Antibiotic Use in 2016 by Members of the American Association of Endodontists: Report of a National Survey

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Abstract

Introduction: This study surveyed the antibiotic prescribing practices of endodontists, and data were compared with previous surveys conducted in 1994 and 1999. **Methods:** A 17-question survey was sent via www.surveymonkey.com to 3000 active members of the American Association of Endodontists for responses about antibiotic prescribing practices and demographics. The data were analyzed using descriptive statistics, chi-square tests, and linear regression analyses. **Results:** Six hundred eighty-six participants (22.86%) completed the survey. The most frequently prescribed antibiotics were amoxicillin (60.71%) followed by penicillin V (30.43%) and clindamycin for patients with allergies (95.4%). Respondents reported prescribing antibiotics for irreversible pulpitis with mild symptoms (1.75%), irreversible pulpitis with moderate symptoms (6.41%), necrotic pulp with symptomatic apical periodontitis (43.59%), chronic apical abscess without (10.50%) or with symptoms (29.74%), acute apical abscess (95.92%), avulsion (70.26%), endodontic surgery (41.69%), retreatment (silver point [23.76%] or gutta-percha [15.60%]), postoperative pain after instrumentation or obturation (12.39%), and perforation repair (5.98%). The type of practice (solo/group) and geographic region (Southeast) were significant predictors of increased antibiotic prescribing; 36.89% of respondents reported prescribing antibiotics that are not necessary, most commonly because of patient expectations. **Conclusions:** Since 1999, there has been a significant shift from prescribing penicillin V to amoxicillin as endodontists' first choice of antibiotic and a significant increase in the use of clindamycin for penicillin-allergic patients. Antibiotics continue to be prescribed in clinical situations for which they are typically not indicated, most commonly because of patient expectations. Regional differences in antibiotic prescribing practices by endodontists exist in the United States. *(J Endod 2017;■:1–8)*

Key Words

Amoxicillin, antibiotics, clindamycin, endodontic therapy, endodontists, penicillin, root canal, survey

Significance

AAE members were surveyed about their antibiotic prescribing practices. Since 1999, amoxicillin and clindamycin prescribing has significantly increased, and penicillin has decreased. 37% of respondents reported prescribing antibiotics that are not necessary, most commonly because of patient expectations. Regional differences in prescribing practices exist in the US.

Alexander Fleming's 1929 seminal publication on penicillin helped usher in the antibiotic era in medicine (1). However, within a decade, antibiotic resistance to sulfanilamide was reported in 1937 followed by penicillin in 1940 (2, 3). By the 1950s, antibiotic resistance outbreaks in hospitals were a serious concern (4). Attempts to combat resistant microorganisms by developing new antibiotics helped, but it became apparent that the new antibiotics were not immune from resistance (5). Multidrug-resistant bacteria are now commonly identified in hospitals around the world, including a class of bacteria resistant to all known therapies (pandrug-resistant bacteria) (6).

The inappropriate use of antibiotics contributes to the spread of antibiotic resistance. It is estimated that over 250,000 people per year in the United States are diagnosed with an antibiotic-resistant infection, of which 23,000 will succumb and die (7). Conservatively, each year the US health care system spends an additional $20 billion treating antibiotic-resistant infections (7). Those infections lead to an estimated $35 billion in lost worker productivity and pose a major threat to the national health care system and the economy at large (8). A presidential executive order to combat antibiotic-resistant bacteria was issued in 2014; this document included a section on the need for the implementation of improved antibiotic stewardship in health care settings by the end of 2016 (8).

Dentistry's contribution to antibiotic resistance is difficult to calculate; it has been estimated that dentists prescribe 10% of the antibiotics consumed by humans (5, 9). A recent study of a centralized, population-based prescription database in British Columbia found that antibiotic prescribing by dentists increased by 62.2% from 1996 to 2013 (10). Given that 50% or more of the antibiotics provided in the United States are estimated to be prescribed incorrectly (7), dentistry is likely to have had an impact on the development of antibacterial resistance (5, 7, 9, 11). Bacteria showing resistance to common antibiotics have been isolated from deep neck

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0099-2399/$ - see front matter

http://dx.doi.org/10.1016/j.joen.2017.05.009

Baseline demographics

1. What year did you graduate from dental school?

2. What year did you graduate from your endodontic residency?

3. How many years have you been in practice?

4. What is your gender?
Male
Female

5. Which of the following best describes your working situation? (Please select one.)
Full-time private practice
Academics only
Retired
Part-time private practice
Part-time practice/part time academics

6. Which type of practice best describes your practice? (Please select one.)
Corporate practice
Group practice
Solo practice
Military
Academics

7. In which region do you practice?
Northeast (MA,RI,CT,VT,NH,ME,NY,NJ)
Mid Atlantic (PA, MD, DE,WV,VA,NC,SC, Wash. DC)
Southeast (KY,TN,AR,LA, MS, AL,GA,FL)
Great Lakes (MN,WI, IL, IN, MI, OH)
Midwest (NM,CO,WY,MT,ND,SD,NE,KS,OK,TX,IA,MO)
Western (WA,OR,CA,ID,NV,UT,AZ,AK,HI)
Other_____

8. On average how many patients do you treat in a week?

9. On average how many times in a week do you prescribe antibiotics?

10. In which of the following situations would you prescribe antibiotics? (Please select all that apply.)
- Irreversible Pulpitis; mod/severe pre-op symptoms
- Irreversible Pulpitis with Symptomatic Apical Periodontitis; mod/severe pre-op symptoms
- Necrotic Pulp with Symptomatic Apical Periodontitis; no swelling, mod/severe pre-op symptoms
- Necrotic Pulp with Chronic Apical Abscess; sinus tract present; no/mild pre-op symptoms
- Necrotic Pulp with Chronic Apical Abscess; sinus tract present; mod/severe pre-op symptoms
- Necrotic Pulp with Acute Apical Abscess; swelling present; mod/severe pre-op symptoms

11. In which of the following situations would you prescribe antibiotics? (Please select all that apply.)
- Avulsion
- I & D of a localized intraoral swelling, no external swelling
- I & D of a diffuse intraoral swelling, no external swelling
- I & D of a diffuse intraoral oral swelling, external swelling present
- Post-op pain after instrumentation or obturation
- Retreatment of silver points
- Retreatment of gutta percha
- Perforation repair (before or after)
- Endodontic surgeries (before or after)

Antibiotic selection

12. Please **select** the **antibiotic** and **dosage** you prescribe most often for patients with **no medical allergies.**

Drug	Dosage (please circle)	Number of Days
Amoxicillin	250mg, tid | 500mg, tid	_____
Ampicillin	250mg, qid | 500mg, qid	_____
Augmentin	250mg, tid | 500mg, tid	_____
Azithromycin (Zithromax)	250mg, qid	_____
Cephalexin	250mg, qid | 500mg, qid	_____
Ciprofloxacin (Cipro)	500mg, bid | 750mg, bid	_____
Clarithromycin (Biaxin)	250mg, bid | 500mg, bid	_____
Clindamycin	150mg, qid | 300mg, qid	_____
Erythromycin Base	250mg, qid | 500mg, qid	_____
Metronidazole (Flagyl)	250mg, qid | 500mg, qid	_____
Penicillin V	250mg, qid | 500mg, qid	_____
Tetracycline	250mg, qid | 500mg, qid	_____
Other: _____	Dosage: _____	Number of Days: _____

13. Please **select** the **antibiotic** and **dosage** you prescribe most often for patients with an **allergy to penicillin.**

Drug	Dosage (please circle)	Number of Days
Azithromycin	250mg, qid	_____
Cephalexin	250mg, qid | 500mg, qid	_____
Ciprofloxacin	500mg, bid | 750mg, bid	_____
Clarithromycin	250mg, bid | 500mg, bid	_____
Clindamycin	150mg, qid | 300mg, qid	_____
Erythromycin base	250mg, qid | 500mg, qid	_____
Metronidazole	250mg, qid | 500mg, qid	_____
Tetracycline	250mg, qid | 500mg, qid	_____
Other: _____	Dosage: _____	Number of Days: _____

Antibiotic prescribing practices

14. Do you prescribe a loading dose?
Yes
No

15. If your antibiotic prescription is ineffective after 2-3 days what would you do? (Select all that apply.)
Change antibiotics?
If so, to which antibiotic? _____
Add a second antibiotic?
If so, which antibiotic?_____
Other
Please explain: _____

16. Do you prescribe antibiotics differently based on the day of the week?
Yes
No
If yes, please explain:_____

17. Do you ever prescribe antibiotics that are not necessary?
Yes
No
If yes, what percentage?_____
Please explain: _____

Figure 1. The survey questionnaire.