# Improving Antibiotic Use in Dentistry

**CAPT Lauri A. Hicks, D.O.**
Director, Office of Antibiotic Stewardship
Division of Healthcare Quality Promotion

# Improving Antibiotic Use in Dentistry

- Describe progress in measuring antibiotic use in dentistry
- Discuss key partnerships and policies to improve antibiotic use in dentistry
- Discuss challenges and opportunities for infectious diseases professionals to play a role in improving antibiotic use in dentistry

# Top Specialties by Volume of Outpatient Antibiotic Prescriptions — United States, 2014

| Provider specialty | No. antibiotic prescriptions | Percent of total antibiotic prescriptions |
|---|---|---|
| Family practice | 58,100,000 | 22% |
| Physician Assistants & Nurse Practitioners | 54,400,000 | 20% |
| Internal medicine | 30,100,000 | 11% |
| Pediatrics | 25,400,000 | 10% |
| Dentistry | 24,900,000 | 9% |
| Emergency Medicine | 14,200,000 | 5% |
| **All providers (total)** | **266,100,000** | **100%** |

Hicks CID 2015: 60(9):1308-16; *CDC. Outpatient antibiotic prescriptions — United States, 2013. Available via the internet:* http://www.cdc.gov/getsmart/community/pdfs/annual-reportsummary_2014.pdf

# Antibiotic Prescribing by General Dentists in the United States, 2013

ORIGINAL CONTRIBUTIONS

**Dentists prescribed 24.5 million courses of outpatient antibiotics in 2013 (77.5 prescriptions per 1,000 people)**

## Antibiotic prescribing by general dentists in the United States, 2013

Rebecca M. Roberts, MS; Monina Bartoces, PhD; Sydney E. Thompson, DNP, APRN; Lauri A. Hicks, DO

In dentistry, antibiotics are recommended for management of bacterial oral infections and for prophylaxis of infective endocarditis (IE) in patients with certain cardiac conditions and potentially in some patients who are immunocompromised. Increasing concerns about antibiotic resistance and antibiotic-associated adverse events make the identification of opportunities to improve antibiotic prescribing a public health priority. The Centers for Disease Control and Prevention estimates that, in the United States, antibiotic-resistant infections annually affect at least 2 million people and cause 23,000 deaths.[1] The primary driver of antibiotic resistance is the use of

Supplemental material is available online.

**ABSTRACT**

**Background.** Dentists prescribe approximately 10% of outpatient antibiotics, but little is known about dentists' antibiotic prescribing patterns. The authors conducted a study to characterize prescribing by dentists according to antibiotic agent and category, patient demographic characteristics, and geographic region in the United States.

**Methods.** The authors identified oral antibiotic prescriptions dispensed during 2013 in the Xponent (QuintilesIMS) database. The authors used the total number of prescriptions and county-level census population denominators to calculate prescribing rates. In addition, the authors analyzed prescribing according to individual agent, drug category, and patient demographic characteristics and the total number of prescriptions calculated for general dentists overall.

**Results.** Dentists prescribed 24.5 million courses of antibiotics in 2013, a prescribing rate of 77.5 prescriptions

*Roberts, et al. J Am Dent Assoc. 2017 Mar;148(3):172-178.*

# Antibiotic Selection in Dentistry

- Penicillins were the most common antibiotic category prescribed
- Some categories of antibiotics prescribed by dentists are generally not indicated in dentistry

| CHARACTERISTIC | PRESCRIPTION | | |
|---|---|---|---|
| | Number in Millions | Percentage | Per 1,000 People |
| **Antibiotic Category** | | | |
| Penicillins | 17.07 | 69.6 | 53.9 |
| Lincosamides | 3.57 | 14.6 | 11.3 |
| Macrolides | 1.33 | 5.4 | 4.2 |
| Cephalosporins | 1.24 | 5.1 | 3.9 |
| β-lactams, increased activity | 0.56 | 2.3 | 1.8 |
| Tetracycline | 0.47 | 1.9 | 1.5 |
| Quinolones | 0.21 | 0.8 | 0.6 |
| Sulfa-containing antibiotics | 0.05 | 0.2 | 0.2 |
| Urinary anti-infective agents | 0.02 | 0.1 | 0.1 |
| Other | 0.00 | 0.0 | 0.0 |
| Total | 24.52 | 100.0 | 77.5 |

*Roberts, et al. J Am Dent Assoc. 2017 Mar;148(3):172-178*.

# Prescribing for Dental Conditions in the Emergency Department

- From 2010-2012, there were 1.3 million ED visits for dental-related conditions each year (1.5% of all ED visits)
- An antibiotic was prescribed in 64% of ED visits with any dental diagnosis
- Most commonly prescribed antibiotics in EDs for dental conditions are a narrow-spectrum penicillin or clindamycin
- Possible that the lack of access to or underutilization of preventive dental care may lead to unnecessary antibiotic prescribing for dental conditions in EDs

*Source: National Hospital Ambulatory Medical Care Survey (NHAMCS) 2010-2012, in press.*

# From IDWeek 2017

- The Minnesota Department of Health (MDH) tracked community-associated *C. diff* infections, infections in patients who did not have an overnight stay in a hospital or nursing home, in five counties in the state.[1]
  - During the six-year period, researchers determined 15 percent of those with the infection who had taken antibiotics had been prescribed them for dental procedures.
  - But one-third of those patients' medical charts included no mention of patients receiving dental procedure-related antibiotics, researchers determined.
- An earlier survey conducted by the MDH found over a third of dentists prescribed antibiotics in situations that are generally not recommended by the American Dental Association (ADA) and reported challenges to making appropriate antibiotic prescribing decisions, including confusion about or perceived conflicts among prescribing guidelines.[2]


1. *Holzbauer et al. Presented at IDWeek 2017.*
2. *Tomczyk, et al. Gen Dent 2018 Sep-Oct;66(5):61-68.*

# From IDWeek 2018

- Cross-sectional study in three U. Utah dentistry clinics
- 6.1% of dental encounters associated with an antibiotic prescription
- The majority of antibiotic prescriptions were not consistent with pre-procedure prophylaxis (10% of prescriptions were consistent with pre-procedure prophylaxis)
- Mean duration of 8.3 days for prescriptions not written as pre-procedure prophylaxis
- Subsequent *Clostridioides difficile* infection was more common after antibiotic-associated encounters

*Spivak, et al. IDWeek poster #255, 2018.*

# Partnerships and Policies: Partners Increasing Uptake of Antibiotic Stewardship in Dentistry

- American Dental Association
  - Updating prescribing guidelines and have included antibiotic prescribing sessions in national meetings
  - Attended White House Antibiotic Stewardship Forum in 2015 and UN General Assembly AMR Challenge in 2018
- American Academy of Orthopaedic Surgeons: AMR Challenge "AAOS will also increase awareness of when antibiotics should and should not be used for patients with hip and knee implants who are undergoing dental procedures."
- Ohio State University—brought dentists and orthopedists together to discuss policies in an Antibiotic Stewardship in Dentistry & Orthopaedic Surgery Workshop
- The Organization for Safety, Asepsis and Prevention (OSAP)

A SAFER DENTAL VISIT

# Considerations for responsible antibiotic use in dentistry

Marie T. Fluent, DDS; Peter L. Jacobsen, PhD, DDS, Dip ABOM; Lauri A. Hicks, DO; for OSAP, the Safest Dental Visit

Alexander Fleming's discovery of penicillin in 1928 is one of the greatest medical advancements in history.[1] The introduction of antibiotics meant that infectious diseases that were once deadly could now be cured. Since 1928, countless lives have been saved, and antibiotics have been recognized as miracle drugs. However, as antibiotic use has become more prevalent, so have antibiotic-resistant bacteria and adverse events associated with their use.[2,3]

## UNINTENDED CONSEQUENCES OF ANTIBIOTIC USE

Antibiotics should be treated as a resource that is naturally limited in supply. Clinicians must consider the potential effect of their antibiotic prescribing choices on the larger community, as well as on individual patients, because there are risks to both. Each time an antibiotic is used, there is an increased risk of developing a subsequent antibiotic-resistant infection in both the patient taking the antibiotic and those in the community who come into contact with the patient. There are several deadly bacteria for which few antibiotics are effective, making treatment of infections associated with these pathogens more costly and less successful.[2] We have begun to enter the microbiome, potentially leading to other long-term consequences, such as asthma and obesity.[9]

## ANTIBIOTIC PRESCRIPTIONS

Antibiotics are among the most commonly prescribed medications. However, study results indicate that 30% to 50% of prescribed antibiotics are either not necessary or not optimally prescribed.[10] Dentists write approximately 10% of all outpatient antibiotic prescriptions (approximately 25.6 million) filled in the United States each year.[11] Although there are few studies in which the investigators evaluate the appropriateness of antibiotic prescribing in dentistry, it is likely that there are opportunities to improve prescribing

# 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.

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

CS267105-1

# 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/

CS278237-B

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

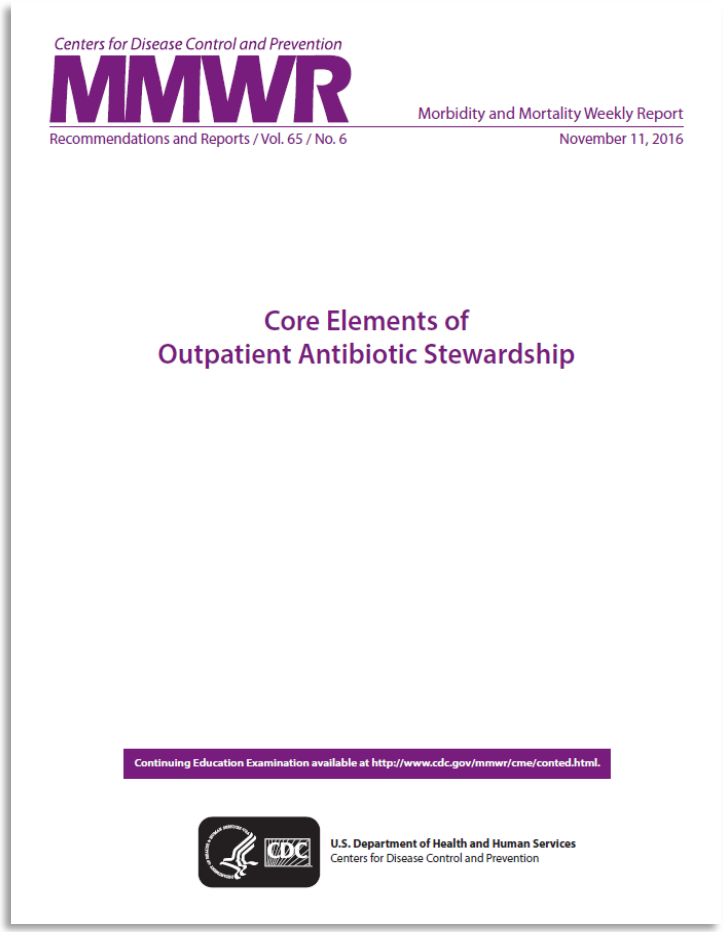
## DO

- ✓ **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.

## DO NOT

- X **DO NOT** skip doses or stop taking your antibiotics without consulting your dentist.
- X **DO NOT** save unused antibiotics for future use or give antibiotics to others.
- X **DO NOT** take antibiotics prescribed for others.
- X **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

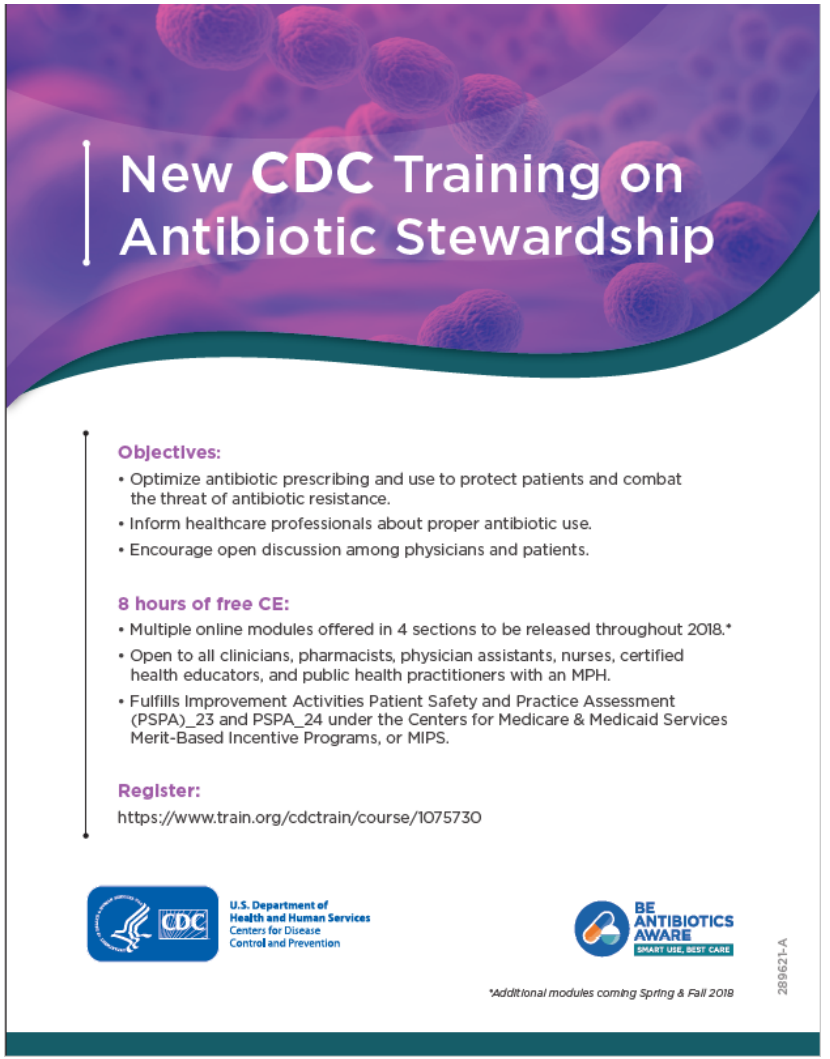




Sanchez GV, Fleming-Dutra KE, Roberts RM, Hicks LA. Core Elements of Outpatient Antibiotic Stewardship. MMWR Recomm Rep 2016;65(No. RR-6):1-12. https://www.cdc.gov/mmwr/volumes/65/rr/rr6506a1.htm?s_cid=rr6506a1_e

# New CDC Training on Antibiotic Stewardship

- Objectives:
  - Optimize antibiotic prescribing
  - Inform healthcare professionals about proper antibiotic use
  - Encourage open discussion among clinicians and patients
- 8 hours of free CE, released in 4 sections through 2018
  - Section 1 is available now
- https://www.train.org/cdctrain/training_plan/3697



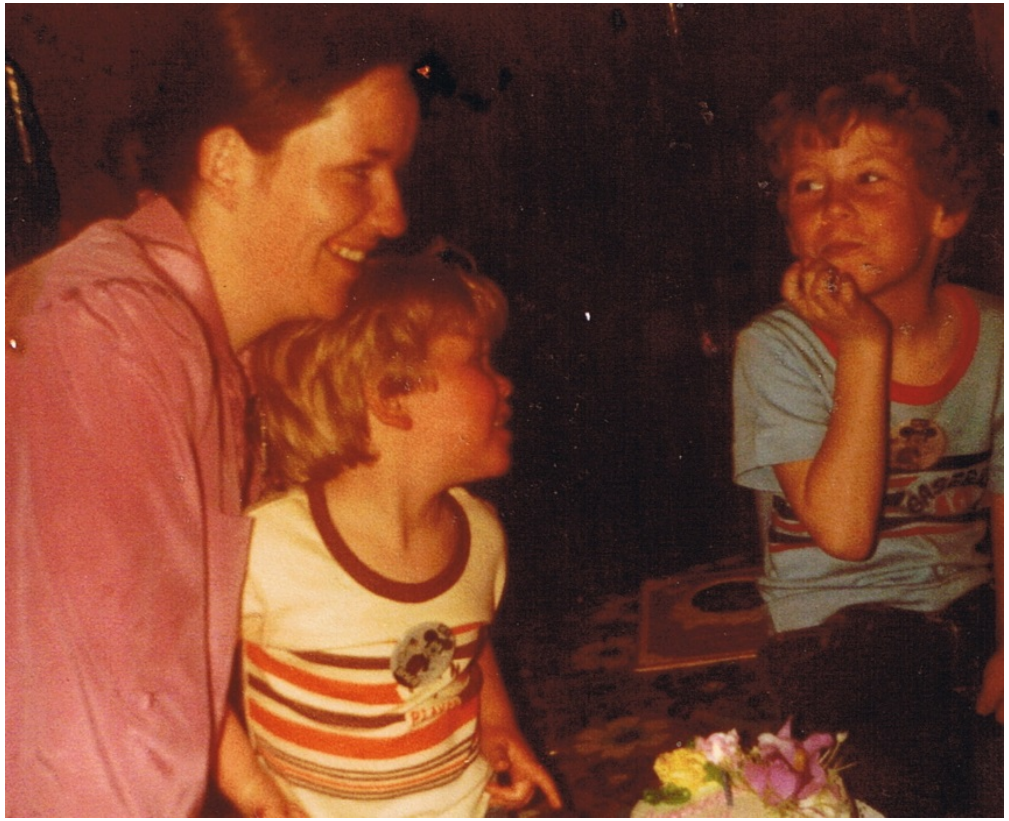
# Challenges to Improving Antibiotic Prescribing in Dentistry

- Lack of clear guidelines and data to inform guidelines
- Dental health professionals may be subject to pressure from patients and other clinicians
- Unclear uptake of de-escalation of prophylaxis recommendations and limited guidance for treatment of infections
- Prescribing data for physicians, nurse practitioners and physician assistants are associated with diagnostic codes, but that is not the case for dentists

# You Can Play a Role in Improving Antibiotic Prescribing in Dentistry

- There are data and guideline gaps that have limited stewardship uptake in dentistry
- Promote optimal prescribing practices by staying up to date on the appropriate management of bacterial oral infections and prophylaxis
- Antibiotic stewards can help to clarify the role of dental prophylaxis and establish local standards bringing relevant partners to the table
- Studies assessing how to measure, assess appropriateness, and improve prescribing in dentistry are needed

# Improving Antibiotic Use in Dentistry is Important: Peggy's Story



http://peggyfoundation.org/


For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

# Extra slide: Top three most common dental ICD9 codes for which antibiotics were prescribed in EDs

| Most common dental ICD9 codes for which antibiotics were prescribed | | | |
|---|---|---|---|
| Diagnosis | ICD9 code | Weighted number of visits in which antibiotics were prescribed (average annual) | Percentage of antibiotics for dental conditions |
| Unspecified disorder of the teeth and supporting structures | 525.9 | 1,731,041 | 44% |
| Periapical abscess without sinus | 522.5 | 911,211 | 23% |
| Dental caries | 521.0 | 605,482 | 15% |

Source: National Hospital Ambulatory Care Survey (NHAMCS), 2010-2012, in press