ANTIBIOTIC STEWARDSHIP TOOLKIT

for Dental Settings

Mississippi State Department of Health

Office of Epidemiology
Antibiotic Stewardship
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MISSISSIPPI STATE DEPARTMENT OF HEALTH

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INTRODUCTION

Antibiotic resistance continues to be a significant public health concern in the United States, resulting in more than 2.8 million infections and over 48,000 deaths each year.[1] Dentists consistently rank among the top five outpatient antibiotic prescribers nationwide, and recent data show that general dentists accounted for 10%–12% of all outpatient antibiotic prescriptions between 2020 and 2022.[2,3] Although the American Dental Association (ADA) issued guidelines in 2019 to promote responsible antibiotic use in dentistry, prescribing practices have remained largely unchanged, highlighting a critical need for enhanced antibiotic stewardship within the dental profession to combat the growing challenge of resistance.[2]

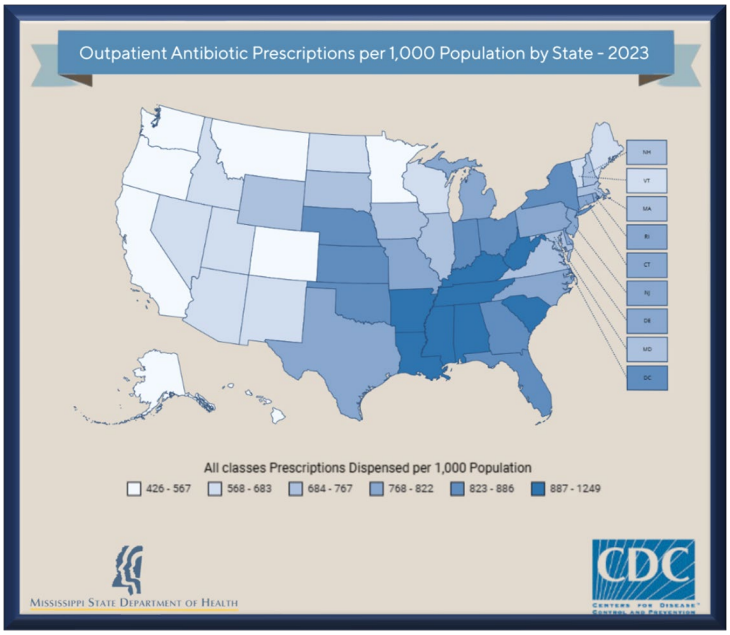
Antibiotic stewardship in dentistry is essential to reduce unnecessary antibiotic use, improve patient outcomes, and combat the spread of drug-resistant infections. Dentists are encouraged to prescribe antibiotics only when clinically indicated, such as for certain odontogenic infections or appropriate prophylaxis, and to also ensure correct drug selection, dosage, and treatment duration.[4] Dentists play a key role in combating antimicrobial resistance by advocating for and practicing responsible antibiotic prescribing.

The CDC's Core Elements of Outpatient Antibiotic Stewardship can be tailored to dental care settings to help dental professionals adopt and apply effective stewardship strategies. This toolkit is intended to complement those core elements by supporting dental professionals in developing and implementing practical antibiotic stewardship programs within their facilities. Additionally, it includes a variety of resources aimed at both dental providers and patients within Mississippi, helping to promote awareness, education, and adherence to best practices in antibiotic prescribing. By utilizing this toolkit, dental practices can enhance their stewardship programs, improve patient outcomes, and play a vital role in reducing antibiotic resistance.

Guidance on antibiotic use continues to evolve, and all recommendations and guidelines come with certain limitations and exceptions. This toolkit is intended to serve as a reference and should not replace professional clinical judgment. For more information, please visit www.cdc.gov/antibiotic-use or e-mail HAIAR@msdh.ms.gov.

OVERVIEW

Outpatient Antibiotic Use in Mississippi



Outpatient prescription rates of all antibiotic classes dispensed in US.
CDC Antibiotic Resistance & Patient Safety Portal

In 2023, Mississippi had the second-highest rate of outpatient antibiotic prescriptions in the country, with 1,191 prescriptions per 1,000 people—significantly above the national rate of 756 per 1,000.[6,7]

According to CMS Medicare Part D data, dentists in Mississippi accounted for 8% of all outpatient antibiotic prescriptions. Antibiotics represented 51% of total drug claims and contributed to 42% of overall drug costs.[8]

Opportunities for Improvement

- Antibiotics are commonly prescribed by dentists for prophylaxis, post-surgical care, and treatment of oral infections. Studies suggest that 30%–85% of these prescriptions may be unnecessary or inappropriate.[9]

- Dentists are the leading prescribers of clindamycin, an antibiotic known for its high risk of causing *C. difficile* infections. Inappropriate prescribing of antibiotics in dental settings, particularly clindamycin, contributes significantly to the increased risk of such adverse outcomes.[10,11]

- Although dentists play a crucial role in antibiotic stewardship, the establishment of antibiotic stewardship programs (ASPs) in dental settings remains limited. Implementing ASPs in dentistry is key to improving prescribing practices, enhancing patient safety, and reducing resistance.

ANTIBIOTIC STEWARDSHIP

What is Antibiotic Stewardship?

The CDC defines antibiotic stewardship as the effort to improve how antibiotics are prescribed and used. It involves a systematic approach to optimizing antibiotic use, ensuring they are prescribed only when truly needed, minimizing misdiagnoses or delays that can lead to misuse or underuse, and selecting the correct drug, dose, and duration when treatment is appropriate. The goal of antibiotic stewardship is to maximize the benefit of antibiotic treatment while minimizing potential harm to both individuals and communities.

Why it Matters

Antibiotics are vital, life-saving drugs, but their use is not without risks. Every time an antibiotic is prescribed, it can lead to adverse drug events and contribute to the development of antibiotic resistance.[5]

Inappropriate antibiotic prescribing increases the risk of adverse effects such as allergic reactions, toxicity, and *C. difficile* infections. It also accelerates the development of antibiotic-resistant bacteria, reducing the effectiveness of treatments over time. As resistance grows, infections become more difficult and costly to treat, often requiring stronger or more toxic medications, longer hospital stays, and additional care. These consequences place a significant financial burden on patients and healthcare systems, while straining already limited medical resources.

What Can Be Done?

Antibiotic stewardship applies to all health care settings in which antibiotics are prescribed, including dentistry. By implementing effective antibiotic stewardship programs, dental professionals can help protect patients and the public by reducing resistance and minimizing adverse drug events. **CDC's Core Elements of Outpatient Antibiotic Stewardship** provides a practical guide to support responsible antibiotic use in dental care settings.

Every member of a dental team plays an important role in stewardship efforts, with each patient encounter presenting an opportunity to educate and help manage expectations around antibiotic use. This toolkit is designed to empower all dental team members to take an active role in stewardship through enhanced education and awareness.

CORE ELEMENTS OF ANTIBIOTIC STEWARDSHIP

Improving antibiotic prescribing involves implementing effective strategies to modify prescribing practices to align them with evidence-based recommendations for diagnosis and management. The CDC outlined four Core Elements essential for building a successful antibiotic stewardship program in all outpatient and dental settings, even solo practices. These elements serve as a framework for quality improvement in antibiotic prescribing within a practice setting. They guide continuous efforts to enhance prescribing practices and encourage responsible antibiotic use in clinical settings.

Core Elements of Outpatient Antibiotic Stewardship | CDC

Strategies and Resources for Implementing Core Elements

Dental practices and clinicians can enhance antibiotic prescribing by beginning with one or two targeted activities and gradually expanding their efforts with additional strategies as improvements are made.

COMMITMENT

- Write and display public commitments in support of antibiotic stewardship
- Identify a single leader to direct antibiotic stewardship activities within a facility
- Include antibiotic stewardship-related duties in position descriptions or job evaluation criteria
- Communicate with all clinic staff members to set patient expectations

ACTION FOR POLICY AND PRACTICE

- Use evidence-based diagnostic criteria and treatment recommendations
- Participate in communications skills training to better address patient concerns about antibiotics, manage self-limiting conditions, and set realistic expectations during visits

TRACKING & REPORTING

- Establish a system to track and report antibiotic prescribing within your practice
- Choose whether to monitor by clinician (preferred) or at the facility level
- Decide what data to collect and how - focus on the "4Ds" (drug, dose, duration, diagnosis). You may also track high-priority conditions, prescribing rates, and any adverse events from antibiotic use

EDUCATION & EXPERTISE

- Use evidence-based diagnostic criteria and treatment recommendations
- Educate patients and families about responsible antibiotic use and the potential harms of antibiotic treatment
- Use effective communication strategies to educate patients about when antibiotics are and are not needed
- Provide patient education materials
- Educate clinicians and clinic staff through academic detailing, continuing education activities, and ensuring timely access to persons with expertise

COMMITMENT

Ways to demonstrate commitment to improving antibiotic prescribing

Create and display commitment posters in waiting areas and exam rooms.

- A Commitment to Improving Antibiotic Use | CDC
- MSDH Commitment Poster

Use social media, websites, and/or newsletters to promote antibiotic stewardship efforts.

- Distribute brochures to promote safe and appropriate antibiotic use
  - Patient Brochure: Antibiotic Use for a Safe Dentist Visit

Involve all clinic staff in setting patient expectations about antibiotic use by providing training on consistent and effective messaging.

Resources:

Antibiotic Stewardship for the Dental Team | Association for Dental Safety

Fact Sheet: Seven Ways Dentists can act Against Antibiotic Resistance

Fact Sheet: Treating Patients with Dental Pain and Swelling

Your health is important to us

That's why we guarantee we will do our best to prescribe **antibiotics only when you need them.**

Antibiotics are powerful, lifesaving drugs—but only when used correctly. We're committed to prescribing them only when necessary, because taking them when not needed can do more harm than good.

Antibiotics treat bacterial infections. They do not work against viruses that cause the common cold, most coughs, or sore throats.

They can also cause side effects such as rash, diarrhea, or yeast infections. In rare cases, antibiotics can cause serious problems like *C. difficile*, a severe intestinal infection 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 protects your health and helps preserve their effectiveness for the future.

To learn more about antibiotic prescribing and use, visit www.cdc.gov/antibiotic-use.

Sincerely,

CDC

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

How can you *Be Antibiotics Aware* at the dentist?

- Talk to your dentist about when antibiotics are and are not needed as part of your dental care.
- Take your antibiotics exactly as prescribed by your dentist.
- Call your dentist immediately if you experience any side effects or allergic reactions.

What should you tell your dentist before you take an antibiotic?

- Any other medical conditions
- Other medications and supplements you are taking
- If you have had an allergic reaction to an antibiotic in the past
- If you have ever had severe diarrhea when taking an antibiotic

This information will help your dentist identify the safest antibiotic for you.

Improving antibiotic use in dental care will keep you healthy now, help prevent side effects, and help fight antimicrobial resistance.

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

CS321741-A

Antibiotic Use for a Safe Dental Visit

BE ANTIBIOTICS AWARE

SMART USE, BEST CARE

What do antibiotics do?

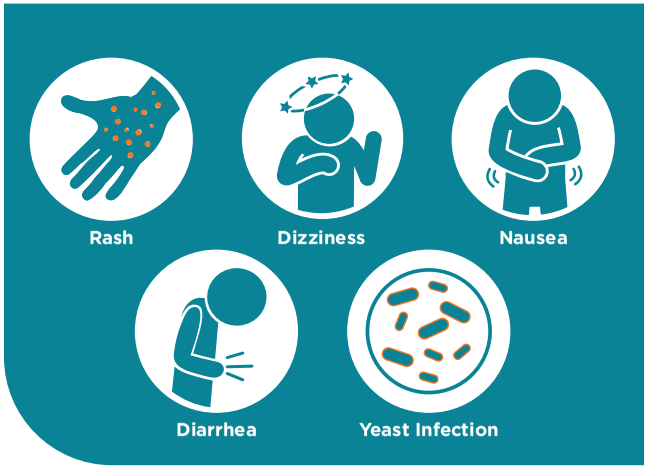
- In dentistry, antibiotics treat certain mouth infections caused by bacteria, like an infected tooth.
- Antibiotics are medicines that fight infections caused by bacteria either by killing or stopping the growth of the bacteria.

Antibiotics do not prevent or treat:

- Infections caused by viruses, like cold sores
- Infections caused by fungi, like oral thrush
- Toothaches or other pain from injury, unless the injury has led to a bacterial infection. Ibuprofen or acetaminophen may be recommended to help ease toothache.

Your dentist will determine if an antibiotic is needed as part of your dental care.

What are the possible side effects of taking antibiotics?



Get immediate help if you experience:

- Severe diarrhea, which could be a symptom of a *C. difficile* infection (also called *C. diff*), which can lead to severe colon damage and death.
- Severe and life-threatening allergic reactions, such as wheezing, hives, shortness of breath, and anaphylaxis (which also includes feeling that your throat is closing or choking, or your voice is changing).

When antibiotics aren't needed, they won't help you, and the side effects could still cause harm.

When antibiotics are needed, the benefits outweigh the risks of side effects and antimicrobial resistance.

What is antimicrobial resistance?

Antimicrobial resistance is one of the most urgent threats to the public's health. Any time antibiotics are used, they can cause side effects and contribute to the development of antimicrobial resistance.

- Antimicrobial resistance does not mean the body is becoming resistant to antibiotics; it means bacteria develop the ability to defeat the antibiotics designed to kill them.
- When bacteria become resistant, antibiotics cannot fight them, and the bacteria multiply.
- Some resistant bacteria can be harder to treat and can spread to other people.

ACTION

Actions dentists can take to improve antibiotic prescribing

Key areas:

- Avoid prescribing antibiotic prophylaxis for prosthetic joint implants
- Use cephalexin or azithromycin instead of clindamycin to reduce the risk of *C. difficile* infection
- Use shorter courses of antibiotics

Evidence-based diagnostic criteria and treatment recommendations

- ADA I Antibiotic Prophylaxis Prior to Dental Procedures
- JADA I The use of prophylactic antibiotics prior to dental procedures in patients with prosthetic joints
- AHA I Guidelines for Prevention of Infective Endocarditis
- ADA I Antibiotic Use for Management of Dental Pain and Intra-oral Swelling
- ADA I Management of Patients with Orthopedic Implants Undergoing Dental Procedures

Communications skills training for clinicians

- Healthcare Communication I Drexel University College of Medicine

Resources:

Antibiotic Stewardship for Prescribers | ADS - Association for Dental Safety

MARR I Antibiotic Prophylaxis Resources

Clinical Features of Penicillin Allergy | CDC

CDC I Penicillin Allergy Fact Sheet

MARR I Penicillin Allergy Assessment Tools

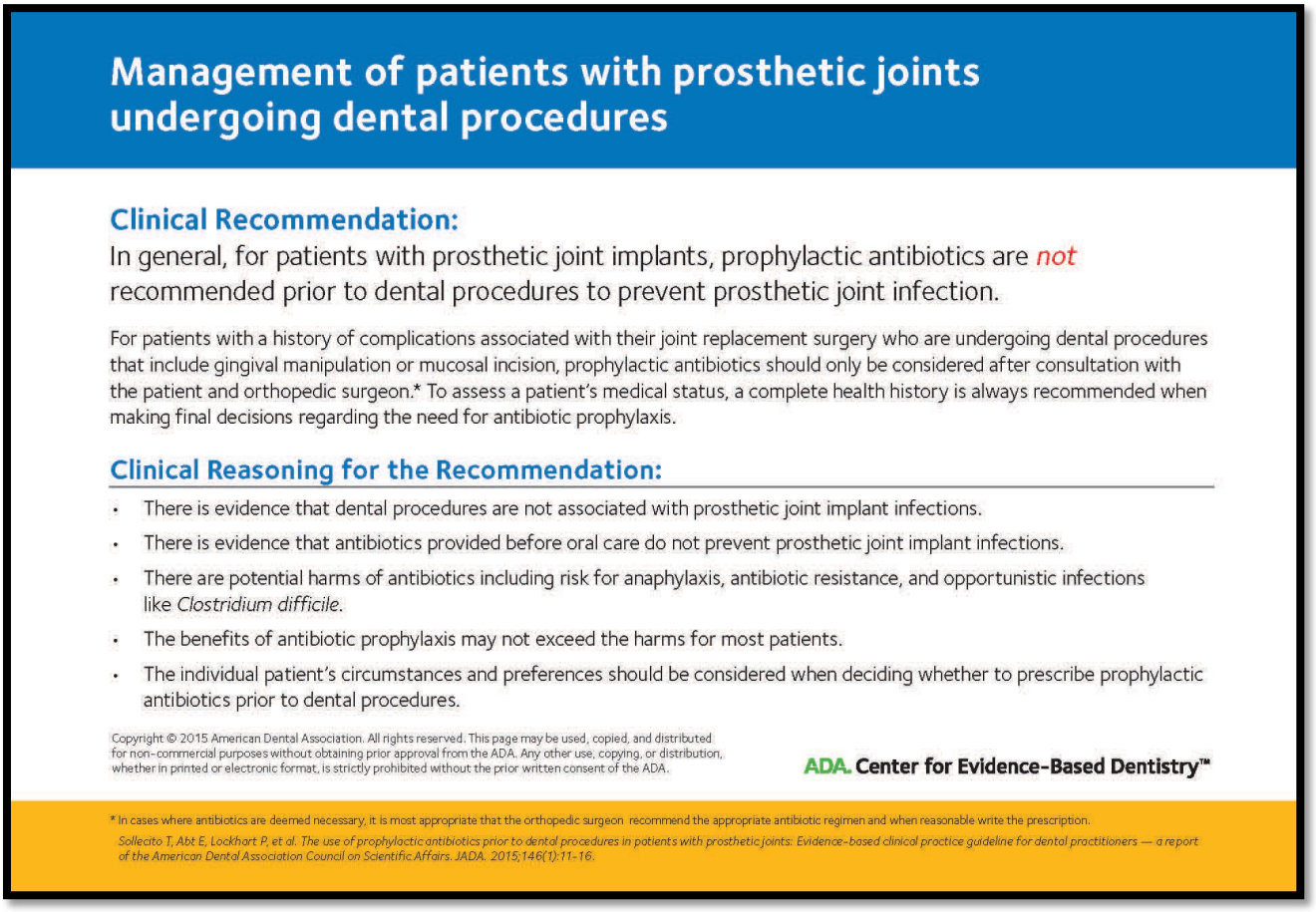
Guidelines for Antibiotic Prophylaxis

Key Takeaways

- Dental procedures do not carry a higher risk of causing systemic bacteremia than everyday activities like tooth brushing or eating.
- Routine use of antibiotic prophylaxis is not advised, as it carries unnecessary risks such as adverse drug reactions and antibiotic resistance.
- Decisions about antibiotic prophylaxis should be personalized based on each patient's medical history.

Patients with Prosthetic Joint Implants

For most patients with prosthetic joints, prophylactic antibiotics are **not** recommended prior to dental procedures to prevent prosthetic joint infections.[12] Exceptions include patients with underlying medical conditions or surgical complications. In such cases, a joint decision should be made by the patient, dentist, and orthopedic surgeon after carefully weighing the risks and benefits of prophylaxis.[12]



Management of patients with prosthetic joints undergoing dental procedures

Clinical Recommendation:

In general, for patients with prosthetic joint implants, prophylactic antibiotics are *not* recommended prior to dental procedures to prevent prosthetic joint infection.

For patients with a history of complications associated with their joint replacement surgery who are undergoing dental procedures that include gingival manipulation or mucosal incision, prophylactic antibiotics should only be considered after consultation with the patient and orthopedic surgeon.* To assess a patient's medical status, a complete health history is always recommended when making final decisions regarding the need for antibiotic prophylaxis.

Clinical Reasoning for the Recommendation:

- There is evidence that dental procedures are not associated with prosthetic joint implant infections.
- There is evidence that antibiotics provided before oral care do not prevent prosthetic joint implant infections.
- There are potential harms of antibiotics including risk for anaphylaxis, antibiotic resistance, and opportunistic infections like *Clostridium difficile*.
- The benefits of antibiotic prophylaxis may not exceed the harms for most patients.
- The individual patient's circumstances and preferences should be considered when deciding whether to prescribe prophylactic antibiotics prior to dental procedures.

ADA Center for Evidence-Based Dentistry™

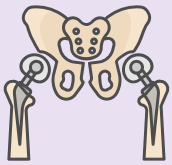
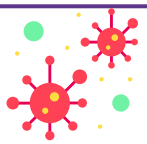
* In cases where antibiotics are deemed necessary, it is most appropriate that the orthopedic surgeon recommend the appropriate antibiotic regimen and when reasonable write the prescription.

Sollecito T, Abt E, Lockhart P, et al. The use of prophylactic antibiotics prior to dental procedures in patients with prosthetic joints: Evidence-based clinical practice guideline for dental practitioners — a report of the American Dental Association Council on Scientific Affairs. JADA. 2015;146(1):11-16.

ADA I Chairside Guide I Management of Patients with Prosthetic Joints

What do Dental Teams need to know about Antibiotic Prophylaxis Prior to Invasive Dental Procedures in Patients with Total Joint Replacement (TJR)?

- Dental procedures pose no greater risk for systemic bacteremia than activities of daily living, such as brushing your teeth or eating.
- The use of antibiotic prophylaxis is not recommended. The use of antibiotic prophylaxis poses unnecessary risk of adverse drug reactions and/or antibiotic resistance.
- Recommendations for antibiotic prophylaxis should be considered individually in each patient, depending on their medical history.
- Following is a summary of the literature supporting this public health recommendation:

Year	Key Points	
2024	A retrospective cohort study of 10,894 patients evaluated antibiotics prior to dental procedures and the association between dental procedures and periprosthetic joint infection (PJI). Routine antibiotics prior to dental procedures were not shown to affect the risk of late-presenting PJI. ***These findings suggest that routine antibiotic prophylaxis before dental procedures is not necessary after total hip and total knee arthroplasty (THA/TKA).***(1)	
2023	An analysis of 2,344 patients who were admitted with late periprosthetic joint infections (PJI) noted no relationship with prior dental procedures. Authors' conclusion: ***"In the absence of benefit, the continued use of antibiotic prophylaxis poses an unnecessary risk to patients from adverse drug reactions and to society from the potential of antibiotic prophylaxis to promote development of antibiotic resistance. Dental antibiotic prophylactic use to prevent late PJI should, therefore, cease."*** (2)	
2022	Antibiotic prophylaxis is not utilized in the UK. An analysis of dental records for more than 9000 British patients admitted for treatment of late PJI showed ***no significant association between invasive dental procedures and subsequent late PJI***. (3)	
2016	In 2016, the American Academy of Orthopaedic Surgeons developed Appropriate Use Criteria for the Management of Patients with Orthopaedic Implants Undergoing Dental Procedures stating that ***"the chance of oral bacteremia being related to joint infections is extremely low, with no evidence for an association." A tool was developed to help clinicians make patient specific decisions for prophylaxis.*** (4) In 2016, the American Association of Orthopaedic Surgeons removed clindamycin as an option for dental prophylaxis due to the high risk of C. difficile diarrhea.	
2014	In 2014, the ADA's Council on Scientific Affairs assembled an expert panel to conduct a systematic review that recommended: ***"...for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures."*** (5)	

References

1 - Simon SJ, Aziz AA, Coden GS, Smith EL, Hollenbeck BL. Antibiotic Prophylaxis Prior to Dental Procedures After Total Hip and Knee Arthroplasty Does Not Decrease the Risk of Periprosthetic Joint Infection. J Arthroplasty. 2024 Feb 22:S0883-5403(24)00145-1. doi: 10.1016/j.arth.2024.02.046. Epub ahead of print. PMID: 38401610.

2 - Thornhill MH, Gibson TB, Pack C, Rosario BL, Bloemers S, Lockhart PB, Springer B, Baddour LM. Quantifying the risk of prosthetic joint infections after invasive dental procedures and the effect of antibiotic prophylaxis. J Am Dent Assoc. 2023 Jan;154(1):43-52.e12. doi: 10.1016/j.adaj.2022.10.001. Epub 2022 Dec 2. PMID: 36470690.

3 - Thornhill MH, Crum A, Rex S, Stone T, Campbell R, Bradburn M, Fibisan V, Lockhart PB, Springer B, Baddour LM, Nicholl J. Analysis of Prosthetic Joint Infections Following Invasive Dental Procedures in England. JAMA Netw Open. 2022 Jan 4;5(1):e2142987. doi: 10.1001/jamanetworkopen.2021.42987. PMID: 35044470; PMCID: PMC8771300.

4 - American Academy of Orthopaedic Surgeons Appropriate Use Criteria for the Management of Patients Undergoing Dental Procedures aaos.org/dentalauc Published September 23, 2016.

5 - Sollecito T, Abt E, Lockhart P, et al. The use of prophylactic antibiotics prior to dental procedures in patients with prosthetic joints: Evidence-based clinical practice guideline for dental practitioners — a report of the American Dental Association Council on Scientific Affairs. JADA. 2015;146(1):11-16.

1997-2022 25th ANNIVERSARY MARR Michigan Antibiotic Resistance Reduction Coalition

ADS Association for Dental Safety formerly known as OSAP

Prevention of Infective Endocarditis

Infective endocarditis prophylaxis for dental procedures should be reserved for patients with underlying cardiac conditions associated with the highest risk of adverse outcome from infective endocarditis. For patients with these underlying cardiac conditions, prophylaxis is recommended for all dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa.[13]

The current infective endocarditis/valvular heart disease guidelines [14, 15, 16] state that use of antibiotic prophylaxis before certain dental procedures is reasonable for patients with:

- Prosthetic cardiac valves, including transcatheter-implanted prostheses and homografts
- Prosthetic material used for cardiac valve repair, such as annuloplasty rings and chords
- History of infective endocarditis
- Cardiac transplant[a] with valve regurgitation due to a structurally abnormal valve
- The following congenital (present from birth) heart disease.[b]
    - Unrepaired cyanotic congenital heart disease, including palliative shunts and conduits
    - Any repaired congenital heart defect with residual shunts or valvular regurgitation at the site of or adjacent to the site of a prosthetic patch or a prosthetic device

Pediatric Patients

- Congenital heart disease may justify prescribing prophylactic antibiotics for children. However, when antibiotic prophylaxis is called for due to congenital heart concerns, they should only be considered when the patient has:
    - Unrepaired cyanotic congenital heart disease (birth defects causing low oxygen levels), including cases with surgical shunts or conduits.
    - Congenital heart defects fully repaired with prosthetic material or devices, during the first 6 months following the procedure.
    - Repaired congenital heart disease with residual defects, such as persistent leaks or abnormal flow at or adjacent to a prosthetic patch or device.

[a] According to limited data, infective endocarditis appears to be more common in heart transplant recipients than in the general population; the risk of infective endocarditis is highest in the first 6 months after transplant because of endothelial disruption, high-intensity immunosuppressive therapy, frequent central venous catheter access, and frequent endomyocardial biopsies.[13]

[b] Except for the conditions listed above, antibiotic prophylaxis is no longer recommended for any other form of congenital heart disease.

Prevention of Infective Endocarditis

Antibiotic Regimens for a Dental Procedure Regimen: Single Dose 30 to 60 Minutes Before Procedure			
Situation	**Drug**	**Adults**	**Children**
Oral	Amoxicillin	2 g	50 mg/kg
Unable to take oral medication	Ampicillin OR Cefazolin or ceftriaxone	2 g IM or IV	50 mg/kg IM or IV
		1 g IM or IV	50 mg/kg IM or IV
Allergic to penicillin or ampicillin – oral	Cephalexin*+ OR Azithromycin or clarithromycin OR Doxycycline	2 g	50 mg/kg
		500 mg	15 mg/kg
		100 mg	< 45 kg, 2.2 mg/kg > 45 kg, 100 mg
Allergic to penicillin or ampicillin – 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 *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 urticarial with penicillin or ampicillin.			

AHA I Guidelines for Prevention of Infective Endocarditis

Miscellaneous Indications

- No other general guidance or recommendations exist for prophylactic antibiotics prior to dental procedures. Exceptions may include patients predisposed to infection (immunocompromising illness, organ transplant, chemotherapy). Always consult oncologists or other treating specialists to determine the need for prophylaxis.
  - HHS I NIDCR I Dental Provider's Oncology Pocket Guide
- Clindamycin… to use or not to use?
  - The AHA recommends against the use of clindamycin (Cleocin, Evoclin) due to complications occurring from C. diff (*Clostridioides difficile*) infections.

Guidelines for Antibiotics for Therapeutic Use

Clinical Recommendations for the Urgent Management of Dental Pain and Intraoral Swelling

Patients with dental pain and swelling should receive definitive, conservative dental treatment (DCDT) and, if needed, take over-the-counter pain relievers like acetaminophen or ibuprofen. The ADA advises against prescribing antibiotics when DCDT is available due to limited benefit and possible harm. [17] Refer patients urgently if symptoms worsen, a deep space infection develops, or sepsis is suspected.

Summary of clinical recommendations:

Urgent Situations in Dental Settings in which Pulpotomy, Pulpectomy, Nonsurgical Root Canal Treatment, or Incision for Drainage of Abscess are NOT an Immediate Option (Not on Same Visit)

1. For immunocompetent adults with **symptomatic irreversible pulpitis with or without symptomatic apical periodontitis**, should we recommend the use of oral systemic antibiotics compared with the nonuse of oral systemic antibiotics to improve health outcomes?

Recommendation 1: Do not prescribe oral systemic antibiotics for immunocompetent adults with **symptomatic irreversible pulpitis with or without symptomatic apical periodontitis**. Clinicians should refer patients for DCDT while providing interim monitoring.

2. For immunocompetent adults with **pulp necrosis and symptomatic apical periodontitis or localized acute apical abscess**, should we recommend the use of oral systemic antibiotics compared with the nonuse of oral systemic antibiotics to improve health outcomes?

Recommendation 2A: Do not prescribe oral systemic antibiotics for immunocompetent adults with **pulp necrosis and symptomatic apical periodontitis**. Clinicians should refer patients for DCDT while providing interim monitoring. If DCDT is not feasible, a delayed prescription for oral amoxicillin (500 mg, 3 times per d, 3- 7 d) or oral penicillin V potassium (500 mg, 4 times per d, 3-7 d) should be provided.

Recommendation 2B: Prescribe oral amoxicillin (500 mg, 3 times per d, 3-7 d) or oral penicillin V potassium (500 mg, 4 times per d, 3-7 d) for immunocompetent adults with **pulp necrosis and localized acute apical abscess**. Clinicians also should provide urgent referral as DCDT should not be delayed.

Good practice statement: Dentists should prescribe oral amoxicillin (500 mg, 3 times per d, 3-7 d) or oral penicillin V potassium (500 mg, 4 times per d, 3-7 d) for immunocompetent adults with pulp necrosis and acute apical abscess with systemic involvement. Clinicians also should provide urgent referral as DCDT should not be delayed. If the clinical condition worsens or if there is concern for deeper space infection or immediate threat to life, refer patient for urgent evaluation.

Urgent Situations in Dental Settings and Pulpotomy, Pulpectomy, Nonsurgical Root Canal Treatment, or Incision for Drainage of Abscess are an Immediate Option (Same Visit)

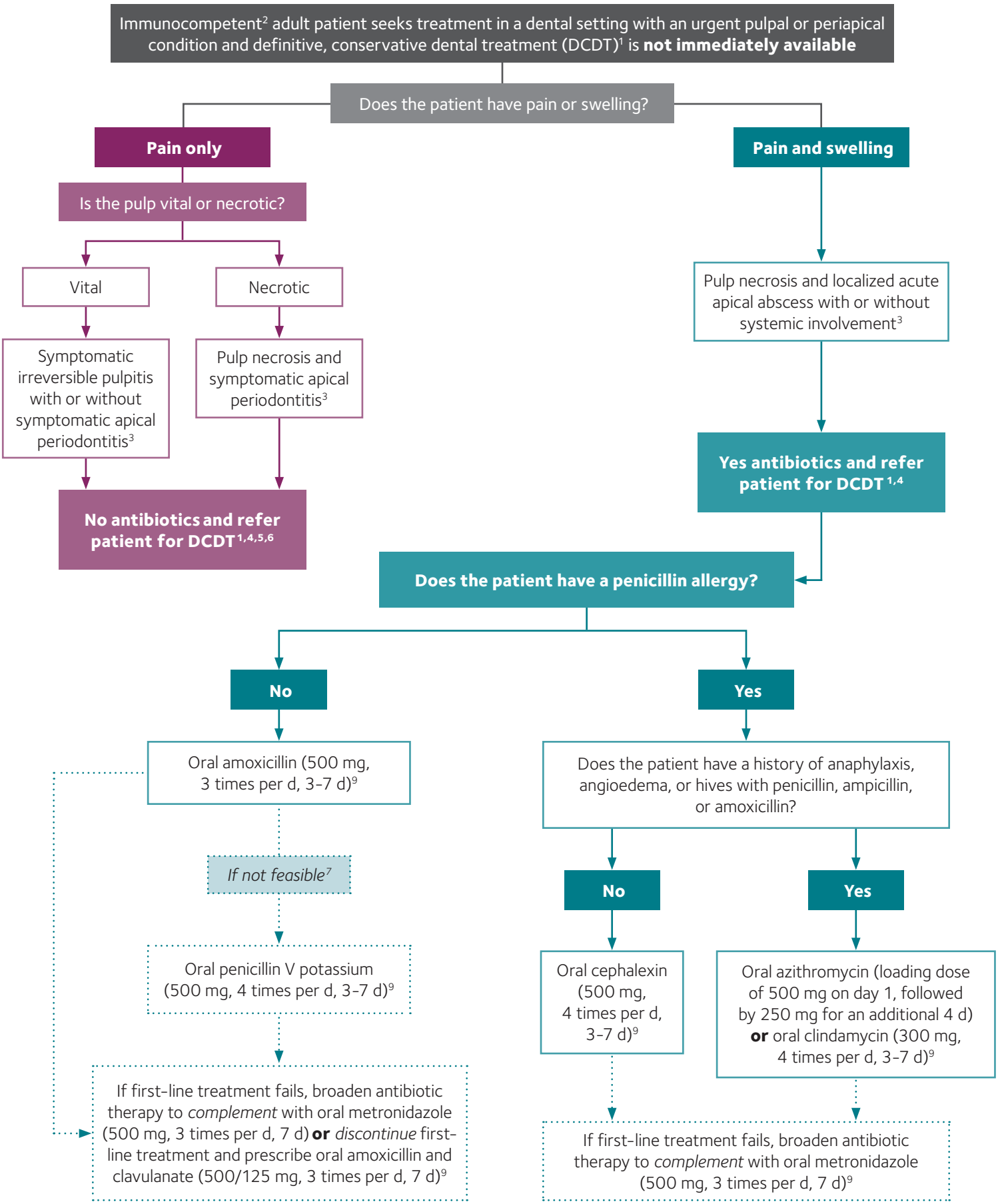
3. For immunocompetent adults with **pulp necrosis and symptomatic apical periodontitis or localized acute apical abscess**, should we recommend the use of oral systemic antibiotics compared with the nonuse of oral systemic antibiotics as adjuncts to DCDT to improve health outcomes?

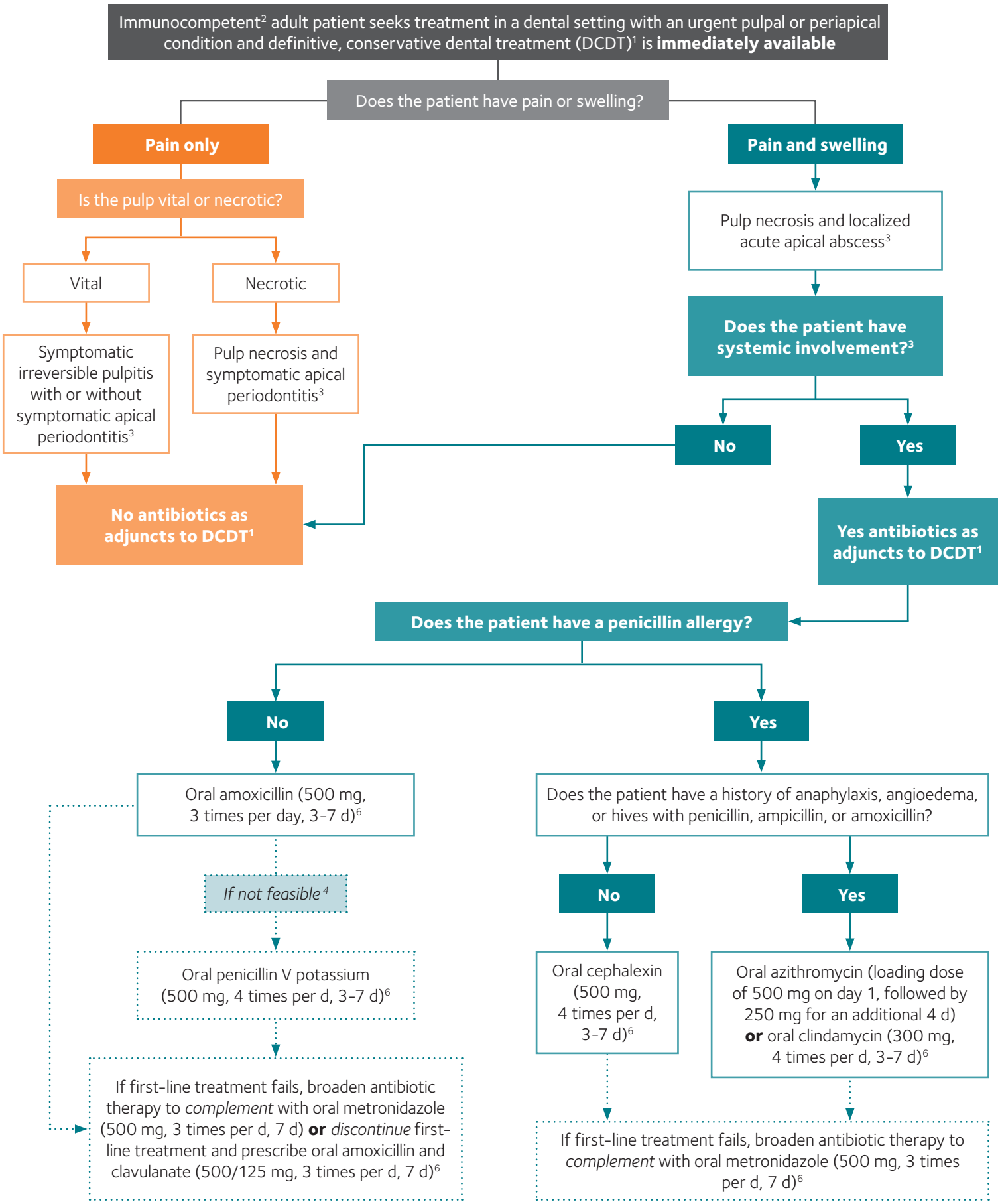
Recommendation 3: Do not prescribe oral systemic antibiotics as an adjunct to DCDT for immunocompetent adults with **pulp necrosis and symptomatic apical periodontitis or localized acute apical abscess**.

4. For immunocompetent adults with **symptomatic irreversible pulpitis with or without symptomatic apical periodontitis**, should we recommend the use of oral systemic antibiotics compared with the nonuse of oral systemic antibiotics as adjuncts to DCDT to improve health outcomes?

Recommendation 4: Do not prescribe oral systemic antibiotics as an adjunct to DCDT for immunocompetent adults with **symptomatic irreversible pulpitis with or without symptomatic apical periodontitis**.

Good practice statement: Dentists should perform urgent DCDT in conjunction with prescribing oral amoxicillin (500 mg, 3 times per d, 3-7 d) or oral penicillin V potassium (500 mg, 4 times per d, 3-7 d) for immunocompetent adults with pulp necrosis and acute apical abscess with systemic involvement. If the clinical condition worsens or if there is concern for deeper space infection or immediate threat to life, refer for urgent evaluation.


Immunocompetent[2] adult patient seeks treatment in a dental setting with an urgent pulpal or periapical condition and definitive, conservative dental treatment (DCDT)[1] is **not immediately available**
Does the patient have pain or swelling?
Pain only
Pain and swelling
Is the pulp vital or necrotic?
Vital
Necrotic
Symptomatic irreversible pulpitis with or without symptomatic apical periodontitis[3]
Pulp necrosis and symptomatic apical periodontitis[3]
No antibiotics and refer patient for DCDT[1,4,5,6]
Pulp necrosis and localized acute apical abscess with or without systemic involvement[3]
Yes antibiotics and refer patient for DCDT[1,4]
Does the patient have a penicillin allergy?
No
Yes
Oral amoxicillin (500 mg, 3 times per d, 3-7 d)[9]
If not feasible[7]
Oral penicillin V potassium (500 mg, 4 times per d, 3-7 d)[9]
If first-line treatment fails, broaden antibiotic therapy to *complement* with oral metronidazole (500 mg, 3 times per d, 7 d) **or** *discontinue* first-line treatment and prescribe oral amoxicillin and clavulanate (500/125 mg, 3 times per d, 7 d)[9]
Does the patient have a history of anaphylaxis, angioedema, or hives with penicillin, ampicillin, or amoxicillin?
No
Yes
Oral cephalexin (500 mg, 4 times per d, 3-7 d)[9]
Oral azithromycin (loading dose of 500 mg on day 1, followed by 250 mg for an additional 4 d) **or** oral clindamycin (300 mg, 4 times per d, 3-7 d)[9]
If first-line treatment fails, broaden antibiotic therapy to *complement* with oral metronidazole (500 mg, 3 times per d, 7 d)[9]


Immunocompetent[2] adult patient seeks treatment in a dental setting with an urgent pulpal or periapical condition and definitive, conservative dental treatment (DCDT)[1] is **immediately available**
Does the patient have pain or swelling?
Pain only
Is the pulp vital or necrotic?
Vital
Necrotic
Symptomatic irreversible pulpitis with or without symptomatic apical periodontitis[3]
Pulp necrosis and symptomatic apical periodontitis[3]
Pain and swelling
Pulp necrosis and localized acute apical abscess[3]
Does the patient have systemic involvement?[3]
No
Yes
No antibiotics as adjuncts to DCDT[1]
Yes antibiotics as adjuncts to DCDT[1]
Does the patient have a penicillin allergy?
No
Yes
Oral amoxicillin (500 mg, 3 times per day, 3-7 d)[6]
If not feasible[4]
Oral penicillin V potassium (500 mg, 4 times per d, 3-7 d)[6]
If first-line treatment fails, broaden antibiotic therapy to *complement* with oral metronidazole (500 mg, 3 times per d, 7 d) **or** *discontinue* first-line treatment and prescribe oral amoxicillin and clavulanate (500/125 mg, 3 times per d, 7 d)[6]
Does the patient have a history of anaphylaxis, angioedema, or hives with penicillin, ampicillin, or amoxicillin?
No
Yes
Oral cephalexin (500 mg, 4 times per d, 3-7 d)[6]
Oral azithromycin (loading dose of 500 mg on day 1, followed by 250 mg for an additional 4 d) **or** oral clindamycin (300 mg, 4 times per d, 3-7 d)[6]
If first-line treatment fails, broaden antibiotic therapy to *complement* with oral metronidazole (500 mg, 3 times per d, 7 d)[6]

EVALUATION FOR TRUE PENICILLIN ALLERGY

Penicillin Allergy Assessment is a key antibiotic stewardship strategy that enhances patient safety and informed decision-making for the consideration of optimal antibiotic therapy. Patients labeled penicillin-allergic are more likely to receive broad-spectrum antibiotics, increasing their risk of adverse outcomes such as *Clostridioides difficile* infection. CDC advises all healthcare providers to work with patients to evaluate the allergy and consider de-labeling when appropriate.

A Joint Task Force on Practice Parameters, representing the American Academy of Allergy, Asthma and Immunology (AAAAI), the American College of Allergy, Asthma and Immunology (ACAAI), and the Joint Council of Allergy, Asthma and Immunology (JCAAI) states that about 10% of U.S. patients report a penicillin allergy, but fewer than 1% have true IgE-mediated reactions—such as anaphylaxis, rash, breathing difficulty, nausea, or vomiting. Nearly 80% of those with true allergies lose sensitivity after 10 years. Patients labeled "penicillin-allergic" often receive broad-spectrum antibiotics, which are linked to higher costs, increased resistance, and less effective treatment. Accurate identification of true allergies is essential to reduce unnecessary broad-spectrum antibiotic use.

Know the Facts Before Prescribing:

- Nearly 10% of U.S. patients report penicillin allergies, but fewer than 1% have a true IgE-mediated allergy.[18]
- Around 80% of those with confirmed penicillin allergy lose their sensitivity after 10 years.[18]
- Use of broad-spectrum antibiotics as alternatives in "penicillin-allergic" patients is associated with higher costs, increased antimicrobial resistance, and suboptimal treatment.[18]

Penicillin Allergy Identification and Testing

The purpose of penicillin allergy assessment is to rule out false allergies and reduce unnecessary use of broad-spectrum antibiotic alternatives. Penicillin skin tests and challenge doses are reliable methods for identifying true IgE-mediated penicillin allergies. A positive skin test strongly indicates a true allergy, while a negative result may be confirmed with an oral challenge to ensure accurate diagnosis.

Special Considerations

- Patients with severe hypersensitivity syndromes (e.g., Stevens-Johnson syndrome, toxic epidermal necrolysis, serum sickness, interstitial nephritis, hemolytic anemia, or DRESS) should avoid the offending drug; skin testing and challenges are not recommended for these cases.

- Many later generation cephalosporins are safe for patients with penicillin allergies, but those with a history of anaphylaxis or severe reactions need careful evaluation.

- Children taking amoxicillin or ampicillin with Epstein-Barr virus may develop a non-allergic, non-pruritic rash that can mimic an allergic reaction.

Learn more about Clinical Features of Penicillin Allergy | CDC

Is it Really a Penicillin Allergy?

Evaluation and Diagnosis of Penicillin Allergy for Healthcare Professionals

Did You Know?

5 Facts About Penicillin Allergy (Type 1, Immunoglobulin E (IgE)-mediated)

1. Approximately 10% of all U.S. patients report having an allergic reaction to a penicillin class antibiotic in their past.
2. However, many patients who report penicillin allergies do not have true IgE-mediated reactions. When evaluated, fewer than 1% of the population are truly allergic to penicillins.[1]
3. Approximately 80% of patients with IgE-mediated penicillin allergy lose their sensitivity after 10 years.[1]
4. Broad-spectrum antibiotics are often used as an alternative to penicillins. The use of broad-spectrum antibiotics in patients labeled "penicillin-allergic" is associated with higher healthcare costs, increased risk for antibiotic resistance, and suboptimal antibiotic therapy.[1]
5. Correctly identifying those who are not truly penicillin-allergic can decrease unnecessary use of broad-spectrum antibiotics.[1]

10% of the population reports a penicillin allergy but <1% of the whole population is truly allergic.

Before prescribing broad-spectrum antibiotics to a patient thought to be penicillin-allergic, evaluate the patient for true penicillin allergy (IgE-mediated) by conducting a history and physical, and, when appropriate, a skin test and challenge dose.

History and Physical Examination

The history and physical examination are important components when evaluating a patient's drug reactions.[1]

- Questions to ask during the examination:
  - What medication were you taking when the reaction occurred?
  - What kind of reaction occurred?
  - How long ago did the reaction occur?
  - How was the reaction managed?
  - What was the outcome?[2]
- Characteristics of an IgE-mediated (Type 1) reaction:
  - Reactions that occur immediately or usually within one hour[1]
  - Hives: Multiple pink/red raised areas of skin that are intensely itchy[3]
  - Angioedema: Localized edema without hives affecting the abdomen, face, extremities, genitalia, oropharynx, or larynx[4]
  - Wheezing and shortness of breath
  - Anaphylaxis

- Broad-spectrum antibiotics are often used as an alternative to narrow-spectrum penicillins.
- Using broad-spectrum antibiotics can increase healthcare costs and antibiotic resistance, and may mean your patient receives less than the best care.
- Correctly identifying if your patient is actually penicillin-allergic can decrease these risks by reducing unnecessary use of broad-spectrum antibiotics.

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

Download the complete Penicillin Fact Sheet at this link:
https://www.cdc.gov/antibiotic-use/media/pdfs/penicillin-factsheet-508.pdf

Penicillin Allergy Assessment Tool (PAAT)

The PAAT was developed by the Michigan Antibiotic Resistance Reduction Coalition (MARR) and the Organization for Safety and Asepsis Procedures (OSAP) to support dental offices in referring appropriate patients for penicillin allergy assessment. To read the accompanying paper describing how to effectively utilize this tool, continue to the Journal of the Michigan Dental Association.

SHOULD YOUR PATIENT BE REFERRED FOR PENICILLIN-ALLERGY ASSESSMENT?

USE THIS TOOL TO IDENTIFY PATIENTS WHO MAY BENEFIT FROM HAVING THEIR PENICILLIN ALLERGY EVALUATED BY A HEALTHCARE PROFESSIONAL.

Who?

The "Penicillin Allergy Assessment Algorithm" is designed for use by the dental team.

What?

The "Penicillin Allergy Assessment Algorithm" is a decision-making tool to guide the dental team to identify patients who may benefit from having their penicillin allergy evaluated by a healthcare professional with the ultimate goal being to "de-label" the patient as penicillin allergic--if appropriate.

When not?

The framework is NOT intended to provide precise prescribing recommendations* for individual clinical situations, but rather assist the clinician and the patient to collaborate and determine if there is evidence from the patient's allergy history to recommend an evaluation.

Why?

- Patients who state that they are allergic to penicillin often do not have a true allergy, or their allergy may have waned over time.[1]
- Patients labelled as penicillin-allergic are more likely to receive antibiotics that are NOT recommended as first-line therapy that have been associated with:
  - Reduced efficacy
  - More adverse reactions, including C. diff diarrhea which has been frequently observed in dental patients
  - Increased risk for antibiotic resistance
  - Higher healthcare costs

1. *J Allergy Clin Immunol Pract. 2020 Oct;8(9S):S16-S116*

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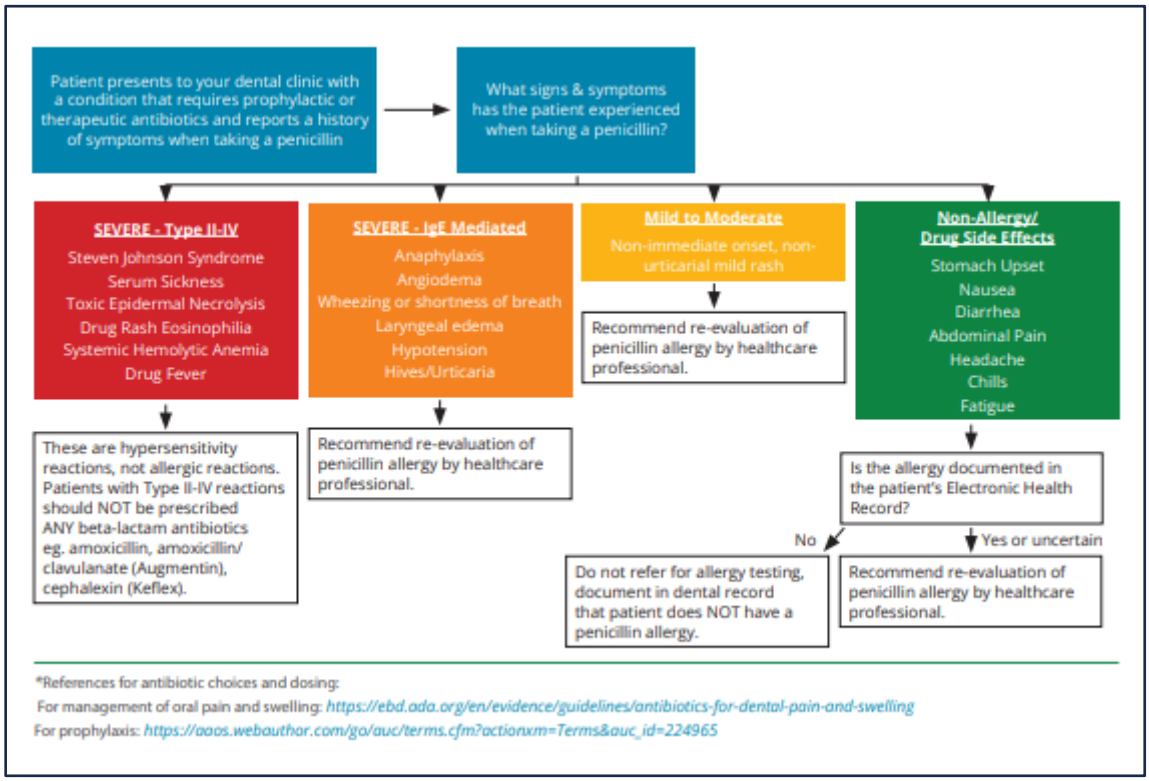


Patient presents to your dental clinic with a condition that requires prophylactic or therapeutic antibiotics and reports a history of symptoms when taking a penicillin

What signs & symptoms has the patient experienced when taking a penicillin?

SEVERE - Type II-IV
Steven Johnson Syndrome
Serum Sickness
Toxic Epidermal Necrolysis
Drug Rash Eosinophilia
Systemic Hemolytic Anemia
Drug Fever

These are hypersensitivity reactions, not allergic reactions. Patients with Type II-IV reactions should NOT be prescribed ANY beta-lactam antibiotics eg. amoxicillin, amoxicillin/clavulanate (Augmentin), cephalexin (Keflex).

SEVERE - IgE Mediated
Anaphylaxis
Angiodema
Wheezing or shortness of breath
Laryngeal edema
Hypotension
Hives/Urticaria

Recommend re-evaluation of penicillin allergy by healthcare professional.

Mild to Moderate
Non-immediate onset, non-urticarial mild rash

Recommend re-evaluation of penicillin allergy by healthcare professional.

Non-Allergy/ Drug Side Effects
Stomach Upset
Nausea
Diarrhea
Abdominal Pain
Headache
Chills
Fatigue

Is the allergy documented in the patient's Electronic Health Record?

No → Do not refer for allergy testing, document in dental record that patient does NOT have a penicillin allergy.

Yes or uncertain → Recommend re-evaluation of penicillin allergy by healthcare professional.

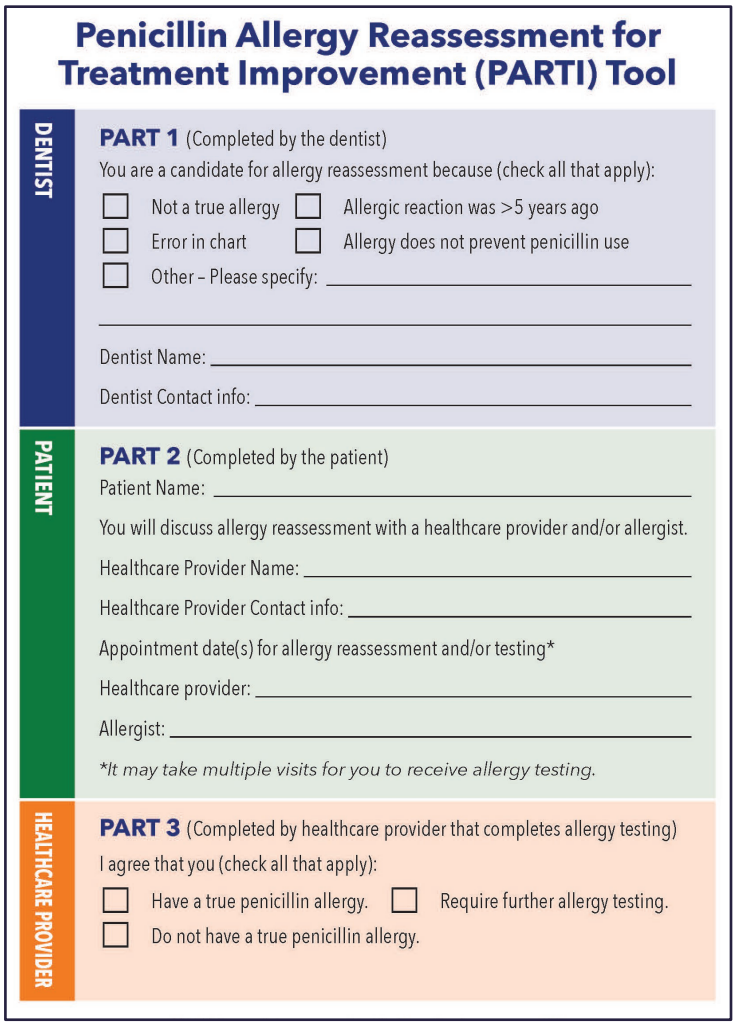
*References for antibiotic choices and dosing:
For management of oral pain and swelling: https://ebd.ada.org/en/evidence/guidelines/antibiotics-for-dental-pain-and-swelling
For prophylaxis: https://aaos.webauthor.com/go/auc/terms.cfm?actionxm=Terms&auc_id=224965

Download the Penicillin Allergy Assessment Tool (PAAT)

Penicillin Allergy Reassessment for Treatment Improvement (PARTI)

The PARTI tool is intended to be used as a communicative resource to help address mislabeling of penicillin allergies in all healthcare settings, including dental offices and pharmacies.

Dentists can use this tool to implement and enhance antimicrobial stewardship practices in the outpatient setting.



Penicillin Allergy Reassessment for Treatment Improvement (PARTI) Tool

DENTIST

PART 1 (Completed by the dentist)

You are a candidate for allergy reassessment because (check all that apply):

- ☐ Not a true allergy
- ☐ Allergic reaction was >5 years ago
- ☐ Error in chart
- ☐ Allergy does not prevent penicillin use
- ☐ Other – Please specify: _____

Dentist Name: _____

Dentist Contact info: _____

PATIENT

PART 2 (Completed by the patient)

Patient Name: _____

You will discuss allergy reassessment with a healthcare provider and/or allergist.

Healthcare Provider Name: _____

Healthcare Provider Contact info: _____

Appointment date(s) for allergy reassessment and/or testing*

Healthcare provider: _____

Allergist: _____

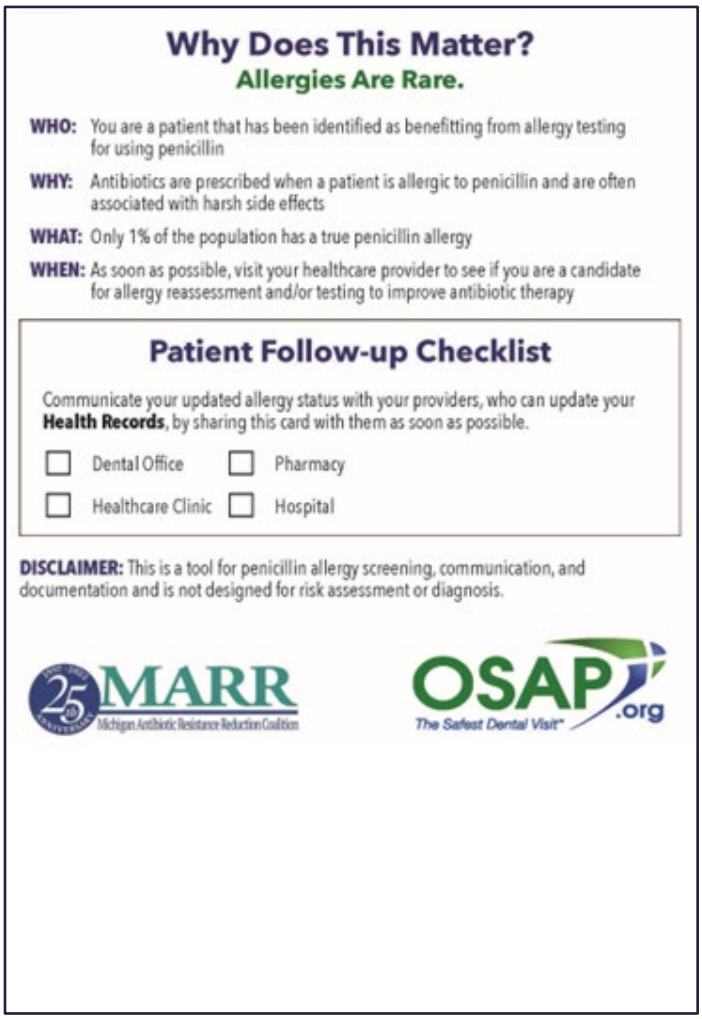
**It may take multiple visits for you to receive allergy testing.*

HEALTHCARE PROVIDER

PART 3 (Completed by healthcare provider that completes allergy testing)

I agree that you (check all that apply):

- ☐ Have a true penicillin allergy.
- ☐ Require further allergy testing.
- ☐ Do not have a true penicillin allergy.



Why Does This Matter?

Allergies Are Rare.

WHO: You are a patient that has been identified as benefitting from allergy testing for using penicillin

WHY: Antibiotics are prescribed when a patient is allergic to penicillin and are often associated with harsh side effects

WHAT: Only 1% of the population has a true penicillin allergy

WHEN: As soon as possible, visit your healthcare provider to see if you are a candidate for allergy reassessment and/or testing to improve antibiotic therapy

Patient Follow-up Checklist

Communicate your updated allergy status with your providers, who can update your **Health Records**, by sharing this card with them as soon as possible.

- ☐ Dental Office
- ☐ Pharmacy
- ☐ Healthcare Clinic
- ☐ Hospital

DISCLAIMER: This is a tool for penicillin allergy screening, communication, and documentation and is not designed for risk assessment or diagnosis.

MARR Michigan Antibiotic Resistance Reduction Coalition

OSAP.org The Safest Dental Visit™

[Download the Penicillin Allergy Reassessment (PARTI) Tool]

TRACKING & REPORTING

Tracking and reporting antibiotic prescribing can help guide changes and evaluate progress in antibiotic stewardship efforts.

Participate in continuing medical education and quality improvement activities to track and improve antibiotic prescribing.

- ADS I Dental Training Courses and Resources

Implement a tracking and reporting system in your facility to monitor antibiotic prescribing.

- Determine what level of data will be tracked (e.g., individual prescriber or practice level)
- Choose which outcomes to track and report (e.g., appropriate indication, agent, dose, frequency, and/or duration of therapy)
- Decide how to obtain the data (for example, manual chart review)

Conduct routine chart reviews or audits to track antibiotic prescribing and progress. Considerations for chart audits:

- Relevant medical conditions or comorbidities?
- Does the patient have any allergies?
- Was the antibiotic prescribed for prophylaxis or treatment?

After reviewing prescribing patterns, evaluate trends and provide feedback on over prescribing, under prescribing, or incorrect drug, dose, or duration.

Resources:

ADS I Sample Chart Audit Tool

Dental Facility Resources - ICAP

EDUCATION & EXPERTISE

With the right resources and tools, education can raise health literacy and reinforce responsible antibiotic prescribing.

Educate patients and families about appropriate antibiotic use through communication and educational materials.

- Talk about when antibiotics are needed and when they are not needed
- Educate on the potential harms of antibiotics
- Discuss exactly how to take any prescribed antibiotics
- Provide patient education materials

Provide education to all members of the dental clinic staff and ensure access to expertise.

- Provide training in communication skills for all staff members so they can promote stewardship efforts and address patient concerns
- Provide continuing education activities related to antibiotic stewardship activities
- Collaborate with other providers in the community like pharmacists or the Department of Public Health, who can serve as resources

Resources:

CDC | Patient Education Resources

Patient Brochure: Antibiotic Use for a Safe Dentist Visit

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

Poster | Improving Antibiotic Use

Fact Sheet: 7 Ways Dentists can act Against Antibiotic Resistance

Fact Sheet: Treating Patients with Dental Pain and Swelling

CDC | Antibiotic Stewardship Training Courses

Checklist for Antibiotic Prescribing in Dentistry

DENTISTS: *BE ANTIBIOTICS AWARE*

Treating Patients with Dental Pain and Swelling

American Dental Association (ADA) treatment guidelines state that antibiotics are not needed for the urgent management of most dental pain and intraoral swelling associated with pulpal and periapical infections in immunocompetent adult patients without additional comorbidities.[1]

Patients with dental pain and intraoral swelling should undergo **definitive, conservative dental treatment (DCDT)** and, if needed, use over-the-counter pain relievers such as acetaminophen and ibuprofen. The ADA expert panel recommends **NOT prescribing antibiotics** as an adjunct to most dental conditions when DCDT is available due to limited benefit and potential harm associated with antibiotic use.[1]

Patients should be referred for urgent evaluation if their condition worsens, they develop a deep space infection, or sepsis is suspected.

ADA Treatment Recommendations[1]

Pulpal/Periapical Condition	DCDT Immediately Available		DCDT Not Immediately Available	
	Prescribe Antibiotics	Perform DCDT	Prescribe Antibiotics	Refer to DCDT
Symptomatic irreversible pulpitis with or without symptomatic apical periodontitis	X	✓	X	✓ Interim monitoring
Pulp necrosis and symptomatic apical periodontitis	X	✓	X*	✓ Interim monitoring
Pulp necrosis and localized acute apical abscess without systemic involvement	X	✓	✓	✓ Urgent referral
Pulp necrosis and localized acute apical abscess with systemic involvement	✓	✓	✓	✓ Urgent referral

**If DCDT is not feasible, provide a delayed antibiotic prescription to be filled after a predetermined period if symptoms worsen or do not improve*

✓ ADA Antibiotic Recommendations†

Amoxicillin
(500mg, 3 times per day, 3–7 days)

OR

Penicillin V potassium
(500mg, 4 times per day, 3–7 days)

Follow up after 3 days to assess for resolution of systemic signs and symptoms. Discontinue antibiotics 24 hours after complete resolution of systemic signs and symptoms.

† For patients with penicillin allergy, please refer to ADA guidelines for treatment recommendation[1].

*This document provides general guidance and does **not** apply to all clinical scenarios. Always assess the individual patient and use your clinical judgment. Refer to ADA guidelines for specific treatment recommendations, definitions, and resources[1].*

1. Lockhart PB, et al. JADA. 2019 Nov;150(11) :906-21.

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

CDC

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APPENDIX

Antimicrobial Resistance

- About Antibiotic Resistance | CDC
- 5 Things to Know | CDC

Antibiotic Stewardship

- Antibiotic Stewardship | American Dental Association
- Antibiotic Prescribing and Use | Antibiotic Prescribing and Use | CDC

Core Elements of Outpatient Antibiotic Stewardship

- Core Elements of Outpatient Antibiotic Stewardship | CDC
- CDC I Checklists I The Core Elements of Outpatient Antibiotic Stewardship

Commitment

- A Commitment to Improving Antibiotic Use
- Patient Brochure: Antibiotic Use for a Safe Dentist Visit
- Antibiotic Stewardship for the Dental Team | Association for Dental Safety
- Fact Sheet: Seven Ways Dentists can act Against Antibiotic Resistance

Action

- Antibiotic Stewardship for Prescribers | ADS - Association for Dental Safety
- Healthcare Communication I Drexel University College of Medicine
- Evidence-based Diagnostic Criteria and Treatment Recommendations
- MARR I Antibiotic Prophylaxis Resources
- Penicillin Allergy Assessment

Tracking & Reporting

- ADS I Sample Chart Audit Tool
- Dental Facility Resources - ICAP

Education & Expertise

- Dental Clinic Staff Education Resources
    - Antibiotic Stewardship for Prescribers | ADS - Association for Dental Safety
    - CDC I Antibiotic Stewardship Training Courses
    - CDC I Checklist for Antibiotic Prescribing in Dentistry
    - Fact Sheet: 7 Ways Dentists Can Act Against Antibiotic Resistance
    - Fact Sheet: Treating Patients with Dental Pain and Swelling
    - Center for Professionalism and Communication in Health Care

APPENDIX

- Patient Education Resources
  - CDC I Patient Education Resources
  - Patient Brochure: Antibiotic Use for a Safe Dentist Visit
  - Antibiotic Safety: Do's and Don'ts at the Dentist
  - CDC I Poster I Improving Antibiotic Use
  - ADA I Video I Why Your Dentist Might Not Prescribe Antibiotics for Pain and Swelling
  - MARR I Safe Antibiotic Use in the Dentist Office
  - JADA I What is antibiotic prophylaxis?

Evidence-based Diagnostic Criteria and Treatment Recommendations

- Antibiotic Prophylaxis
  - ADA I Antibiotic Prophylaxis Prior to Dental Procedures
  - JADA I The use of prophylactic antibiotics prior to dental procedures in patients with prosthetic joints
  - ADA I Chairside Guide I Management of Patients with Prosthetic Joints
  - Literature Summary I Antibiotic Prophylaxis Prior to Invasive Dental Procedures in Patients with TJR
  - AHA I Guidelines for Prevention of Infective Endocarditis
  - HHS I NIDCR I Dental Provider's Oncology Pocket Guide
- Antibiotic Treatment
  - ADA I Antibiotic Use for Management of Dental Pain and Intra-oral Swelling
  - ADA I Chairside Guide I Antibiotic use for dental pain and swelling when dental treatment is NOT immediately available
  - ADA I Chairside Guide I Antibiotic use for dental pain and swelling when dental treatment is immediately available
  - ADA I Management of Patients with Orthopedic Implants Undergoing Dental Procedures

Penicillin Allergy

- Clinical Features of Penicillin Allergy | CDC
- CDC I Penicillin Allergy Fact Sheet
- ADS I MARR I Penicillin Allergy Reassessment (PARTI) Tool
- ADS I MARR I Penicillin Allergy Assessment Tool (PAAT)

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