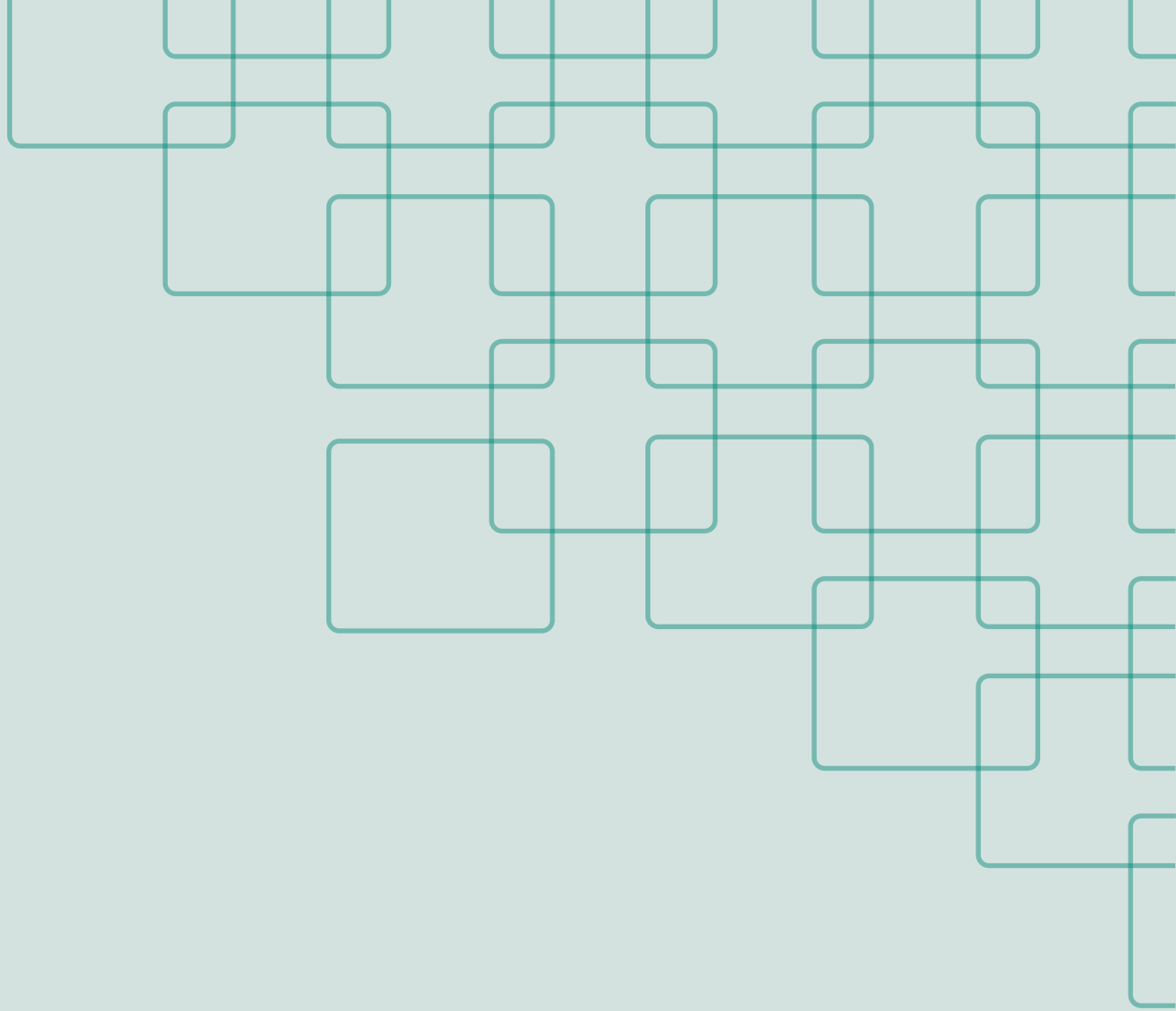


Improving Outpatient Antibiotic Prescribing: A Toolkit for Healthcare Payers



**Centers for Disease
Control and Prevention**
National Center for Emerging and
Zoonotic Infectious Diseases



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Overview

Most antibiotic prescribing in the United States occurs in the outpatient setting, and studies show ample opportunity for improvement (1,2). Although antibiotics are an incredible resource and can save lives, any antibiotic use can cause side effects and contribute to the development of antibiotic resistance which can lead to antibiotic-resistant infections, associated hospitalizations and poor outcomes, and increases in healthcare costs.

Improving Outpatient Antibiotic Prescribing: A Toolkit for Healthcare Payers provides a framework for antibiotic stewardship for health payers to support efforts to improve outpatient antibiotic prescribing. Recognizing that healthcare payers are leaders in healthcare quality improvement and play a unique role in improving outpatient antibiotic use, this toolkit contains materials and examples specific for this audience.

This toolkit highlights:

- the importance of improving outpatient antibiotic prescribing
- how to get started improving outpatient antibiotic prescribing using [CDC's Core Elements of Outpatient Antibiotic Stewardship](#) (3), which includes commitment, action for policy and practice, tracking and reporting, and education and expertise
- metrics for measuring and tracking outpatient antibiotic use and pros and cons to their use
- discussion of evidence-based interventions that leverage measurement and tracking data to improve antibiotic use, including examples of healthcare payer activities promoting outpatient antibiotic stewardship

Background

Antibiotics can save lives and are an important tool in the management of bacterial infections and sepsis; therefore, preserving their usefulness is an important goal. Antibiotic stewardship is a growing field of quality improvement in healthcare settings aimed at improving antibiotic prescribing practices. Infectious diseases and antibiotic resistance are ongoing public health threats and optimizing antibiotic use is a public health priority. At a patient level, the goals of stewardship include successful treatment of infections and optimizing patient safety. Antibiotic stewardship has been described as prescribing the right antibiotic, at the right dose, for the right duration, and at the right time. While physicians and other healthcare professionals are responsible for the actual prescribing of antibiotics, it has become clear that efforts to improve prescribing are more effective when additional partners are engaged in the process. In particular, efforts in recent years have focused on educating patients and their families, in addition to engaging healthcare systems and public health entities in quality improvement interventions.

In January 2020, The Pew Charitable Trusts invited representatives from healthcare payers, leaders in antibiotic stewardship, and subject matter experts from the Centers for Disease Control and Prevention (CDC) to a meeting to discuss improving antibiotic prescribing through measuring and tracking antibiotic use. Payers expressed the need for CDC guidance on antibiotic stewardship (4).

Healthcare payers play a unique role in improving outpatient antibiotic use. Because healthcare payers have financial oversight in the provision of healthcare, they are uniquely positioned to facilitate quality improvement. These efforts can extend across multiple clinics, hospitals, and health systems and provide quality improvement benefits beyond antibiotic use. Many payers are already engaged in efforts to improve healthcare quality and health outcomes. In fact, these efforts not only improve patient care, but in many cases, they offer cost savings for health plans as unnecessary treatments are eliminated and complications or adverse events are avoided (5).

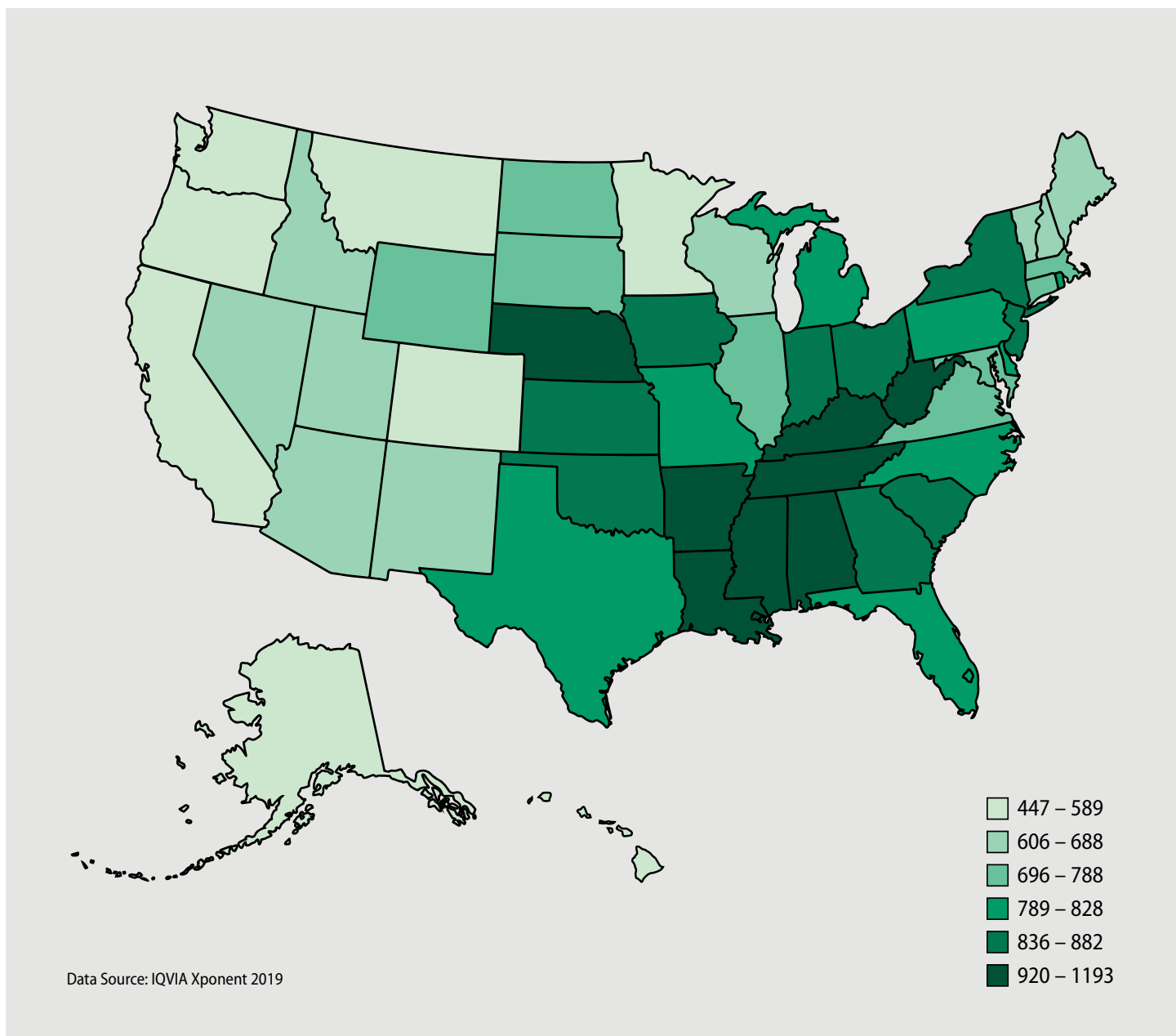
Why Focus on Improving Outpatient Antibiotic Prescribing?

Most antibiotics are prescribed in the outpatient setting. During 2010–2015, the total antibiotic expenditure for human healthcare in the United States was \$56 billion, \$33.2 billion of which was spent in the outpatient setting (\$16.4 billion non-federal hospitals; \$6.5 billion long-term care and federal facilities) (1). Outpatient medications are generally less expensive than medications given in the hospital, so the volume of outpatient antibiotic prescriptions is likely even higher than spending alone suggests. In a study reviewing data available from multiple countries, antibiotics dispensed in the community (e.g., local pharmacy) accounted for 85–95% of all human antibiotic consumption (2).

There is a lot of room for improvement. Although there have been decreases in overall and inappropriate antibiotic prescribing over the last few years, there is still room for additional improvement. In 2019, 251.1 million antibiotic prescriptions were dispensed from U.S. pharmacies, which is 765 prescriptions per 1,000 people (see Figure 1 on page 2) (6).

Previous studies show that nearly 30% of outpatient antibiotic prescriptions are unnecessary, or not needed at all (7). When examining outpatient antibiotic prescribing for acute respiratory infections, nearly half of these prescriptions are unnecessary (7). Certain patient populations, prescriber types, and clinical settings are associated with higher inappropriate antibiotic prescribing representing targets for improvement. For example, although there have been improvements in prescribing to children, there hasn't been much change in prescribing to older adults (> 65 years old) (8). Additionally, clinical settings like urgent care have been shown to have high rates of inappropriate prescribing for conditions like viral respiratory infections that do not benefit from antibiotics (9), although there has been some improvement in these rates in recent years (unpublished data).

Figure 1. Community Antibiotic Prescriptions per 1,000 Population by State — 2019



Accessible Description: In 2019, there were a total of 251.1 million outpatient oral antibiotic prescriptions in the U.S., equivalent to 765 prescriptions per 1000 persons. The map displays outpatient antibiotic prescriptions dispensed per 1,000 population. The legend is divided by the following prescriptions per 1,000 population: 447–589, 606–688, 696–788, 789–828, 836–882, and 920–1193. The highest state, West Virginia had 1193 prescriptions per 1000 people and the lowest state, Alaska had 447 prescriptions per 1000 people. The data is sourced by IQVIA.

Improving outpatient antibiotic prescribing combats antibiotic resistance and improves the quality of care delivered to patients. All antibiotic use contributes to the development of antibiotic resistance. Improving outpatient prescribing can help slow the development of antibiotic resistance, which is considered a key public health priority. In CDC’s [Antibiotic Resistance Threats in the United States](#) (2019), one of the key actions to slow resistance is to improve antibiotic prescribing (10).

Any antibiotic use can lead to adverse drug events, or side effects, like allergic reactions. Antibiotics are the most common class of drugs that lead to emergency department (ED) visits. CDC estimates around 200,000 ED visits occur nationally per year due to antibiotic-associated adverse events (11).

One potentially severe adverse event associated with taking antibiotics is *Clostridioides difficile* infection (or *C. diff*), which is a diarrheal illness that results from disruption of the normal microbiome. CDC estimates that *C. diff* caused 462,100 infections in the United States in 2017, with nearly 50% of infections being community-associated (12). These infections can become recurrent, are costly, and can even be fatal.

Although antibiotics are frequently prescribed for viral infections, like colds, they are not helpful and can cause harm. For viral upper respiratory infections (URIs), the number needed to treat (NNT) to prevent one case of bacterial pneumonia is 4,400. This means that a clinician would typically need to prescribe antibiotics to 4,400 patients with a viral infection to prevent a single case of pneumonia (13). Conversely, the number needed to harm is much lower: 1 in 1,000 antibiotic prescriptions leads to an ED visit for an adverse event (not including *C. diff*) (14).

Improving antibiotic use aligns with global, national, and local goals. Organizations at all levels are committed to improving antibiotic use and combating antibiotic resistance. The Antimicrobial Resistance (AMR) Challenge, for example, was a yearlong effort to encourage organizations to make commitments towards combating resistance (15). This effort resulted in hundreds of organizations across the healthcare and industry spectrum committing to improving antibiotic use. The Joint Commission, one organization that accredits and certifies health care organizations in the United States under the approval of the Centers for Medicare & Medicaid Services, announced new antibiotic stewardship requirements for ambulatory health care organizations that became effective January 1, 2020 (16). In October 2020, the Federal Task Force on Combating Antibiotic-Resistant Bacteria released the [National Action Plan for Combating Antibiotic-Resistant Bacteria 2020-2025](#), which highlights the importance of antibiotic stewardship (17).

Getting Started: Exploring CDC's *The Core Elements of Outpatient Antibiotic Stewardship*

In 2016, CDC published [The Core Elements of Outpatient Antibiotic Stewardship](#) (3). The *Core Elements* provides a framework for antibiotic stewardship for outpatient clinicians and facilities that routinely provide antibiotic treatment. This report augments existing guidance for other clinical settings and is intended for any outpatient clinician, clinic, or health system interested in improving antibiotic prescribing and use.

Although the *Core Elements* are written for those providing clinical care across a variety of outpatient settings, the principles therein are widely applicable to anyone doing work in the outpatient setting, and they can serve as a helpful framework in thinking about how to get started within your own organization.

The four elements are:

1. Commitment
2. Action for policy and practice
3. Tracking and reporting
4. Education and expertise



Figure 2. *The Core Elements Cover*

Figure 3. Core Elements: Summary



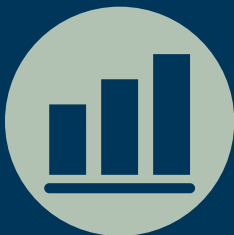
Commitment

Demonstrate dedication to and accountability 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 have 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 needed expertise on optimizing antibiotic prescribing.

Commitment

Making the commitment to improve antibiotic prescribing is the first step in stewardship work. In clinical settings, commitment from all health care team members is critical for tackling improvement. Healthcare payers can similarly show commitment for improving prescribing practices through commitment and communication to clinicians and patients. Designating a person or team to work on this aspect of quality improvement is one helpful step to take. Actively communicating the commitment to all interested parties is key to this element, and it can help keep everyone accountable to working towards improving antibiotic use.

In 2019, leadership at BlueCross BlueShield Tennessee communicated their commitment through a letter from their chief medical officer (Figure 4) (18).



Let's Work Together to Combat Antibiotic Resistance

In Tennessee and across the country, winter means cold and flu season. Waiting rooms get overcrowded, and patients will often ask for an antibiotic to ease their condition.

As doctors, we all know antibiotics are the first line of defense when treating bacterial infections. However, it's our shared responsibility to ensure antibiotics are being prescribed for the right conditions at the right time.

The goal of our antibiotic stewardship program is to increase awareness about the appropriate prescribing of antibiotics and ways to decrease antibiotic resistance. This brochure shares information about common winter illnesses and ways your team can ensure the proper use of antibiotics.

We want you to stay ahead of the game, so we've updated this brochure with new requirements and guidelines for the antibiotic use measures. Being aware of these changes now will help you meet the quality standards for these measures going forward.

Thank you for your partnership as we work together to lower antibiotic resistance across Tennessee.

Andrea Willis, MD
Senior Vice President and Chief Medical Officer
BlueCross BlueShield of Tennessee

Figure 4. BCBS Tennessee Commitment Letter

Action for Policy and Practice

Implementing policies and interventions to improve antibiotic prescribing is key to achieving stewardship goals. Like other quality improvement efforts, assess and modify interventions to ensure their effectiveness. It's helpful to think about resources and anticipated barriers up front. Measuring the effect of interventions is also important to understanding whether they worked or not and next steps to take. Some examples of these types of policies and interventions include:

1. Promoting evidence-based diagnostic criteria and treatment recommendations,
2. Encouraging the use of delayed prescribing or watchful waiting when appropriate, and
3. Recommending and providing communications skills training for all clinicians.

For more details on these interventions, see *Interventions to Improve Antibiotic Use*, page 11.



Tracking and Reporting

Tracking and reporting are essential to improving antibiotic prescribing because an understanding of current prescribing practices is necessary to target interventions for improvement and to know whether these interventions are working. Measuring antibiotic prescribing and other metrics related to antibiotic use may be something many healthcare payers are already familiar with through national quality metrics like the National Committee for Quality Assurance's (NCQA) Health Effectiveness and Data Information Set (HEDIS), which will be discussed in more detail in the upcoming section on Measures (19). Additionally, providing feedback to prescribers on how they are doing compared with other prescribers can be a powerful tool to change behavior for the better (20).

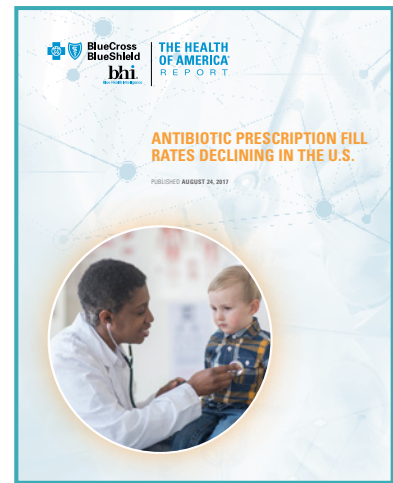


Figure 5. BCBS Report Cover

One example of this is examining metrics for the health plan as a whole. In 2017, BlueCross BlueShield, in partnership with HealthCore and Blue Health Intelligence, published a report summarizing antibiotic prescribing in the outpatient setting during 2010–2016 among their members. Prescribing among their members was characterized by age, sex, type of antibiotic, setting of care, and regional geography, among other factors (21). They used these data to track progress in improving prescribing.

Data at the clinician- or facility-level can be used to identify opportunities to improve quality across the network. In the section on measures, we'll describe specific metrics and how tracking and reporting can be used in your networks; and ultimately how you can design interventions to improve antibiotic prescribing.

Education and Expertise

Providing education to both clinicians and patients about the benefits and potential harms of antibiotic prescribing can help align expectations in a clinical encounter.

Patient education helps empower patients with knowledge when entering a clinical encounter, and it can help set realistic expectations for treatment. This toolkit includes examples of patient education campaigns and materials. Clinicians should have direct conversations with their patients about when antibiotics work and when they do not, in addition to describing the potential harms of taking antibiotics. Patient education materials can supplement these conversations and provide additional detail.



Education on appropriate prescribing is also necessary for clinicians to optimize their practice, which can include continuing education sessions and communication skills training. Antibiotic treatment recommendations are available for select conditions for adults and children on the CDC website (22), where they have been summarized from clinical practice guidelines. CDC's [Antibiotic Stewardship Course](#) provides training in communication skills and also provides free continuing education credits (23). Face-to-face directed feedback and training can also be provided through activities like academic detailing, where messaging is tailored to an individual clinician. Providing timely access to up-to-date guidance for prescribing is key as guidelines change from time to time and busy clinicians need quick access.

Measures for Tracking and Reporting Outpatient Antibiotic Use

Tracking antibiotic use is key to improving antibiotic prescribing. Understanding current antibiotic prescribing practices can help identify areas for improvement for which interventions can be designed, and after an intervention has been implemented, tracking antibiotic use can show if that intervention was effective. Table 1 summarizes

currently used metrics and some considerations for each, which is adapted from the Center for Healthcare Strategies' guide on "Measurement and Evaluation Approaches to Improve Outpatient Antibiotic Prescribing" (24) (A second table detailing measure specifications can be found in Appendix A).

Table 1. Outpatient Antibiotic Prescribing Measurement Strategies, Key Considerations, and Examples (24)

Approach	Key Operational Considerations	Pros	Cons	Example Measures
Numbers and Rates of Overall Antibiotic Prescriptions	<ul style="list-style-type: none"> Overall numbers and rates per population can be produced with pharmacy claims only Rates per visit require information from electronic health records or medical claims to calculate denominator 	<ul style="list-style-type: none"> Relative simplicity of data analysis Not vulnerable to diagnostic shifting 	<ul style="list-style-type: none"> Antibiotic appropriateness cannot be assessed, may be less actionable than other measures as a result Does not adjust for patient acuity or volume 	<ul style="list-style-type: none"> Overall prescribing rates by provider, facility or region Overall prescribing rates by visit
Numbers and Rates of Prescriptions for Select Antibiotic Classes or Agents	<ul style="list-style-type: none"> Does not require linkage to an outpatient visit so long as information about prescribing provider, facility, and/or region is available 	<ul style="list-style-type: none"> Relative simplicity of data analysis Not vulnerable to diagnostic shifting Focusing on specific classes makes information more actionable 	<ul style="list-style-type: none"> Antibiotic appropriateness cannot be assessed, may decrease provider buy-in Potential for providers to shift to other antibiotics not targeted 	<ul style="list-style-type: none"> Rates of fluoroquinolone prescribing by provider, facility, or region Rates of fluoroquinolone prescriptions by visit
Targeting Conditions for which Antibiotics Should Never be Prescribed	<ul style="list-style-type: none"> Requires linkage of prescription to a visit to classify diagnosis associated with prescription Requires examining all diagnostic codes for a visit to exclude visits with antibiotic-appropriate diagnoses 	<ul style="list-style-type: none"> Clarity-focuses on "never events" and goal is zero Excludes patients with comorbidities where antibiotics may be warranted; may be more palatable to providers as a result 	<ul style="list-style-type: none"> Vulnerable to diagnostic shifting, e.g., coding diagnoses to avoid classification of an antibiotic prescription as inappropriate Does not capture common conditions where antibiotics are sometimes warranted but frequently overprescribed (e.g., sinusitis) 	<ul style="list-style-type: none"> MITIGATE metric HEDIS metric: Avoidance of antibiotic treatment with acute bronchitis HEDIS metric: Appropriate treatment for URI
Targeting Conditions for which Antibiotics are Sometimes Indicated but Often Over-prescribed	<ul style="list-style-type: none"> Requires linkage of prescription to a visit to classify diagnosis associated with prescription Requires examining all diagnoses codes to exclude visits with antibiotic-appropriate diagnoses 	<ul style="list-style-type: none"> Less susceptible to diagnostic shifting May help improve diagnostic accuracy Focusing on conditions that are major drivers of antibiotic use likely to have larger impact than only focusing on conditions for which antibiotics are never indicated 	<ul style="list-style-type: none"> Goal is less clear than measures focusing on conditions where antibiotics are never warranted 	<ul style="list-style-type: none"> Choosing Wisely: WHA Respiratory infections HEDIS metric: Appropriate Testing for Pharyngitis
Targeting Antibiotic Selection for Conditions Where Antibiotics Are Appropriate	<ul style="list-style-type: none"> Requires linkage of prescription to a visit to classify diagnosis associated with prescription 	<ul style="list-style-type: none"> Addresses a type of inappropriate antibiotic use distinct from the other measures 	<ul style="list-style-type: none"> Can only be used in evaluating antibiotics prescribed for conditions where antibiotics are appropriate or sometimes appropriate 	<ul style="list-style-type: none"> Adult Sinusitis: Appropriate Choice of Antibiotic



Overall Antibiotic Use. Metrics for overall antibiotic use do not require detailed information to calculate prescribing rates, but access to prescribing or dispensing information is needed. These metrics provide overall trends, so they may lack the detail needed to plan more targeted interventions. Additionally, they provide baseline information on use that can be tracked over time. The first two rows in Table 1 summarize measures of overall antibiotic use, followed by additional details for each approach below.

Number and rates of overall antibiotic use. Overall antibiotic prescriptions can be reported by clinician or facility over a specific time period. To calculate rates, a denominator should be selected based on the data available, such as number of visits or beneficiaries. For example, if you have access to visit data you may consider a visit-based rate (e.g., antibiotic prescriptions per 100 visits). One way this metric can be used to improve antibiotic prescribing is by identifying the highest prescribers for feedback. Examples of this intervention are described in the section on Interventions, under Audit & feedback, page 11.

Volume and rates of select antibiotic classes or agents. In addition to total antibiotic use, it can be useful to track use of specific antibiotic agents that may present higher risks of adverse events or potential for misuse. For example, agents that are rarely indicated for first-line therapy (e.g., fluoroquinolones in adults, cefdinir in pediatrics) or are often used inappropriately (e.g., azithromycin) may be helpful to track, especially if efforts are underway to improve prescribing in these areas.

Condition-specific metrics. Using claims or other visit-level data to calculate condition-specific metrics requires access to more detailed data, but in return, can provide greater insight into prescribing practices and potential areas for improvement. This type of metric requires that you can reliably link diagnoses with prescriptions in your data, or more simply, you have the ability to connect a claim for a prescription with a medical claim that includes a diagnostic code or other diagnosis information. This link may be inferred when the antibiotic prescription and medical claim occur on the same day or within a few days of each other. Refer to the bottom three rows in Table 1 for a summary of metrics that are condition-specific, followed by the discussion that follows.

Targeting conditions for which antibiotics are inappropriate, or unnecessary use. There are many conditions for which antibiotics are not indicated and are frequently prescribed. These conditions include acute respiratory infections (ARIs), like acute bronchitis, viral upper respiratory infections, and influenza. Metrics for unnecessary use are often reported as percent of visits for the diagnosis of interest associated with an antibiotic prescription. The benefit to using this metric is the clear focus on “never events” where the goal is zero prescribing. The below discussed examples of this metric exclude patients with comorbidities where antibiotics may be warranted, and thus this metric may be more palatable to providers as a result.

Two examples of metrics for unnecessary use include:

1. National Committee for Quality Assurance (NCQA)'s HEDIS measures (19):
 - Avoidance of antibiotic treatment for acute bronchitis/bronchiolitis (AAB) and
 - Appropriate treatment for upper respiratory infection (URI)

These measures report a performance rate; they are expressed as the percentage of episodes for patients with the specified diagnosis of (acute bronchitis/bronchiolitis or viral URI) that did not result in an antibiotic prescription (19).

2. [MITIGATE Antimicrobial Stewardship Toolkit](#). This toolkit was created for practical stewardship implementation in adult and pediatric emergency department and urgent care settings. The toolkit includes a detailed list of ICD codes for conditions for which antibiotics are not indicated (26).

There is a limitation of this metric, although it's unclear how much this affects its use. Because determining appropriateness depends on coding for the conditions you choose, and there is variability in how clinicians diagnose similar sets of symptoms, and thereby how they code, so you may underestimate or under-describe inappropriate prescribing (25). This has been described in studies as coding bias; for example, one clinician may diagnose a syndrome as sinusitis where another may diagnose a viral upper respiratory infection. The former diagnosis (sinusitis) is a condition for which antibiotics are sometimes indicated, however viral upper respiratory infection does not require antibiotics. So, in this case, one clinician's prescribing may look more or less appropriate than another's even though they saw similar conditions and even prescribed similarly. One solution to this potential problem of coding bias is to create a composite metric that includes all conditions in a similar category (more about this later in this section). Nonetheless, this is a powerful metric that can provide clear feedback to clinicians on inappropriate prescribing.

Targeting conditions for which antibiotics are sometimes indicated, but often overprescribed.

Antibiotics are often overprescribed for conditions for which antibiotics are sometimes indicated. Examples of these conditions include acute otitis media and sinusitis. For example, sinusitis is typically caused by a virus, and therefore often does not require antibiotic therapy. In cases that do, there are professional society criteria for who should receive them. Because prescribing for these types of conditions are more complex, clinicians may not be aware of their own poor performance. The goal for prescribing for these conditions is not zero, but rather a low rate based on guideline-recommended diagnosis and treatment.

1. NCQA's HEDIS measure (19):
 - Appropriate testing for pharyngitis (CWP)

This is a performance measure expressed as the percent of episodes where the patient was diagnosed with pharyngitis, dispensed an antibiotic, and received a group A *Streptococcus* test for the episode. This focuses on ensuring those suspected of having group A *Strep*, and thus prescribed an antibiotic, are getting the recommended testing to confirm they really need the antibiotic (19).

2. The [Choosing Wisely Initiative](#). This campaign is a wider quality improvement project that focuses on a range of healthcare services that are frequently overused, including antibiotics for acute respiratory infections. The initiative provides educational materials for both conditions for which antibiotics are sometimes appropriate (e.g., sinusitis) and conditions for which antibiotics are not indicated (e.g., viral URI) (27). The Washington Health Alliance developed the Antibiotics for Respiratory Infections measure which combined both of these conditions (never appropriate and sometimes appropriate) with a goal of prescribing between 10-20 percent (28).





Targeting antibiotic selection for which antibiotics are indicated or guideline-concordant care. Even conditions for which antibiotics are indicated are often associated with inappropriate antibiotic prescribing. Conditions like pneumonia or Streptococcal pharyngitis have clinical practice guidelines, which include first-line and alternative agents. One metric that can be reported for these conditions is the percent of patients with a condition who receive the first-line agent; consider a goal of 80% (accounting for approximately 10% with an allergy to first-line agent and 10% who may have already had the first-line agent for this illness) (29). Another metric could include duration of therapy; report the percent of patients who receive the guideline-recommended number of days of therapy.

1. Non-first-line agents. One example of improving antibiotic selection includes the avoidance of fluoroquinolones, a class of antibiotics that are no longer first-line recommended for many conditions. Fluoroquinolones have received multiple Food and Drug Administration (FDA) warnings for side effects and adverse events, and should only be used when other options are not available (30). Reviewing fluoroquinolone prescribing can reveal opportunities for improving guideline-concordant care.
2. Centers for Medicare & Medicaid Services' Merit-based Incentive Payment System (MIPS). CMS' MIPS program uses clinical quality measures to tie prescribing to reimbursement. For example, the system includes a quality metric for first-line antibiotic choice in adult sinusitis (amoxicillin with or without clavulanate) (31).

Composite metrics. A composite metric is a metric that combines similar conditions to give a fuller understanding of prescribing within a category of syndromes or conditions (e.g., acute respiratory infections). A benefit to

using a composite metric is that it includes multiple ICD codes for related conditions, thereby minimizing the effects of differences in coding among clinicians treating similar conditions. Researchers have documented coding bias, or code shifting, in reference to respiratory infections in particular. In a recent study evaluating visits resulting in antibiotic prescribing in a large telemedicine platform during 2013–2016, the highest prescribing physicians billed for sinusitis and pharyngitis at higher rates than the lower prescribing physicians (25). This is significant, because conditions like sinusitis and pharyngitis fit into the “sometimes indicated” category and would not necessarily be identified as being inappropriate, whereas lower prescribing physicians who billed for viral respiratory infections may appear to have more inappropriate prescribing. Using a composite metric that captures prescribing for all acute respiratory conditions can provide a more accurate measurement of prescribing performance, as differential coding practices would not matter as much because all diagnoses in the category would be included.

The goal of a composite metric cannot be set at zero because it combines multiple conditions; rather the reporting of performance of a composite metric may focus on peer comparisons and targeting clinicians who are in the highest prescribing percentiles for improvement.

A national measure was recently developed by the National Committee for Quality Assurance (NCQA) to be included in the Healthcare Effectiveness Data and Information Set (HEDIS) measures for Measurement Year 2022. This new measure, Antibiotic Utilization for Respiratory Conditions (AXR), incorporates multiple respiratory conditions and uses an episode-based denominator to better characterize opportunities for improvement in this area (19).

Interventions to Improve Outpatient Antibiotic Use

Tracking and measuring antibiotic use provide insights into areas for improving prescribing. Researchers and clinicians working on antibiotic stewardship have learned about what works from other researchers, payers, healthcare systems, and public health departments who have designed interventions to meet the specific needs of their organizations, implemented them, and measured the results. The following section includes categories of interventions to consider implementing in your own organization, as well as examples of how organizations have implemented them.

These include:

1. Audit and feedback with peer comparison
2. Commitment posters
3. Clinical education
4. Communication skills training
5. Promoting delayed prescribing or watchful waiting
6. Patient education
7. Incentives to clinicians

Audit & feedback with peer comparison. Tracking antibiotic prescribing practices and reporting them back to clinicians has been shown to be effective in changing prescribing because clinicians often don't have insight into their own performance until comparisons are made (32). In particular, giving feedback on quality measure performance with comparison to peers is important; including things like transparency around methodology and having the letter come from a clinician can lend more credibility and buy-in. CDC has developed a sample letter that payers can use to provide prescribers with feedback (Figure 6).

Even broad metrics like overall antibiotic use can be useful in providing audit and feedback with peer comparison. England's National Health Service sent out peer comparison letters to general practitioners who had been identified as prescribing high volumes of antibiotics (33). The letter stated, "The great majority, 80%, of practices in your area prescribe fewer antibiotics per head than yours." The letter also contained three actions clinicians could take to improve prescribing (for example, providing recommendations for symptoms relief). The intervention led to a 3% decrease in overall prescribing, which translated to 73,000 fewer prescriptions dispensed and a cost-savings of £92,000.

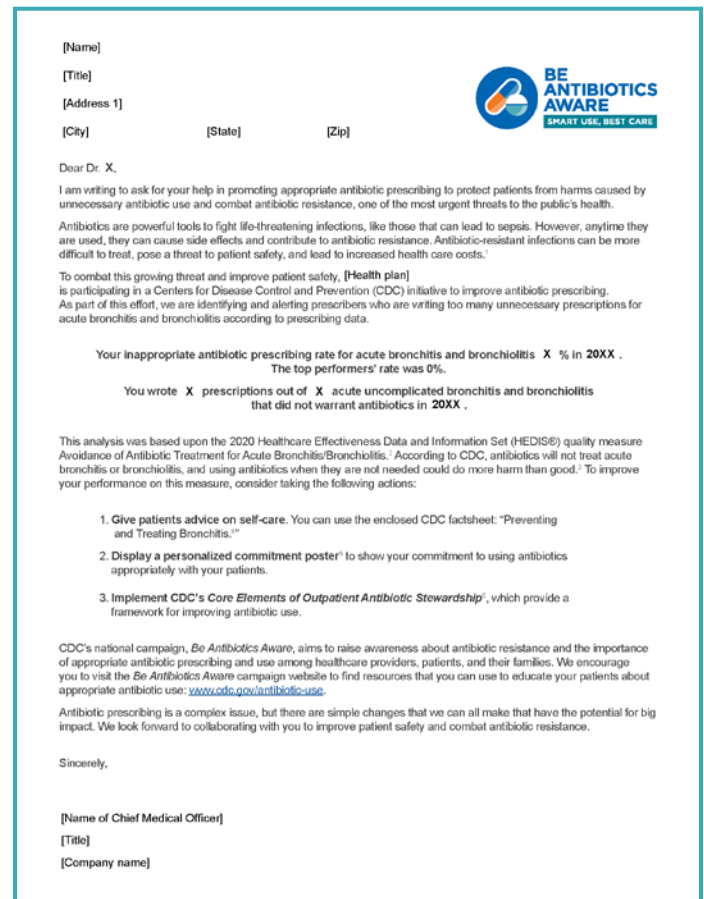


Figure 6. Sample Feedback Letter

Aetna, a CVS Health company, undertook an audit & feedback intervention over a three-year time period using the HEDIS measure on Avoidance of Antibiotic Treatment in Adults with Acute Bronchitis. They identified “high prescribers” as those who prescribed antibiotics to more than 50% of patients diagnosed with acute bronchitis, and “champions” who prescribed no antibiotics. In year 1 of the intervention, letters (for example, see Figure 7) signed by Aetna’s Chief Medical Officer were sent to both high prescribers and champions with corresponding messages. In years 2 and 3, Aetna continued to notify clinicians and expanded the intervention with tailored letters from five collaborating state health departments. They ultimately sent over 4,500 letters during the three years, and it paid off: between 2016 and 2019 Aetna observed a 6% improvement in HEDIS performance.

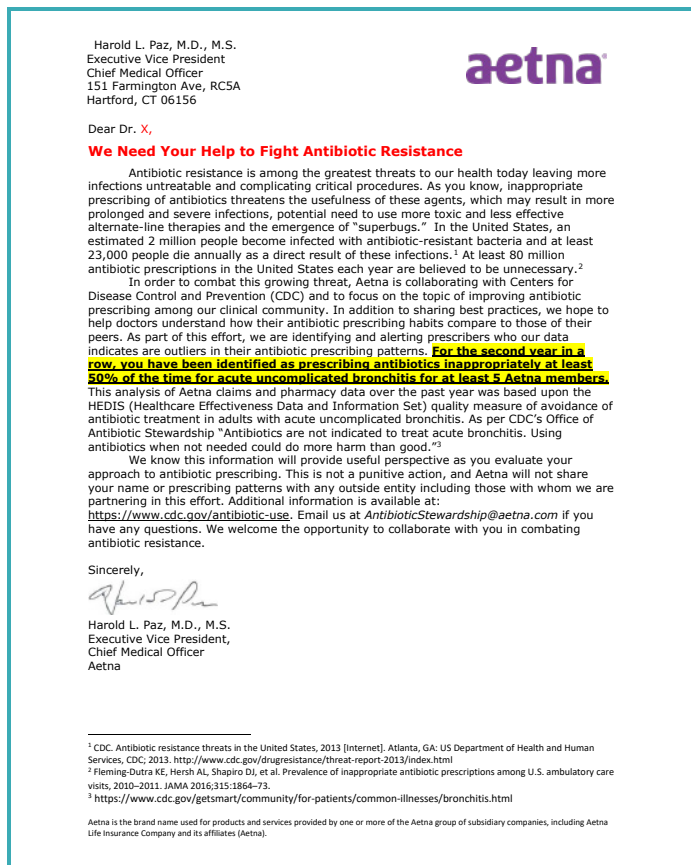


Figure 7. Aetna Antibiotic Resistance Letter

Commitment posters. Commitment posters are a simple, low-cost intervention that have been shown to reduce inappropriate antibiotic prescribing (34, 35). They provide a public commitment to patients as well as a reminder to prescribers to optimize prescribing. CDC has developed a template for these posters (Figure 8).

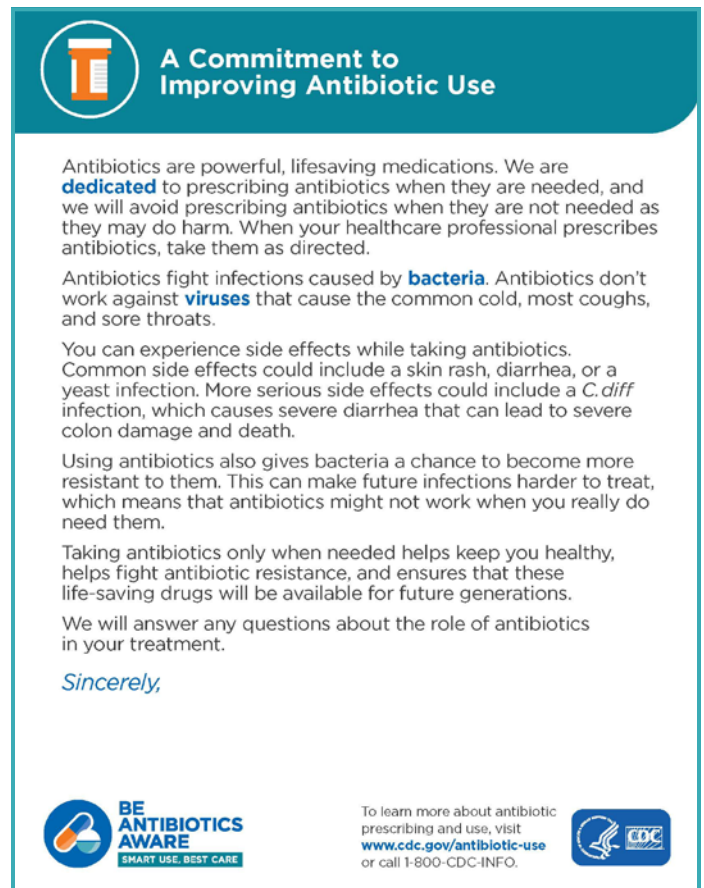


Figure 8. Commitment Poster Template

Superior HealthPlan in Texas collaborated with the Texas Health and Human Services Commission and Department of State Health Services to develop a commitment poster, which they were able to distribute to hundreds of providers within Superior’s network.

State health departments, like the New York State Department of Health, have also developed commitment posters and other materials, like this “Guarantee” palm card (Figure 9). In lieu of handing a patient a prescription for an unnecessary antibiotic, this card can be given to a patient leaving an office visit so they won’t leave empty-handed (36).



Figure 9. NYS Department of Health Palm Card

Clinician education. Ensuring prescribers have access to current clinical guidelines is an important part of supporting appropriate prescribing. Studies have shown that more active forms of clinician education, like academic detailing, are more effective than passive education (37).

National education efforts like CDC’s *Be Antibiotics Aware: Smart Use, Best Care* and observance of *U.S. Antibiotic Awareness Week*, provide a number of opportunities to educate and share resources for clinicians (39).



Figure 10. CDC’s *Be Antibiotics Aware* Campaign Logo

CDC summarizes clinical guidelines for prescribing antibiotics to children and adults for select conditions on the website (41). Additionally, CDC offers an Antibiotic Stewardship Online Training Course with multiple modules that can be taken in any order, for which 10 hours of free continuing education credits are also available (23).

Course highlights include educational content on:

- communication skills
- antibiotic resistance threats in the United States
- benefits of antibiotic stewardship
- risk and benefits of antibiotics
- epidemiology of outpatient antibiotic use in the United States and opportunities for improvement
- antibiotic stewardship considerations for the management of common outpatient conditions
- antibiotic stewardship in the outpatient setting, dentistry, emergency departments, hospitals, and nursing homes

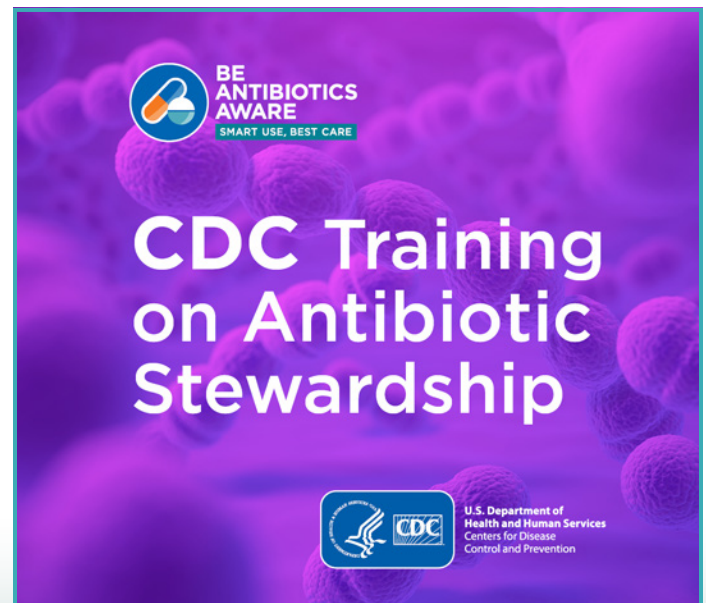


Figure 11. CDC Training Graphic

Cigna, along with other payers, have embraced the [Choosing Wisely Initiative](#) and its resources to educate clinicians and their patients (27, 38).

In 2014, the University of Louisville began working with Kentucky's Medicaid program with a goal of improving antibiotic prescribing in children and adolescents in Kentucky. Analysis of Medicaid quality metrics helped the team identify areas for improvement. In 2017, Kentucky Antibiotic Awareness was launched, and included educational materials for clinicians, in addition to a portfolio of other resources (40).

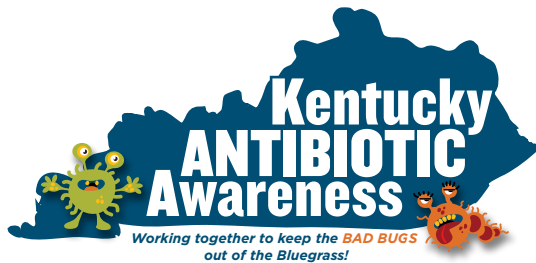


Figure 12. Kentucky Antibiotic Awareness Graphic

Communication skills training. Although there is a widely-held perception among clinicians that patients will not be satisfied without an antibiotic prescription, studies show that this may not be the case. In the case of parents of pediatric patients, for example, they were actually satisfied if they didn't get antibiotics, even if they wanted one, if their communication expectations were met (42–44).

For this reason, communication skills training can be instrumental in helping clinicians gain skills and confidence in providing guideline-concordant care. In one study, clinicians who received communications training were still prescribing fewer antibiotics than control clinicians 3.5 years later (45, 46).

Below are some examples of trainings that could be shared with prescribers in your networks:

- [CDC's Antibiotic Stewardship online training course](#), mentioned in clinician education, includes communication skills training for clinicians. Over 10 hours of continuing education is available (23).
- [To Prescribe or Not to Prescribe? Antibiotics and Outpatient Infections](#). An online communication training activity from Stanford University that provides a practical approach to communication through videos and role play. Continuing education is available (47).
- [The Primary Care Office Visit: Antibiotics](#). A role-play simulation that allows you to enter a simulated patient-physician encounter in either person's shoes; the goal is to improve collaboration at the point of care and change behaviors. Continuing education is not available (48).

Promoting delayed prescribing or watchful waiting.

Delayed prescribing is the practice of providing a prescription for an antibiotic with instructions to fill it if symptoms do not improve in the next few days. Watchful waiting is similar, and entails waiting for a return call or visit from a patient before prescribing an antibiotic. Clinical guidelines for certain conditions which may improve on their own without antibiotics, like acute otitis media in children and sinusitis, recommend this approach (49–51). Delayed antibiotic prescribing has been shown to be safe, result in similar patient/parent satisfaction compared to immediate prescribing, and is effective in decreasing dispensed antibiotics (52). CDC developed delayed prescribing prescription pads for prescribers to use with patients (Figure 13) (53).

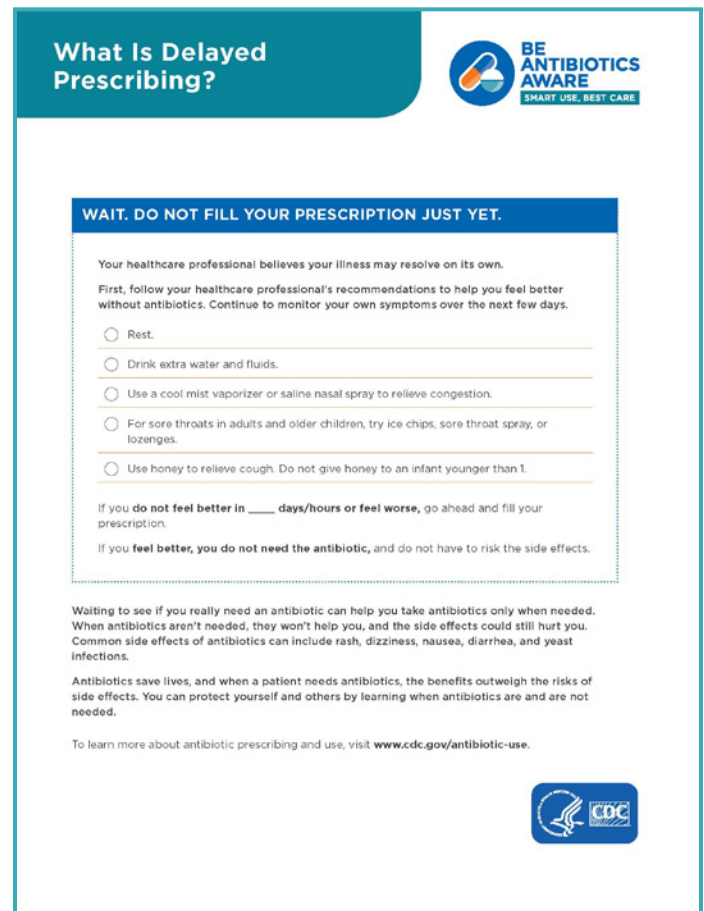


Figure 13. CDC Delayed Prescribing Prescription Pad

Patient education. Educating clinicians is only half of the patient-physician encounter; there is growing support for mass media campaigns and other patient-facing education. Such campaigns are difficult to assess for their role in prescribing reductions; however, observational studies have shown associations between implementation of community-facing messaging and decreases in antibiotic prescribing (54–55).

CDC's [Be Antibiotics Aware](#) is a national educational effort to help improve antibiotic prescribing and use and combat antibiotic resistance. The campaign seeks to promote awareness and increase knowledge about when antibiotics are needed and when they are not. Social media graphics, print materials, and other resources are available for download and print materials are available to order through [CDC-INFO on Demand](#). In addition to the *Be Antibiotics Aware* campaign, CDC's redesigned [Antibiotic Use website](#) includes information for patients about common illnesses and whether or not antibiotics are needed to treat them (58).

Common Condition	Common Cause			Are Antibiotics Needed?
	Bacteria	Bacteria or Virus	Virus	
Strep throat	✓			Yes
Whooping cough	✓			Yes
Urinary tract infection	✓			Yes
Sinus infection		✓		Maybe
Middle ear infection		✓		Maybe
Bronchitis/chest cold (in otherwise healthy children and adults)*		✓		No
Common cold/runny nose			✓	No
Sore throat (except strep)			✓	No
Flu			✓	No

* In some cases, acute bronchitis is caused by bacteria, but even in those cases, antibiotics still do not help.

Figure 14. CDC Viruses or Bacteria Graphic

Geisinger Health Plan created a series of [patient education articles](#) on its website, educating its members about when antibiotics are likely not helpful (for viruses) (56).

BlueCross BlueShield Excellus in New York created a public awareness campaign titled, "[Is an Antibiotic right for you](#)" with colorful and informative infographics, answering questions such as, "What's wrong with taking antibiotics when you don't need them?" and encouraging members to start conversations with their doctors about the best treatment for them (57).

Rewards or incentives to prescribers. Providing rewards or incentives to clinicians for adhering to guideline-concordant care or tying some portion of reimbursement to good performance may be a powerful way to improve prescribing.

[BlueCross BlueShield Illinois' Quality Program](#) has antibiotic stewardship indicators based on the previously described HEDIS measures for appropriate prescribing and testing for acute respiratory infections in which better performance dictates higher payment incentives (59).

[CMS' Merit-based Incentive Payment System \(MIPS\)](#) is another example of tying appropriate prescribing to reimbursement (31). MIPS uses metrics like those developed by HEDIS to measure and reimburse based on performance.

Summary

Implementation of interventions to improve outpatient antibiotic use can vary based on your organization's needs, but the starting point is generally the same: measuring and tracking outpatient antibiotic use. Starting with a highly effective intervention, such as providing feedback to high prescribing clinicians in your network through audit and feedback with peer comparison, can be a high yield, potentially cost-saving approach. Healthcare payers are uniquely positioned to improve the quality of antibiotic prescribing to optimize patient safety and combat antibiotic resistance for generations to come.

Resources

CDC Website

- [Core Elements of Outpatient Antibiotic Stewardship](#)
- [Condition-specific Outpatient Treatment Recommendations](#) (Children and Adults)
- [Be Antibiotics Aware](#)
 - [Patient Materials](#)
 - [Educational Resources for Healthcare Professionals](#)
- [U.S. Antibiotic Awareness Week](#)
 - [Partner Toolkit](#)
- [CDC Stewardship Course](#)
- [Audit & Feedback Letter Template for Health Plans](#) (also available in Appendix B)
- [Commitment Poster Template](#) (also available in Appendix C)
- [CDC Stewardship Reports](#)
- [Patient Safety Portal](#): Data on prescribing and antimicrobial resistance in the U.S.
- [Resources on Early Detection and Management of Sepsis](#)

Stewardship toolkits from various professional organizations and healthcare systems

- [MITIGATE toolkit](#): Urgent care and ED settings
- [JumpStart Stewardship](#): Implementing Antibiotic Stewardship in Ambulatory Settings (Washington State DOH, Nov 2017)
- [Promoting Antibiotic Stewardship in Outpatient Pediatric Settings](#) (Children's Hospital of Philadelphia, 2018)
- [A Field Guide to Antibiotic Stewardship in Outpatient Settings](#) (Centers for Medicaid & Medicare Services Quality Improvement Organization Program and HealthInsight, Jul 2018)
- [Minnesota Sample Antibiotic Stewardship Plan for Outpatient Clinics](#) (MN State DPH, May 2019)
- [Outpatient Antibiotic Stewardship Playbook](#) (Centers for Medicaid & Medicare Services Quality Improvement Organization Program and Telligen, July 2018)
- [Measurement and Evaluation Approaches to Improve Outpatient Antibiotic Prescribing](#) (Center for Health Care Strategies, Inc., July 2020)

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Appendices

Appendix A: Outpatient Antibiotic Prescribing Measure Specifications

<https://www.chcs.org/media/Improving-Antibiotic-Use-Measurement-071320.pdf>

Measure	Numerator	Denominator	Exclusions
Overall antibiotic prescribing (numbers)	Number of antibiotic prescriptions	N/A	N/A
Overall antibiotic prescribing (rates)	Number of antibiotic prescriptions	Number of providers, practices, or visits, as relevant. Visits can be derived from EHR data or medical claims. Population (if all prescriptions for a given population are captured).	N/A
Select classes/agents antibiotic prescribing (number)	Number of relevant antibiotic prescriptions	N/A	N/A
Select classes/agents antibiotic prescribing (rates)	Number of relevant antibiotic prescriptions	Number of providers, practices, or visits, as relevant. Visits can be derived from EHR data or medical claims. Population (if all prescriptions for a given population are captured).	N/A
Targeting Conditions for Which Antibiotics Should Never be Prescribed: MITIGATE	Number of visits associated with an antibiotic-inappropriate diagnosis of acute upper respiratory infections where an antibiotic was prescribed	Total number of visits for an antibiotic-inappropriate diagnosis of acute upper respiratory infections	Cases where a comorbid condition or antibiotic-appropriate infection may warrant antibiotic use
Targeting Conditions for Which Antibiotics Should Never be Prescribed: Avoidance of antibiotic treatment for acute bronchitis/bronchiolitis	Number of patients with a diagnosis of acute bronchitis or bronchiolitis in the measurement period who were not prescribed an antibiotic	Number of patients with a diagnosis of acute bronchitis or bronchiolitis in the measurement period	Cases where a comorbid condition may warrant antibiotic use; observations or ED visits that result in inpatient admission
Targeting Conditions for Which Antibiotics Should Never be Prescribed: Appropriate treatment for URI	Patients aged 3 months or older who had a visit with a diagnosis of upper respiratory infection (URI) during the measurement period and were not prescribed an antibiotic within 3 days of relevant visit	Patients aged 3 months or older who had an visit with a diagnosis of upper respiratory infection (URI) during the measurement period	Children prescribed or dispensed antibiotic for documented medical reason within 3 days of URI diagnosis; taking antibiotics 30 days prior to URI diagnosis; patients using hospice any time during measurement period
Targeting Conditions for which Antibiotics are Sometimes Indicated but Often Over-prescribed: Choosing Wisely, Antibiotics for Respiratory Infections	Unique members with diagnosis codes related to acute ARI that have antibiotics prescribed within 0-3 days of visit	Unique members with visits with diagnosis codes related to acute ARI	Comorbid (e.g., HIV, cystic fibrosis) or competing (e.g., pertussis) diagnoses at visit
Targeting Conditions for which Antibiotics are Sometimes Indicated but Often Over-prescribed: Appropriate Testing for Pharyngitis	Patients aged 3 years and older who were diagnosed with pharyngitis, ordered an antibiotic and received a group A streptococcus (strep) test	Patients aged 3 years and older who had visit with a diagnosis of pharyngitis during the measurement period and an antibiotic ordered on or three days after the visit	Children prescribed or dispensed antibiotic for documented medical reason within 3 days of pharyngitis diagnosis; taking antibiotics 30 days prior to pharyngitis diagnosis; patients using hospice any time during measurement period
Targeting Antibiotic Selection for Conditions Where Antibiotics Are Appropriate: Adult Sinusitis: Appropriate Choice of Antibiotic	Patients aged 18 years and older with a diagnosis of acute bacterial sinusitis that were prescribed amoxicillin, with or without clavulanate, as a first line antibiotic at the time of diagnosis	Patients aged 18 years and older with a diagnosis of acute bacterial sinusitis who are prescribed an antibiotic	Claims with telehealth modifiers

Appendix B: Audit and Feedback Letter Template for Health Plans

(fillable PDF: <https://www.cdc.gov/antibiotic-use/community/pdfs/HEDIS-example-letter-2020-508.pdf>)

[Name]

[Title]

[Address 1]

[City]

[State]

[Zip]



Dear Dr. X,

I am writing to ask for your help in promoting appropriate antibiotic prescribing to protect patients from harms caused by unnecessary antibiotic use and combat antibiotic resistance, one of the most urgent threats to the public's health.

Antibiotics are powerful tools to fight life-threatening infections, like those that can lead to sepsis. However, anytime they are used, they can cause side effects and contribute to antibiotic resistance. Antibiotic-resistant infections can be more difficult to treat, pose a threat to patient safety, and lead to increased health care costs.¹

To combat this growing threat and improve patient safety, [Health plan] is participating in a Centers for Disease Control and Prevention (CDC) initiative to improve antibiotic prescribing. As part of this effort, we are identifying and alerting prescribers who are writing too many unnecessary prescriptions for acute bronchitis and bronchiolitis according to prescribing data.

Your inappropriate antibiotic prescribing rate for acute bronchitis and bronchiolitis **X %** in **20XX** .
The top performers' rate was **0%**.

You wrote **X** prescriptions out of **X** acute uncomplicated bronchitis and bronchiolitis
that did not warrant antibiotics in **20XX** .

This analysis was based upon the 2020 Healthcare Effectiveness Data and Information Set (HEDIS®) quality measure Avoidance of Antibiotic Treatment for Acute Bronchitis/Bronchiolitis.² According to CDC, antibiotics will not treat acute bronchitis or bronchiolitis, and using antibiotics when they are not needed could do more harm than good.³ To improve your performance on this measure, consider taking the following actions:

1. **Give patients advice on self-care.** You can use the enclosed CDC factsheet: "Preventing and Treating Bronchitis."⁴
2. **Display a personalized commitment poster⁵** to show your commitment to using antibiotics appropriately with your patients.
3. **Implement CDC's Core Elements of Outpatient Antibiotic Stewardship⁶,** which provide a framework for improving antibiotic use.

CDC's national campaign, *Be Antibiotics Aware*, aims to raise awareness about antibiotic resistance and the importance of appropriate antibiotic prescribing and use among healthcare providers, patients, and their families. We encourage you to visit the *Be Antibiotics Aware* campaign website to find resources that you can use to educate your patients about appropriate antibiotic use: www.cdc.gov/antibiotic-use.

Antibiotic prescribing is a complex issue, but there are simple changes that we can all make that have the potential for big impact. We look forward to collaborating with you to improve patient safety and combat antibiotic resistance.

Sincerely,

[Name of Chief Medical Officer]

[Title]

[Company name]

Appendix C: Commitment Poster Template

(PDF: <https://www.cdc.gov/antibiotic-use/pdfs/Commitment-Poster-english-11x17-P.pdf>)



A Commitment to Improving Antibiotic Use

Antibiotics are powerful, lifesaving medications. We are **dedicated** to prescribing antibiotics when they are needed, and we will avoid prescribing antibiotics when they are not needed as they may do harm. When your healthcare professional prescribes antibiotics, take them as directed.

Antibiotics fight infections caused by **bacteria**. Antibiotics don't work against **viruses** that cause the common cold, most coughs, and sore throats.

You can experience side effects while taking antibiotics. Common side effects could include a skin rash, diarrhea, or a yeast infection. More serious side effects could include a *C. diff* infection, which causes severe diarrhea that can lead to severe colon damage and death.

Using antibiotics also gives bacteria a chance to become more resistant to them. This can make future infections harder to treat, which means that antibiotics might not work when you really do need them.

Taking antibiotics only when needed helps keep you healthy, helps fight antibiotic resistance, and ensures that these life-saving drugs will be available for future generations.

We will answer any questions about the role of antibiotics in your treatment.

Sincerely,



To learn more about antibiotic prescribing and use, visit www.cdc.gov/antibiotic-use or call 1-800-CDC-INFO.



Appendix D: Delayed Prescribing Prescription Pad

- A. [English 8.5"x11"](#) C. [English 4.5"x5.5"](#)
B. [Spanish 8.5"x11"](#) D. [Spanish 4.5"x5.5"](#)

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.



Appendix E: Symptom Relief Prescription Pad

- A. [English 8.5"x11"](#) C. [English 4.5"x5.5"](#)
B. [Spanish 8.5"x11"](#) D. [Spanish 4.5"x5.5"](#)

Symptom Relief for Viral Illnesses



**BE
ANTIBIOTICS
AWARE**

SMART USE, BEST CARE

1. DIAGNOSIS

- Cold or cough

- Middle ear fluid
(Otitis Media with Effusion, OME)

- 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 treatments prescribed below will help you feel better while 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 medication 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.



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