OKLAHOMA
State Department
of Health

DENTAL SETTING ANTIMICROBIAL STEWARDSHIP

2026 TOOLKIT FOR OKLAHOMA PROVIDERS

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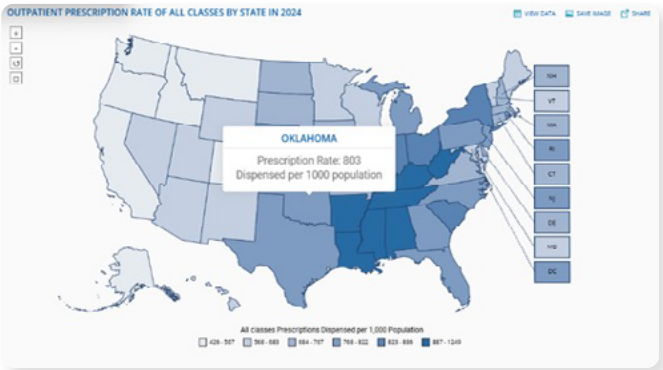
Introduction

What?

Antimicrobial resistance (AR) is the process by which bacteria, fungi, and other microorganisms adapt and no longer respond to drugs that were once effective against them.[1] According to the Centers for Disease Control and Prevention (CDC), AR is now an urgent and global public health threat.[2]

In the United States, the impact is evident. Each year, more than 2.8 million antimicrobial-resistant infections occur, and are associated with over 35,000 deaths.[3]

Oklahoma has historically seen elevated rates of antibiotic utilization compared to national averages. In 2022, the state ranked 10th in the nation, with 808 prescriptions per 1,000 people.[4] By 2024 it remained well above the national average of 752 per 1,000.[5] These numbers underscore the urgent need for an increased focus on antimicrobial stewardship in Oklahoma.

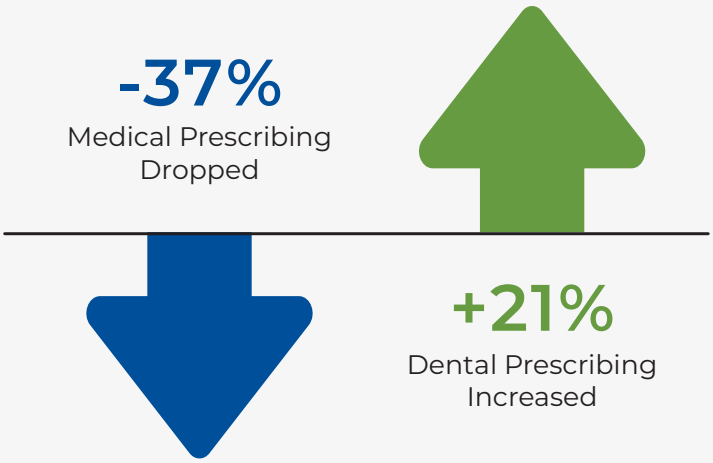


Who?

Dentistry plays a significant role in the global problem of AR, which means dental professionals are essential partners in solving it. An estimated 60% of human antibiotic use in the U.S. occurs in outpatient settings.[6] Within this setting, dental care accounts for nearly 10% of all U.S. antibiotic prescriptions, twice as much as hospital emergency services,[7] about 25 million each year, ranking them among the third- to fourth-highest prescribers by volume.[8-10] In outpatient care overall, 30–50% of prescriptions are unnecessary or inappropriate, and in dentistry specifically, 30–85% of prescriptions are inappropriate or fall outside guideline recommendations for prophylaxis.[11, 12]

ANTIBIOTIC USE[4]

2011 - 2022



Interestingly, antibiotic use is declining in medicine but rising in dentistry. From 2011–2022, medical prescribing dropped 37%, while dental prescribing increased 21%.[4]

More recent data support this shift: between 2017 and 2022, physicians' share of outpatient antibiotic prescribing fell, while the dental share grew from ~9% to ~11%, placing dentistry among the nation's top prescribers.[13, 14]

Additionally, use of amoxicillin and clindamycin, the most common dental antibiotics, continued to rise between 2012 and 2017.[15] Clindamycin usage is a major risk factor for *Clostridioides difficile* infections, which account for nearly one-third of all U.S. deaths linked to antibiotic use and resistance.[3, 16]

According to the Centers for Medicare and Medicaid Services (CMS), Medicare Part D prescribing data for Oklahoma,[17] which primarily reflects patients 65 years and older, dental practitioners represent a prominent share of clindamycin prescriptions among health care providers in the state. This data also shows a surge in antibiotic prescribing among dentists, who account for 6.7% of antibiotic prescriptions in this population.

In dentistry, guidelines for antibiotic prophylaxis have changed over the past decade.[18] Updated evidence has narrowed the use of antibiotic prophylaxis to only a small number of high-risk cases.[19-21] Despite these updates, a persistent gap exists between current clinical standards and routine dental prescribing, particularly in cases where antibiotic therapy may not be clinically indicated.[22] This gap between evidence and practice highlights the challenge that antibiotic stewardship programs are designed to address in all outpatient settings including dentistry.

Why?

The good news is that dentists can be powerful agents of change. Most inappropriate prescribing in dentistry occurs for conditions that could be managed with definitive dental treatment rather than medication. When applied consistently, stewardship strategies have been shown to work effectively in dental practice.[23] By reinforcing these proven approaches in Oklahoma's dental community, we can ensure safer, more effective prescribing and preserve the effectiveness of antibiotics for future generations.

How? Through 4 Core Elements (Commitment, Action, Tracking, Education)

CDC provides the Core Elements of Outpatient Antibiotic Stewardship as a framework for clinicians and facilities that routinely prescribe antibiotics. This toolkit is built on the CDC's Four Core Elements of Outpatient Antimicrobial Stewardship: commitment, action, tracking and reporting, and education to improve antibiotic prescribing practices and protect both our patients and the health of our communities.[6]

Use of Clindamycin Among Health Care Providers

Health Care Providers	Percentage
Family Practice	21.79%
Nurse Practitioners	15.41%
Physician Assistants	8.68%
Internal Medicine Providers	8.44%
Urologists	8.12%
Dentists	6.70%
Ophthalmology	5.92%
Dermatology	4.84%

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

Definition: Demonstrate dedication to and accountability for optimizing antibiotic prescribing and patient safety.[6]

A commitment from dentists and all members of the dental health care team to actively engage in antibiotic stewardship is essential to optimize antibiotic prescribing. Each dentist, hygienist, and staff member has the opportunity to make stewardship the standard of care at every patient encounter.

Clinicians can demonstrate their commitment to responsible antibiotic prescribing through the following steps:

Step 1: Display Commitment Publicly

- Sign a Commitment Letter for Antibiotic Stewardship, display it in clinics, and share it on clinical websites, newsletters, or social media.
- Sign a Safe Antibiotic Pledge, display it in clinics, and share it on clinical websites, newsletters, or social media.

Research has demonstrated that publicly displayed commitment letters are an effective strategy to reduce inappropriate antibiotic prescribing. In one randomized controlled trial conducted in outpatient settings, providers who signed and posted a visible statement pledging to improve antibiotic use achieved a 20% reduction in inappropriate prescribing within just two months.[24]

There are two main psychological mechanisms to explain why public commitments are effective

1. People place a high value on consistency and follow through with their public commitments to avoid disapproval by their peers.[27]
2. Publicly committing to a behavior prompts people to later justify that behavior and identify the behavior with their self-image, which may enhance personal dedication to performing that behavior.[24,28]

By leveraging these principles, commitment letters become a simple, low-cost, yet powerful intervention.

Links

Sample Statement of Leadership Commitment for Antibiotic Stewardship

- **Simple version**

Los Angeles County Department of Public Health Resources:

- **For Dentist**
- **For Dental Team**

- **CDC Commitment Letter**
- **Illinois Department of Public Health Sample Commitment Letter**
- **Illinois Department of Public Health Sample of Safe Antibiotic Use**

Step 2: Designate an Antibiotic Stewardship Committee

- Select a champion in the office to be responsible for leading an Antibiotic Stewardship Committee. The leader could be a dentist or hygienist.

    Strong leadership commitment is widely recognized as an important factor in the success of antibiotic stewardship programs in hospital settings.[29] Translating this evidence to the dental setting means that stewardship efforts should have formal support and be actively led by a dedicated dental provider who can guide the team, ensure clinical care follows best practices, and is responsible for tracking data on prescribing rates or patterns.

Step 3: Integrate Stewardship into Job Roles

Add stewardship-related responsibilities into job descriptions and evaluations for dentists, hygienists, and office managers who are members of the Antibiotic Stewardship Committee in the clinic.

- Responsibilities could include documenting antibiotic indications, auditing prescriptions, and leading staff training.

Step 4: Educate and Establish Delayed Antibiotic Prescription Technique

Delayed prescription is defined by the CDC as a prescription that is used for patients with conditions that usually resolve without treatment but who can benefit from antibiotics if the conditions do not improve. In other words, delayed prescribing involves giving the patient a prescription but advising them to wait a few days before filling it, using it only if symptoms worsen or fail to improve or when definitive conservative dental treatment (DCDT) is not available. This approach, which is only recommended for specific clinical situations, can help clinicians address patient expectations while reducing unnecessary antibiotic use, and evidence has shown that it maintains high patient satisfaction without negatively impacting outcomes.[6]

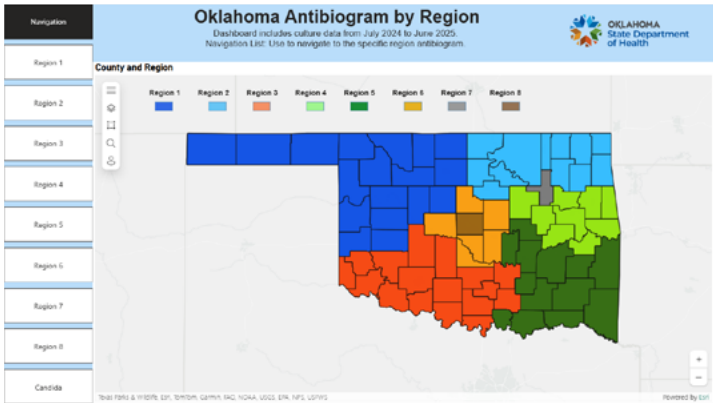
Action for Policy and Practice

Definition: Implement at least one policy or practice to improve antibiotic prescribing, assess whether it is working, and modify as needed.[6]

Dental clinics can strengthen antibiotic stewardship by translating broad principles into practical, stepwise changes. Action means more than acknowledging best practices, it requires setting achievable goals and establishing clinic-wide policies.[6]

1. Using the Regional Antibiogram in Dental Practice

A regional antibiogram provides local data on bacterial resistance patterns and should guide antibiotic selection whenever possible. Developed from aggregate culture data, an antibiogram summarizes antibiotic susceptibility for routinely tested pathogens in a given location for a set timeframe. The OSDH provides a regional antibiogram dashboard that includes aggregate reference lab culture data for the eight regions across Oklahoma, updated regularly to reflect current resistance trends.



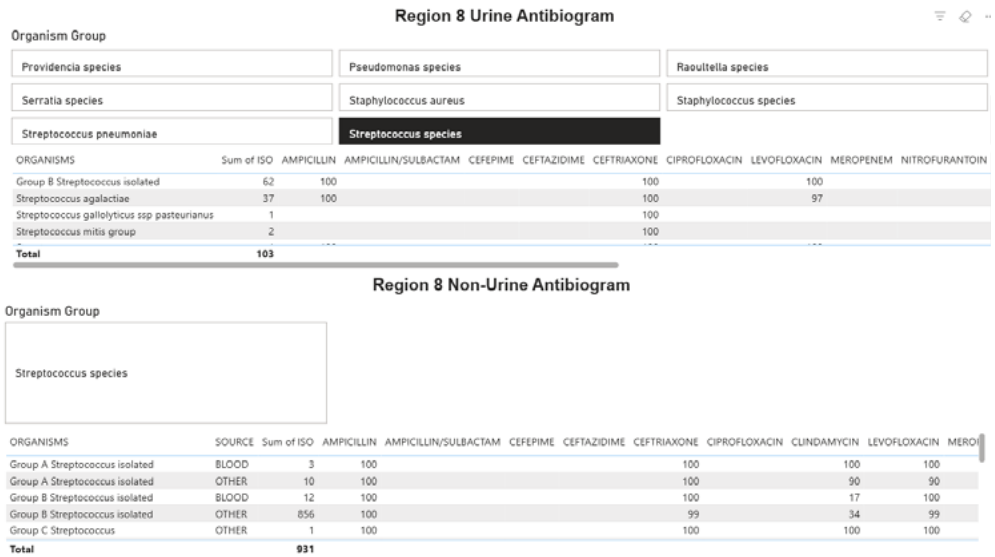
For dentists, this tool is especially valuable when prescribing empiric antibiotics for oral and dental infections, as resistance patterns may vary across regions. By referring to the regional antibiogram, dentists can make more informed prescribing decisions, reduce the use of broad-spectrum antibiotics, and support antibiotic stewardship.

Accessing the Regional Antibiogram Dashboard:

Dentists in Oklahoma can gain access to the Regional Antibiogram Dashboard by submitting a request through the following link: **OSDH Regional Antibiogram Access Request**. Once approved, dentists will be able to view culture data for the eight regions across the state, supporting evidence-based antibiotic prescribing and stewardship in dental practice.

How to Use the Regional Antibiogram Dashboard:

After access is approved, open the dashboard and select the region of interest from the Oklahoma map. Next, review the data for specific oral bacteria linked to dental infections. Keep in mind that a statistically significant percent susceptibility requires at least 30 isolates of each pathogen. Dentists can check which antibiotics show the highest susceptibilities (85% or higher is generally accepted as a reliable option for empiric therapy) and when to exercise caution based on susceptibility trends.



2. Prophylaxis

Antibiotic Prophylaxis (AP) before dental visits is frequently utilized in patients with certain underlying health conditions. It is theorized that bacteria induced during invasive dental treatment can subsequently result in serious distant site infections. Recommendations for AP have changed in recent decades. Current ADA guidelines emphasize that prophylaxis should only be used in select situations.

For the Patient: What Is Antibiotic Prophylaxis?

Prophylaxis for Infective Endocarditis (IE)

The American Heart Association (AHA) recommends that only patients at the highest risk for adverse outcomes from IE receive AP prior to invasive dental procedures.[20]

AP for a Dental Procedure: Underlying Conditions for Which AP Is Suggested

Prosthetic cardiac valve or material
Presence of cardiac prosthetic valve
Transcatheter implantation of prosthetic valves
Cardiac valve repair with devices, including annuloplasty, rings, or clips
Left ventricular assist devices or implantable heart
Previous, relapse, or recurrent IE
CHD
Unrepaired cyanotic CHD, including palliative shunts and conduits
Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by transcatheter during the first 6 mo after the procedure
Repaired CHD with residual defects at the site of or adjacent to the site of a prosthetic patch or prosthetic device
Surgical or transcatheter pulmonary artery valve or conduit placement such as Melody valve and Contegra conduit
Cardiac transplant recipients who develop cardiac valvulopathy
AP for a dental procedure not suggested
Implantable electronic devices such as a pacemaker or similar devices
Septal defect closure devices when complete closure is achieved
Peripheral vascular grafts and patches, including those used for hemodialysis
Coronary artery stents or other vascular stents
CNS ventriculoatrial shunts
Vena cava filters
Pledgets

AP indicates antibiotic prophylaxis; CHD, congenital heart disease; CNS, central nervous system; and IE, infective endocarditis.

Dental Procedures and AP

AP suggested
All dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa
AP not suggested
Anesthetic injections through noninfected tissue, taking dental radiographs, placement of removable prosthodontic or orthodontic appliances, adjustment of orthodontic appliances, placement of orthodontic brackets, shedding of primary teeth, and bleeding from trauma to the lips or oral mucosa

AP indicates antibiotic prophylaxis.

When antibiotic prophylaxis is indicated, it should be given as a single dose 30-60 minutes before the procedure. If prophylactic medication is not given before the procedure due to unforeseen circumstances, it can be given afterward within two hours.[20]

In patients who require prophylaxis but are already taking a short course of oral antibiotics, it is recommended to select a different class for prophylaxis than the one the patient is already taking (example: a patient already taking amoxicillin could be prescribed azithromycin or clarithromycin for prophylaxis). When possible, consider postponing elective dental treatment for 10 days after the completion of the course of antibiotics. [20,30,53] During dental procedures that last longer than six hours, it is necessary to repeat the prophylaxis with the same dose.[31]

Patients who are on IV antimicrobial therapy due to IE or some other infection and require an invasive dental procedure still receive the applied antibiotic parenterally during the procedure.[20]

Antibiotic Prophylaxis Regimens for Dental Procedures:
Regimen - Single Dose 30 to 60 Minutes Before Procedure

Situation	Agent	Adults	Children
Oral	Amoxicillin	2 g	50 mg/kg
Unable to take oral medication	Ampicillin OR	2 g IM or IV	50 mg/kg IM or IV
	Cefazolin or ceftriaxone	1 g IM or IV	50 mg/kg IM or IV
Allergic to penicillin or ampicillin—oral	Cephalexin*† OR	2 g	50 mg/kg
	Azithromycin or clarithromycin OR	500 mg	15 mg/kg
	Doxycycline	100 mg	<45 kg, 2.2 mg/kg >45 kg, 100 mg
Allergic to penicillin or ampicillin and unable to take oral medication	Cefazolin or ceftriaxone†	1 g IM or IV	50 mg/kg IM or IV

Clindamycin is no longer recommended for antibiotic prophylaxis for a dental procedure.

IM indicates intramuscular; and IV, intravenous.

**Or other first- or second-generation oral cephalosporin in equivalent adult or pediatric dosing*

† *Cephalosporins should not be used in an individual with a history of anaphylaxis, angioedema or urticaria with penicillin or ampicillin.*

Maintaining good oral health plays a significant role in preventing IE.[20] Routine daily activities such as toothbrushing, flossing, and chewing can cause transient bacteremia, often at a much higher frequency than a single dental procedure. Poor oral hygiene and untreated periodontal disease increase the risk of IE. Patients should be encouraged to practice oral hygiene twice daily, schedule biannual dental examinations and have routine cleanings to minimize infection risk.[20]

Shared decision-making between providers and patients is an essential component of care. There may be situations where patients request prophylaxis outside the recommendations statement. In such cases, providers should explain the rationale for current guidance, review both the risks and benefits of prophylaxis, and ensure patients have the opportunity to ask questions before accepting or declining the treatment plan recommended by their dentists in order to make an informed decision about their care.[20]

For the Patient: Infective Endocarditis (American Heart Association)

Prophylaxis for Artificial Joints

According to the American Dental Association (ADA) 2015 clinical practice guideline,[32] prophylactic antibiotics are not recommended for most patients with prosthetic joint implants prior to dental procedures, as there is no evidence linking dental treatment with prosthetic joint infections. For patients who have experienced complications related to their joint replacement surgery and are undergoing procedures involving gingival manipulation or mucosal incision, antibiotic prophylaxis should be considered only after consultation with the patient and orthopedic surgeon. In such cases, the orthopedic surgeon is best positioned to determine the need for antibiotics, recommend the appropriate regimen, and, when reasonable, provide the prescription.[33]
ADA, Management of Patients with Prosthetic Joints

ADA and American Academy of Orthopaedic Surgeons (AAOS) jointly developed a guide to assist in determining if patients with prosthetic joints are candidates for prophylaxis: **Care Decision Tree**

Prophylaxis for Other Underlying Health Conditions

According to the ADA, antibiotics before dental procedures are usually unnecessary unless your medical specialist recommends them for your specific condition. For patients with diabetes, patients with transplanted organs, patients at risk of osteoradionecrosis of the jaw (previous head and neck irradiation), patients at risk of medication related osteonecrosis of the jaw (MRONJ) (patients taking antiresorptive and antiangiogenic drugs), patients with HIV infection, patients on dialysis, and patients on biological therapy there are no universally accepted guidelines for antibiotic prophylaxis in dentistry. Recommendations vary across studies and are often based on individual patient risk factors and clinical judgment.

Prophylaxis for Tooth Extraction and Implant in Healthy Patients

Tooth extractions and dental implants are frequent invasive procedures that may result in pain, inflammation, and surgical site infections (SSI). Due to these risks, prophylactic antibiotics are often prescribed, although strong evidence supporting this practice is limited.[34]

Current clinical guidelines in the United States do not specifically address the use of prophylaxis for these procedures.[35, 36]

3. Antibiotic Treatment

Antibiotic stewardship is not only about prophylaxis, but it also means using antibiotics appropriately to treat existing infections. Raising awareness of the risks of unnecessary antibiotic use is an essential part of a dental stewardship strategy.[37]

Before prescribing, dentists should evaluate[38]:

- Patient's overall health and immune status
- Preexisting medical conditions
- Type and location of infection
- Evidence of infection spreading
- Whether Definitive Conservative Dental Treatment (DCDT) is possible
- Presence of systemic symptoms beyond localized pain
- Whether a delayed prescription should be considered
- Any other pertinent patient specific factors

Urgent pain and swelling

The American Dental Association (ADA) provides two decision tools based on whether Definitive Conservative Dental Treatment (DCDT) is immediately available or NOT.[21] Definitive Conservative Dental Treatment (DCDT) includes[21]:

- Pulpotomy or pulpectomy
- Non-surgical root canal treatment
- Incision and drainage for localized acute abscess

DCDT Is Available:

Clinical pathway for treatment of immunocompetent adult patients seeking treatment in a dental setting with a pulpal or periapical condition, in which definitive, conservative dental treatment (DCDT) is immediately available[21]: **Chairside Guide for Treatment of Dental Pain and Intraoral Swelling when DCDT Available (ADA)**

In immunocompetent adult patients, when DCDT is available, antibiotics should only be prescribed if there are signs of systemic involvement, such as fever, malaise, lymphadenitis, or spreading infection.[21] Antibiotics should be discontinued 24 hours after the resolution of symptoms, even if this occurs before the full course ends.[21]

For pain management, over-the-counter analgesics (e.g., ibuprofen and acetaminophen, either alone or in combination) are recommended as first-line therapy.[21]

DCDT Is NOT Available

Clinical pathway for treatment of immunocompetent adult patients seeking treatment in a dental setting with a pulpal or periapical condition, in which definitive, conservative dental treatment (DCDT) is NOT immediately available[21]: **Chairside Guide for Treatment of Dental Pain and Intraoral Swelling when DCDT NOT Immediately Available (ADA)**

When DCDT is not immediately available, a delayed antibiotic prescription may be considered in some instances.

For patients:

Will antibiotics help treat my dental pain?

Dentists: Be Antibiotic Aware - Treating Patients with Dental Pain and Swelling (CDC)

Antibiotic for Dental Pain and Swelling Guideline (ADA)

ACE Panel Report - Antibiotic Use in Endodontic Infection (ADA)

Oral Analgesics for Acute Dental Pain (ADA)

Delayed prescribing:

It is defined by CDC as a prescription that is used for patients with conditions that usually resolve without treatment but who can benefit from antibiotics if the conditions do not improve. Delayed prescribing should be considered for immunocompetent adults with pulp necrosis and symptomatic apical periodontitis when DCDT is not immediately available. Dentists can apply delayed prescribing practices by giving the patient a postdated prescription and providing instructions to fill the prescription after a predetermined period (24 through 48 hours after the initial visit) or by instructing the patient to call or return to collect a prescription if symptoms worsen, do not improve, or DCDT has yet to be performed. Dentists should communicate to the patient that if their symptoms worsen and they experience swelling or pus formation, the delayed prescription should be filled at that time. Dentists may also partner with frequently utilized pharmacies, so pharmacists can reinforce instructions and educate patients who attempt to fill prescriptions early. The following template is intended for dentists to establish this practice in the clinic. **Delayed Prescription in Dental Settings**

4. Adverse Events

Beyond resistance, antibiotics are a leading cause of medication-related side effects. A U.S. study (2011–2015) reported over 145,000 emergency visits from antibiotic adverse events, with most cases involving allergic reactions.[39] Even small reductions in unnecessary prescribing can significantly lower these risks.[40] The development of adverse events may also depend on the length of the antibiotic regimen. A 2019 systematic review[7] found that longer courses of antibiotics (≥72 hours) are associated with a much higher risk of side effects compared to short courses (≤24 hours).[41]

Penicillin Allergy Evaluation:

Although uncommon, allergic reactions to antibiotics can be severe and even life-threatening, so they should always be taken seriously. Careful evaluation of each patient is essential before prescribing. According to a CDC report, while about 10% of people report a penicillin allergy, fewer than 1% are truly allergic.[42] Over time, many patients lose this allergy. Only about 20% with a true allergy still have it after 10 years.[43]

PEN-FAST is a validated clinical decision-making tool designed to help providers quickly assess whether a patient's reported penicillin allergy is low-risk. A low PEN-FAST score indicates that the patient can safely receive oral penicillin without the need for prior skin testing. A recent study published in *JAMA* demonstrated that PEN-FAST had a negative predictive value of 100% in identifying patients with low-risk allergy histories who were eligible for safe penicillin use and subsequent allergy de-labeling.[44] Incorporating PEN-FAST or other interviewing tools into clinical practice supports evidence-based prescribing and reduces unnecessary avoidance of first line antibiotic options:

The PEN-FAST Clinical Decision-making Tool (see Supplemental Content in article)

With high rates of clindamycin resistance in oral *Streptococcus* (18–30%) and increasing resistance among anaerobes such as *Prevotella and Porphyromonas* species (31–38%), penicillin and similar agents of the beta lactam class remain the most effective and recommended first-line treatments.[45, 46] Patients with non-anaphylactic reactions to penicillin may often tolerate cephalosporins, especially later-generation options.[43] For more information about beta lactam cross reactivity please refer to this chart: **OSDH Beta Lactam Cross Reactivity Chart**

Clindamycin is not recommended as an alternative for prophylaxis in penicillin-allergic patients,[20] though it can be appropriate for treating oral infections in select cases.[21]

Being mislabeled as penicillin-allergic often leads to use of second-line antibiotics, which may result in[42]:

- Higher health care costs
- Less effective treatment
- Greater risk of side effects (e.g., *C. diff* infection)
- Higher risk of antibiotic resistance development

Note on Clindamycin Use

The 2021 American Heart Association (AHA) scientific statement no longer recommends clindamycin as an oral or injectable alternative to amoxicillin or ampicillin for antibiotic prophylaxis in patients with allergies. This change reflects evidence that clindamycin is linked to more frequent and severe adverse reactions, including *C. diff* infection.

For more information on how to ask patients about their penicillin allergy, visit CDC website:

Clinical Features of Penicillin Allergy (CDC)

MARR/OSAP: Penicillin Allergy Assessment Tool

MARR/OSAP: Penicillin Allergy Reassessment Tool

Approach to Patients Reporting Penicillin Allergies (AHRQ)

For patients: Am I Allergic to Penicillin?

Clostridioides difficile Infection:

Clostridioides difficile (C. diff) causes 15–25% of antibiotic-associated diarrhea.[47] Normally a harmless gut resident, it can become pathogenic when balance is disrupted by antibiotic treatment, tissue damage, diet changes, or immune deficiencies.[48] *C. diff* infections (CDI) are rising in prevalence and severity. While most cases are linked to health care settings, nearly half are community-associated, and the majority of those occur after antibiotic use.[47] Clindamycin, fluoroquinolones (such as ciprofloxacin and levofloxacin), and later-generation cephalosporins (such as ceftriaxone and cefdinir) are most commonly linked to *C. diff* infections.[47]

Studies have shown that even a single dose of clindamycin prescribed for dental prophylaxis can result in serious complications, including *C. diff* infections and, in rare cases, death.[49] Compared to other antibiotics used for prophylaxis, clindamycin has been linked to more frequent and more severe adverse reactions. Notably, up to 15% of community-acquired *C. diff* infections have been associated with antibiotics prescribed for dental procedures.[50] For this reason, its use for antibiotic prophylaxis is no longer recommended.[20]

Symptoms of CDI may appear within just a few days of starting antibiotics and can include diarrhea, fever, abdominal tenderness, nausea, and loss of appetite.[47] Patients taking antibiotics who experience three or more loose stools within 24 hours should be advised to contact their primary care provider promptly for evaluation.[47] According to the 2021 Infectious Diseases Society of America and Society for Healthcare Epidemiology of America guidelines, when *C. diff* infection is diagnosed or strongly suspected, clinicians should discontinue the inciting antibiotic as soon as clinically feasible. In such cases, if the dentist prescribed the antibiotic, the best practice is to advise the patient to stop the antibiotic immediately and seek prompt medical evaluation, ideally the same day.[51]

Clear communication is essential: provide the patient with details of the prescribed antibiotic (drug, dose, start date, and indication) and emphasize the importance of contacting their physician promptly if needed. Patients should also be advised to monitor for warning signs such as fever, abdominal pain, or dehydration, which require urgent medical attention.[51]

About *C. diff* (CDC)

The progression of a *C. diff* Infection-Fact sheet (CDC)

For patients: ***C. diff* infection: Am I at risk?**

5. Antibiotics in Pediatric Patients

- Antibiotic Prophylaxis in Children with Congenital Heart Disease will follow the same rules as adults except in dose prescription which is covered in table 5 of AHA guideline.[20, 52]

Dental Treatment[53]

- Antibiotics in children should be prescribed with great caution. The American Academy of Pediatric Dentistry (AAPD) emphasizes that antibiotics should only be used as an adjunct to definitive care, not as a substitute. Overuse in children increases the risk of antimicrobial resistance and adverse drug reactions, with amoxicillin being the most common source of pediatric antibiotic-related emergency visits.

When antibiotics are NOT indicated

- Conditions like pulpitis, apical periodontitis, draining sinus tracts, and localized intraoral swelling can often be managed with dental treatment alone, if treatment is immediately available.
- Viral infections, such as primary herpetic gingivostomatitis, do not benefit from antibiotics.

When antibiotics ARE indicated (Note: signs of systemic involvement and septicemia necessitate emergency treatment)

- Systemic involvement (fever, malaise, lymphadenitis, or facial swelling) in a child with dental infection.
- Acute facial cellulitis of dental origin with signs of rapid spread or airway risk.
- Avulsed permanent teeth (amoxicillin or penicillin is preferred; doxycycline may be used short-term).
- Salivary gland infections.
- Certain types of periodontal diseases.
- Certain types of oral wounds.
- Aggressive periodontal disease associated with systemic conditions.

First-line choices:

- Amoxicillin remains the drug of choice for dental infection in non-allergic children.
- Duration: typically 5–7 days, but discontinuation of antibiotic should be considered 24 hours after complete resolution of systemic signs and symptoms.[53]

For additional details on antibiotic prescribing for pediatric dental patients, please refer to the following guideline: **Use of Antibiotic Therapy for Pediatric Dental, AAPD Guideline**

Tracking and Reporting

Definition: Monitor antibiotic prescribing practices and offer regular feedback to clinicians, or have clinicians assess their own antibiotic prescribing practices themselves.[6]

Tracking and reporting clinician antibiotic prescribing, also called audit and feedback, can guide changes in practice and be used to assess practices in improving antibiotic prescribing.[6] Unsurprisingly, research shows that interventions addressing system-level factors, such as audit and feedback, have a greater impact on reducing inappropriate dental antibiotic prescribing than interventions focused only on improving knowledge through education.[7, 54]

Steps to implement tracking and reporting include[6]:

1. Decide What Level of Data to Track

The first step is to determine whether data will be tracked for individual prescribers or for the entire dental practice.

- In a private dental office with only one dentist, tracking can be done at the individual level. The dentist can periodically review their own prescribing patterns to monitor improvement or identify changes needed.
- In group practices or multi-provider clinics, data can be collected for each provider to compare individual prescribing patterns over time or against clinic averages. This peer-to-peer comparison can help identify variation and promote discussions about best practices.

2. Select Outcomes to Monitor

Next, decide which aspects of antibiotic prescribing will be reviewed. Possible outcomes include:

- Indication for prescribing
- Choice of antibiotic agent
- Dose, frequency, and duration

If staff time or resources are limited, it may be more manageable to focus on one or two outcomes at first (for example, appropriate indication and duration) and expand as the system becomes established.

3. Choose How to Collect the Data

There are different ways to collect prescribing data, and the best method depends on the tools and personnel available in the clinic:

- Manual chart reviews involve periodically reviewing patient records to determine if antibiotics were prescribed appropriately. This is often feasible in small or solo practices.
- Electronic data reviews can be done in clinics using digital record systems, where antibiotic prescription information can be extracted and analyzed.

A practical tool for tracking antibiotic prescribing in dentistry is a chart audit. Below is a link to an example chart audit tool from Association for Dental Safety and the Massachusetts Department of Public Health.

Massachusetts Department of Public Health Sample Chart Audit Tool

Data collection for antibiotic prescribing does not need to be complicated or time-consuming. Each dental office can decide how much tracking is realistic based on the resources of their staff. One effective approach is to focus only on high-priority conditions, the situations where antibiotics are frequently prescribed unnecessarily or where prescribing decisions have the greatest impact.[55, 56]

> According to CDC, there are two approaches for outpatient settings like dental clinics regarding tracking and reporting antibiotic stewardship practices[6]:

For individual dentists (prescribers):

- Self-evaluate antibiotic prescribing practices. A dentist can periodically review their own patient charts to see if antibiotics were prescribed only when indicated, and if the drug, dose, and duration matched ADA guidelines. There was high-certainty evidence that audit and feedback interventions which provided dentists with personalized prescribing data significantly reduced antibiotic prescribing.[54]

- Stay current through education. Dentists can participate in continuing education or quality improvement activities that focus on prescribing antibiotics. These may also help meet CE or licensure requirements.

For dental clinics (practice-wide):

The Antibiotic Stewardship Committee, established in the first step of implementing the antibiotic stewardship program, should take the lead in coordinating this process.

- Implement a simple tracking system: Once the prescribing practices have been audited, the trends can be evaluated and feedback provided. Based on the staff resources, dentists can receive individualized summaries of their prescribing patterns, which can then be compared against guideline standards and the practices of their peers. Providing clinicians with individualized prescribing rates, benchmarked against their peers, has been shown to reduce unnecessary antibiotic prescribing.[6, 57]

- Share feedback with providers: Based on the staff resources, clinics can decide how to share prescription patterns with dentists in their practice. Feedback should focus on identifying over-prescribing, recognizing successes and providing opportunities for peer discussion about prescribing challenges. It should also provide opportunities to identify barriers that prevent improvement and develop strategies to address them. By providing dentists with personalized prescribing data and behavior-change recommendations in each report, audit and feedback approaches create sustained improvements in prescribing patterns.[58]

Education

Definition: Provide educational resources to clinicians and patients on antibiotic prescribing, and ensure access to needed expertise on optimizing antibiotic prescribing.[6]

Education on appropriate antibiotic use can involve patients and clinicians. Educating patients and their families can improve health literacy and support better antibiotic use, while educating dentists helps reinforce appropriate prescribing practices and enhances overall quality of care.[6, 59-61]

Patient Education:

1. Educating patients is a cornerstone of antibiotic stewardship in dentistry. Patients often expect antibiotics, so clear communication can help manage these expectations while maintaining satisfaction with their care. Dental providers should explain when antibiotics are truly needed, and when dental procedures or symptom management are better options.

2. It is also important to discuss the potential harm of antibiotics, including common side effects like nausea, diarrhea, and more serious risks such as allergic reactions or *C. difficile* infection. Parents of children may especially want to know about these risks.[62]

3. Whenever antibiotics are prescribed, give patients clear instructions on how to take them correctly, including when to stop using them. Providing written educational materials can reinforce these conversations. Combining the message "why antibiotics are not needed" with recommendations for what patients can do instead has been shown to increase satisfaction even when no antibiotic is prescribed.[6, 63, 64]

Antibiotic Safety: Do's and Don'ts at the Dentist

Antibiotic Use for a Safe Dentist Visit

Provider and Staff Education

The entire dental team plays a role in stewardship. Training staff in communication skills ensures they can confidently explain to patients why antibiotics may not always be the answer and how to manage symptoms safely. Targeted education and behavior change strategies, such as continuing education, communication training, and case-based discussions, can directly address the main factors influencing overprescribing in dental settings.[7]

Provide face-to-face educational training for dental providers.

In the dental setting, peer-to-peer education, conducted by trusted colleagues, stewardship experts, or pharmacists, can be an effective approach to improving antibiotic prescribing practices. These trainings may include case discussions, review of prescribing data, and reinforcement techniques such as peer comparisons to encourage best practices and guideline adherence.[65-67]

Offer continuing education activities for dental providers and staff.

Continuing education should address topics such as evidence-based antibiotic prescribing, recognition and management of adverse drug events, effective communication with patients, and delayed prescription practice in dentistry.[68, 69]

CDC's Antibiotic Stewardship Courses

Ensure timely access to subject matter experts.

Dentists should have access to pharmacists, infectious disease consultants, or dental specialists who can provide guidance on complex cases, such as patients with systemic infections, those who are immuno-compromised, or those requiring prophylaxis for specific medical indications. Collaboration with pharmacists and other experts can support safe prescribing, improve patient outcomes, and reduce unnecessary antibiotic use.

Swish and Swallow: Antibiotic Stewardship in Dentistry

Checklist for Antibiotic Prescription in Dentistry

Use Antibiotics Wisely

Prescription Pearls

PEARL 1: Delayed Prescribing Can Be a Useful Strategy When Dental Care is Not Immediately Available[21]

For adult, immunocompetent patients with pulp necrosis and symptomatic apical periodontitis, the ADA suggests that clinicians consider the use of a delayed antibiotic prescription. Clinicians who choose to utilize this option should provide clear instructions on when to fill the delayed prescription. The patient should be referred for DCDT and provided interim monitoring. **Delayed Prescription in Dental Settings.**

PEARL 2: "Take Antibiotics Until Finished" is Outdated Guidance[21]

According to the ADA, antibiotics for dental infections should generally be prescribed for **3–7 days.**

- Patients should be re-evaluated within 3 days (in person or by phone).
- Advise patients to stop antibiotics 24 hours after symptoms are resolved.

Completing the entire course is no longer routinely recommended unless symptoms persist.

PEARL 3: Clindamycin is No Longer Recommended for Prophylaxis[20]

Even a single dose of clindamycin significantly increases the risk of *C. diff* infection and should not be used for antibiotic prophylaxis in dental patients.

PEARL 4: Counseling Points for Commonly Prescribed Dental Antibiotics

β-lactams (amoxicillin, penicillin VK, amoxicillin–clavulanate, cephalexin):

- May be taken with or without food.
- Severe allergic reactions are rare but possible. The most common adverse effects are gastrointestinal (GI) disturbances.

Azithromycin:

- Taking with food may reduce stomach upset.
- May prolong the QT interval; use caution in patients with QT-prolonging medications.

Metronidazole:

- Taking with food may reduce stomach upset.
- May cause a metallic taste or other GI disturbance as well as peripheral neuropathy.

Clindamycin:

- May be taken with or without food.
- May cause diarrhea; if the patient experiences ≥3 loose stools in 24 hours, they should contact their primary care provider.[47]

PEARL 5: Consider the Useful Effect of Tracking Reports in Enhancing Prescription Practice[54, 58]

Providing dentists with individualized feedback reports that visualize their prescribing patterns, especially when paired with simple behavior-change messaging, is a proven, evidence-based approach to improving antibiotic stewardship in dental practice. **The example of Audit and Feedback Chart Including Behavior Change Message, is available in the supporting information section of this paper**

PEARL 6: Don't Save or Share Antibiotics

Antibiotics should never be saved for later or shared with others. It can be harmful and increase resistance. Dentists should encourage patients to safely dispose of leftovers at a local pharmacy or medication drop-off site instead of keeping them at home.

PEARL 7: Antibiotic Decision-Making When Dental Care isn't Accessible

More than 2 million Americans visit emergency departments (ED) each year for dental pain. These patients rarely receive definitive care onsite because the facility often lacks a dentist.[70] In ED/urgent care/rural settings clinicians should always ask about access to dental care before prescribing antibiotics; when patients have no dental home and DCDT is not readily available, an immediate antibiotic may be the best option for pulp necrosis with symptomatic apical periodontitis.[21] However, this should be paired with shared decision-making, clear communication about the limited role of antibiotics, and referral to local dental clinics or community resources.

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