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### ABSTRACT

The misuse of antibiotics has been associated with adverse events that have the potential to burden the health-care system and negatively impact current and future generations. The practice of antibiotic stewardship will help dentists prescribe the appropriate antibiotic with the correct dosage, duration, and timing for patient diagnoses, which will likely improve patient outcomes. This course will provide an understanding of antibiotic stewardship, aid dental teams in the evaluation of their current protocols, and apply clinical practice guideline tools for optimal antibiotic stewardship.

### EDUCATIONAL OBJECTIVES

At the conclusion of this educational activity, participants will be able to:

1. Describe the risks, benefits, and impact of the inappropriate use of antibiotics
2. Explore the concept of antibiotic stewardship in clinical practice
3. Evaluate existing national trainings, state tool kits, and practice guidelines in general dentistry



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# Antibiotic stewardship

A PEER-REVIEWED ARTICLE | by Erinne Kennedy, DMD, MPH, MMSc

Today, researchers can better connect unfavorable patient outcomes to inappropriate antibiotic use. As we understand this connection in more detail, the demand for antibiotic stewardship in inpatient and outpatient settings increases. Antibiotic stewardship is defined as “the optimal selection, dosage, and duration of antimicrobial treatment that results in the best clinical outcome for the treatment or prevention of infection, with minimal toxicity to the patient and minimal impact on subsequent resistance.”<sup>1</sup>

### Adverse events

Adverse patient outcomes associated with inappropriate antibiotic use include allergic reactions, antibiotic resistance, opportunistic

infections such as *Clostridioides difficile* (*C. diff*) infections (CDI), and the disruption of normal flora. As clinicians practicing evidence-based dentistry (EBD), we are called to evaluate each clinical case that may benefit from antibiotic use with the latest evidence and our own personal expertise, while accounting for patient needs, desires, and values. Understanding the risks and benefits associated with the use of antibiotics will help our practice of EBD for preventing and treating oral infections.<sup>1</sup>

An example of a short-term adverse event associated with systemic antibiotic use is an allergic reaction. Data from 2011 to 2015 demonstrated adults aged 20 and older had an estimated 145,490

emergency department visits for adverse events associated with antibiotic use.<sup>2</sup> Across all adverse drug events, about 13% are attributed to antibiotic use, and studies estimate 74 to 78% of antibiotic-associated adverse events are allergic reactions.<sup>2,3</sup>

The most common antibiotic classes that resulted in adverse events included sulfonamides, penicillins, and quinolones.<sup>2</sup> Among general dentists, these three antibiotic classes account for most prescribed antibiotics for prevention and treatment of oral infections.<sup>4</sup> By judiciously using antibiotics, we could decrease adverse reactions as well.

In addition to allergic drug reactions, antibiotics can alter aspects of the microbiome that are beneficial to the body's homeostasis. Antibiotics benefit the host by treating the infection and benefit the community by preventing the spread of infection. However, one of the consequences associated with antibiotics, particularly broad-spectrum antibiotics, is the disruption of normal flora by reduction of bacterial diversity, decreased metabolome, and increased risk for antibiotic-resistant bacteria to thrive.<sup>5,6</sup>

Disruption of the normal flora impacts the commensals that defend our gut from invasive species of *Candida* and *Clostridioides difficile*. The human microbiome encompasses the organisms, genes, metabolites, and the host, as well as their intimate and collective interactions. Dentists are among the top prescribers of clindamycin and are more likely to prescribe it inappropriately.<sup>7</sup>

Once antibiotic treatment has stopped, the microbiota works to return to its preexposure state but does not typically fully recover, meaning the compromised state can last for years.<sup>5</sup> Although we still do not fully understand the impact of gut microbiome disruption on our immune system, cognitive abilities, and

metabolism, we do know it can alter these functions and/or result in disease.

A long-term complication of inappropriate antibiotic use is the rise and spread of antibiotic-resistant infections. According to the Centers for Disease Control and Prevention (CDC), antibiotic resistance is an urgent national public health threat causing at least 2.8 million infections per year.<sup>8</sup> The 2019 Antibiotic Resistance Report, published by the CDC, estimates that CDI caused 223,900 cases in hospitalized patients and claimed at least 12,800 lives.<sup>8</sup>

The minimum inhibitory concentration (MIC) is the amount of drug needed to kill a bacterial organism and how we measure antibiotic resistance. In each population of bacteria causing an infection, there is a range of MICs with some in the population needing more drug to kill or inhibit the growth of some of the bacteria. These organisms may survive during treatment, and in some situations, the mutations causing the higher MIC or resistance can be transferred to other bacteria, including organisms that are naturally colonized. An example is *C. diff*, which colonizes at low levels among normal flora, but antibiotics are associated with disruption of this flora, often leading to antibiotic-resistant organisms and the potential for CDI.<sup>9</sup> Research shows that a single dose of clindamycin results in disruption of the microbiome and can present risks to the patient.<sup>10</sup> This transfer of resistance can occur in other environments. For example, *Escherichia coli* (*E. coli*) that is resistant to fluoroquinolones such as ciprofloxacin has been identified in water sources, particularly in developing countries.

Health-care facilities often administer antibiotics to treat infections that can result in resistant infectious organisms. These resistant organisms can spread through contaminated

objects (fomite transfer) or unclean hands in a hospital environment. Those who come into contact with the microbes can then transfer them to patients in the community. Patients who are most at risk of antibiotic resistance include those who receive treatment for end-stage renal disease, organ transplants, chemotherapy, complex surgery, or patients with immunosuppression and/or autoimmune diseases.<sup>8</sup>

A costly adverse outcome associated with the use of antibiotics is *Clostridioides difficile* infection. *C. diff* is an anaerobic, gram-positive, spore-forming bacillus that induces pseudomembranous colitis. Strains of *C. diff* can become drug resistant, and they are increasing in prevalence and severity. Complications from CDI are costly and range in severity from diarrhea to severe complications such as toxic megacolon, sepsis, colectomy, and death.<sup>11</sup> In 2017, 223,900 cases of CDI resulted in hospitalizations among patients in the United States, and an estimated 12,800 of these infections resulted in death.<sup>8</sup> Like antibiotic resistance, the CDC has classified *Clostridioides difficile* as an urgent public health threat.<sup>8</sup>

Antibiotics commonly used in dentistry and frequently associated with CDI include clindamycin, penicillins (including ampicillin and amoxicillin), and cephalosporins.<sup>12,13</sup>

### Antibiotic prescribing patterns

Short- and long-term adverse events can result from clinical scenarios in which antibiotics are used inappropriately. Antibiotic stewardship has the ability to reduce, but not eliminate, the patient risks for these adverse events. A 2017 study examined outpatient antibiotic claims data for the 2015 calendar year, finding that all dentists, including specialists, were ranked third by count of antibiotics prescribed.<sup>4</sup> General dentists

ranked first in the number of prescriptions, accounting for 17.93% of all prescribers and 13.17% of all prescriptions over the year. Most antibiotic courses spanned seven to 10 days, with few lasting less than five. Prescription rates were also highest in the southern and northeastern United States. While antibiotics are essential for preventing and treating oral infections, they are often used inappropriately.

### Practical implementation of antibiotic stewardship practices

Most antibiotics are prescribed in outpatient settings, including dental offices. The CDC shares and explains the common reasons for the inappropriate use of antibiotics.<sup>14</sup>

- Unnecessary antibiotic use is a situation in which a provider prescribes an antibiotic when it is not indicated. A possible example of unnecessary antibiotic use in dentistry is prescribing a systemic antibiotic for a healthy patient presenting with irreversible pulpitis.<sup>15</sup> In this case, definitive dental treatment is recommended.
- Improper antibiotic selection is when the wrong antibiotic is prescribed for a specific diagnostic condition.
- Errors in antibiotic dosing occur when the proper antibiotic is selected for the correct duration, but the dosing is too frequent, infrequent, or the individual doses are too high or too low. An example would be prescribing a pediatric dose of amoxicillin for an adult with pericoronitis.
- Errors in antibiotic duration result in inappropriate dosing. For example, if a patient with dental cellulitis is given only one dose of amoxicillin, 2 g would be incorrect. That dosage is used for antibiotic prophylaxis when needed. A longer

duration of antibiotics based on the case-specific details would be recommended to treat the condition adequately.

In dentistry, there are challenges in quantifying antibiotic misuse. This is partly because, in lieu of diagnostic codes, procedure codes are associated with dental visits or prescriptions. As a result, we are unable to track and link a diagnosis to the drug, dose, duration, and timing of prescriptions, making assessment of appropriateness of use difficult.<sup>16</sup> Lack of awareness and slow adoption of current guidelines for cardiovascular and prosthetic joint prophylaxis have also been indicated as reasons for nonadherence and altered prescribing patterns among dentists.<sup>17,18</sup> Diagnostic uncertainty, fear of adverse outcomes and medicolegal liability, pressure for patient satisfaction, and decision fatigue have also been associated with unnecessary antibiotic use among medical and dental providers as well.<sup>14</sup>

A Canadian dental survey reported further explanations for unnecessary antibiotic prescriptions that included unnecessary treatment for periapical abscess and irreversible pulpitis, prescribing patterns associated with dental implant surgery and further complications, and palliative care for uninsured patients seeking a substitute for definitive care, among others.<sup>17</sup>

### Addressing patients

Patients may struggle to understand why they no longer need prophylactic antibiotics when they were previously told it was necessary. It is essential to an evidence-based practice and protocols to ensure providers properly educate and communicate with patients about their risks. Adhering to the new guidelines will help reduce the risk of an adverse event due to inappropriate antibiotic use. The

American Dental Association (ADA) has published guidelines for patients with specific cardiac conditions and patients with total joint replacements.<sup>19,20</sup> For patients with total joint replacements, evidence suggests antibiotics are no longer recommended.

The CDC encourages antibiotic stewardship to reduce adverse patient outcomes and decrease the cost burden on the health-care system.<sup>21</sup> Antimicrobial stewardship is defined by the Association for Professionals in Infection Control and Epidemiology (APIC) as “a coordinated program that promotes the appropriate use of antimicrobials (including antibiotics), improves patient outcomes, reduces microbial resistance, and decreases the spread of infections caused by multidrug-resistant organisms.”<sup>22</sup> The CDC has created a framework to help providers, such as dentists, to implement these principles, called the Core Elements of Outpatient Antibiotic Stewardship.<sup>23</sup> The four core elements include a commitment to judicious prescribing and patient safety, implementing at least one policy or new clinical practice to improve antibiotic stewardship, tracking and reporting prescribing practices, and offering education for patients, staff, and clinicians.<sup>23</sup>

### Tips for antibiotic stewardship implementation in private practice dental offices

#### 1. MAKE A COMMITMENT

Practicing antibiotic stewardship starts with the clinician’s commitment to safe and responsible prescribing. Making a commitment may be different for each provider. The CDC recommends dental offices identify a “stewardship champion” to coordinate and execute stewardship protocol.<sup>23</sup> One of the best ways that you can support this rule is to include these responsibilities in job descriptions of oral health-care team

members. For example, you may choose to have your lead assistant, hygienist, office manager, or infection control coordinator hold the role of stewardship champion. In the Antibiotic Stewardship toolkit for Massachusetts, you will see sample job descriptions that you can adapt for your team.<sup>24</sup>

In their role, the antibiotic stewardship champion can help others make a commitment, schedule trainings and/or train team members on antibiotic stewardship, conduct and summarize audit reports, and promote provider, staff, and patient education throughout the office and social media platforms.

Additionally, it's important that auxiliary staff be trained to adequately communicate with patients about the office protocol and clinicians' practice standards of antibiotic use.

## 2. IMPLEMENT NEW POLICIES OR PRACTICES

Tools exist to help you as a practitioner prescribe responsibly. Association for Dental Safety (ADS, formerly known as "OSAP") supports a team that curates a website monthly with antibiotic-stewardship-related resources.<sup>25</sup> The resources are organized by audience, including policymakers, prescribers, dental team members, and patients. The CDC also has a website with antibiotic stewardship resources for oral health teams as well as a checklist for dentists to help them prescribe antibiotics.<sup>26,27</sup> Hanging this checklist in your operatories or office where you frequently write your prescriptions will help you develop a protocol for prescribing safely and accurately diagnosing patients.

It is important to remember that the dentist doesn't have to prescribe alone; they can collaborate with their stewardship champion and other health-care providers in the

community. Interdisciplinary care centered around the patient can help the dentist practice evidenced-based dentistry. A report published by the Veterans Association (VA) demonstrated a 12% decrease in inpatient prescribing of antibiotics over the course of seven years when primary care providers, pharmacists, and dentists worked together to provide interdisciplinary care.<sup>28</sup>

Alongside interdisciplinary care, supporting antibiotic stewardship within our profession is essential. Committing to stewardship can be even more impactful when shared with local study clubs or colleagues. Consider dedicating study club time to case discussions, sharing community impact stories, and collaborating on better clinical decision-making.

## 3. TRACK AND REPORT

Each oral health professional must be accountable for their own prescribing patterns. One way to do this is through conducting a self-audit. The Massachusetts State Toolkit is a comprehensive resource that is easy to follow and divided into five indicator factors that help the clinician identify how they are prescribing. Through the use of the Antibiotic Stewardship Chart Audit Tool,<sup>24</sup> the clinician can determine their own prescribing patterns and determine what changes need to be implemented to be a more effective steward of antibiotics.

The first section is about informed consent and medical history. It prompts the prescriber to obtain a thorough, up-to-date patient history and see if they had a recent medical or dental treatment that required antibiotics.

The second section is about the diagnostic indicator, which helps the prescriber collect all the information necessary to make a proper assessment of the patient's presenting condition. This segment looks at

intraoral and extraoral findings, radiographic evaluation, and the pulpal and periapical diagnoses of symptomatic teeth. It also reinforces the need for diagnostic testing such as percussion, palpation, probing depths, hot and cold testing, and the electronic pulp testing for accurate diagnosis prior to prescribing. The CDC Checklist also notes the importance of an accurate diagnosis as a key to responsible prescribing.

The third section of the assessment tool reviews the indications for antibiotic use. These symptoms include, but are not limited to, prophylaxis procedures, localized fluctuant swelling, elevated temperature, inability to remove the drain or source of infection, and delayed treatment or specialty referral. Patient expectations are also listed under this indication. Evidence-based practice is ideal, but if you find that patients are influencing your practice, you can use this data to train staff or to create office policies concerning antibiotic prescribing to guide your patient base.

The fourth section is the stewardship review, which assesses each case, stewardship guidelines, and drugs prescribed within the current recommendations. This review aims to determine if the dosage, duration, and frequency of the antibiotic prescription aligns with the diagnosis, evidence, and treatment plan for the patient, allowing the prescriber to adjust how they will treat a case in the future.

The fifth section is a review of the actions to change and apply to future cases. Often, this will be to apply a new guideline to your decision-making toolkit or update your data collection method to gather additional patient information that may be helpful in decision-making.

We recommend training all team members on how to use the Antibiotic Stewardship Chart Audit Tool and to review as a team quarterly. Since each



team member assists in the collection of data, it is essential to train them on important chart information for evaluating antibiotic stewardship practices. Roughly a quarterly report of all prescriptions, including the name of the antibiotic, dosage, and duration of each prescription that was written by each practitioner in the practice, should be recorded. Regularly reviewing these reports can help your team identify any prescribing patterns that can be improved.

#### 4. PATIENT AND STAFF EDUCATION

Prescribers are accountable to the patient and the community at large to practice antibiotic stewardship, and one way to do this is to provide patients and clinicians with educational resources on current antibiotic guidelines. Each dentist, dental assistant, and dental hygienist should have access to the ADA Chairside Clinical Guide, an example of effective education materials.<sup>29</sup> This guide reviews the protocol for patients with prosthetic joints in relation to the use of antibiotics prior to a prophylaxis.

The ADA's Center for Evidence-based Dentistry released a clinical practice guideline titled "Evidence-based clinical practice guideline on the antibiotic use for the urgent management of pulpal- and periapical-related dental pain and intraoral swelling."<sup>30,31</sup> In addition to providing clinical guidance for patients with urgent tooth pain and/or swelling, with or without dental care immediately available, the guidelines outlined some key practices. The key practices include:

- Definitive conservative dental treatment (including pulpotomy, pulpectomy, etc.) is the best treatment for patients with tooth pain and/or swelling.
- Reevaluate patients after 72 hours, and discontinue antibiotics 24 hours after symptoms resolve

so that courses of antibiotics are shorter for patients. Ideally, they are three to five days, instead of the historic seven to 10.

- Use amoxicillin as a first-line antibiotic.
- Patient compliance is important. Prescribe with twice (BID) or three (TID) times per day dosing.
- For pain management, use over-the-counter combination therapy of nonsteroidal anti-inflammatory drugs (NSAIDs) and acetaminophen.

Accompanying this guideline are two additional chairside guides that help clinicians use antibiotics to treat tooth pain and intraoral swelling when dental care is or is not available in adult patients who are not immunocompromised. Printing the guide and laminating the document for chairside use as well as hanging posters throughout the office in locations such as treatment rooms, restrooms, and reception areas is another way for the dental team to demonstrate that they are making a commitment to antibiotic stewardship. Signage and educational materials can supplement and reinforce information offered by dental team members.

The impact of providing patient materials is often underestimated. A recent study explored the relationship of a low-cost behavioral intervention (a personalized poster) that demonstrated a public commitment to stewardship concerning acute respiratory infections.<sup>32</sup> They found that a commitment poster with clinician photographs and signatures, when displayed in the examination room for 12 weeks, showed a significant decrease in unnecessary antibiotic prescribing for those with the poster compared to the control with no poster.<sup>32</sup> It is important to note that the study mentions that unnecessary prescribing patterns were still high, greater than 30%, even after the

poster intervention. This supports the idea that continual education and implementation of a stewardship program is still needed.

Sharing informational content through social media accounts prior to the appointment can also prepare the patient for their appointment. A recent study noted that "...94% of respondents stated they read [posters and leaflets provided in medical and dental offices], 45% took the leaflets home, and 78% indicated they understood the content of the leaflets. Nineteen percent of respondents reportedly discussed the content of the leaflets with their physician and 26% indicated that leaflets allowed them to ask fewer questions of their physician."<sup>33</sup> Educational infographics can enhance the patient's knowledge and reinforce the information shared by the dental team.

Suggestions for using patient educational material on social media platforms in dental offices can be found in the Massachusetts State Toolkit for Antibiotic Stewardship for Oral Health Clinicians.<sup>24</sup>

Additionally, audio and video content can be highlighted through office newsletters, emails, patient reminder systems, and social media accounts. The CDC and some state toolkits provide audio and video resources to assist the dental team in educating patients on the risks and benefits of taking antibiotics, the expectations for use, and the role of stewardship in good practice.<sup>14</sup>

#### Team meetings

To effectively achieve antibiotic stewardship, it is essential to conduct regular team meetings. This allows the team to evaluate the current science, train staff on protocol, reinforce the practice's stewardship commitment, and review patient cases. All team members need to practice communicating with patients about the

science and recommendations of antibiotic stewardship. Communication can be challenging, but when updating the science, phrases such as “we now know,” “current research demonstrates,” and “the benefits of the antibiotic do not outweigh the risks” can increase patient confidence.

Furthermore, team meetings allow for all members to present questions and review the office policy concerning antibiotic stewardship. Empowering each team member to represent the commitment will increase their credibility with patients and will reinforce the importance of antibiotic stewardship for the patient and the community.

There are multiple resources that can be reviewed during team meetings. The CDC and ADS provide valuable online CE courses.<sup>14,25</sup> The online antibiotic stewardship course reviews the history of antibiotic use, the process of antibiotic resistance, and practical steps to implement to encourage responsible prescribing. As a dental team, it may be useful to work through these online resources during meetings or attend training in your state. When onboarding new employees, providing training on the practice’s commitment to stewardship is essential so that the team shares uniform information with the patients.

## Conclusion

This course is intended to provide an introduction to the impact you can make for your patients and community by practicing antibiotic stewardship in your office. Take the first step today by committing to one aspect of stewardship by writing it down and sharing it with your team. Explore the resources through the CDC and professional dental organizations and reach out to your state’s department of public health. This network will help you identify resources with

regard to antibiotic stewardship for dental health-care workers and help you start your own journey in stewardship.



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## QUESTIONS

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- Which of the following is not an adverse outcome of antibiotic use?
  - Toxicity
  - Antibiotic resistance
  - Alteration of the gut microbiome
  - Resolution of an infection
- Among adverse drug events from medications, what percent is associated with antibiotics?
  - ~13%
  - ~23%
  - ~33%
  - ~43%
- What are the top three antibiotics classes that result in allergic reactions leading to emergency department visits?
  - Macrolides, penicillins, and quinolones
  - Sulfonamides, macrolides, and quinolones
  - Penicillins, macrolides, and quinolones
  - Sulfonamides, penicillins, and quinolones
- Antibiotics are known to disrupt the normal flora of the microbiome. The compromised state of the gut microbiota can last for how long?
  - Minutes
  - Days
  - Months
  - Years
- According to the CDC, antibiotic resistance is classified as which level of public health threat?
  - Mild
  - Concerning
  - Serious
  - Urgent
- Which of the following conditions result in an increased susceptibility of developing an antibiotic-resistant infection?
  - End-stage renal disease
  - Chemotherapy
  - Immune suppression
  - All of the above
- Which of the following classes of antibiotics are commonly used in dentistry and frequently associated with *Clostridioides difficile* infections?
  - Clindamycin
  - Vancomycin
  - Cephalosporins
  - A and C
- In 2017, approximately how many cases of *Clostridioides difficile* infection (CDI) resulted in hospitalization of patients in the United States?
  - 123,800
  - 223,900
  - 323,800
  - 423,900
- In 2017, approximately how many cases of *Clostridioides difficile* resulted in death among patients in the United States?
  - 8,800
  - 10,800
  - 12,800
  - 22,800
- According to the CDC, *Clostridioides difficile* infections are classified as which level of public health threat?
  - Mild
  - Concerning
  - Serious
  - Urgent
- According to a 2017 study by Durkin et al., how do general dentists rank by count of prescriptions of all healthcare providers?
  - First
  - Second
  - Third
  - Last
- According to a 2017 study by Durkin et al., of all prescriptions written during this one-year period, what estimated percentage was attributed to dentists?
  - 10%
  - 11%
  - 12%
  - 13%
- According to a 2017 study by Durkin et al., in which regions of the United States was the number of prescriptions written by dentists the highest?
  - Northeast and South
  - Northwest and Midwest
  - Midwest and Southwest
  - None of the above
- Which of the following are reasons for the inappropriate use of antibiotics?
  - Improper antibiotic selection
  - Errors in dose
  - Errors in duration
  - All of the above
- A pediatric patient presents with a diffuse odontogenic infection associated with tooth No. 23. You prescribe an adult dose of amoxicillin. How would you classify this error?
  - Unnecessary use
  - Improper antibiotic selection
  - Error in dose
  - Error in duration
- Prescribing a systemic antibiotic for a patient presenting with only tooth pain and access to dental care is an example of:
  - Antibiotic stewardship
  - Improper antibiotic selection
  - Error in dosing
  - Unnecessary antibiotic prescription
- What is the term for prescribing the wrong antibiotic for a specific diagnostic condition?
  - Antibiotic stewardship
  - Improper antibiotic selection
  - Error in dosing
  - Unnecessary antibiotics
- According to a survey of Canadian dentists, what were possible explanations for unnecessary antibiotic prescriptions?
  - Prescriptions used as palliative care
  - Antibiotic prescription for periapical abscesses or irreversible pulpitis
  - Prescribing patterns associated with dental implant surgery
  - All of the above
- Which of the following statements is not true regarding patients with prosthetic joints?
  - Dental procedures pose no greater risk for systemic bacteremia than activities of daily living such as brushing your teeth.
  - The use of antibiotic prophylaxis is recommended.
  - Recommendations for antibiotic prophylaxis should be considered individually in each patient depending on medical history.
  - All of the above are true.

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20. The CDC has created a framework to help providers, such as dentists, implement antibiotic stewardship. What is it called?

- A. Core Elements of Outpatient Antibiotic Stewardship
- B. Elements of Outpatient Antibiotic Stewardship
- C. Comprehensive Elements of Outpatient Stewardship
- D. Core Elements of Antimicrobial Stewardship in Outpatients

21. What are the four core elements of outpatient antibiotic stewardship?

- A. Commitment; action for policy and practice; monitoring; education and expertise
- B. Contribution; action for policy and practice; tracking and reporting; education and expertise
- C. Commitment; support for policy and practice; tracking and reporting; education and expertise
- D. Commitment; action for policy and practice; tracking and reporting; education and expertise

22. How can dental professionals demonstrate their commitment to antibiotic stewardship?

- A. Customized posters in the reception area
- B. Social media content
- C. Patient pamphlets
- D. All of the above

23. The CDC recommends that a person be responsible for helping other team members be trained and evaluated on the importance of antibiotic stewardship, organize reports, and organize provider, staff, and patient education. What is the role of this person called?

- A. Lead assistant
- B. Lead RDH
- C. Office manager
- D. Stewardship champion

24. What percentage of respondents stated they read posters and leaflets provided in medical and dental offices?

- A. 94%
- B. 74%
- C. 64%
- D. 54%

25. What does ADS stand for?

- A. Association for Daily Subscribers
- B. Agency for Dental Solutions
- C. Association for Dental Safety
- D. Agency for Dental Staff

26. According to the CDC checklist, which of the following is key to responsible prescribing?

- A. Accurate diagnosis
- B. Pharmacist availability
- C. Accuracy of allergy testing
- D. None of the above

27. What tool can help the dental team keep track of cases in which antibiotics are used so they can review and adapt practices?

- A. Self-audit reports
- B. Educational posters
- C. Case review
- D. All of the above

28. An example of a definitive conservative dental treatment is:

- A. Dental radiograph
- B. Dental exam
- C. Pulpotomy
- D. Antibiotic and/or pain medication

29. If you are planning to hang a poster in your office regarding your commitment to antibiotic stewardship, which of the following practices could make this more effective?

- A. Cover it up with other posters
- B. Sign it with your signature
- C. Put your office logo on the poster
- D. None of the above

30. When is communication and training recommended for the dental team regarding antibiotic stewardship?

- A. During onboarding
- B. At team meetings
- C. Annually
- D. All of the above



## Antibiotic stewardship

NAME:	TITLE:	SPECIALTY:	
ADDRESS:	EMAIL:	AGD MEMBER ID (IF APPLIES):	
CITY:	STATE:	ZIP:	COUNTRY:
TELEPHONE (PRIMARY):	TELEPHONE (OFFICE):		

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If you have any questions, please contact [dace@endeavorb2b.com](mailto:dace@endeavorb2b.com) or call (800) 633-1681. A score of 70% or higher is required for CE credit.

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### EDUCATIONAL OBJECTIVES

- Describe the risks, benefits, and global impact of the inappropriate use of antibiotics
- Explore the concept of antibiotic stewardship in clinical practice
- Evaluate existing national trainings, state tool kits, and practice guidelines in general dentistry
- Define true penicillin allergy and implement clinically relevant antibiotic protocols for individuals with and without true penicillin allergy seeking dental care

### COURSE EVALUATION

- Were the individual course objectives met?

Objective #1: Yes No

Objective #3: Yes No

Objective #2: Yes No

Objective #4: Yes No

Please evaluate this course by responding to the following statements, using a scale of Excellent = 5 to Poor = 0.

- |  |     |    |   |   |   |   |
|--|-----|----|---|---|---|---|
| 2. To what extent were the course objectives accomplished overall?       | 5   | 4  | 3 | 2 | 1 | 0 |
| 3. Please rate your personal mastery of the course objectives.           | 5   | 4  | 3 | 2 | 1 | 0 |
| 4. How would you rate the objectives and educational methods?            | 5   | 4  | 3 | 2 | 1 | 0 |
| 5. How do you rate the author's grasp of the topic?                      | 5   | 4  | 3 | 2 | 1 | 0 |
| 6. Please rate the author's effectiveness.                               | 5   | 4  | 3 | 2 | 1 | 0 |
| 7. Was the overall administration of the course effective?               | 5   | 4  | 3 | 2 | 1 | 0 |
| 8. Please rate the usefulness and clinical applicability of this course. | 5   | 4  | 3 | 2 | 1 | 0 |
| 9. Please rate the usefulness of the references.                         | 5   | 4  | 3 | 2 | 1 | 0 |
| 10. Do you feel that the references were adequate?                       | Yes | No |   |   |   |   |
| 11. Would you take a similar course on a different topic?                | Yes | No |   |   |   |   |

- If any of the continuing education questions were unclear or ambiguous, please list them.

\_\_\_\_\_

- Was there any subject matter you found confusing? Please describe.

\_\_\_\_\_

- How long did it take you to complete this course?

\_\_\_\_\_

- What additional dental continuing education topics would you like to see?

\_\_\_\_\_

\_\_\_\_\_

Mail/fax completed answer sheet to:

**Endeavor Business Media**

Attn: Dental Division; 7666 E. 61st St. Suite 230, Tulsa, OK 74133  
Fax: (918) 831-9804

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| 11. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 26. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 12. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 27. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 13. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 28. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 14. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 29. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |
| 15. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D | 30. <input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D |

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