



ANTIBIOTIC STEWARDSHIP TOOLKIT

FOR DENTAL PROVIDERS

NOVEMBER 2017

Printed by Authority of the State of Illinois
P.O. # 273029 350 11/2017



Antibiotics Stewardship Toolkit for Dental Providers

The purpose of this toolkit is to provide Illinois dentists with resources to support appropriate antibiotic prescribing as part of the Illinois Precious Drugs & Scary Bugs Campaign. The campaign aims to promote the judicious use of antibiotics in the outpatient setting. Antibiotic resistance is among the greatest public health threats today, leading to 2 million infections and 23,000 deaths each year¹. In community settings in the United States, dentists are the fourth highest prescribers of antibiotics and have an important role to play to ensure that antibiotics are prescribed only:

- when needed;
- at the right dose;
- for the right duration; and
- at the right time.²

The Centers for Disease Control and Prevention (CDC) recommends that all outpatient health care providers, including dentists, take steps to measure and improve how antibiotics are prescribed using the Core Elements of Outpatient Antibiotic Stewardship as a framework. The four core elements include:

- ❖ **Commitment:** Demonstrate dedication to optimizing antibiotic prescribing and patient safety
- ❖ **Action for Policy and Practice:** Implement a practice change to improve antibiotic prescribing
- ❖ **Tracking and Reporting:** Monitor antibiotic prescribing practices
- ❖ **Education and Expertise:** Provide educational resources to health care providers and patients

This toolkit is organized around these core elements and includes provider and patient resources. It is intended to be used as a practical action planning guide. For more information please visit www.cdc.com/antibiotic-use or e-mail DPH.DPSQ@Illinois.gov.

Funding for this toolkit was made possible by the Centers for Disease Control and Prevention. The views expressed in this document do not necessarily reflect the official policies of the US Department of Health and Human Services, nor does the mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government.

¹ Centers for Disease Control and Prevention. (2017). *Antibiotic/Antimicrobial Resistance*. Available at: <https://www.cdc.gov/drugresistance/index.html>

² Roberts, et. al. (2013). *Antibiotic prescribing by general dentists in the United States*. Available at: [http://jada.ada.org/article/S0002-8177\(16\)30942-4/fulltext](http://jada.ada.org/article/S0002-8177(16)30942-4/fulltext)

INTRODUCTION

Gubernatorial Proclamation.....	3
The Need.....	4
What YOU Can Do: Core Elements of Outpatient Antibiotic Stewardship.....	5

1. MAKE A COMMITMENT.....6

You can demonstrate commitment to optimizing antibiotic prescribing and patient safety by:

- Submitting a letter of commitment to IDPH
- Displaying a customizable commitment poster

2. ACT

Use evidence-based diagnostic criteria and treatment recommendations to improve antibiotic prescribing with the resources provided.

Evidence-based Practices

- Checklist for Antibiotic Prescribing in Dentistry10
- Combating Antibiotic Resistance11
- Antibiotic Prophylaxis Update 201715

Treatment Guidelines

- Use of Antibiotic Therapy for Pediatric Patients18
- Management of Patients with Prosthetic Joints – Chairside Guideline21
- Nonsurgical Treatment of Chronic Periodontitis by Scaling and Root Planing.....22

3. TRACK AND REPORT

Implement at least one system to track and report antibiotic prescribing. Page 24 includes resources for outcome tracking and continuing medical education. Please complete a self-evaluation of your prescribing practices by January 5, 2018 using the survey provided.

- Illinois Dental Provider Survey

4. EDUCATE

Educate patients about appropriate antibiotic use and the potential harms of antibiotic treatment with these resources:

- Antibiotic Safety : Do’s & Don’ts at the Dentist.....26
- What is Antibiotic Prophylaxis?27
- What is Infective Endocarditis?.....28
- Improving Antibiotic Use30

REFERENCES.....32



WHEREAS, the Illinois Department of Public Health seeks to promote the health of the people of Illinois through the prevention and control of disease and injury; and,

WHEREAS, antibiotics are lifesaving when used correctly for bacterial infections, but can cause individuals unnecessary and significant harm when used incorrectly or when not needed; and,

WHEREAS, nationwide, one out of every three prescriptions for antibiotics are unnecessary or incorrectly prescribed; and,

WHEREAS, antibiotics become less effective for everyone as bacteria become resistant to them; and,

WHEREAS, antibiotic resistance is a public health crisis, causing more than two million illnesses and at least 23,000 deaths in the United States each year; and,

WHEREAS, all health care facilities are required to develop programs to improve antibiotic use; and,

WHEREAS, everyone has a role to play to improve antibiotic use and fight antibiotic resistance; and,

WHEREAS, working in partnership, the Illinois Department of Public Health, local organizations, and stakeholders seek to raise awareness and educate health care workers and the general public about the appropriate use of antibiotics;

THEREFORE, I, Bruce Rauner, Governor of the State of Illinois, do hereby proclaim November 13-19, 2017, as ANTIBIOTIC AWARENESS WEEK in Illinois, and encourage all Illinoisans to educate themselves, their families, and their communities about best practices regarding the appropriate use of antibiotics.

In Witness Whereof, I have hereunto set my hand and caused the Great Seal of the State of Illinois to be affixed.



Done at the Capitol in the City of Springfield,
this EIGHTEENTH *day of* OCTOBER, *in*
the Year of Our Lord, two thousand and
SEVENTEEN, *and of the State of Illinois,*
one hundred and NINETY-NINTH.

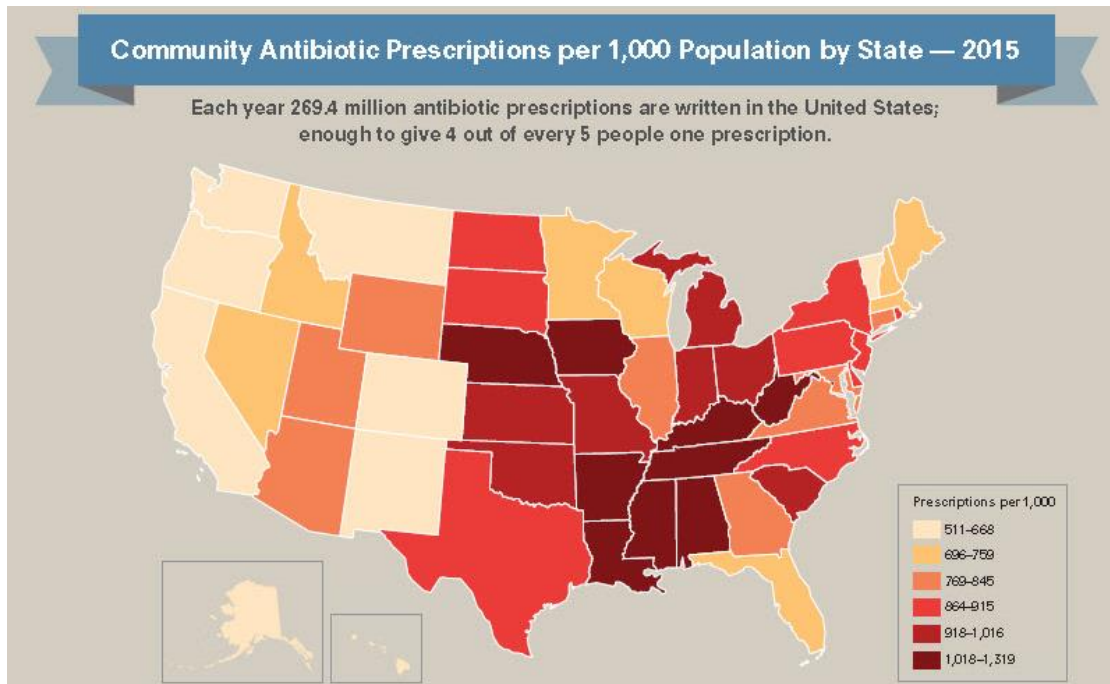
Deese White

SECRETARY OF STATE

Bruce Rauner

GOVERNOR

The Need



Antibiotic Prescribing in Outpatient Settings in the United States

- Over 60% of all antibiotic expenditures are associated with the outpatient setting.
- At least 30% of antibiotics prescribed in the outpatient setting are unnecessary.³

Antibiotic Prescribing Among Dentists in the United States

- Dentists account for 10% of outpatient antibiotic prescriptions, or 24.5 million prescriptions. In 2013, dentists wrote an average of 205 antibiotic prescriptions each.
- Overall, in the United States dentists prescribe 77.5 prescriptions per 1,000 people.
- Illinois dentists prescribe, on average, 79.6 prescriptions per 1,000 people (higher than the national average).
- Among dentists, the three highest prescribed types of antibiotics are penicillin (69.6%), lincosamides (14.6%), and macrolides (5.4%).⁴

Unintended Consequences of Antibiotic use

- Adverse events from antibiotics include rashes, diarrhea, and severe allergic reactions. These lead to an average of 143,000 emergency department visits each year and contribute to excess health care costs.⁵
- Antibiotic treatment is the most important risk factor for *Clostridium difficile* infection, which can cause life-threatening diarrhea. A 2013 study found that over 40% of patients with *C. difficile* infection visited a dentist or physician's office in the preceding four months.⁶

³ Centers for Disease Control and Prevention: <https://www.cdc.gov/antibiotic-use/community/programs-measurement/measuring-antibiotic-prescribing.html>

⁴ Roberts, R., Bartoces, M., Thompson, S. and Hicks, L. (2017). Antibiotic prescribing by general dentists in the United States, 2013. *The Journal of the American Dental Association*, 148(3), pp.172-178.e1.

⁵ Centers for Disease Control and Prevention: https://www.cdc.gov/medicationsafety/program_focus_activities.html

⁶ Roberts, R., Bartoces, M., Thompson, S. and Hicks, L. (2017). Antibiotic prescribing by general dentists in the United States, 2013. *The Journal of the American Dental Association*, 148(3), pp.172-178.e1.

What YOU Can Do:

Implement the Centers for Disease Control & Prevention's Core Elements of Outpatient Antibiotic Stewardship



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.

Read more about the Core Elements of Outpatient Antibiotic Stewardship by visiting:
<http://tinyurl.com/outpatientstewardship>

1. MAKE A COMMITMENT



A commitment from your dental office to prescribe antibiotics appropriately and engage in antibiotic stewardship is critical to improving antibiotic prescribing.

Here are some ways your dental office can demonstrate commitment:

- Submit the enclosed statement of commitment to the Illinois Department of Public Health (IDPH). Providers making a commitment can choose to be recognized on IDPH's Website at www.tinyurl.com/drugsandbugs.
- Display public commitment to antibiotic stewardship in your office (see sample templates on page 7).
- Include antibiotic stewardship-related duties in position descriptions or job evaluation criteria.
- Educate all staff members on how to manage patient expectations about appropriate antibiotic use.

Sample Commitment Poster Templates

Insert organization name here

is committed to being antibiotics aware!



Your health is important to us. As your dental provider, I promise to provide you with the best care possible. I am dedicated to avoid prescribing antibiotics when they are likely to do more harm than good.

Click icon to add picture

You have a role to play in antibiotic stewardship, too!

Learn more by visiting:
www.cdc.com/antibiotic-use

Insert organization logo here.



Safe Antibiotic Use: An Important Message From Your Providers

Dear Patient,





We want to give you some important information about antibiotics.

- ▶ **Antibiotics only fight infections caused by bacteria.**
- ▶ **Antibiotics will NOT help you feel better if you have a viral infection like:**
 - Cold or runny nose
 - Bronchitis or chest cold
 - Flu
- ▶ **If you take antibiotics when you don't really need them, they can cause more harm than good:**
 - You might feel worse
 - You can get diarrhea, rashes, or yeast infections
 - Antibiotics may **NOT** work when you really need them because antibiotics make bacteria more resistant to them. This can make future infections harder to treat.


What can you do as a patient? Talk with me about the treatment that is best for you. Follow the treatment plan that we discuss.

As your healthcare provider, I will give you the best care possible. I am dedicated to avoid prescribing antibiotics when they are likely to do more harm than good. If you have any questions, please ask me, your nurse, or your pharmacist.

Sincerely,

			
<i>Signature</i>	<i>Signature</i>	<i>Signature</i>	<i>Signature</i>

Facility Logo



The best care is the right care.
Only use antibiotics when needed.

Download the customizable template by visiting:

<http://tinyurl.com/drugsandbugsresources>

Sample Commitment Poster Template

A Commitment to Our Patients about Antibiotics

Antibiotics only fight infections caused by bacteria. Like all drugs, they can be harmful and should only be used when necessary. Taking antibiotics when you have a virus can do more harm than good: you will still feel sick and the antibiotic could give you a skin rash, diarrhea, a yeast infection, or worse.

Antibiotics also give bacteria a chance to become more resistant to them. This can make future infections harder to treat. It means that antibiotics might not work when you really do need them. Because of this, it is important that you only use an antibiotic when it is necessary to treat your illness.

How can you help? When you have a cough, sore throat, or other illness, tell your doctor you only want an antibiotic if it is really necessary. If you are not prescribed an antibiotic, ask what you can do to feel better and get relief from your symptoms.

*Your health is important to us. As your healthcare providers, we promise to provide the best possible treatment for your condition. If an antibiotic is not needed, we will explain this to you and will offer a treatment plan that will help. We are **dedicated** to prescribing antibiotics **only** when they are needed, and we will avoid giving you antibiotics when they might do more harm than good.*

If you have any questions, please feel free to ask us.

Sincerely,



U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

C280042

Download the customizable template by visiting:

<http://tinyurl.com/drugsandbugsresources>

2. Act



Dentists can implement policies and interventions to promote appropriate antibiotic prescribing.

- Use evidence-based diagnostic criteria and treatment recommendations

Evidence Based Practices

- Checklist for Antibiotic Prescribing in Dentistry (page 10)
 - Download here: <http://tinyurl.com/dentalabxlist>
- Combating Antibiotic Resistance (page 11)
- Antibiotic Prophylaxis Update 2017 (page 15)

Treatment Guidelines

- Guideline on the use of Antibiotic Therapy for Pediatric Patients (page 18)
- Management of Patients with Prosthetic Joints – Chairside Guide (page 21)
- Nonsurgical Treatment of Chronic Periodontitis by Scaling and Root Planing with or without Adjuncts: Clinical Practice Guideline (page 22)

- Review communications skills training for clinicians

- Drexel University College of Medicine Physician Communication Modules: interactive modules designed to enhance physician and patient communication and address patient attitudes and beliefs that more care is better care.
 - Link to modules: <http://tinyurl.com/cwmodules>

Checklist for Antibiotic Prescribing in Dentistry



Pretreatment

- Correctly diagnose an oral bacterial infection.
- Consider therapeutic management interventions, which may be sufficient to control a localized oral bacterial infection.
- Weigh potential benefits and risks (i.e., toxicity, allergy, adverse effects, *Clostridium difficile* infection) of antibiotics before prescribing.
- Prescribe antibiotics only for patients of record and only for bacterial infections you have been trained to treat. **Do not** prescribe antibiotics for oral viral infections, fungal infections, or ulcerations related to trauma or aphthae.
- Implement national antibiotic prophylaxis recommendations for the medical concerns for which guidelines exist (e.g., cardiac defects).
- Assess patients' medical history and conditions, pregnancy status, drug allergies, and potential for drug-drug interactions and adverse events, any of which may impact antibiotic selection.



Prescribing

- Ensure evidence-based antibiotic references are readily available during patient visits. **Avoid** prescribing based on non-evidence-based historical practices, patient demand, convenience, or pressure from colleagues.
- Make and document the diagnosis, treatment steps, and rationale for antibiotic use (if prescribed) in the patient chart.
- Prescribe only when clinical signs and symptoms of a bacterial infection suggest systemic immune response, such as fever or malaise along with local oral swelling.
- Revise empiric antibiotic regimens on the basis of patient progress and, if needed, culture results.
- Use the most targeted (narrow-spectrum) antibiotic for the shortest duration possible (2-3 days after the clinical signs and symptoms subside) for otherwise healthy patients.
- Discuss antibiotic use and prescribing protocols with referring specialists.



Patient Education

- Educate your patients to take antibiotics exactly as prescribed, take antibiotics prescribed only for them, and not to save antibiotics for future illness.



Staff Education

- Ensure staff members are trained in order to improve the probability of patient adherence to antibiotic prescriptions.



Combating antibiotic resistance

ADA COUNCIL ON SCIENTIFIC AFFAIRS

For the past 70 years, antibiotic therapy has been a mainstay in the treatment of bacterial infectious diseases. However, widespread use of these drugs by the health professions and the livestock industry has resulted in an alarming increase in the prevalence of drug-resistant bacterial infections.

Worldwide, many strains of *Staphylococcus aureus* exhibit resistance to all medically important antibacterial drugs, including vancomycin,^{1,2} and methicillin-resistant *S. aureus* is one of the most frequent nosocomial pathogens.³

Any perceived potential benefit of antibiotic prophylaxis must be weighed against the known risks of antibiotic toxicity, allergy and the development, selection and transmission of microbial resistance.

In the United States, the proportion of *Streptococcus pneumoniae* isolates with clinically significant reductions in susceptibility to β lactam antimicrobial agents has increased more than threefold.^{4,5} Even more alarming is the rate at which bacteria develop resistance; microorganisms exhibiting resistance to new drugs often are isolated soon after the drugs have been introduced.⁶ This growing problem has contributed significantly to the morbidity and mortality of infectious diseases, with death rates for communicable diseases such as tuberculosis rising again.^{7,8}

Disease etiologies also are changing. In recent studies, staphylococci, particularly *S. aureus*, have surpassed viridans streptococci as the most common cause of infective endocarditis.⁹ Resistance among bacteria of the oral microflora is

increasing as well. During the past decade, retrospective analyses of clinical isolates have clearly documented an increase in resistance in the viridans strep-

Background. The ADA Council on Scientific Affairs developed this report to provide dental professionals with current information on antibiotic resistance and related considerations about the clinical use of antibiotics that are unique to the practice of dentistry.

Overview. This report addresses the association between the overuse of antibiotics and the development of resistant bacteria. The Council also presents a set of clinical guidelines that urges dentists to consider using narrow-spectrum antibacterial drugs in simple infections to minimize disturbance of the normal microflora, and to preserve the use of broad-spectrum drugs for more complex infections.

Conclusions and Practice Implications.

The Council recommends the prudent and appropriate use of antibacterial drugs to prolong their efficacy and promotes reserving their use for the management of active infectious disease and the prevention of hematogenously spread infection, such as infective endocarditis or total joint infection, in high-risk patients.

tococci.¹⁰ Further, strains of virtually every oral microorganism tested exhibit varying degrees of resistance to various antibacterial agents.¹¹

This increase in antibacterial resistance has been attributed primarily to two different processes. First, reduced susceptibility may develop via genetic mutations that spontaneously confer a newly resistant phenotype.¹² Alternatively, the exchange of resistant determinants between sensitive and resistant microorganisms (of the same or different species) may occur.¹³ Regardless of the genetic basis of resistance, the selective pressure exerted by widespread use of antibacterial drugs is the driving force behind this public health problem. It is only through the prudent and appropriate use of antibacterial drugs that their efficacy may be prolonged.

Antibacterial drugs should be

TABLE 1

NARROW-SPECTRUM* ANTIMICROBIAL AGENTS ENCOUNTERED IN DENTISTRY.†		
GENERIC NAME	CHARACTERISTICS‡	COMMON INDICATIONS FOR USE
Clindamycin	Bacteriostatic (bactericidal at higher doses); active against some aerobic gram-positive cocci (including <i>Staphylococcus aureus</i> , <i>S. epidermidis</i> , streptococci and pneumococci), some anaerobic gram-negative bacilli, many anaerobic gram-positive non-spore-forming bacilli, many anaerobic gram-positive cocci and clostridia	Indicated for the treatment of infections caused by susceptible microorganisms; used as a prophylactic antibiotic in high-risk patients allergic to penicillin for the prevention of both bacterial endocarditis and infections of total joint replacements
Metronidazole	Bactericidal; active against most anaerobic cocci and both gram-negative bacilli and gram-positive spore-forming bacilli	Has been used as adjunct in treatment of periodontitis and acute necrotizing ulcerative gingivitis; commonly coprescribed with amoxicillin (Note: its combined use with amoxicillin or amoxicillin/clavulanic acid has not been approved by the U.S. Food and Drug Administration)
Penicillin V Potassium	Bactericidal; cell-wall synthesis inhibitor that is active primarily against gram-positive cocci (including <i>S. aureus</i>), gram-positive and gram-negative bacilli, and spirochetes	Use is limited to treatment of minor infections such as ulcerative gingivostomatitis, and to the prophylaxis and continued treatment of streptococcal infections

* Active against a small number of organisms.
† Adapted in part from Ciancio.¹⁷
‡ Bactericidal drugs directly kill an infecting organism; bacteriostatic drugs inhibit the proliferation of bacteria by interfering with an essential metabolic process.

reserved for the management of active infectious disease and considered for the prevention of hematogenously spread infection, such as infective endocarditis or total joint infection, in high-risk patients (as defined by the American Heart Association¹⁴ and the American Dental Association and the American Academy of Orthopedic Surgeons¹⁵). One example of their use in managing infectious disease is in the treatment of aggressive periodontal disease, which use has become well-accepted for optimal control of the disease process.¹⁶ The Council encourages further research on the appropriate use of antibacterial therapy in the management of oral diseases.

GUIDELINES FOR PRESCRIBING ANTIBIOTICS

The following guidelines should be observed when prescribing antibacterial drugs:

- (1) make an accurate diagnosis;
- (2) use appropriate antibiotics and dosing schedules;
- (3) consider using narrow-spectrum antibacterial drugs (Table 1) in simple infections to minimize disturbance of the normal microflora, and preserve the use of broad-spectrum drugs (Table 2) for more complex infections¹⁷;
- (4) avoid unnecessary use of antibacterial drugs in treating viral infections;
- (5) if treating empirically, revise treatment regimen based on patient progress or test results;
- (6) obtain thorough knowledge of the side effects and drug interactions of an antibacterial drug before prescribing it;
- (7) educate the patient regarding proper use of the drug

and stress the importance of completing the full course of therapy (that is, taking all doses for the prescribed treatment time).

Furthermore, the diagnosis and antibiotic selection should be based on a thorough history (medical and dental) to reveal or avoid adverse reactions, such as allergies and drug interactions. Any perceived potential benefit of antibiotic prophylaxis must be weighed against the known risks of antibiotic toxicity, allergy and the development, selection and transmission of microbial resistance.¹⁵

It remains incumbent on dental practitioners, as health care providers, to use antibacterial drugs in a prudent and appropriate manner. Adherence to the principles outlined here will aid in extending the efficacy of the antibacterial drugs that form the treatment foundation for many infectious diseases. ■

TABLE 2

BROAD-SPECTRUM* ANTIMICROBIAL AGENTS ENCOUNTERED IN DENTISTRY.†

GENERIC NAME	CHARACTERISTICS‡	COMMON INDICATIONS FOR USE
Amoxicillin (Semisynthetic Penicillin)	Bactericidal; active against many gram-negative and gram-positive organisms; not effective against β -lactamase-producing bacteria	Commonly used as an empirical antibiotic for oral infections, sinusitis and skin infections; used as a prophylactic antibiotic in high-risk patients for the prevention of bacterial endocarditis and infections of total joint replacements
Amoxicillin With Clavulanic Acid	Bactericidal; active against a wide spectrum of gram-negative and gram-positive organisms, including β -lactamase-producing bacteria	Used for the treatment of sinus, oral and respiratory infections
Ampicillin (Semisynthetic Penicillin)	Bactericidal; active against many gram-negative and gram-positive organisms; not effective against β -lactamase-producing bacteria	Commonly used as an empirical antibiotic for oral infections, sinusitis and skin infections; used as a prophylactic antibiotic in high-risk patients unable to take oral medication for the prevention of both bacterial endocarditis and total joint infections
Cefadroxil (First-Generation Cephalosporin)	Bactericidal; active against β -hemolytic streptococci, staphylococci, <i>Streptococcus pneumoniae</i> , <i>Escherichia coli</i> , <i>Proteus mirabilis</i> , <i>Klebsiella</i> and <i>Moraxella</i>	Indicated for the treatment of infections caused by susceptible microorganisms; used as a prophylactic antibiotic in high-risk patients for the prevention of bacterial endocarditis and infections of total joint replacements; caution should be exercised when prescribing cephalosporins for patients sensitive to penicillin§
Cefazolin (First-Generation Cephalosporin)	Bactericidal; active against group A β -hemolytic streptococci, <i>Haemophilus influenzae</i> , <i>S. pneumoniae</i> , <i>E. coli</i> , <i>Enterobacter aerogenes</i> , <i>P. mirabilis</i> and <i>Klebsiella</i>	Used for the treatment of respiratory, urinary tract, skin and biliary infections and for the treatment of septicemia and endocarditis; used as a prophylactic antibiotic in high-risk patients who are unable to take oral medications for the prevention of both bacterial endocarditis and infections of total joint replacements; caution should be exercised when prescribing cephalosporins for patients sensitive to penicillin§
Cephalexin (First-Generation Cephalosporin)	Bactericidal; active against β -hemolytic streptococci, staphylococci, <i>S. pneumoniae</i> , <i>E. coli</i> , <i>P. mirabilis</i> , <i>Klebsiella</i> and <i>Moraxella</i>	Indicated for the treatment of infections caused by susceptible microorganisms; used as a prophylactic antibiotic in high-risk patients for the prevention of bacterial endocarditis and infections of total joint replacements; caution should be exercised when prescribing cephalosporins for patients sensitive to penicillin§
Cephadrine (First-Generation Cephalosporin)	Bactericidal; active against group A β -hemolytic streptococci, <i>H. influenzae</i> , <i>S. pneumoniae</i> , <i>E. coli</i> , <i>E. aerogenes</i> , <i>P. mirabilis</i> and <i>Klebsiella</i>	Used as a prophylactic antibiotic in high-risk patients for the prevention of bacterial endocarditis and infections of total joint replacements; caution should be exercised when prescribing cephalosporins for patients sensitive to penicillin§
Azithromycin (Macrolide)	Bactericidal; active against a wide range of aerobic gram-negative and gram-positive organisms	Indicated for the treatment of mild-to-moderate infections caused by susceptible microorganisms; used as a prophylactic antibiotic in high-risk patients allergic to penicillin for the prevention of bacterial endocarditis
Clarithromycin (Macrolide)	Bactericidal; active against a wide spectrum of aerobic and anaerobic gram-positive and gram-negative organisms	Indicated for the treatment of mild-to-moderate infections caused by susceptible microorganisms; used as a prophylactic antibiotic in high-risk patients allergic to penicillin for the prevention of bacterial endocarditis
Erythromycin (Macrolide)	Bacteriostatic; active against gram-positive bacteria, particularly gram-positive cocci; provides limited activity against gram-negative bacteria	Indicated for the treatment of infections of upper and lower respiratory tract, skin and soft-tissue infections of mild-to-moderate severity; alternative to penicillin G and other penicillins for treatment of gram-positive coccoid infections in patients with hypersensitivity to penicillins; used as a prophylactic antibiotic in high-risk patients allergic to penicillin for the prevention of bacterial endocarditis
Tetracycline (Doxycycline, Minocycline)	Bacteriostatic; active against gram-positive and gram-negative bacteria, mycoplasmas, rickettsial and chlamydial infections	Indicated for the treatment of periodontitis and acute necrotizing ulcerative gingivitis (Note: to avoid the gastrointestinal side effects of oral tetracyclines, localized delivery systems of doxycycline and minocycline are marketed for the treatment of periodontitis)

* Used as empirical antibiotics or when culture and sensitivity testing are not available.

† Adapted in part from Ciancio.¹⁷

‡ Bactericidal drugs directly kill an infecting organism; bacteriostatic drugs inhibit the proliferation of bacteria by interfering with an essential metabolic process.

§ Cross-hypersensitivity has been documented and will occur in up to 10 percent of patients who have a history of penicillin allergy.¹⁸

Address reprint requests to ADA Council on Scientific Affairs, 211 E. Chicago Ave., Chicago, Ill. 60611.

1. Smith TL, Pearson ML, Wilcox KR, et al. Emergence of vancomycin resistance in *Staphylococcus aureus*. Glycopeptide-Intermediate *Staphylococcus aureus* Working Group. N Engl J Med 1999;340:493-501.
2. Fridkin SK. Vancomycin-intermediate and -resistant *Staphylococcus aureus*: what the infectious disease specialist needs to know. Clin Infect Dis 2001;32(1):108-15.
3. Flournoy DJ. Methicillin-resistant *Staphylococcus aureus* at a Veterans Affairs Medical Center (1986-96). J Okla State Med Assoc 1997;90(6):228-35.
4. Istre GR, Tarpay M, Anderson M, Pryor A, Welch D. Pneumococcus Study Group. Invasive disease due to *Streptococcus pneumoniae* in an area with a high rate of relative penicillin resistance. J Infect Dis 1987;156:732-5.
5. Breiman RF, Spika JS, Navarro VJ, Darden PM, Darby CP. Pneumococcal bacteremia in Charleston County, South Carolina: a decade later. Arch Intern Med 1990;150:1401-5.
6. Stratton CW. Dead bugs don't mutate: susceptibility issues in the emergence of bacterial resistance. Emerg Infect Dis 2003;9(1):10-6.
7. Khan K, Muennig P, Behta M, Zivin JG. Global drug-resistance patterns and the management of latent tuberculosis infection in immigrants to the United States. N Engl J Med 2002;347(23):1850-9.
8. Musoke RN, Revathi G. Emergence of multidrug-resistant gram-negative organisms in a neonatal unit and the therapeutic implications. J Trop Pediatr 2000;46(2):86-91.
9. Mylonakis E, Calderwood SB. Infective endocarditis in adults. N Engl J Med 2001;345(18):1318-30.
10. Doern GV, Ferraro MJ, Brueggemann AB, Ruoff KL. Emergence of high rates of antimicrobial resistance among viridans group streptococci in the United States. Antimicrob Agents Chemother 1996;40:891-4.
11. Jorgensen MG, Slots J. The ins and outs of periodontal antimicrobial therapy. J Calif Dent Assoc 2002;30(4):297-305.
12. Normark BH, Normark S. Evolution and spread of antibiotic resistance. J Inter Med 2002;252(2):91-106.
13. Kozlova EV, Pivovarenko TV, Malinovskaia IV, Aminov RI, Kovalenko NK, Voronin AM. Antibiotic resistance of *Lactobacillus* strains [in Russian]. Antibiot Khimioter 1992;37(6):12-5.
14. Dajani AS, Taubert KA, Wilson W, et al. Prevention of bacterial endocarditis: recommendations by the American Heart Association. JADA 1997;128:1142-51.
15. American Dental Association; American Academy of Orthopedic Surgeons. Antibiotic prophylaxis for dental patients with total joint replacements. JADA 2003;134:895-9.
16. Herrera D, Sanz M, Jepsen S, Needleman I, Roldan S. A systematic review on the effect of systemic antimicrobials as an adjunct to scaling and root planing in periodontitis patients. J Clin Periodontol 2002;29(supplement 3):136-59.
17. Ciancio SG, ed. ADA guide to dental therapeutics. 3rd ed. Chicago: ADA Publishing; 2003:136-72.
18. Physicians' desk reference. 58th ed. Montvale, N.J.: Medical Economics; 2004:1321.

Distribution Information

AAE members may reprint this position statement for distribution to patients or referring dentists.

About This Document

This paper is designed to provide scientifically based guidance to clinicians regarding the use of antibiotics in endodontic treatment. Thank you to the Special Committee on Antibiotic Use in Endodontics: Ashraf F. Fouad, Chair, B. Ellen Byrne, Anibal R. Diogenes, Christine M. Sedgley and Bruce Y. Cha.

©2017

Antibiotic Prophylaxis 2017 Update

AAE Quick Reference Guide

Endocarditis Prophylaxis Recommendations

These recommendations are taken from 2017 American Heart Association and American College of Cardiology focused update of the 2014 AHA/ADA Guideline for Management of Patients with Valvular Disease (1) and cited by the ADA (2).

Prophylaxis against infective endocarditis is reasonable before dental procedures that involve manipulation of gingival tissue, manipulation of the periapical region of teeth, or perforation of the oral mucosa in patients with the following:

In 2017, the AHA and American College of Cardiology (ACC) published a focused update (5) to their previous guidelines on the management of valvular heart disease. This reinforced their previous recommendations that AP is reasonable for the subset of patients at increased risk of developing IE and at high risk of experiencing adverse outcomes from IE (5). Their key recommendations were:

1. Prosthetic cardiac valves, including transcatheter-implanted prostheses and homografts.
2. Prosthetic material used for cardiac valve repair, such as annuloplasty rings and chords.
3. Previous IE.
4. Unrepaired cyanotic congenital heart disease or repaired congenital heart disease, with residual shunts or valvular regurgitation at the site of or adjacent to the site of a prosthetic patch or prosthetic device.
5. Cardiac transplant with valve regurgitation due to a structurally abnormal valve.

The guidance in this statement is not intended to substitute for a clinician's independent judgment in light of the conditions and needs of a specific patient.

In 2017, the ADA reaffirmed the recommended regimen as follows.

Situation	Agent	Adults	Children
Oral	Amoxicillin	2 g	50 mg/kg
Unable to take oral medication	Ampicillin OR Cefazolin or ceftriaxone	2 g IM* or IV+ 1 g IM or IV	50 mg/kg IM or IV 50 mg/kg IM or IV
Allergic to penicillins or ampicillin—oral	Cephalexin $\phi\delta$ OR Clindamycin OR Azithromycin or clarithromycin	2 g 600 mg 500 mg	50 mg/kg 20 mg/kg 15 mg/kg
Allergic to penicillins or ampicillin and unable to take oral medication	Cefazolin or ceftriaxone δ OR Clindamycin	1 g IM or IV 600 mg IM or IV	50 mg/kg IM or IV 20 mg/kg IM or IV
*IM: Intramuscular +IV: Intravenous ϕ Or other first- or second-generation oral cephalosporin in equivalent adult or pediatric dosage. δ Cephalosporins should not be used in an individual with a history of anaphylaxis, angioedema, or urticaria with penicillins or ampicillin.			

The ADA and AHA have a downloadable wallet card available to providers at no cost to educate patients who may be at risk for IC. http://www.heart.org/idc/groups/heart-public/@wcm/@hcm/documents/downloadable/ucm_448472.pdf

Patients with Joint Replacement

The following recommendation is taken from the *ADA Chairside Guide* (© ADA 2015)

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

Additional Considerations

The practitioner and patient should consider possible clinical circumstances that may suggest the presence of a significant medical risk in providing dental care without antibiotic prophylaxis, as well as the known risks of frequent or widespread antibiotic use. As part of the evidence-based approach to care, this clinical recommendation should be integrated with the practitioner's professional judgment in consultation with the patient's physician, and the patient's needs and preferences.

- These considerations include, but are not limited to:
- Patients with previous late artificial joint infection
- Increased morbidity associated with joint surgery (wound drainage/hematoma)
- Patients undergoing treatment of severe and spreading oral infections (cellulitis)
- Patient with increased susceptibility for systemic infection
- Congenital or acquired immunodeficiency
- Patients on immunosuppressive medications
- Diabetics with poor glycemic control
- Patients with systemic immunocompromising disorders (e.g. rheumatoid arthritis, lupus erythematosus)
- Patient in whom extensive and invasive procedures are planned
- Prior to surgical procedures in patients at a significant risk for medication-related osteonecrosis of the jaw.

Special Circumstances

The 2007 AHA guidelines state that an antibiotic for prophylaxis should be administered in a single dose before the procedure (3,4). However, in the event that the dosage of antibiotic is inadvertently not administered before the procedure, it may be administered up to two hours after the procedure. For patients already receiving an antibiotic that is also recommended for IE prophylaxis, then a drug should be selected from a different class; for example, a patient already taking oral penicillin for other purposes may likely have in their oral cavity viridans group streptococci that are relatively resistant to beta-lactams.

In these situations, clindamycin, azithromycin or clarithromycin would be recommended for AP. Alternatively if possible, treatment should be delayed until at least 10 days after completion of antibiotic to allow re-establishment of usual oral flora. In situations where patients are receiving long-term parenteral antibiotic for IE, the treatment should be timed to occur 30 to 60 min after delivery of the parenteral antibiotic; it is considered that parenteral antimicrobial therapy is administered in such high doses that the high concentration would overcome any possible low-level resistance developed among oral flora (3,4).

APPENDIX C REFERENCES

1. Nishimura RA, Otto CM, Bonow RO, Carabello BA, Erwin JP, 3rd, Fleisher LA, et al. 2017 AHA/ACC Focused Update of the 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation* 2017
2. ADA. Antibiotic prophylaxis prior to dental procedures. *Oral Health Topics* 2017 [cited 31st March 2017]; Available from: <http://www.ada.org/en/member-center/oral-health-topics/antibiotic-prophylaxis>
3. Wilson W, Taubert KA, Gewitz M, Lockhart PB, Baddour LM, Levison M, et al. Prevention of infective endocarditis: guidelines from the American Heart Association: a guideline from the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Circulation* 2007;116:1736-54.
4. Wilson W, Taubert KA, Gewitz M, Lockhart PB, Baddour LM, Levison M, et al. Prevention of infective endocarditis: guidelines from the American Heart Association: a guideline from the American Heart Association Rheumatic Fever, Endocarditis and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *J Am Dent Assoc* 2008;139 Suppl:3S-24S.

Use of Antibiotic Therapy for Pediatric Dental Patients

Review Council

Council on Clinical Affairs

Latest Revision

2014

Purpose

The American Academy of Pediatric Dentistry (AAPD) recognizes the increasing prevalence of antibiotic-resistant microorganisms. This guideline is intended to provide guidance in the proper and judicious use of antibiotic therapy in the treatment of oral conditions.¹

Methods

This guideline was originally developed by the Council on Clinical Affairs and adopted in 2001. This document is a revision of the previous version, last revised in 2009. The revision was based upon a new systematic literature search of the PubMed®/MEDLINE database using the terms: antibiotic therapy, antibacterial agents, antimicrobial agents, dental trauma, oral wound management, orofacial infections, periodontal disease, viral disease, and oral contraception; fields: all; limits: within the last 10 years, humans, English, clinical trials, birth through age 18. One hundred sixty-five articles matched these criteria. Papers for review were chosen from this search and from hand searching. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

Background

Antibiotics are beneficial in patient care when prescribed and administered correctly for bacterial infections. However, the widespread use of antibiotics has permitted common bacteria to develop resistance to drugs that once controlled them.¹⁻³ Drug resistance is prevalent throughout the world.³ Some microorganisms may develop resistance to a single antimicrobial agent, while others develop multidrug-resistant strains.^{2,3} To diminish the rate at which resistance is increasing, health care providers must be prudent in the use of antibiotics.¹

Recommendations

Conservative use of antibiotics is indicated to minimize the risk of developing resistance to current antibiotic regimens.^{2,3} Practitioners should adhere to the following general principles when prescribing antibiotics for the pediatric population.

Oral wound management

Factors related to host risk (e.g., age, systemic illness, malnutrition) and type of wound (e.g., laceration, puncture) must be evaluated when determining the risk for infection and subsequent need for antibiotics. Wounds can be classified as clean, potentially contaminated, or contaminated/dirty. Facial lacerations may require topical antibiotic agents.⁴ Intraoral lacerations that appear to have been contaminated by extrinsic bacteria, open fractures, and joint injury have an increased risk of infection and should be covered with antibiotics.⁴ If it is determined that antibiotics would be beneficial to the healing process, the timing of the administration of antibiotics is critical to supplement the natural host resistance in bacterial killing. The drug should be administered as soon as possible for the best result. The most effective route of drug administration (intravenous vs. intramuscular vs. oral) must be considered. The clinical effectiveness of the drug must be monitored. The minimal duration of drug therapy should be five days beyond the point of substantial improvement or resolution of signs and symptoms; this is usually a five- to seven-day course of treatment dependent upon the specific drug selected.⁵⁻⁷ In light of the growing problem of drug resistance, the clinician should consider altering or discontinuing antibiotics following determination of either ineffectiveness or cure prior to completion of a full course of therapy.⁸ If the infection is not responsive to the initial drug selection, a culture and susceptibility testing of isolates from the infective site may be indicated.

Special conditions

Pulpitis/apical periodontitis/draining sinus tract/localized intra-oral swelling

Bacteria can gain access to the pulpal tissue through caries, exposed pulp or dentinal tubules, cracks into the dentin, and defective restorations. If a child presents with acute symptoms of pulpitis, treatment (i.e., pulpotomy, pulpectomy, or extraction) should be rendered. Antibiotic therapy usually is not indicated if the dental infection is contained within the pulpal tissue or the immediate surrounding tissue. In this case, the

ABBREVIATION

AAPD: American Academy Pediatric Dentistry.

child will have no systemic signs of an infection (i.e., no fever and no facial swelling).^{9,10}

Consideration for use of antibiotics should be given in cases of advanced non-odontogenic bacterial infections such as staphylococcal mucositis, tuberculosis, gonococcal stomatitis, and oral syphilis. If suspected, it is best to refer patients for culture, biopsy, or other laboratory tests for documentation and definitive treatment.

Acute facial swelling of dental origin

A child presenting with a facial swelling or facial cellulitis secondary to an odontogenic infection should receive prompt dental attention. In most situations, immediate surgical intervention is appropriate and contributes to a more rapid cure.¹² The clinician should consider age, the ability to obtain adequate anesthesia (local vs. general), the severity of the infection, the medical status, and any social issues of the child.^{11,12} Signs of systemic involvement (i.e., fever, asymmetry, facial swelling) warrant emergency treatment. Intravenous antibiotic therapy and/or referral for medical management may be indicated.⁹⁻¹¹ Penicillin remains the empirical choice for odontogenic infections; however, consideration of additional adjunctive antimicrobial therapy (i.e., metronidazole) can be given where there is anaerobic bacterial involvement.⁸

Dental trauma

Systemic antibiotics have been recommended as adjunctive therapy for avulsed permanent incisors with an open or closed apex.¹⁴⁻¹⁷ Tetracycline (doxycycline twice daily for seven days) is the drug of choice, but consideration of the child's age must be exercised in the systemic use of tetracycline due to the risk of discoloration in the developing permanent dentition.^{13,14} Penicillin V or amoxicillin can be given as an alternative.^{14,15,17} The use of topical antibiotics to induce pulpal revascularization in immature non-vital traumatized teeth has shown some potential.^{14,15,17,18} However, further randomized clinical trials are needed.¹⁹⁻²¹ For luxation injuries in the primary dentition, antibiotics generally are not indicated.^{22,23} Antibiotics can be warranted in cases of concomitant soft tissue injuries (see **Oral wound management**) and when dictated by the patient's medical status.

Pediatric periodontal diseases

Dental plaque-induced gingivitis does not require antibiotic therapy. Pediatric patients with aggressive periodontal diseases may require adjunctive antimicrobial therapy in conjunction with localized treatment.²⁴ In pediatric periodontal diseases associated with systemic disease (e.g., severe congenital neutropenia, Papillon-Lefèvre syndrome, leukocyte adhesion deficiency), the immune system is unable to control the growth of periodontal pathogens and, in some cases, treatment may involve antibiotic therapy.^{24,25} The use of systemic antibiotics has been recommended as adjunctive treatment to mechanical debridement in patients with aggressive periodontal disease.^{24,25} In severe and refractory cases, extraction is indicated.^{24,25} Cul-

ture and susceptibility testing of isolates from the involved sites are helpful in guiding the drug selection.^{24,25}

Viral diseases

Conditions of viral origin such as acute primary herpetic gingivostomatitis should not be treated with antibiotic therapy unless there is strong evidence to indicate that a secondary bacterial infection exists.²⁶

Salivary gland infections

Many salivary gland infections, following confirmation of bacterial etiology, will respond favorably to antibiotic therapy. Acute bacterial parotitis has two forms: hospital acquired and community acquired.²⁷ Both can be treated with antibiotics. Hospital acquired usually requires intravenous antibiotics; oral antibiotics are appropriate for community acquired. Chronic recurrent juvenile parotitis generally occurs prior to puberty. Antibiotic therapy is recommended and has been successful.²⁷ For both acute bacterial submandibular sialadenitis and chronic recurrent submandibular sialadenitis, antibiotic therapy is included as part of the treatment.²⁷

Oral contraceptive use

Whenever an antibiotic is prescribed to a female patient taking oral contraceptives to prevent pregnancy, the patient must be advised to use additional techniques of birth control during antibiotic therapy and for at least one week beyond the last dose, as the antibiotic may render the oral contraceptive ineffective.^{28,29} Rifampicin has been documented to decrease the effectiveness of oral contraceptives.^{28,29} Other antibiotics, particularly tetracycline and penicillin derivatives, have been shown to cause significant decrease in the plasma concentrations of ethinyl estradiol, causing ovulation in some individuals taking oral contraceptives.^{28,29} Caution is advised with the concomitant use of antibiotics and oral contraceptives.^{28,29}

References

1. Wilson W, Taubert KA, Gevitz M, et al. Prevention of infective endocarditis: Guidelines from the American Heart Association—A Guideline From the American Heart Association Rheumatic Fever, Endocarditis and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Circulation* 2007; 116(15):1736-54. E-published April 19, 2007. Erratum in: *Circulation* 2007;116(15):e376-e7.
2. Center for Disease Control and Prevention. Antibiotic/Antimicrobial Resistance. Available at: "<http://www.cdc.gov/drugresistance/>". Accessed August 5, 2014.
3. Costelloe C, Metcalfe C, Lovering A, et al. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: Systematic review and meta-analysis. *BMJ* 2010;340:c2096.

4. Nakamura Y, Daya M. Use of appropriate antimicrobials in wound management. *Emerg Med Clin North Am* 2007;25(1):159-76.
5. Wickersham RM, Novak KK, Schweain SL, et al. Systemic anti-infectives. In: *Drug Facts and Comparisons*. St. Louis, Mo.: 2004:1217-336.
6. Kuriyama T, Karasawa T, Nakagawa K, Saiki Y, Yamamoto E, Nakamura S. Bacteriological features and antimicrobial susceptibility in isolates from orofacial odontogenic infections. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000;90(5):600-8.
7. Prieto-Prieto J, Calvo A. Microbiological basis of oral infections and sensitivity to antibiotics. *Med Oral Patol Oral Cir Bucal* 2004;9(suppl S):11-8.
8. Flynn T. What are the antibiotics of choice for odontogenic infections, and how long should the treatment course last? *Oral Maxillofac Surg Clin N Am* 2011;23(4):519-36.
9. Maestre Vera Jr. Treatment options in odontogenic infection. *Med Oral Patol Oral Cir Bucal* 2004;9(suppl S):19-31.
10. Keenan JV, Farman AG, Fedorowicz Z, Newton JT. A Cochrane system review finds no evidence to support the use of antibiotics for pain relief in irreversible pulpitis. *J Endod* 2006;32(2):87-92.
11. Thikkurissy S, Rawlins JT, Kumar A, Evans E, Casamasimo PS. Rapid treatment reduces hospitalization for pediatric patients with odontogenic-based cellulitis. *Am J Emerg Med* 2010;28(6):668-672.
12. Johri A, Picuch JF. Should teeth be extracted immediately in the presence of acute infection? *Oral Maxillofac Surg Clin North Am* 2011;23(4):507-11.
13. Rega AJ, Aziz SR, Ziccardi VB. Microbiology and Antibiotic Sensitivities of Head and Neck Space Infections of Odontogenic Origin. *J Oral Maxillofac Surg* 2006;64(9):1377-1380.
14. Andreasen JO, Andreasen FM. Avulsions. In: *Textbook and Color Atlas of Traumatic Injuries to the Teeth*, 4th ed. Copenhagen, Denmark: Blackwell Munksgaard; 2007:461, 478-88.
15. Dentaltraumaguide.org. The Dental Trauma Guide 2010. Permanent Avulsion Treatment. Available at "http://www.dentaltraumaguide.org/Permanent_Avulsion_Treatment.aspx". Accessed October 1, 2013.
16. DiAngelis AJ, Andreasen JO, Ebelseder KA, et al. International Association of Dental Traumatology Guidelines for the management of traumatic dental injuries: 1 – Fractures and luxations of permanent teeth. *Dent Traumatol* 2012;28:2-12.
17. Andersson L, Andreasen JO, Day P, et al. International Association of Dental Traumatology Guidelines for the management of traumatic dental injuries: 2 – Avulsion of permanent teeth. *Dent Traumatol* 2012;28:88-96.
18. McIntyre JD, Lee JY, Tropte M, Vann WF Jr. Management of avulsed permanent incisors: A comprehensive update. *Pediatr Dent* 2007;29(1):56-63.
19. Hargreaves KM, Diogenes A, Teixeira FB. Treatment options: Biological basis of regenerative endodontic procedures. *Pediatr Dent* 2013;35(2):129-40.
20. Thibodeau B, Teixeira F, Yamauchi M, Caplan DJ, Trope M. Pulp revascularization of immature dog teeth with apical periodontitis. *J Endod* 2007;36(6):680-9.
21. Shabahang S. Treatment options: Apexogenesis and apexification. *Pediatr Dent* 2013;35(2):125-8.
22. Malmgren B, Andreasen JO, Flores MT, et al. International Association of Dental Traumatology Guidelines for the management of traumatic dental injuries: III. Injuries in the primary dentition. *Dental Traumatology* 2012; 28:174-82.
23. Dentaltraumaguide.org. The Dental Trauma Guide: Primary Teeth, 2010. Available at "http://www.dentaltraumaguide.org/Primary_teeth.aspx". Accessed October 1, 2013.
24. American Academy of Periodontology Research, Science and Therapy Committee. Periodontal diseases of children and adolescents. *J Periodontol* 2003;74:1696-704.
25. Schmidt JC, Wlater C, Rischewski JR, Weiger R. Treatment of periodontitis as a manifestation of neutropenia with or without systemic antibiotics: A systematic review. *Pediatr Dent* 2013;35(2):E54-E63.
26. American Academy of Pediatrics. Herpes simplex. In: *Red Book: 2003 Report of the Committee on Infectious Diseases*. 26th ed. Elk Grove Village, Ill: American Academy of Pediatrics; 2003:344-53.
27. Carlson ER. Diagnosis and management of salivary gland infections. *Oral Maxillofac Surg Clin N Am* 2009;21(3):293-312.
28. DeRossi SS, Hersh EV. Antibiotics and oral contraceptives. *Pediatr Clin North Am* 2002;46(4):653-64.
29. Becker DE. Adverse drug interactions. *Anesth Prog* 2011; 58(1):31-41.

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.

Copyright © 2015 American Dental Association. All rights reserved. This page may be used, copied, and distributed for non-commercial purposes without obtaining prior approval from the ADA. Any other use, copying, or distribution, whether in printed or electronic format, is strictly prohibited without the prior written consent of the ADA.

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.

Nonsurgical Treatment of Chronic Periodontitis by Scaling and Root Planing with or without Adjuncts: Clinical Practice Guideline^{1,2}

Strength of recommendations: Each recommendation is based on the best available evidence. The level of evidence available to support each recommendation may differ.

Strong	In Favor	Weak	Expert Opinion For	Expert Opinion Against	Against
Evidence strongly supports providing this intervention. There is a high level of certainty of benefits, and the benefits outweigh the potential harms.	Evidence favors providing this intervention. Either there is a high level of certainty of benefits, but the benefits are balanced with the potential harms OR there is a moderate level of certainty of benefits, and the benefits outweigh the potential for harms.	Evidence suggests implementing this intervention only after alternatives have been considered. There is a moderate level of certainty of benefits, and either the benefits are balanced with potential harms or there is uncertainty in the magnitude of the benefit.	Expert Opinion suggests this intervention can be implemented, but there is a low level of certainty of benefits and there is uncertainty in the benefit to harm balance.	Expert Opinion suggests this intervention NOT be implemented because there is a low level of certainty that there is no benefit or the potential harms outweigh benefits.	Evidence suggests not implementing this intervention or discontinuing ineffective procedures. There is moderate or high certainty that there are no benefits and/or the potential harms outweigh the benefits.

Clinical Recommendation

Scaling and root planing (no adjuncts)

For patients with chronic periodontitis, clinicians should consider scaling and root planing (SRP) as the initial treatment.

SRP with systemic sub-antimicrobial dose doxycycline

For patients with moderate to severe chronic periodontitis, clinicians may consider systemic sub-antimicrobial dose doxycycline (20 mg twice a day) for 3 to 9 months as an adjunct to SRP with a small net benefit expected.

SRP with systemic antimicrobials

For patients with moderate to severe chronic periodontitis, clinicians may consider systemic antimicrobials as an adjunct to SRP with a small net benefit expected.

SRP with locally-delivered antimicrobials

For patients with moderate to severe chronic periodontitis, clinicians may consider locally delivered chlorhexidine chips as an adjunct to SRP with a moderate net benefit expected.

For patients with moderate to severe chronic periodontitis, clinicians may consider locally delivered doxycycline hyclate gel as an adjunct to SRP, but the net benefit is uncertain.

For patients with moderate to severe chronic periodontitis, clinicians may consider locally delivered minocycline microspheres as an adjunct to SRP, but the net benefit is uncertain.

Strength

In Favor

In Favor

Weak

Weak

Expert Opinion For

Expert Opinion For

1 Smiley CJ, Tracy SL, Abt E, Michalowicz B, et al. Evidence-Based Clinical Practice Guideline on the Nonsurgical Treatment of Chronic Periodontitis by Scaling and Root Planing with or without Adjuncts. *JADA* 2015; 146 (7):525-535.
 2 Smiley CJ, Tracy SL, Abt E, Michalowicz B, et al. Systematic Review and Meta-Analysis on the Nonsurgical Treatment of Chronic Periodontitis by Scaling and Root Planing with or without Adjuncts. *JADA* 2015; 146 (7):508-524.
 ©2015 American Dental Association. All rights reserved.

Nonsurgical Treatment of Chronic Periodontitis by Scaling and Root Planing with or without Adjuncts: Clinical Practice Guideline^{1,2}

Strength of recommendations: Each recommendation is based on the best available evidence. The level of evidence available to support each recommendation may differ.

Strong	In Favor	Weak	Expert Opinion For	Expert Opinion Against	Against
---------------	-----------------	-------------	---------------------------	-------------------------------	----------------

Clinical Recommendation		Strength
<p>SRP with nonsurgical use of lasers For patients with moderate to severe chronic periodontitis, clinicians may consider photodynamic therapy (PDT) using diode lasers as an adjunct to SRP with a moderate net benefit expected.</p>		Weak
<p>For patients with moderate to severe chronic periodontitis, clinicians should be aware that the current evidence shows no net benefit from diode (non-PDT) lasers when used as an adjunct to SRP.</p>		Expert Opinion Against
<p>For patients with moderate to severe chronic periodontitis, clinicians should be aware that the current evidence shows no net benefit from Nd:YAG lasers when used as an adjunct to SRP.</p>		Expert Opinion Against
<p>For patients with moderate to severe chronic periodontitis, clinicians should be aware that the current evidence shows no net benefit from erbium lasers when used as an adjunct to SRP.</p>		Expert Opinion Against

ADA: Center for Evidence-Based Dentistry™

3.Track and Report



Tracking and reporting antibiotic prescribing can guide changes in practice and be used to assess progress in improving antibiotic prescribing. Dentists can track and report antibiotic prescribing practices by doing the following:

- Complete the enclosed survey
 - This tool is intended to help you assess your facility’s current antibiotic prescribing practices and identify areas for improvement. It will also help IDPH learn how to support dentists’ antibiotic stewardship efforts. **Please complete this brief survey online at <http://tinyurl.com/survey4dentists> by December 22, 2017.**
 - Rather complete the survey by mail? A postage-paid envelope has been included for your convenience. You may also fax the completed survey to: 312-814-1953.

- Participate in continuing medical education and quality improvement activities to track and improve antibiotic prescribing
 - Attend the Annual Illinois Summit on Antimicrobial Stewardship next summer. This annual event convenes clinicians across health care settings to discuss antibiotic stewardship best practices. More information on the summit will be shared in spring 2018. To be added to the e-mail list, contact: DPH.DPSQ@Illinois.gov.

- Implement a tracking and reporting system in your facility to monitor antibiotic prescribing
 - Refer to CDC’s resources on tracking at: <https://tinyurl.com/CDCtrack>.

4. Educate



Dentists can educate patients about the potential harms of antibiotic treatment with the following tools:

- Antibiotic Safety: Do's & Don'ts at the Dentist (page 26)
 - Download here: <http://tinyurl.com/patiented1>.
- What is antibiotic prophylaxis? (page 27)
 - Download here: <http://tinyurl.com/patiented2>.
- What is Infective endocarditis? (page 28)
 - Download here: <http://tinyurl.com/patiented3>.
- Improving Antibiotic Use (page 30)
 - Download here: <http://tinyurl.com/patiented4>.

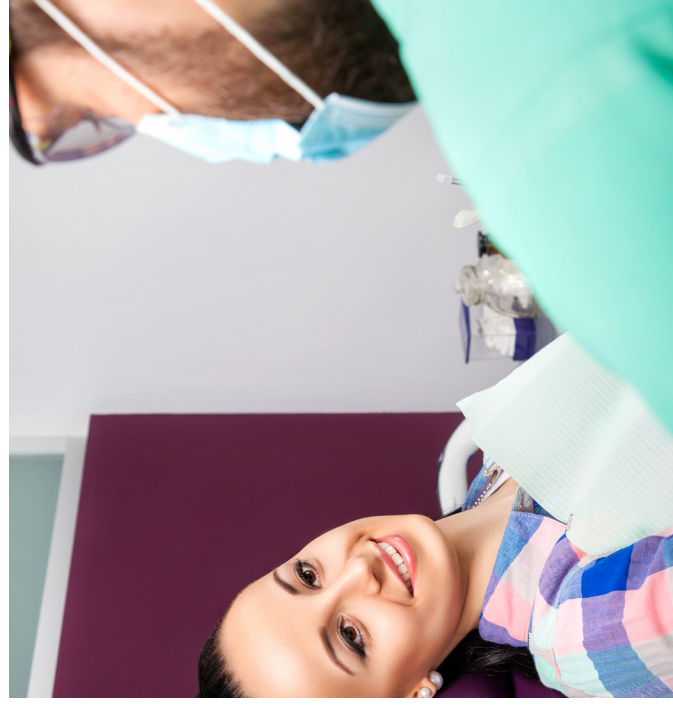
Antibiotic Safety: Do's and Don'ts at the Dentist

DO

- ✓ **DO** tell your dentist if you have any drug allergies or medical conditions.
- ✓ **DO** tell your dentist about any medications, vitamins, or herbal supplements you are taking.
- ✓ **DO** ask how some mouth infection can be treated without antibiotics.
- ✓ **DO** take your antibiotics exactly as prescribed.
- ✓ **DO** tell your dentist if you have side effects, such as frequent diarrhea, while taking, or shortly after stopping antibiotics.



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



DO NOT

- ✗ **DO NOT** skip doses or stop taking your antibiotics without consulting your dentist.
- ✗ **DO NOT** save unused antibiotics for future use or give antibiotics to others.
- ✗ **DO NOT** take antibiotics prescribed for others.
- ✗ **DO NOT** pressure your dentist to prescribe an antibiotic. Instead, ask your dentist how you can feel better even if antibiotics are not prescribed.

CS267104

What is antibiotic prophylaxis?



Antibiotics usually are used to treat bacterial infections. Sometimes, though, dentists or physicians suggest taking antibiotics before treatment to decrease the chance of infection. This is called *antibiotic prophylaxis*.

During some dental treatments, bacteria from the mouth enter the bloodstream. In most people, the immune system kills these bacteria. There is concern, though, that in some patients, bacteria from the mouth can travel through the bloodstream and cause an infection somewhere else in the body. Antibiotic prophylaxis may offer these people extra protection.¹

WHO MIGHT BENEFIT FROM ANTIBIOTIC PROPHYLAXIS?

People with certain heart conditions may be at increased risk of developing infective endocarditis (IE)—an infection of the lining of the heart or heart valves. To protect against IE, or limit its effects should the infection develop, the American Heart Association suggests that antibiotic prophylaxis be considered for people who have¹

- an artificial heart valve or who have had a heart valve repaired with a prosthetic material;
- a history of IE;
- a heart transplant that develops a valve problem;
- certain heart conditions that are congenital (present from birth), including
 - unrepaired or incompletely repaired cyanotic congenital heart disease, including those with palliative shunts and conduits;
 - a completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first 6 months after the procedure;
 - any repaired congenital heart disease with residual defect at the site or adjacent to the site of a prosthetic patch or prosthetic device.

WHAT ABOUT PEOPLE WHO HAVE HAD HIP OR KNEE REPLACEMENT SURGERY?

The American Dental Association does not routinely recommend antibiotic prophylaxis for people who have had a hip, knee, or other joint replaced.² People who have had joint replacement surgery and have a weakened immune system—meaning that they are less able to fight infections—should talk to their dentist and their orthopedic surgeon to see if antibiotic prophylaxis is recommended. Conditions such as diabetes, rheumatoid arthritis, or cancer and medications such as steroids

and those used in chemotherapy can affect your ability to fight infections.

WHY IS ANTIBIOTIC PROPHYLAXIS NOT USED FOR EVERY PATIENT?

Antibiotic prophylaxis is not right for everyone and—like any medicine—antibiotics should only be used when the potential benefits outweigh the risks of taking them. For example, consider that infections after dental treatment are not common and that, in some people, antibiotics can have side effects. Side effects associated with taking antibiotics include stomach upset, diarrhea, and allergic reactions, some of which can be life threatening. In addition, using antibiotics too often or incorrectly can allow bacteria to become resistant to those medications. Therefore, it is important to use antibiotic prophylaxis in only those people at greatest risk of developing an infection after dental treatment.

WHAT CAN YOU DO?

Tell your dentist about any changes in your health since your last visit and make sure he or she knows about all medications you are taking. With this information in hand, your dentist can talk to you and your physician about whether you could benefit from antibiotic prophylaxis.

Good home care is key to good dental health. Be sure to brush your teeth twice a day with a fluoride toothpaste, clean between your teeth once a day, eat a balanced diet, and visit your dentist regularly. ■

<http://dx.doi.org/10.1016/j.adaj.2016.03.106>

Prepared by Anita M. Mark, manager, Scientific Information Development, ADA Science Institute, American Dental Association, Chicago, IL.

Disclosure. Ms. Mark did not report any disclosures.

Copyright © 2016 American Dental Association. Unlike other portions of JADA, the print and online versions of this page may be reproduced as a handout for patients without reprint permission from the ADA Publishing Division. Any other use, copying, or distribution of this material, whether in printed or electronic form, including the copying and posting of this material on a website is prohibited without prior written consent of the ADA Publishing Division.

“For the Patient” provides general information on dental treatments. It is designed to prompt discussion between dentist and patient about treatment options and does not substitute for the dentist’s professional assessment based on the individual patient’s needs and desires.

1. Wilson W, Taubert KA, Gewitz M, et al. Prevention of infective endocarditis: guidelines from the American Heart Association: a guideline from the American Heart Association Rheumatic Fever, Endocarditis and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *JADA*. 2008;139(suppl):3S-24S.

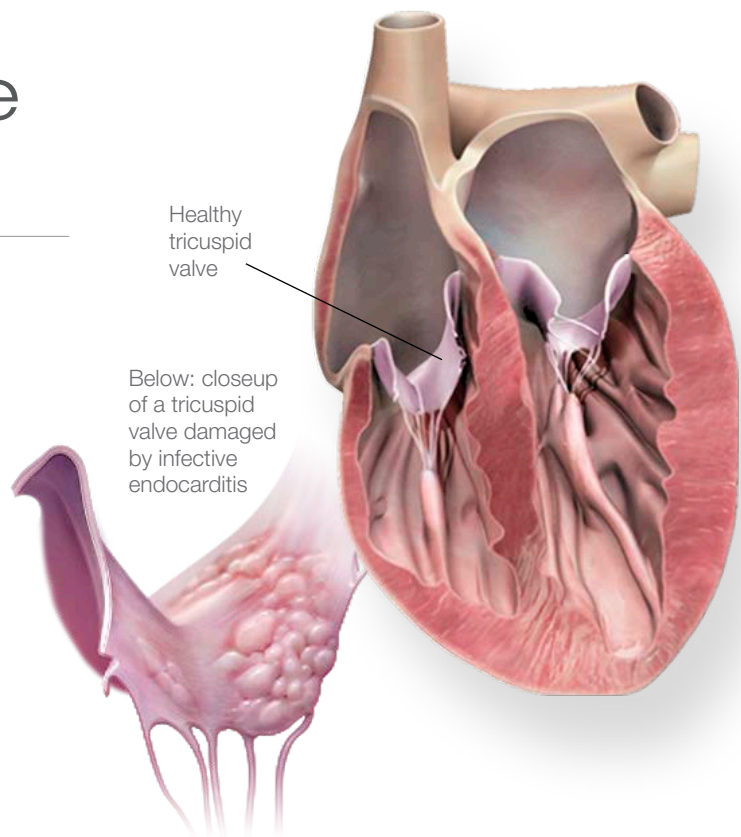
2. Sollecito TP, Abt E, Lockhart PB, et al. The use of prophylactic antibiotics prior to dental procedures in patients with prosthetic joints: evidence-based clinical practice guideline for dental practitioners—a report of the American Dental Association Council on Scientific Affairs. *JADA*. 2015;146(1):11-16.e8.



What Is Infective Endocarditis?

Infective (bacterial) endocarditis (IE) is an infection of either the heart's inner lining (endocardium) or the heart valves. Infective endocarditis is a serious — and sometimes fatal — illness. Two things increase risk for it to occur: pathogens such as bacteria or fungi in the blood and certain high-risk heart conditions.

Men, women and children of all racial and ethnic groups can get it. In the United States, there are up to 34,000 hospital discharges related to IE each year.



What's the role of bacteria?

Certain bacteria normally live on parts of your body. They live in or on the:

- mouth and upper respiratory system.
- intestinal and urinary tracts.
- skin.

Bacteria can get in the bloodstream. This is called bacteremia. These bacteria can settle on abnormal, damaged, or prosthetic heart valves or other damaged heart tissue. If this happens, they can damage or even destroy the heart valves.

The heart valves are important in guiding blood flow through the heart. They work like doors to keep the blood flowing in one direction. If they become damaged, the results can be very serious.

A brief bacteremia can occur after many routine daily activities such as:

- tooth brushing and flossing.
- use of wooden toothpicks.

- use of water picks.
- chewing food.

It can also result after certain surgical and dental procedures. Not all bacteria cause endocarditis, though.

What's the heart's role?

People who have certain heart conditions are at increased risk of developing infective endocarditis. People with the highest risk for poor outcomes from IE may be prescribed antibiotics prior to dental procedures to reduce their risk of developing IE.

Heart conditions that put people at the highest risk for poor outcomes from IE include:

- artificial (prosthetic) heart valves or heart valves repaired with artificial material
- a history of infective endocarditis
- some kinds of congenital heart defects
- abnormality of the heart valves after a heart transplant

People who've had IE before are at higher risk of getting
(continued)



it again. This is true even when they don't have heart disease.

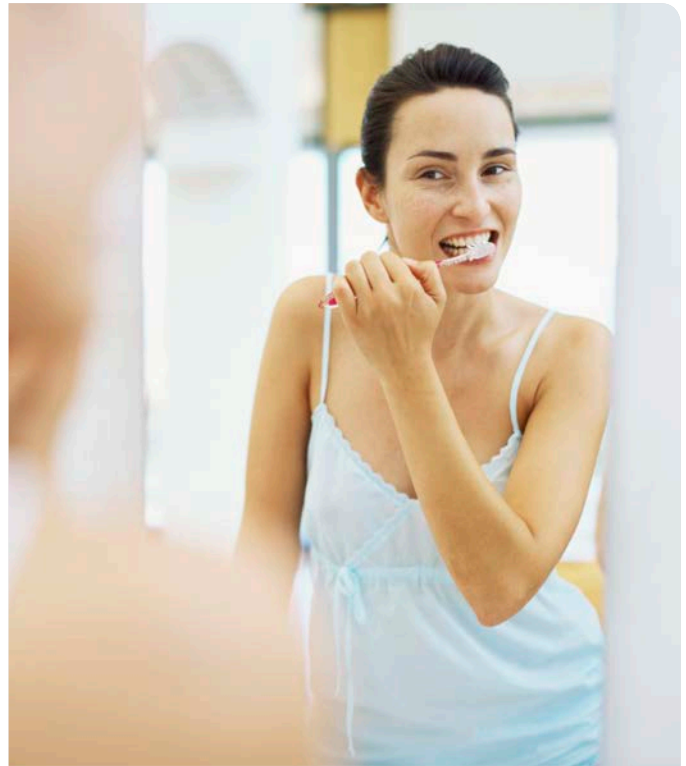
How can infective endocarditis be prevented?

Not all cases can be prevented. That's because we don't always know when an infection will occur.

For patients whose heart conditions put them at the highest risk for adverse events from IE, the American Heart Association (AHA) recommends antibiotics before certain dental procedures. These include procedures that involve manipulation of gingival tissue or the periapical region of teeth, or perforation of the oral mucosa. However, for most patients, antibiotics are not needed.

The AHA has an endocarditis wallet card in English and Spanish. People who have been told that they need to take antibiotics should carry it. You can get it from your doctor or on our Web site, heart.org. Show the card to your dentist or physician. It will help them take the precautions needed to protect your health.

Keeping your mouth clean and healthy and maintaining regular dental care may reduce the chance of bacteremia from routine daily activities.



Patients whose heart conditions put them at risk for IE may reduce the risk by practicing good dental hygiene. In some cases, they may need to take antibiotics prior to dental procedures.

HOW CAN I LEARN MORE?

- 1 Call **1-800-AHA-USA1** (1-800-242-8721), or visit heart.org to learn more about heart disease and stroke.
- 2 Sign up to get *Heart Insight*, a free magazine for heart patients and their families, at heartinsight.org.
- 3 Connect with others sharing similar journeys with heart disease and stroke by joining our Support Network at heart.org/supportnetwork.

Do you have questions for the doctor or nurse?

Take a few minutes to write your questions for the next time you see your healthcare provider.

For example:

What conditions do I have that put me at risk for endocarditis?

Should I take antibiotics before I see the dentist?

My Questions:

We have many other fact sheets to help you make healthier choices to reduce your risk, manage disease or care for a loved one. Visit heart.org/answersbyheart to learn more.

IMPROVING ANTIBIOTIC USE



**BE
ANTIBIOTICS
AWARE**

SMART USE, BEST CARE

Do I really need antibiotics?



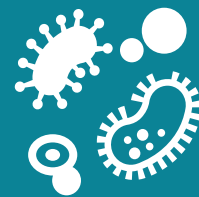
SAY YES TO ANTIBIOTICS

when needed for certain infections caused by **bacteria**.



SAY NO TO ANTIBIOTICS

for **viruses**, such as colds and flu, or runny noses, even if the mucus is thick, yellow or green. Antibiotics also won't help for some common bacterial infections including most cases of bronchitis, many sinus infections, and some ear infections.



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

Antibiotics do **NOT** work on viruses.

Do antibiotics have side effects?

Anytime antibiotics are used, they can cause side effects. When antibiotics aren't needed, they won't help you, and the side effects could still hurt you. Common side effects of antibiotics can include:



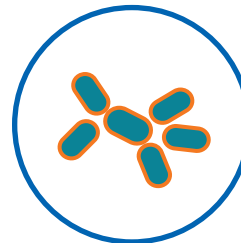
Rash



Dizziness



Nausea



Yeast Infections



Diarrhea

More serious side effects include *Clostridium difficile* infection (also called *C. difficile* or *C. diff*), which causes diarrhea that can lead to severe colon damage and death. People can also have severe and life-threatening allergic reactions.

Antibiotics save lives. When a patient needs antibiotics, the benefits outweigh the risks of side effects.

1 out of 5

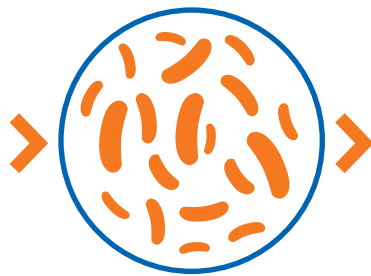
medication-related visits to the ED are from reactions to antibiotics.

What are antibiotic-resistant bacteria?

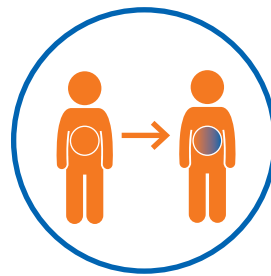
Antibiotic resistance occurs when bacteria no longer respond to the drugs designed to kill them. Anytime antibiotics are used, they can cause antibiotic resistance.



Bacteria, not the body, become resistant to 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.

Each year in the United States, at least **2 million people** get infected with antibiotic-resistant bacteria. At least **23,000 people** die as a result.

Can I feel better without antibiotics?

Respiratory viruses usually go away in a week or two without treatment. To stay healthy and keep others healthy, you can:



Clean Hands



Cover Coughs



Stay Home
When Sick



Get
Recommended
Vaccines

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



REFERENCES

- Abt, E., Hellstein, J., Lockhart, P., Mariotti, A., Sollecito, T., Truelove, E., Armstrong, S., De Rossi, S., Epstein, J., Laudendach, J., Patton, L., Paumier, T. and Weyant, R. (2017). American Dental Association guidance for utilizing appropriate use criteria in the management of the care of patients with orthopedic implants undergoing dental procedures. *The Journal of the American Dental Association*, 148(2), pp.57-59.
- American Dental Association. (2017). *Antibiotics and Dental Treatment brochure - ADA W307*. [online] Available at: <http://ebusiness.ada.org/productcatalog/205/Medication/Antibiotics-and-Dental-Treatment/W307>
- CDC.gov. (2017). *Measuring Outpatient Antibiotic Prescribing*. [online] Available at: <https://www.cdc.gov/antibiotic-use/community/programs-measurement/measuring-antibiotic-prescribing.html>
- CDC.gov. (2017). *Print Materials for Healthcare Professionals*. [online] Available at: <https://www.cdc.gov/antibiotic-use/community/materials-references/print-materials/hcp/index.html>.
- Combating antibiotic resistance. (2004). *The Journal of the American Dental Association*, 135(4), pp.484-487.
- Guideline on Use of Antibiotic Therapy for Pediatric Dental Patients. (2014). *American Academy of Pediatric Dentistry Clinical Practice Guidelines*, 37(6), pp.289-291.
- Roberts, R., Bartoces, M., Thompson, S. and Hicks, L. (2017). Antibiotic prescribing by general dentists in the United States, 2013. *The Journal of the American Dental Association*, 148(3), pp.172-178.e1.
- Wilson, W., Taubert, K., Gewitz, M., Lockhart, P., Baddour, L., Levison, M., Bolger, A., Cabell, C., Takahashi, M., Baltimore, R., Newburger, J., Strom, B., Tani, L., Gerber, M., Bonow, R., Pallasch, T., Shulman, S., Rowley, A., Burns, J., Ferrieri, P., Gardner, T., Goff, D. and Durack, D. (2007). Prevention of Infective Endocarditis: Guidelines From the American Heart Association: A Guideline From the American Heart Association Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Circulation*, 116(15), pp.1736-1754.

Seven Ways Dentists can Act Against Antibiotic Resistance



Dental providers are uniquely positioned to play a role in preventing the spread of antibiotic resistance. Here are seven simple “how-tos” for safe, appropriate antibiotic prescribing and use when treating dental infections.



1

MAKE an accurate diagnosis.

2



When prescribing an antibiotic, **CHOOSE** the right drug for the right dose and duration.

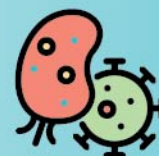
3



USE narrow-spectrum antibiotics for simple infections and preserve broad-spectrum drugs for more complex infections.

4

AVOID prescribing antibiotics for viral infections.



5

For empiric treatment, **REVISE** treatment regimen based on patient progress and/or test results.

6

KNOW the side effects and drug interactions of an antibiotic before prescribing.



7



TEACH your patients about appropriate antibiotic use and emphasize the importance of taking antibiotics exactly as directed.



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

To learn more:
<https://www.cdc.gov/getsmart/community/materials-references/print-materials/hcp/>