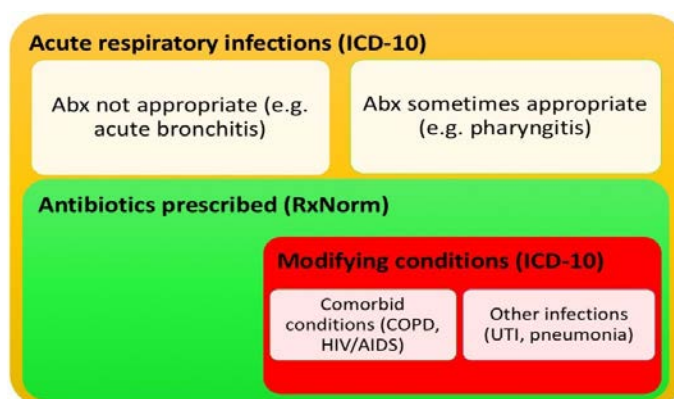
### Data Extraction

Data extraction can be done with the IT team identified in the pre-implementation phase. This section talks about how to gather the data needed for the provider feedback. Patients with antibiotic-nonresponsive diagnoses include nonspecific upper respiratory infections, acute bronchitis, croup, bronchiolitis, and influenza without concomitant diagnostic codes to potentially support antibiotic prescribing (e.g. pneumonia, suppurative otitis media). Reported measures for emergency department and urgent care visits include antibiotic selection for visits with International Classification of Diseases, Tenth Revision [ICD-10-CM] codes consistent with antibiotic-nonresponsive ARI diagnoses (see Figure 7), and ICD10 list (Table 3)—first sheet O=outcomes of interest and A=concomitant diagnosis that might necessitate antibiotics. Visits in which another diagnosis that typically requires antibiotics are excluded (i.e., an “A” code). A visit for an antibiotic-nonresponsive ARI (i.e., an “O” code) is eligible for outcome inclusion. We have developed a consensus-based list that provides a framework for specific inclusion and exclusion of diagnoses for eligible visits. This algorithm is best suited to sites with robust informatics support for reporting. This detailed list will hopefully satisfy concerns that reporting metrics may not address clinical conditions that could warrant antibiotics (such as a diagnosis of ARI in a patient who is immune suppressed and may be at risk for complications including bacterial infection).

### Alternative Measures

Sites may choose to implement existing measures for practice site audit and feedback and/or pay for performance such as Healthcare Effectiveness Data and Information Set (HEDIS) measures or other pay-for-performance measures if you do not have access to dedicated time from a report writer. Alternatives include existing data that is being reported for institutional quality measures, such as HEDIS or National Quality Forum Measures on appropriate antibiotic use for acute bronchitis.

**Figure 7. Suggested MITIGATE ICD10 Algorithm**



# DETAILED LIST OF CONDITIONS OF INTEREST AND EXCLUSIONS

## Pediatric Considerations

Disease entities and causative pathogens often differ between adults and children. Three particular conditions—otitis media (OM), sinusitis, and conjunctivitis—have been attributed to both viral and bacterial etiologies, or sometimes even co-infection. For numerous reasons, including etiology, symptom management, return to school or daycare, and lack of accurate microbiologic data, antibiotics are frequently prescribed for these infections. For the purposes of creating a uniform approach in defining viral respiratory infections, this toolkit classifies these conditions as potentially antibiotic sensitive. Therefore, pediatric ED visits for one of these conditions are excluded as antibiotics may be appropriate. Current research and evolving literature should be considered when implementing the list below as part of this toolkit.

0=outcome of interest; A=co-existing condition that may warrant antibiotic use; (\*)=this code is inclusive of all codes contained within the higher level code (e.g., A00\* means A00.00-A00.xx).

**Table 3. ICD-10 codes list**

<b>A00*</b>	<b>Cholera</b>	<b>A</b>
<b>A01*</b>	<b>Typhoid</b>	<b>A</b>
<b>A02*</b>	<b>Other GI Salmonella</b>	<b>A</b>
<b>A03*</b>	<b>Shigella</b>	<b>A</b>
<b>A04*</b>	<b>Other bacterial intestinal infections</b>	<b>A</b>
<b>A05*</b>	<b>Other bacterial foodborne infections</b>	<b>A</b>
<b>A06*</b>	<b>Amebic infections</b>	<b>A</b>
<b>A07*</b>	<b>Other protozoal intestinal infections</b>	<b>A</b>
<b>A09*</b>	<b>Infectious gastroenteritis and colitis, unspecified</b>	<b>A</b>
<b>A15*</b>	<b>TB</b>	<b>A</b>
<b>A17*</b>	<b>TB</b>	<b>A</b>
<b>A18*</b>	<b>TB</b>	<b>A</b>
<b>A19*</b>	<b>TB</b>	<b>A</b>
<b>A2*</b>	<b>Certain zoonotic bacterial diseases</b>	<b>A</b>
<b>A3*</b>	<b>Bacterial diseases</b>	<b>A</b>
<b>A4*</b>	<b>Bacterial diseases</b>	<b>A</b>
<b>A46*</b>	<b>Erysipelas</b>	<b>A</b>
<b>A5*</b>	<b>Bacteria STDs and syphilis</b>	<b>A</b>
<b>A64*</b>	<b>Unspecified sexually transmitted disease</b>	<b>A</b>
<b>A65*</b>	<b>Nonvenereal syphilis</b>	<b>A</b>
<b>A66*</b>	<b>Yaws</b>	<b>A</b>
<b>A67*</b>	<b>Pinta</b>	<b>A</b>
<b>A68*</b>	<b>Relapsing Fevers</b>	<b>A</b>
<b>A69*</b>	<b>Lyme and other spirochete infections</b>	<b>A</b>
<b>A7*</b>	<b>Chlamydial and rickettsia disease</b>	<b>A</b>
<b>B5*</b>	<b>Protozoal Diseases</b>	<b>A</b>
<b>B6*</b>	<b>Other protozoal and spirochetes and worms</b>	<b>A</b>
<b>B7*</b>	<b>Worms</b>	<b>A</b>
<b>B95*</b>	<b>Strep, staph, enterococcus causing disease elsewhere classified</b>	<b>A</b>
<b>B96*</b>	<b>Other bacterial agents causing disease elsewhere classified</b>	<b>A</b>
<b>G0*</b>	<b>Meningitis, encephalitis, intracranial and spinal abscess</b>	<b>A</b>
<b>H00*</b>	<b>Hordeolums and chalazion including eyelid abscess</b>	<b>A</b>

H05*	Disorders of orbit	A
H10*	Conjunctivitis	A
H15*	Scleritis	A
H16*	Keratitis	A
H20*	Iridocyclitis	A
H440*	Endophthalmitis	A
H441*	Other endophthalmitis	A
H60*	Otitis Externa	A
H610*	Chondritis and perichondritis of ear	A
H65*	Nonsuppurative otitis media	O
H66*	Suppurative and unspecified otitis media	A
H67*	OM in diseases classified elsewhere	A
H70*	Mastoiditis	A
H73*	Myringitis and other tympanic membrane disorder	A
H75*	Mastoiditis	A
I00*	Rheumatic Fever	A
I01*	Rheumatic Fever	A
I311*	Infectious Pericarditis	A
I33*	Endocarditis	A
I38*	Endocarditis	A
J00*	Acute Nasopharyngitis (Common Cold)	O
J01*	Sinusitis	A
J02*	Pharyngitis	A
J03*	Tonsillitis	A
J040*	Laryngitis	O
J041*	Tracheitis	A
J042*	Laryngotracheitis	O
J043*	Supraglottitis	O
J050*	Croup	O
J051*	Epiglottitis	A
J06*	Acute URI of multiple or unspecified sites	O
J09*	Influenza	O
J10*	Influenza due to other influenza virus	O
J11*	Influenza due to unidentified influenza virus	O
J12*	Viral pneumonia	O
J13*	<i>Streptococcus pneumoniae</i> pneumonia	A
J14*	H Flu pneumonia	A
J15*	Bacterial Pneumonia NOS	A
J16*	Bacterial due to other infections pneumonia	A
J18*	Pneumonia of unspecified location	A
J200*	Bronchitis mycoplasma	A
J201*	Bronchitis h flu	A
J202*	Bronchitis strep	A
J203*	Bronchitis coxsackievirus	O
J204*	Bronchitis parainfluenza	O
J205*	Bronchitis RSV	O
J206*	Bronchitis rhinovirus	O
J207*	Bronchitis echovirus	O
J208*	Bronchitis other specified organisms	O
J209*	Unspecified bronchitis	O
J21*	Bronchiolitis	O
J22*	Lower RTI unspecified	O

J30*	Vasomotor and allergic rhinitis	O
J31*	Chronic rhinitis, nasopharyngitis, and pharyngitis	O
J32*	Chronic sinusitis	A
J340*	Nasal abscess	A
J36*	Peritonsillar abscess	A
J390*	Retropharyngeal abscess	A
J391*	Other abscess of pharynx	A
J40*	Bronchitis NOS	O
J41*	Chronic bronchitis specified such as mucopurulent	A
J42*	Chronic bronchitis NOS	A
J43*	Emphysema	A
J44*	COPD	A
J45*	Asthma	O
J47*	Bronchiectasis	A
J80*	ARDS	A
J84*	Interstitial lung disease	A
J85*	Lung abscess	A
J86*	Pyothorax	A
K02*	Dental caries	A
K04*	Diseases of pulp and periapical tissue	A
K05*	Gingivitis and periodontal diseases	A
K112*	Sialoadenitis	A
K113*	Salivary abscess	A
K12*	Stomatitis	A
K35*	Acute appendicitis	A
K36*	Other appendicitis	A
K37*	Unspecified appendicitis	A
K38*	Other diseases of appendix	A
K50*	Crohn's	A
K51*	Ulcerative colitis	A
K55*	Vascular disorders of intestine	A
K57*	Diverticular disease of intestine	A
K61*	Abscess of anal and rectal regions	A
K63*	Other diseases of intestine	A
K65*	Peritonitis	A
K66*	Peritoneum	A
K67*	Infectious disorders of peritoneum	A
K68*	Disorders of retroperitoneum	A
K750*	Abscess of liver	A
K80*	Cholelithiasis, some with complications	A
K81*	Cholecystitis	A
K83*	Other diseases of biliary tract	A
K85*	Acute pancreatitis	A
K92*	Other diseases of digestive system	A
K94*	Complications of artificial openings of the digestive system	A
K95*	Complications of bariatric procedures	A
L00*	L00 Staphylococcal scalded skin syndrome	A
L01*	L01 Impetigo	A
L02*	L02 Cutaneous abscess, furuncle and carbuncle	A
L03*	L03 Cellulitis and acute lymphangitis	A
L04*	L04 Acute lymphadenitis	A
L05*	L05 Pilonidal cyst and sinus	A

L08*	L08 Other local infections of skin and subcutaneous tissue	A
L10*	L10 Pemphigus	A
L11*	L11 Other acantholytic disorders	A
L12*	L12 Pemphigoid	A
L13*	L13 Other bullous disorders	A
L14*	L14 Bullous disorders in diseases classified elsewhere	A
L40*	L40 Psoriasis	A
L51*	L51 Erythema multiforme	A
L52*	L52 Erythema nodosum	A
L600*	L600 Ingrowing nail	A
L70*	L70 Acne	A
L73*	L73 Other follicular disorders including hidradenitis suppurativa	A
L88*	L88 Pyoderma gangrenosum	A
L89*	L89 Pressure ulcer	A
L97*	L97 Non-pressure chronic ulcer of lower limb, not elsewhere classified	A
M00*	Bacterial arthritis	A
M01*	Other infectious arthritis	A
M46*	Vertebral/disc infections	A
M60*	Myositis	A
M70*	Soft tissue disorders related to overuse and pressure, including bursitis	A
M86*	Osteomyelitis	A
N10*	Acute Pyelonephritis	A
N12*	Tubulointerstitial Nephritis NOS	A
N151*	Perinephric abscess	A
N30*	Cystitis	A
N34*	Urethritis	A
N390*	UTI NOS	A
N41*	Prostatitis	A
N45*	Epididymo-orchitis	A
N476*	Balanoposthitis	A
N481*	Balanitis	A
N49*	Inflammatory disorders of male genitals NOS including Fournier's'	A
N61*	Mastitis and Breast Abscess	A
N7*	Female GU infections	A
O23*	Infections of the genitourinary system in pregnancy	A
O411*	Infection of amniotic sac and membranes	A
O85*	Puerperal sepsis	A
O86*	Other puerperal infections	A
O91*	Infections of breast associated with pregnancy, the puerperium and	A
O98*	Maternal infectious and parasitic diseases classifiable elsewhere but	A
P36*	Bacterial sepsis of newborn	A
P37*	Other congenital infectious diseases	A
P38*	Omphalitis	A
P39*	Other infections specific to the perinatal period	A
P77*	Necrotizing Enterocolitis	A
R36*	Urethral discharge	A
R7881*	Bacteremia	A
R8271*	Bacteriuria	A
S31*	Open wound of abdomen, lower back, pelvis and external genitals	A
S41*	Open wound of shoulder and upper arm	A
S51*	Open wound of elbow and forearm	A
S61*	Open wound of wrist, hand and fingers	A

<b>S71*</b>	<b>Open wound of hip or thigh</b>	<b>A</b>
<b>T802*</b>	<b>Infections following infusion, transfusion and therapeutic injection</b>	<b>A</b>
<b>T826*</b>	<b>Prosthetic cardiac valve infection</b>	<b>A</b>
<b>T827*</b>	<b>Other cardiac device infection</b>	<b>A</b>
<b>T845*</b>	<b>Infections of internal joint prosthesis</b>	<b>A</b>
<b>T846*</b>	<b>Infection of external fixation</b>	<b>A</b>
<b>T847*</b>	<b>Infection of other internal orthopedic device</b>	<b>A</b>
<b>T84*</b>	<b>Complications of internal orthopedic prosthetic devices, implants and</b>	<b>A</b>
<b>T85*</b>	<b>Complications of other internal prosthetic devices, implants and grafts</b>	<b>A</b>
<b>T87*</b>	<b>Complications peculiar to reattachment and amputation</b>	<b>A</b>
<b>T88*</b>	<b>Other complications of surgical and medical care, not elsewhere</b>	<b>A</b>
<b>W53*</b>	<b>Contact with rodent</b>	<b>A</b>
<b>W54*</b>	<b>Contact with dog</b>	<b>A</b>
<b>W55*</b>	<b>Contact with other mammals</b>	<b>A</b>
<b>W56*</b>	<b>Contact with marine animal</b>	<b>A</b>
<b>W57*</b>	<b>Bitten or stung by nonvenomous insect and other nonvenomous</b>	<b>A</b>
<b>W59*</b>	<b>Reptile</b>	<b>A</b>
<b>W60*</b>	<b>Contact with nonvenomous plant thorns and spines and sharp leaves</b>	<b>A</b>
<b>W61*</b>	<b>Birds</b>	<b>A</b>
<b>W62*</b>	<b>Amphibians</b>	<b>A</b>
<b>Y28*</b>	<b>Contact with sharp object, undetermined intent</b>	<b>A</b>
<b>Y83*</b>	<b>Surgical operation and other surgical procedures as the cause of</b>	<b>A</b>
<b>Z11*</b>	<b>Encounter for screening for infectious and parasitic diseases</b>	<b>A</b>
<b>Z20*</b>	<b>Contact with and (suspected) exposure to communicable diseases</b>	<b>A</b>
<b>Z21*</b>	<b>Asymptomatic human immunodeficiency virus (HIV) infection status</b>	<b>A</b>
<b>Z22*</b>	<b>Carrier of infectious disease</b>	<b>A</b>

## Data Extraction for Peer Comparisons

In the peer comparison intervention, each provider’s individual performance is calculated as the percentage of encounters for non-antibiotic appropriate ARIs (i.e., “O” visits) listed in Table 1 for which the provider prescribed an oral antibiotic. Encounters occurring with patients who had certain comorbidities or other diagnosed bacterial infections (i.e., “A” visits) are excluded from the calculation. If the provider had more than 20 qualifying ARI encounters in the past 30 days, all these encounters were included in the calculation. Otherwise, the most recent 20 qualifying ARI encounters were included if they occurred in the past five months. If fewer than 20 occurred in the past five months, only encounters in the past five months are included and the provider is excluded from percentile rank calculations.



## 5. STRATEGIES FOR REPORTING AND FEEDBACK: Share the data!

### Departmental Feedback

Providing feedback to the department allows you to share information with your leadership and local team about the success of your antibiotic stewardship program. A monthly aggregate email to the departmental leadership summarizes antibiotic prescribing practices for ARI from electronic health record data. This includes total qualifying ARI visits evaluated by the department, as well as total and percentage of ARI visits with antibiotics prescribed. Over time, this data can also be used to help you decide if changes need to be made to your antibiotic stewardship program.

## Sample 1 Feedback email templates

Hi Everyone-  
As part of our MITIGATE study examining antibiotic prescribing for likely viral infections, we are providing monthly reports for our Section. For the month of December, our Section evaluated XXXX eligible children with likely viral infections. Of these, XXX (XX.X%) children received an antibiotic prescription by one of our providers.

Thank you for supporting our antimicrobial stewardship efforts.  
Sincerely

The MITIGATE Study Team

## Peer Comparison (PC)

MITIGATE is also an email-based intervention. Giving feedback to clinicians helps them monitor their own behavior and make changes based on their real prescribing habits. Before beginning the intervention, clinicians receive an email (see Sample 1) letting them know what to expect from the peer comparison emails and answering some frequently asked questions. Then, each month, using EHR data within each region about inappropriate prescription rates, clinicians are ranked from highest to lowest (see data extraction section). Rankings are typically only shared with the program team and administration, however sites may choose to share rankings with all clinicians. Clinicians with the lowest inappropriate prescribing rates (the top-performing 10<sup>th</sup> percentile) will be informed that they are a “top performer” in a congratulatory email. The remaining clinicians will be told that they are “not a top performer” by email. Emails will include the number and proportion of inappropriate antibiotic prescriptions written for a month for non-antibiotic-appropriate ARI cases and the proportion written by Top Performers. It is important to be specific in the language used for provider feedback, as this intervention refers specifically to antibiotic prescribing for likely viral respiratory infections, not appropriateness of prescribing for other known bacterial targets for antimicrobial stewardship (e.g. community-acquired pneumonia, urinary tract infection). See Samples 2 and 3 for sample language.

## Sample 2 Feedback email templates:

Dear XX Provider,

Congratulations! You were a top performer in antibiotic stewardship for likely viral infections last month.

- You were in the top 10% of providers.
- Based on your recent activity, you wrote XX prescriptions out of XX acute respiratory infection cases that did not warrant antibiotics.

Sincerely,  
The MITIGATE antibiotic stewardship team

## Sample 3 Feedback email templates:

Dear XX Provider,

You were not a top performer in antibiotic stewardship for likely viral infections last month.

- You wrote too many unnecessary prescriptions.
- Based on your most recent activity, you wrote X prescriptions out of X acute respiratory infection cases that did not warrant antibiotics.

Sincerely,  
The MITIGATE antibiotic stewardship team

In some cases, clinicians might have a strong emotional reaction to the PC feedback. Those who are reacting may be over identifying with the label **top performer** and are preoccupied that they have not achieved this designation. They are unable to step away so that they can determine more clearly how to improve their practice. Or, even to see that they are very close to being a top performer given their score. Additionally, complaints about this feedback from colleagues can be distressing to the physician or staff champion.

The FAQs below can be used to alleviate some of these emotions. It's also important to help clinicians separate their emotions from the actions they need to take. For example, one could ask them to note or label how they reacted to the feedback (perhaps under the guise of QI. Getting feedback made me feel "frustrated," "challenged," "annoyed"). Noting or labeling will require them to distance themselves from their emotions in order to evaluate them. Then, once the emotion is no longer predominant, the individual can be asked to reflect on how to improve performance.

Other potential phrases to address provider concerns include:

"The feedback you receive is rooted in concern for the well-being of others. We provide frank and honest assessments of performance so as not to be evasive or to register this concern only on a very superficial level to clinicians" and "the purpose is not to offend, but to bring everyone closer to using a consistent approach to guidelines."

Depending on your site, the FAQs and feedback should be adjusted depending on the results and methods.

See template and FAQ below:

Dear [Organization Name] Provider,

You will be receiving performance feedback e-mails as part of your participation in the behavioral economics study. In these e-mails, you will encounter the phrase "top performer." In this context, "top performer" only refers to antibiotic prescribing for acute respiratory infections for which antibiotics are not indicated. The "top performers" among you have an inappropriate antibiotic prescribing rate of [Top Performer Rate]. These e-mails will also include the following responses to Frequently Asked Questions:

- ***How many "top performers" can there be?***  
Top performer status is achievable by everyone. We do not limit the number of top performers. For those of you who receive the "not top performer" emails, the bar may seem high, but many of your colleagues are reaching it.
- ***How can I achieve top performance?***  
The best way to improve clinical performance is to review the guidelines for antibiotic prescribing for acute respiratory infections and be faithful to them with future patients. If you do this consistently, you will achieve top performance.
- ***Which patients are you including?***  
We only include patients with diagnoses for which antibiotics are not indicated: non-specific upper respiratory infections, acute bronchitis, and influenza.
- ***Which patients are excluded?***  
We exclude patients with chronic lung disease, certain other medical conditions (e.g., immunosuppression), and any other concomitant infectious diagnosis.



- ***I have changed my prescribing, how soon will I see a change?***

Don't expect an instant change, but it will happen. There is at least a one-month delay in the data. Roughly speaking, we are looking at your most recent 20 applicable visits within the prior five months. If you do not see a lot of acute respiratory infection patients, your "top performer" email could take a few months to arrive.

Sincerely,

[Dr. Clinic Leader Name]



## **6. OUTCOMES AND SUSTAINABILITY:**

The primary study outcome is the likelihood an antibiotic is prescribed in an antibiotic-nonresponsive acute respiratory infection (ARI) visit. This information may be obtained from electronic health record data as described in the process section above.

Now that you have your program active, it is helpful to track these outcomes, select time points for the post-intervention survey, and collect and analyze survey and antibiotic prescribing data. You can check in regularly with your team regarding any changes that need to be made after the initial implementation. You can collect feedback through the survey as well as informally through discussions and feedback from clinician and administrative stakeholders. Data from the surveys can be used to demonstrate departmental change, and, if linked to individual clinicians, to show improvement in outlier physicians and to target academic detailing as well as knowledge deficits regarding antibiotic prescribing. You can gauge clinician experience with the antibiotic stewardship program through the ongoing survey results, and any areas of feedback or discord can be addressed with the stakeholder group. Changes in antibiotic prescribing performance can be calculated as a percentage of eligible visits that were included based on the algorithm for data extraction described above or existing measures such as HEDIS or NQF. This data can be displayed for feedback to the ED or urgent care practice using standard statistical process run charts (SPC) displaying performance over time similar to other quality improvement efforts. Periodic updates in the monthly newsletter or emails to staff can serve as positive reinforcement of successful efforts.

Demonstration of success can be used to obtain institutional buy-in for programmatic and logistical support with ongoing report writing and expansion of programmatic efforts in antibiotic stewardship in order to lead to sustainability. These can also serve as the basis for partnerships with other community organizations and clinicians.

### **Adherence Assessment**

In order to ensure that the study interventions are being reliably delivered, sites may create testing scripts that cover logical and coding variation in EHR-based interventions. Champions will need to designate personnel to conduct site evaluations regularly during the intervention to ensure that tests do not fail. For example, staff will verify that intervention materials are being used and posted and, if not, assess the barriers to implementation and facilitate their uptake.

Throughout the course of the implementation, sites should consider monitoring “diagnostic drift” that may result in provider shifting diagnosis to avoid guideline conflicts that might trigger alerts or poor performance reports. Patient surveys to assess patient engagement and experience during the stewardship implementation may also be considered.

## RESULTS OF COMPARATIVE ANALYSIS AND EVIDENCE BASED INTERVENTIONS FROM MITIGATE STUDY

Kristina Shigyo MD, Larissa May MD MSPH MSHS, Aubyn Stahmer PhD, Kabir Yadav MDCM MS MSHS, for the MITIGATE Study Investigators Implementation of an Antimicrobial Stewardship Program for Acute Respiratory Infections in Acute Care Settings

**Background and Aims:** Inappropriate antibiotic use within emergency department (ED) and urgent care center (UCC) settings is a major public health concern, yet few existing antimicrobial stewardship programs have been designed for application in these settings. As part of a project to adapt existing materials from the CDC's outpatient Get Smart campaign to acute care settings, we report a pre-implementation workflow analysis of five acute care settings at two sites. The aim is to investigate the facilitators and barriers to incorporating an adapted Get Smart antimicrobial stewardship intervention to reduce inappropriate antibiotic prescribing for antibiotic—nonresponsive acute respiratory infections.

**Methods:** Seventeen semi—structured interviews were conducted at Harbor—UCLA Medical Center and UC Davis Medical Center using purposeful sampling of physicians, registered nurses, and administrators in the adult ED, pediatric ED, and UCC. Interviews were recorded, transcribed, and analyzed independently by two researchers using NVivo 11. Grounded theory content analysis was performed for barriers and facilitators of implementation of antibiotic stewardship interventions in acute care settings, as well as any emergent themes. An anonymized survey assessing attitudes and beliefs of prescribing providers is also currently underway.

**Results:** Preliminary analysis of the interviews suggests that facilitators to implementation include: incorporation of stewardship education into the triage process, provision of educational materials while patients wait for care, display of bilingual patient education materials within densely populated patient areas, education of residents and nurses, local guidelines for antibiotic use, and provision of viral prescription pads. Some notable barriers to implementation include: lack of coordinated communication amongst providers, maintaining staff and provider awareness of the program, difficulty of timing of the program interventions with the clinical workflow, and concern that lengthy wait times may increase antibiotic prescribing.

**Implications for practice/policy:** This study can provide a framework for adaptation of existing antibiotic stewardship strategies to match the clinical workflow of acute care settings based on an analysis of the unique challenges inherent within these environments. It also provides a model of pre-implementation analysis for the development of antibiotic stewardship programs at new sites to account for, and adapt to, site--specific variables.

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# Implementation of an Antimicrobial Stewardship Program for Acute Respiratory Infections in Acute Care Settings



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## INTRODUCTION

- Inappropriate antibiotic use within emergency department (ED) and urgent care center (UCC) settings is a major public health concern
- Few existing antimicrobial stewardship programs are designed for these settings.
- CDC developed an outpatient stewardship campaign (Get Smart for Antibiotics) for outpatient settings like ambulatory clinics
- Adaptation is needed for implementation in acute care settings

## Get Smart Program

**Commitment**  
Dedicate yourself to and accept responsibility for optimizing antibiotic prescribing and patient safety.

**Action for policy and practice**  
Implement at least one policy or practice to improve antibiotic prescribing, assess whether it is working, and modify as needed.

**Tracking and reporting**  
Monitor antibiotic prescribing practices and offer regular feedback to clinicians, or their clinicians assess their own antibiotic prescribing practices themselves.

**Education and expertise**  
Provide educational resources to clinicians and patients on antibiotic prescribing, and ensure access to medical expertise on optimizing antibiotic prescribing.

**Study Aim:**  
Investigate facilitators and barriers to incorporating an antimicrobial stewardship intervention to reduce inappropriate antibiotic prescribing in ED and UCC settings.

## METHODS

- Sites:** Harbor-UCLA; UC Davis Medical Centers  
**Participants:** Purposeful sampling of physicians, nurses, administrators  
**Settings:** Adult ED, Pediatric ED, Urgent Care Centers
- Triangulated Measures**
- ✓ 17 semi-structured interviews exploring clinical workflow, patient assessment, discharge process, antibiotic education and stewardship activities
  - Anonymized surveys sent to 98 prescribing providers assessing attitudes and beliefs around antibiotic stewardship (ongoing).
- Grounded Theory Content Analysis**  
Interviews independently coded by two researchers for barriers and facilitators of implementation of antibiotic stewardship interventions, and emergent themes

## Adult Emergency Departments

BARRIERS	FACILITATORS
Lengthy wait times increase antibiotic prescriptions	Triage nurses and providers contact patient early in clinical process
Limited coordinated communication amongst providers, nurses, administrators	Capacity to display posters & educational materials in ED locations with long wait times
Difficulty timing program interventions with clinical workflow	Perception of positive provider response to audit and feedback
Maintaining staff and provider awareness of the program over time	RN and provider routinely add materials during the discharge process

## Urgent Care Centers

BARRIERS	FACILITATORS
Different workflows during daytime and evening providers	Capacity to display patient education materials in intake room and individual patient rooms
RN discharge of patients before resident documentation is completed	Verbal communication between RN and provider regarding discharge plan
Provider neglect to utilize existing patient education materials	Perception of positive provider response to audit and feedback
Maintaining staff and provider awareness of the program over time	RNs routinely add materials during the discharge process

## Pediatric Emergency Departments

BARRIERS	FACILITATORS
Provider perceptions of parental expectations for antibiotic prescriptions	Routine display of bilingual patient education materials in patient exam rooms
Insufficient communication between residents and nurses prior to patient discharge	Availability of nursing briefings and resident education sessions
Lack of patient and family education regarding viral versus bacterial illnesses	Routine use of prescription aids and additional educational handouts on discharge
Concern for education in triage as a deterrent for further care	Commitment flair (badges; pins) to remind providers of stewardship initiatives



All-Setting Acute Care Modifications	Adult ED Modifications	Urgent Care Center Modifications	Pediatric ED Modifications
Bilingual patient education posters, brochures and handouts from CDC Get Smart campaign materials	Display in waiting rooms and triage areas (long wait)	Display in waiting room, triage areas and patient exam rooms	Poster display in individual patient rooms (Harbor) and waiting rooms (Davis)
Provider public commitment flair (badges; pins) and signing of commitment logs	Bilingual handouts provided to patients after triage process to review while they are waiting for provider	Bilingual handouts provided to patients after intake process to review while they are waiting for provider	Include handouts for families
Monthly individualized provider feedback and peer comparison of antibiotic prescribing practices	Resident didactic sessions	Presentation at monthly UCC provider meetings	Resident didactic sessions
Stewardship program education in monthly department meetings & daily nurse briefings	Included in UC Davis newsletter to all nurses and techs	Initiatives discussed at UCC nursing briefings	UC Davis quarterly provider meetings
Viral prescription pads & discharge workstations supplied with educational handouts for patients to fit clinical workflow	Viral prescription pads and handouts available in provider workrooms	Viral prescription pads on each mobile provider workstation	Viral prescription pads and school notes in provider workroom

## DISCUSSION

- Demonstrates a generalizable framework for adaptation of existing antibiotic stewardship strategies to match the clinical workflow of acute care settings
- Accounts for the unique challenges inherent within acute care environments
- Analysis of the barriers and facilitators enhances "fit" of adapted stewardship programs into diverse pediatric and adult environments

### Next Steps:

- Triangulation with survey results
- Creation of a model of pre-implementation toolkit for the development of antibiotic stewardship programs at new sites to account for, and adapt to, site-specific variables.
- Testing effectiveness of adapted programs.

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**Figure 8. UC Davis distribution summary of selection of enhanced intervention materials for antimicrobial stewardship (1 site)**

Commitment log:	22	Badge reels:	13
Total providers:	54	Total providers:	54
	40.7%		24.1%
Poster signatures:	33	Pins:	53
Total providers:	54	Total providers:	54
	61.1%		98.1%

**Figure 9. Harbor Distribution summary of selection of enhanced intervention materials for antimicrobial stewardship (3 sites)**

Commitment log:	107	Badge reels:	61
Total providers:	108	Total providers:	108
	99.1%		56.5%
Poster signatures:	49	Pins:	39
Total providers:	108	Total providers:	108
	45.4%		36.1%

**Figure 10. Children’s Hospital Colorado Distribution summary of selection of enhanced intervention materials for antimicrobial stewardship (3 sites)**

Commitment log:	113	Badge reels:	~70
Total providers:	145	Total providers:	145
	77.9%		~48%
Poster signatures:	113	Pins:	~30
Total providers:	145	Total providers:	145
	77.9%		21%

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## Interview Structured Questions and Vignette (Physicians)

1. You are here because you work in emergency medicine or urgent care and make antibiotic prescribing decisions for patients presenting with respiratory complaints. Please give a brief overview of your role in the department.  
***Participants will read the ADULT or PEDS vignette***
2. Let's talk about the work flow you would expect for this patient.
  - a. What would the usual wait time for this patient be?
  - b. What is the triage process for this patient?
  - c. What would be your assessment process?
  - d. What is the discharge process?
3. How do you use the EHR in this process? (*Probe for type, fit in workflow, eprescribing, order sets if they don't come up.*)
4. Tell me about how you would talk to the patient about antibiotic use in this case?
  - a. Would this be different based on patient expectation about antibiotics? How would this be assessed
  - b. *Probe for any education to patients about antibiotic use*
5. What is the general culture around antibiotic stewardship in your department?
  - a. What are the barriers to antibiotic stewardship and patient education?
  - b. What might facilitate antibiotic stewardship and patient education?
6. Tell me about training you have received in any stewardship programs. In your opinion, what types of training and patient education works and what doesn't?
  - a. Discuss features of training in stewardship you sustained over time.
  - b. Discuss features of training in stewardship you did not sustain over time.

### ADULT Vignette:

*A 27-year-old woman with no known underlying lung disease presents with a 10-day history of cough that is productive of yellow non bloody sputum. Her symptoms began with nasal congestion and a sore throat, but these initial symptoms resolved after a few days. Her remaining symptom is cough which is less productive than it was several days ago. She has some nasal congestion as well. She denies any known sick contacts. Her cough does not occur in long fits, and she is not short of breath. On physical examination she is not in respiratory distress, afebrile, and has normal vital signs. Lung exam is normal.*

### PEDIATRIC Vignette:

*A 2 year old male with no known underlying lung disease presents with a 4-day history of cough and intermittent fever with max Temp of 101. Child is in daycare with multiple sick contacts and is fully immunized. On physical examination child is afebrile, there is clear rhinorrhea, both TMs are red but not bulging, and vital signs are otherwise normal. Lung exam reveals scattered expiratory wheezes.*

- *How would you manage this patient/these patients?*
- *Would you consider antibiotics for this patient? Under what circumstance?*
- *What instructions would you give the patient or parent?*

- What discussions would you anticipate around antibiotic use?

#### **ADULT**

*OTC medications grouped:*

*Of the drug choices below, please indicate which drugs you would choose in treating this patient. You may select up to three options.*

*Prescription medications:*

- Albuterol inhaler
- An antibiotic of your choice
- Robitussin with codeine
- Benzonatate

*Over-the-counter drugs:*

- Cough lozenge
- Cough spray
- Cough syrup

*OTC medications listed individually:*

*Of the drug choices below, please indicate which drugs you would choose in treating this patient. You may select up to three options.*

*Over-the-counter drugs:*

- Cough lozenge
- Cough spray
- Cough syrup

*Prescription drugs:*

- Albuterol inhaler
- An antibiotic of your choice
- Robitussin with codeine
- Benzonatate

#### **PEDS**

*OTC medications grouped:*

*Of the drug choices below, please indicate which drugs you would choose in treating this patient. You may select up to three options.*

*Prescription medications:*

- Albuterol inhaler
- An antibiotic of your choice
- Robitussin with codeine
- Benzonatate

*Over-the-counter drugs:*

- Cough lozenge
- Cough spray
- Cough syrup

*OTC medications listed individually:*

*Of the drug choices below, please indicate which drugs you would choose in treating this patient. You may select up to three options.*

*Over-the-counter drugs:*

- Cough lozenge
- Cough spray
- Cough syrup

*Prescription medications:*

- Albuterol inhaler
- An antibiotic of your choice
- Robitussin with codeine
- Benzonatate

### **Structured Interview Questions and Vignette (Nurse)**

1. You are here because you work in emergency medicine and you or your team has a role in antibiotic prescription for patients coming into your department. Please give a brief overview of your role in the department.  
***Participants will read the ADULT or PEDS vignette***
2. Let's talk about the work flow you would expect for this patient.
  - a. What would the usual wait time for this patient be?
  - b. What is the triage process for this patient?
  - c. How would this patient move through the department? Who would talk with the patient?
  - d. What is the discharge process?
3. How does the team use the EHR in this process? (*Probe for type, fit in workflow, eprescribing, order sets if they don't come up.*)
4. Tell me about how the team would handle antibiotic prescription for this patient?
  - a. Would this be different based on patient beliefs about antibiotics?

- b. *Probe for any education to patients about antibiotic use*
- c. *What is the nursing role in patient education at triage and/or discharge for antibiotic use?*
- 5. What is the general culture around antibiotic stewardship in your department?
  - a. What are the barriers to antibiotic stewardship and patient education?
  - b. What might facilitate antibiotic stewardship and patient education?
- 6. Tell me about training you have received in any stewardship programs. In your opinion, what types of training and patient education works and what doesn't?
  - a. Discuss features of training in stewardship you sustained over time.
  - b. Discuss features of training in stewardship you did not sustain over time.

**ADULT Vignette:**

*A 27-year-old woman with no known underlying lung disease presents with a 10-day history of cough that is productive of yellow non bloody sputum. Her symptoms began with nasal congestion and a sore throat, but these initial symptoms resolved after a few days. Her remaining symptom is cough which is less productive than it was several days ago. She has some nasal congestion as well. She denies any known sick contacts. Her cough does not occur in long fits, and she is not short of breath. On physical examination she is not in respiratory distress, afebrile, and has normal vital signs. Lung exam is normal.*

**PEDIATRIC Vignette:**

*A 2 year old male with no known underlying lung disease presents with a 4-day history of cough and intermittent fever with max Temp of 101. Child is in daycare with multiple sick contacts and is fully immunized. On physical examination child is afebrile, there is clear rhinorrhea, both TMs are red but not bulging, and vital signs are otherwise normal. Lung exam reveals scattered expiratory wheezes.*

- *Would you consider antibiotics appropriate treatment for this patient? Under what circumstance?*
- *What instructions would you give the patient or parent?*
- *What discussions would you anticipate around antibiotic use? Describe typical education at discharge*

**Structured Interview Questions and Vignette (Administrator)**

1. You are here because you work in emergency medicine and you or your team has a role in antibiotic prescription for patients coming into your department. Please give a brief overview of your role in the department.
 

***Participants will read the ADULT or PEDS vignette***
2. Let's talk about the work flow you would expect for this patient.
  - a. What would the usual wait time for this patient be?
  - b. What is the triage process for this patient?
  - c. How would this patient move through the department? Who would talk with the patient?
  - d. What is the discharge process?
  - e. What is the oversight or regulatory process?
3. How does the team use the EHR in this process? (*Probe for type, fit in workflow, eprescribing, order sets if they don't come up.*)
4. Tell me about how the team would handle antibiotic prescription for this patient?
  - a. Would this be different based on patient beliefs about antibiotics?
  - b. *Probe for any education to patients about antibiotic use*
  - c. What quality metrics might apply to this visit



- d. What support would be available to providers during this encounter to support clinical decision making?
5. What is the general culture around antibiotic stewardship in your department?
  - a. What are the barriers to antibiotic stewardship and patient education?
  - b. What might facilitate antibiotic stewardship and patient education?
  - c. What quality measures are currently being monitored?
6. Tell me about training you have received in any stewardship programs. In your opinion, what types of training and patient education works and what doesn't?
  - a. Discuss features of training in stewardship you sustained over time.
  - b. Discuss features of training in stewardship you did not sustain over time.

ADULT Vignette:

*A 27-year-old woman with no known underlying lung disease presents with a 10-day history of cough that is productive of yellow non bloody sputum. Her symptoms began with nasal congestion and a sore throat, but these initial symptoms resolved after a few days. Her remaining symptom is cough which is less productive than it was several days ago. She has some nasal congestion as well. She denies any known sick contacts. Her cough does not occur in long fits, and she is not short of breath. On physical examination she is not in respiratory distress, afebrile, and has normal vital signs. Lung exam is normal.*

PEDIATRIC Vignette:

*A 2 year old male with no known underlying lung disease presents with a 4-day history of cough and intermittent fever with max Temp of 101. Child is in daycare with multiple sick contacts and is fully immunized. On physical examination child is afebrile, there is clear rhinorrhea, both TMs are red but not bulging, and vital signs are otherwise normal. Lung exam reveals scattered expiratory wheezes.*

- What expectations or discussions would you anticipate with this scenario?
- What types of educational materials or other resources might be available in these discussions
- If the patient or parent leaves without an antibiotic Rx and is upset:
- What are barriers to patient-provider communication?
- What if the patient or parent files a complaint?

## Antimicrobial Stewardship Pre-Implementation Provider Survey

**The following are considered acute upper respiratory infections: the common cold, viral pharyngitis, acute bronchitis, bronchiolitis, croup, laryngitis, acute sinusitis, and acute otitis media.**

**Practice:**

1. How frequently do you prescribe antibiotics to patients with acute **bronchitis**?
  - a. <10% of the time
  - b. 10-25% of the time
  - c. 26-50% of the time
  - d. 51-75% of the time
  - e. More than 75% of the time
2. How frequently do you prescribe antibiotics to patients with acute **bronchiolitis**?

- a. <10% of the time
  - b. 10-25% of the time
  - c. 26-50% of the time
  - d. 51-75% of the time
  - e. More than 75% of the time
3. How frequently do you prescribe antibiotics to patients with **laryngitis**?
- a. <10% of the time
  - b. 10-25% of the time
  - c. 26-50% of the time
  - d. 51-75% of the time
  - e. More than 75% of the time
4. How frequently do you prescribe antibiotics to patients with **croup**?
- a. <10% of the time
  - b. 10-25% of the time
  - c. 26-50% of the time
  - d. 51-75% of the time
  - e. More than 75% of the time
5. How frequently do you prescribe antibiotics to patients with acute **sinusitis**?
- a. <10% of the time
  - b. 10-25% of the time
  - c. 26-50% of the time
  - d. 51-75% of the time
  - e. More than 75% of the time
6. How frequently do you prescribe antibiotics to patients with acute **otitis media**?
- a. <10% of the time
  - b. 10-25% of the time
  - c. 26-50% of the time
  - d. 51-75% of the time
  - e. More than 75% of the time
7. How frequently do you empirically prescribe antibiotics to patients with **pharyngitis** (without testing for group A strep)?
- a. <10% of the time
  - b. 10-25% of the time
  - c. 26-50% of the time
  - d. 51-75% of the time
  - e. More than 75% of the time
8. How frequently do you think other clinicians in your practice prescribe antibiotics for the treatment of non-specific URIs?
- a. <10% of the time
  - b. 10-25% of the time
  - c. 26-50% of the time
  - d. 51-75% of the time
  - e. More than 75% of the time
9. In some online studies, a small number of participants do not pay close attention to all of the items they are answering. To indicate that you are paying close attention, please do not mark any of the choices for

the following question: How frequently do you think physicians prescribe decongestants for non-specific URIs?

- a. <10% of the time
- b. 10-25% of the time
- c. 26-50% of the time
- d. 51-75% of the time
- e. More than 75% of the time

10. Does your emergency department or urgent care center provide guidelines for prescribing antibiotics for acute respiratory infections?

- a. Yes, Please specify \_\_\_\_\_
- b. No
- c. I don't know

11. Under what clinical conditions would you consider prescribing antibiotics that are non-adherent to professional society practice guidelines?

Comments:

12. Which guidelines/resources do you use to make decisions for prescribing antibiotics?

- a. Infectious Diseases Society of America (IDSA)
- b. American Academy of Pediatrics
- c. Centers for Disease Control and Prevention
- d. Up to Date
- e. Podcasts (e.g. EMRAP)
- f. Local or institutional guidelines
- g. Other, Please specify \_\_\_\_\_

13. In your opinion, what are current barriers to appropriate prescribing for acute respiratory infection? Check all that apply.

- Lack of access to guidelines or information on prescribing
- Lack of clear evidence and evidence-based recommendations
- Patient expectations
- Psychosocial barriers
- Electronic Health Record
- Other, Please specify \_\_\_\_\_

14. How often do you consult with other colleagues before prescribing antibiotics for acute upper respiratory infections?

- a. <10% of the time
- b. 10-25% of the time
- c. 26-50% of the time
- d. 51-75% of the time
- e. More than 75% of the time

15. To the best of your knowledge, which of the following resources for outpatient antibiotic prescribing are currently present in your emergency department? Check all that apply.

- a. Pharmacist
- b. Direct physician feedback for antibiotic prescribing
- c. Formulary restriction/Required antibiotic approval by Infectious Disease (for any antibiotics)
- d. Published hospital-wide antibiogram (accessible via web, intranet or in print)
- e. Other, Please specify \_\_\_\_\_

- f. I do not know

**Attitudes:**

16. Antibiotic resistance is a public health problem facing the United States.

- a. Strongly Agree
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly Disagree

17. Inappropriate antibiotic use contributes to antimicrobial resistance.

- a. Strongly Agree
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly Disagree

18. To what extent do you feel antibiotics are over or underused for acute infections with 1 being very underused and 10 being very overused?

1            2            3            4            5            6            7            8            9

**Frequently underused**

**Frequently overused**

19. For which conditions are antibiotics most frequently **over-prescribed** (either inappropriate use or overly broad spectrum use)? Check all that apply.

- a. Common cold
- b. Sinusitis
- c. Otitis media
- d. Pharyngitis
- e. Influenza
- f. Acute bronchitis
- g. Bronchiolitis
- h. Asthma
- i. Skin and Soft Tissue
- j. Gastrointestinal Infection
- k. Urinary tract infection
- l. NONE
- m. Other

Comments:

20. For which conditions are antibiotics most frequently **under-prescribed** (either inappropriate use or overly narrow spectrum use)? Check all that apply.

- a. Common cold
- b. Sinusitis
- c. Otitis media
- d. Pharyngitis
- e. Influenza
- f. Acute bronchitis
- g. Bronchiolitis
- h. Asthma

- i. Skin and Soft Tissue
- j. Gastrointestinal Infection
- k. Urinary tract infection
- l. NONE
- m. Other

Comments:

21. Antibiotic Stewardship programs are important to optimize antibiotic use in the ED and urgent care.
- a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
22. ED and urgent care patients receive adequate education about the use and duration of antibiotic prescriptions prior to discharge.
- a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
23. What resources do you use to stay up-to-date on current approaches to antibiotic prescribing?
- a. Departmental lectures/CME
  - b. Web-based resources (Up to Date or other)
  - c. Smart phone App or pocket guide (EMRA, Sanford Guide)
  - d. Other lectures
  - e. Other, Please specify \_\_\_\_\_
24. ED and urgent care based antibiotic stewardship programs would interfere with my usual approach to clinical decision-making in treatment of infectious diseases.
- a. Strongly agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
- If yes, why: \_\_\_\_\_
25. In your opinion, what are the best strategies to decrease inappropriate use of antibiotics? Check all that apply.
- Better education in pre-clinical training (medical/nursing school)
  - Better education in residency training
  - Developing rigorous practice guidelines for empiric antibiotic treatment of common infections
  - Developing more order sets or decision support tools for the ED or urgent care
  - Other, Please specify \_\_\_\_\_
26. Based on your preference, please rank, in order (1 being the most preferable), the following methods to implement antimicrobial stewardship for the emergency department or urgent care?
- \_\_\_ Provider continuing education
- \_\_\_ Published institutional or local guidelines

\_\_\_ Point-of-care clinical decision support via the electronic health record

\_\_\_ Individual feedback clinicians

\_\_\_ Other, Please specify \_\_\_\_\_

If you have any comments about ED or urgent care based antimicrobial stewardship, please provide them below:

**Demographics:**

27. Gender

- a. Male
- b. Female

28. What is your clinical role within your hospital ED or urgent care?

- a. Attending physician
- b. Fellow physician
- c. Resident physician
- d. Nurse practitioner
- e. Physician assistant
- f. Other, Please specify \_\_\_\_\_

29. For how many years have you worked in this position? \_\_\_\_\_

30. Proportion of pediatric patient's ages 0-17 seen?

- 100%
- >75%
- 50-74
- 26-49
- 11-25
- <10

31. What is your training? Check all that apply.

- Internal medicine
- Emergency medicine
- Pediatrics
- Pediatric emergency medicine
- Specialized residency
- Other, Please specify \_\_\_\_\_

32. Board Certified? Y/N

33. Board Eligible? Y/N

34. How long have you been practicing as an independent provider (since completion of training)?

\_\_\_\_\_ months or years

**Antimicrobial Stewardship Post-Implementation Provider Survey**

**Attitudes:**

1. Antibiotic resistance is a public health problem facing the United States.
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
  
2. Inappropriate antibiotic use contributes to antimicrobial resistance.
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
  
3. Do you feel antibiotics are overused or underused in your emergency department or urgent care center with 1 being very underused and 10 being very overused?

1      2      3      4      5      6      7      8      9      10

**Frequently underused**

**Frequently overused**

4. For which conditions are antibiotics most frequently **over-prescribed** (either inappropriate use or overly broad spectrum use)? Check all that apply.
  - a. Common cold
  - b. Sinusitis
  - c. Otitis media
  - d. Pharyngitis
  - e. Influenza
  - f. Acute bronchitis
  - g. Bronchiolitis
  - h. Asthma
  - i. Skin and Soft Tissue
  - j. Gastrointestinal Infection
  - k. Urinary tract infection
  - l. NONE
  - m. Other

Comments:

5. For which conditions are antibiotics most frequently **under-prescribed** (either inappropriate use or overly narrow spectrum use)? Check all that apply.
  - a. Common cold
  - b. Sinusitis
  - c. Otitis media
  - d. Pharyngitis
  - e. Influenza
  - f. Acute bronchitis
  - g. Bronchiolitis
  - h. Asthma
  - i. Skin and Soft Tissue

- j. Gastrointestinal Infection
- k. Urinary tract infection
- l. NONE
- m. Other

Comments:

- 6. Antibiotic Stewardship programs are important to optimize antibiotic use in the ED and urgent care.
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
- 7. ED and urgent care patients receive adequate education about the use and duration of antibiotic prescriptions prior to discharge.
  - a. Strongly Agree
  - b. Agree
  - c. Neutral
  - d. Disagree
  - e. Strongly Disagree
- 8. What resources do you use to stay up-to-date on current approaches to antibiotic prescribing?
  - a. Departmental lectures/CME
  - b. Web-based resources (Up to Date or other)
  - c. Smart phone App or pocket guide (EMRA, Sanford Guide)
  - d. Other lectures
  - e. Other, Please specify \_\_\_\_\_

**ED/Urgent Care Stewardship Experience:**

- 9. Did you take part in the ED or urgent care stewardship program for acute respiratory infections?
  - a. Basic intervention (education materials)
  - b. Enhanced intervention (individual audit and feedback, peer to peer comparisons)
  - c. I don't know
- 10. Which components of our stewardship intervention did you receive?
  - a. Educational presentations at Academic Forum or other venues
  - b. Distribution of clinical practice guidelines in person
  - c. Distribution of clinical practice guidelines electronically
  - d. Emails from stewardship program
  - e. Departmental feedback on overall prescribing
  - f. Individualized audit and feedback on your practice patterns
  - g. I don't know
- 11. Did you participate in the individual audit/feedback portion of the ED or urgent care stewardship program?
  - a. Yes
  - b. No
  - c. I don't know



**Please answer the following three questions if you participated in the audit and feedback portion of the program.**

12. Did you find it the audit and feedback portion of the program:

- a. Very useful
- b. Mostly useful
- c. Somewhat useful
- d. Marginally useful
- e. Not at all useful

13. How bothersome was the audit and feedback?

- a. Extremely intrusive
- b. Very intrusive
- c. Somewhat intrusive
- d. A little intrusive
- e. Not at all intrusive

14. How willing were you to change your practices based on the audit and feedback, with 1 being unwilling and 10 being very willing?

1      2      3      4      5      6      7      8      9      10

**Unwilling** **Very willing**

15. Do you believe that ED and urgent care based antibiotic stewardship programs would interfere with my usual approach to clinical decision-making in treatment of infectious diseases.

- a. Strongly agree If yes, why: \_\_\_\_\_
- b. Agree
- c. Neutral
- d. Disagree
- e. Strongly Disagree

16. In your opinion, what are the best strategies to decrease inappropriate use of antibiotics? Check all that apply.

- Better education in pre-clinical training (medical/nursing school)
- Better education in residency training
- Developing rigorous practice guidelines for empiric antibiotic treatment of common infections
- Developing more order sets or decision support tools for the ED or urgent care
- Other, Please specify \_\_\_\_\_

17. Based on your preference, please rank, in order (1 being the most preferable), the following methods to implement antimicrobial stewardship for the emergency department or urgent care?

- \_\_\_ Provider continuing education
- \_\_\_ Published institutional or local guidelines
- \_\_\_ Point-of-care clinical decision support via the electronic health record
- \_\_\_ Individual feedback clinicians
- \_\_\_ Other, Please specify \_\_\_\_\_

18. What barriers do you see in appropriate prescribing for acute respiratory infections?

- a. Lack of access to guidelines or information on prescribing
  - b. Patient expectation
  - c. Psychosocial barriers
  - d. EHR
  - e. Other, please specify  
Why?
19. What are your personal feelings about the emergency department or urgent care stewardship program/intervention?
- a. Very helpful
  - b. Slightly helpful
  - c. Neutral
  - d. Wasn't helpful at all
  - e. Other: \_\_\_\_\_
20. What additional resources would you like to see available as part of an ED or urgent care stewardship program and why?
21. Has taking part in the stewardship intervention changed or improved your clinical practices?
- a. Yes.  
Please explain \_\_\_\_\_
  - b. No.  
Please explain \_\_\_\_\_
22. In what ways do you think we could better present the information to clinicians?  
Please explain \_\_\_\_\_
23. If you have any additional comments about ED-based antimicrobial stewardship, please provide them below:

If you are interested sharing more information about your experience please contact us at: XXX

## **Additional Materials for Selection for Patient and Clinician Education**



### **California Medical Association Foundation AWARE program:**

Background & History: The Alliance Working for Antibiotic Resistance Education (AWARE) was initiated by the CMA Foundation in 2000, as a long-term statewide effort to promote

the appropriate use of antibiotics. Physician organizations, healthcare providers, health systems, health plans, public health agencies, consumer and community based organizations, federal, state and local government representatives and the pharmaceutical industry have all worked to achieve the mission and goals of this project.

#### **PROJECT MISSION**

- Reduce the unnecessary use of antibiotics and reduce the prevalence of antibiotic resistant bacteria in California.

#### **PROJECT GOALS**

- Increase appropriate prescribing of antibiotics.
- Raise consumer awareness and understanding regarding the appropriate use of antibiotics.
- Mobilize the community to reduce the unnecessary use of antibiotics

Methods: The AWARE program uses numerous methods to reduce unnecessary antibiotic use. Each year an expert clinical work group meets to develop timely educational materials regarding appropriate antibiotic use for adult and pediatric care. These tools, known as the AWARE Toolkit, are available in English and Spanish. The CMA Foundation mails these Toolkit materials to high-prescribing physicians to promote adherence to appropriate prescribing guidelines. The full version of the AWARE Toolkit is available for free under Resources and an abbreviated version is available on the iTunes App Store and on Google Play.

**Physician Resources:** <http://www.thecmafoundation.org/Resources/Physician-Resources>

#### **AWARE Compendia Application Toolkit**

The Adult compendia summarize the treatment and prescribing guidelines from leading medical experts and professional organizations in the United States for:

- Acute Bacterial Sinusitis
- Pharyngitis
- Nonspecific Cough Illness/Acute Bronchitis/COPD
- Pertussis
- Nonspecific URI
- Outpatient Community-Acquired Pneumonia (CAP)
- Skin and Soft Tissue Infection
- Urinary Tract Infection

The Pediatric compendia summarize the treatment and prescribing guidelines from leading medical experts and professional organizations in the United States for:

- Acute Bacterial Sinusitis
- Pharyngitis
- Nonspecific Cough Illness/ Bronchitis/ Pertussis
- Bronchiolitis/ Nonspecific URI
- Otitis Media
- Skin and Soft Tissue Infection
- Urinary Tract Infection

If you are interested in receiving a printed copy of the AWARE Toolkit please contact CMA Foundation at (916)779-6620 or at Admin@thecmafoundation.org.

**Additional Patient Resources:**

English - <http://www.thecmafoundation.org/Resources/Patient-Resources>

Spanish - <http://www.thecmafoundation.org/Resources/-Recursos-para-Pacientes>

More information can be found at: <http://www.thecmafoundation.org/Programs/AWARE>

**Educational Presentations for Clinicians:** Please contact Larissa May at [lsmay@ucdavis.edu](mailto:lsmay@ucdavis.edu)



## Assessment steps

### **STEP 1: Identify Appropriate Staff:**

- Program Champion(s): \_\_\_\_\_
- Key Administrators: \_\_\_\_\_
- IT support: \_\_\_\_\_
- Key Stakeholders: \_\_\_\_\_
- Nursing staff: \_\_\_\_\_

### **STEP 2: Pre-Implementation Stakeholder Interviews:**

- Who will conduct interviews: \_\_\_\_\_
- Prepare a wide range of sample materials
  - o <https://www.cdc.gov/antibiotic-use/>
  - o <http://www.thecmafoundation.org/Programs/AWARE>
- Take comprehensive notes

### **STEP 3: Pre-Implementation Surveys:**

- Create using:
  - o [REDCap](#)
  - o [Qualtrics](#)
  - o [Survey Monkey](#)
- Target date to send survey:
- Person responsible for sending surveys
- Target date for survey completion
- Compile data

### **STEP 4: Launching the Program:**

- Hold presentations / educational sessions
- Send out announcement email to all staff
- Pick your date(s): \_\_\_\_\_

### **STEP 5: Analyze and Report Key Findings to Program:**

- Stakeholder demographics
- Baseline attitudes towards antibiotic prescribing
- Knowledge of antibiotic use and guidelines
- Preferences regarding commitment tools
- Preferences regarding patient and clinician educational tools
- Identified gaps



## Action steps

### **STEP 1: Choose Materials:**

- Posters
- Educational Videos
- Info Graphics
- Smartphone app
- Pamphlets
- Flyers
- Electronic Health Record education
- Social media messaging
- Viral Prescription pad.
  - Materials ordered: \_\_\_\_\_

Will you participate in antibiotics awareness week?

- Yes
- No
- At a future date

### **STEP 2: Choose Nudges:**

- Potential nudge options
  - Materials ordered: \_\_\_\_\_
  - Public Commitment
- Potential flair options
  - Badge Reel
  - Pin
  - Other: \_\_\_\_\_

### **STEP 3: Share Your Knowledge**

- Choose placement / use of materials  
Describe plan:

### **STEP 4: Data Gathering**

- Choose feedback methods:
  - Department
  - Individual Physician
  - Peer comparison report
    - Frequency: Monthly vs. Other
- IT Contact for data extraction:  
\_\_\_\_\_



### **STEP 5: Data Share**

Launch Date: \_\_\_\_\_

How will launch be communicated to team:  
\_\_\_\_\_

First feedback send date: \_\_\_\_\_

Follow up assessment date(s):

- 3 months
- 6 months
- 12 months
- Other

### **STEP 6: Outcomes and Sustainability**

- Pre and Post Survey Results on Knowledge, Attitudes, Beliefs
- Ongoing Prescribing Data Compared to Baseline
  - SPC charts
  - Graphical Display
- Clinician Experience with Program
- Institutional Buy-in For Sustainability
  - Data Reports