Antibiotic Stewardship Toolkit

For Dental Providers

GEORGIA DEPARTMENT OF PUBLIC HEALTH

CONTENTS

INTRODUCTION

Antibiotic resistance is ranked among the greatest public health threats today, leading to an estimated 2 million infections and 23,000 deaths per year in the United States.[1] While antibiotic resistance is a global concern, antibiotics are also capable of causing harm on an individual level. Risks associated with antibiotics range from nausea and diarrhea to severe allergic reactions and increased risk of developing *Clostridioides difficile* (*C. diff*). [2]

Dentists are often ranked among the top 5 outpatient prescribers of antibiotics in the United States and lead the country in clindamycin prescribing.[3] Clindamycin is frequently associated with being a risk factor for *C. diff* infections and is no longer recommended in dental guidelines for prophylaxis.[4]

Antibiotics are lifesaving necessities and the solution to antibiotic resistance is not to avoid their use, but rather use only when needed. Antibiotic stewardship programs (ASPs) strive to align antibiotic prescribing with evidence-based recommendations.[2]

Every member of a dental office can play an important role in stewardship efforts. Every patient interaction is an opportunity to educate and set or reset expectations. The goal of this toolkit is to empower all dental team members to become antibiotic stewards in their practice setting through awareness and education.

This toolkit is modeled after the Centers for Disease Control and Prevention's (CDC) Core Elements of Outpatient Stewardship.[2] Throughout the toolkit you will find a core element listed on the left side of the page along with resources to help promote the safe use of antibiotics in the dental setting. Underlined statements or phrases are hyperlinks to corresponding resources.

Guidance on antibiotic use is continually progressing and all recommendations and guidelines have limitations and exceptions. The following toolkit is designed to be a guide and should never supersede clinical judgment. The individual needs of the patient should always be considered first.

OVERVIEW

WHO?

Approximately 10% of all outpatient antibiotic prescriptions in the US are written by dentists.[3]

WHAT?

The CDC defines antibiotic stewardship as "the effort to measure antibiotic prescribing; to improve antibiotic prescribing by clinicians and use by patients so that antibiotics are only prescribed and used when needed; to minimize misdiagnoses or delayed diagnoses leading to underuse of antibiotics; and to ensure that the right drug, dose, and duration are selected when an antibiotic is needed."[2]

WHY?

Antibiotics are life-saving drugs but anytime one is prescribed it can cause adverse drug events, such as an allergic reaction or *C. diff* infection, and contribute to the development of antibiotic resistance.[2]

HOW?

The four core elements of outpatient antibiotic stewardship are commitment, action for policy and practice, tracking and reporting, and education and expertise.[6] In this toolkit, you will find ideas for implementing the core elements in your practice as well as other resources for antibiotic prescribing.

The Core Elements of Outpatient Antibiotic Stewardship (cdc.gov)

Core Element: Commitment

COMMITTING TO STEWARDSHIP

How to demonstrate a commitment to optimize antibiotic prescribing in your practice:

Step 1: Display commitment publicly

- Display commitment posters in waiting areas and/or operatories
  - See page 6 or visit the Georgia Department of Public Health Antibiotic Stewardship website for a commitment poster you can display in your office today!
- Use social media, website, and/or newsletters to promote antibiotic stewardship efforts

Step 2: Select a champion in the office to be responsible for leading antibiotic stewardship activities. Activities can include:

- Conducting regular chart audits
- Setting up events to provide education for office staff or community
- Stocking patient educational materials

Step 3: Include antibiotic stewardship-related duties in job descriptions and evaluations

Step 4: Educate all staff members so they can help set or reset patient expectations

Resources

- The Core Elements of Outpatient Antibiotic Stewardship (cdc.gov)
- The Core Elements of Outpatient Antibiotic Stewardship Checklist (cdc.gov)
- 7 Ways Dentists Can Act Against Antibiotic Resistance (CDC)
- OSAP Antibiotic Stewardship for Oral Health
- A Commitment to Improving Antibiotic Use (cdc.gov)
- Antibiotic Use for A Safe Dentist Visit Brochure (CDC) - For the Patient

OUR COMMITMENT TO
Improving Antibiotic Use

Our dental office is committed to using antibiotics responsibly. We support the CDC's Be Antibiotics Aware campaign. By doing so, **we will avoid giving you antibiotics if they may do more harm than good**. Antibiotics fight infections caused by bacteria. Antibiotics don't work against **viruses**.

Antibiotics can cause unwanted side effects. Common side effects could include a **skin rash, diarrhea, or a yeast infection**. More serious side effects could include a **C. diff infection**, which causes severe diarrhea that can lead to severe colon damage and death.

Using antibiotics when they are not needed also gives bacteria a chance to become more resistant to them. This can make future infections harder to treat, which means that antibiotics might not work when you really do need them.

We are committed to only using antibiotics that are necessary for your treatment. Your health and treatment plan are important to us.

Sincerely,

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

DPH
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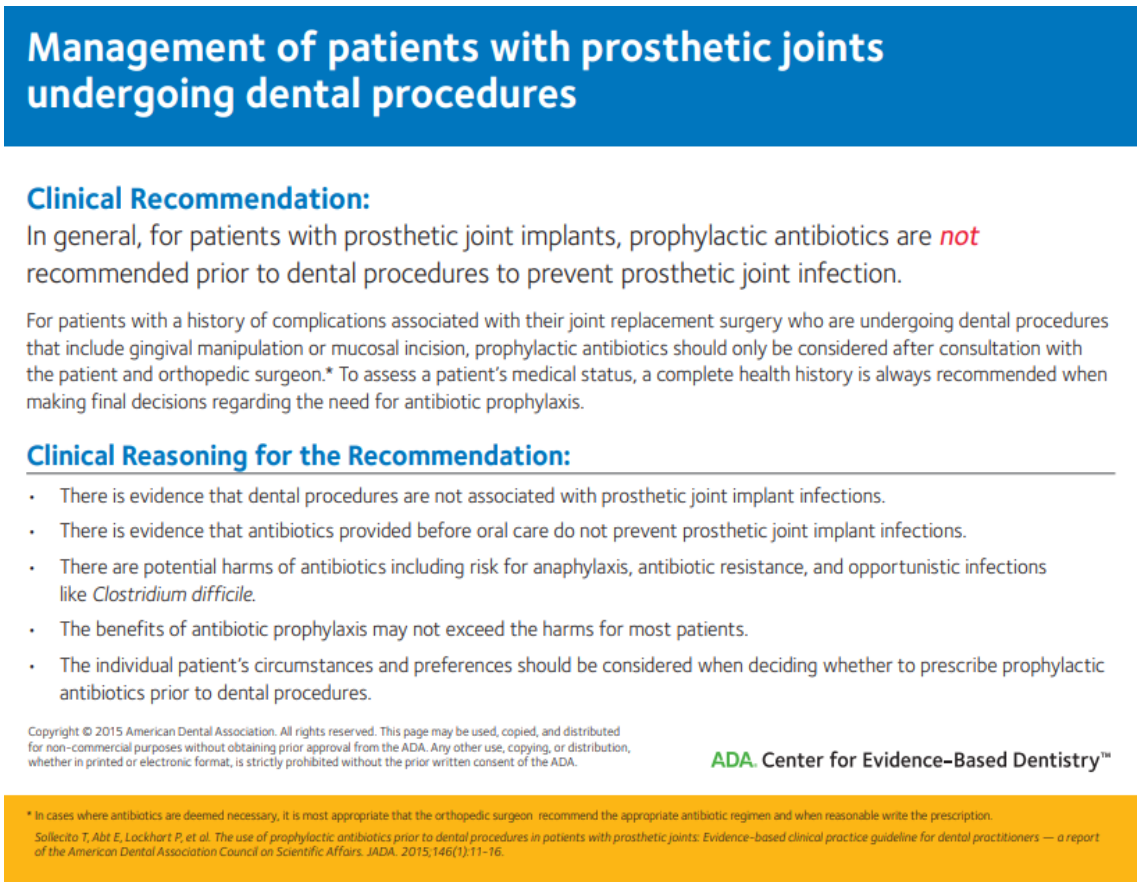
ANTIBIOTIC PROPHYLAXIS

Core Element: Action for Policy and Practice

Prosthetic Joint Replacements

Based on the American Dental Association (ADA) clinical practice guidelines, summarized in the graphic below, patients with prosthetic joint implants generally should ***NOT*** receive antibiotic prophylaxis prior to dental procedures.[7]



Management of patients with prosthetic joints undergoing dental procedures

Clinical Recommendation:

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

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

Clinical Reasoning for the Recommendation:

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

ADA. Center for Evidence-Based Dentistry™

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

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

ADA.org: Management of Patients with Prosthetic Joints

Resources

- ADA Clinical Practice Guidelines for the Use of Prophylactic Antibiotics Prior to Dental Procedures in Patients with Prosthetic Joints
- 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 (ada.org)
- Joint Replacement and Dental Antibiotic Prophylaxis (ADA)- For the Patient

Core Element: Action for Policy and Practice

ANTIBIOTIC PROPHYLAXIS

Infective Endocarditis (IE)

The American Heart Association (AHA) recommends only patients with the highest risk for adverse outcomes from IE receive antibiotic prophylaxis (AP) prior to invasive dental procedures.[4]

Conditions Requiring Antibiotic Prophylaxis[4]
Prosthetic cardiac valve, prosthetic material used for valve repair, left ventricular assist device, or implantable heart
Previous, relapse, or recurrent history of infective endocarditis
Congenital Heart Disease (CHD) • Unrepaired cyanotic congenital CHD, including palliative shunts and conduits • Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by transcatheter during the first 6 mo. after the procedure • Repaired CHD with residual defects at the site of or adjacent to the site of a prosthetic patch or prosthetic device • Surgical or transcatheter pulmonary artery valve or conduit placement such as Melody valve and Contegra conduit
Cardiac transplant recipients who develop cardiac valvopathy
AP not recommended for: pacemakers, vascular stents, CNS ventriculoatrial shunts, pledgets, or mitral valve prolapse

Examples of Invasive Procedures[8] (Requires AP for high-risk patients)	**Examples of Non-Invasive Procedures[8]** (Does not require AP)
Anything involving manipulation of gingival tissue or the periapical region of the teeth, or perforation of the oral mucosa (e.g., biopsies, suture removals, placement of orthodontic bands)	• Routine anesthetic injections through noninfected tissue • Trauma to lips/oral mucosa • Shedding of primary teeth • Radiographs • Placement of removable prosthodontic/ orthodontic appliances or orthodontic brackets • Adjustment of orthodontic appliances

Core Element: Action for Policy and Practice

ANTIBIOTIC PROPHYLAXIS

Antibiotic Regimens for IE

When appropriate, antibiotic prophylaxis should be given as a single dose 30-60 minutes before procedure.[4]

Route	Antibiotic	Adult Dose	Pediatric Dose
Able to take orally	Amoxicillin	2 g	50 mg/kg
Unable to take oral medications	Ampicillin OR	2 g IM or IV	50 mg/kg IM or IV
	Cefazolin or ceftriaxone	1g IM or IV	50 mg/kg IM or IV
Able to take oral + allergic to penicillin or ampicillin	Cephalexin*^ OR	2g	50 mg/kg
	Azithromycin or clarithromycin OR	500 mg	15 mg/kg
	Doxycycline	100 mg	<45 kg: 2.2mg/kg >45 kg:100mg
Unable to take oral medications + allergic to penicillin or ampicillin	Cefazolin or ceftriaxone *	1g IM or IV	50 mg/kg IM or IV

* Should not be used if allergic reaction is anaphylaxis, angioedema, or urticaria
^ May substitute with another first- or second-generation cephalosporin

Clindamycin is no longer recommended for prophylaxis.

Resources

- Prevention of infective endocarditis: Guidelines from the AHA - JADA (ada.org)
- A Scientific Statement from the AHA on Preventing Viridans Group Strep in Infective Endocarditis
- Infective Endocarditis (American Heart Association)- For the Patient

ANTIBIOTIC PROPHYLAXIS

Core Element: Action for Policy and Practice

Tooth Extractions and Dental Implants

Tooth extractions and dental implants are common invasive procedures that can lead to pain, inflammation, and surgical site infections (SSI). Because of the risk of infection, these procedures often prompt the use of prophylactic antibiotics even though there is a lack of strong evidence to support this practice in most cases.[16]

Clinical guidelines in the United States do not address the prophylactic use of antibiotics in dental extractions or implants. However, guidelines in the United Kingdom (UK) do provide guidance on these topics. Recommendations from UK guidelines include[17]:

- Risk versus benefit of antibiotic prophylaxis to prevent early implant failure or post-extraction SSI should be weighed
- Antibiotic prophylaxis to prevent post-extraction SSI in healthy patients is not recommended
- Antibiotic prophylaxis to prevent implant failure or infection in simple implant cases (without tooth extraction, bone regeneration/augmentation, or sinus lift) is not recommended
- A single dose of antibiotic prophylaxis is recommended for dental implants requiring bone augmentation

Resources

- Antibiotic Prophylaxis for Tooth Extractions and Dental Implants, A Narrative Review
- Antibiotics in Dental Implants: A Review of Literature
- A Systematic Review and Meta-Analysis Evaluating Antibiotic Prophylaxis in Dental Implants and Extraction Procedures
- Smoking and Dental Implants: A Systematic Review and Meta-Analysis
- Antimicrobial Prescribing in Dentistry: Good Practice Guidelines (UK)

ANTIBIOTIC TREATMENT

Core Element: Action for Policy and Practice

Urgent Dental Pain and Swelling

The ADA recommends against the use of antibiotics in the management of most cases of pulpal- and periapical conditions in adult immunocompetent patients.[5]

If pain management is needed, over-the-counter ibuprofen and acetaminophen are recommended.[9]

Definitive Conservative Dental Treatment (DCDT) should be the priority in all cases. Examples of DCDT include[5]:

- Pulpotomy or pulpectomy
- Non-surgical root canal treatment
- Incision and drainage for symptomatic irreversible pulpitis, apical periodontitis, and localized acute apical abscess

Antibiotics should be prescribed if patients begin to show signs of systemic involvement such as fever or malaise.[5]

Chairside treatment decision guides are available from the ADA for when DCDT is and is not readily available. The guides include antibiotic treatment options for use when appropriate. Links can be found below along with the complete guidelines.

Resources

- Chairside Guide for Treatment of Dental Pain and Intraoral Swelling when DCDT is Available (ADA)
- Chairside Guide for Treatment of Dental Pain and Intraoral Swelling when DCDT is NOT Immediately Available (ADA)
- Dentists: Be Antibiotics Aware - Treating Patients with Dental Pain and Swelling (cdc.gov)
- Antibiotics for Dental Pain and Swelling Guideline (ADA)
- ACE Panel Report- Antibiotic Use in Endodontic Infections (ADA)
- Oral Analgesics for Acute Dental Pain (ADA)

Core Element: Action for Policy and Practice

ADVERSE EVENTS

Penicillin Allergies

Serious and sometimes fatal allergic reactions to antibiotics are possible and should be taken seriously. These reactions are rare, and it is important to evaluate each patient prior to prescribing an antibiotic.

According to the CDC, 10% of the population reports a penicillin allergy but <1% of the population is truly allergic.[10] Only 20% of patients with a penicillin allergy will retain that allergy after 10 years. Patients labeled as penicillin allergic can be referred to an allergist to confirm. [10]

Patients with non-anaphylactic penicillin allergies can often tolerate cephalosporins, especially later generations.[10]

Clindamycin should not be used as an alternative for prophylaxis in penicillin-allergic patients but may be an appropriate choice in treating oral infections in those patients.[4,5]

Patients labeled as penicillin allergic are more likely to receive antibiotics that are not first-line therapies.[10] Receiving a sub-optimal antibiotic due to penicillin allergy can lead to[11]:

- Higher healthcare costs
- Reduced efficacy
- Increased rate of adverse reactions such as *C.diff*
- Increased risk of antibiotic resistance

Clostridioides difficile Infection

C. diff can affect anyone; however, most cases occur while taking antibiotics or shortly after.[12]

Clindamycin, fluoroquinolones (e.g., ciprofloxacin, levofloxacin), and 3rd/4th generation cephalosporins (e.g., ceftriaxone, cefdinir) are among the list of antibiotics most frequently associated with *C. Diff*.[12]

Symptoms may develop within a few days of starting an antibiotic and include diarrhea, fever, stomach tenderness, loss of appetite, and nausea. Rare but more serious complications include toxic megacolon, sepsis, and death.[12]

If a patient on antibiotic therapy has 3 or more loose stools in 24 hours they should be instructed to reach out to their primary care provider for assessment.[12]

Resources

- Evaluation of Penicillin Allergy for Healthcare Professionals (CDC)
- MARR/OSAP: Penicillin-Allergy Assessment Tool
- Am I Allergic to Penicillin? (JAMA)
- Approach to Patients Reporting Penicillin Allergies (AHRQ)
- What is *C. diff*? (CDC)
- Be Antibiotics Aware, *C. DIFF* Infection Fact Sheet- For Patients (CDC)
- Progression of a *C. Diff* Infection Fact Sheet (CDC)

AUDIT AND FEEDBACK

Core Element: Tracking and Reporting

Evaluate Antibiotic Prescribing

Tracking and reporting antibiotic prescribing can help guide changes and evaluate progress in antibiotic stewardship efforts.[2]

When implementing a tracking and reporting system, also known as audit and feedback, the following steps may be helpful[6]:

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

A practical tool for tracking antibiotic prescribing in dentistry is a chart audit. Below is a link to an example chart audit tool from OSAP and the Massachusetts Department of Public Health. Questions to consider when conducting a chart audit include[15]:

- Is there a medical history or comorbidities to consider?
- Does the patient have allergies?
- If an antibiotic was prescribed, was it for prophylaxis or treatment?

Once prescribing practices have been audited the trends can be evaluated and feedback provided (overprescribing, underprescribing, misprescribing with incorrect agent, dose, or duration).[6]

Resources

- Massachusetts Department of Public Health Sample Chart Audit Tool (OSAP)

EDUCATION

Core Element: Education and Expertise

Patient Education

Ways to help educate patients on safe antibiotic use[2]:

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

Staff Education

Provide training in communication skills for all staff members so they can promote stewardship efforts and address patient concerns.[2]

Provide continuing education activities related to antibiotic stewardship activities.

Collaborate with other providers in the community like pharmacists or the Department of Public Health, who can serve as resources.

Resources

- Antibiotics and Adverse Events (cdc.gov)
- CDC's Antibiotic Stewardship Course
- Using antibiotics wisely (The Journal of the American Dental Association)
- Antibiotic Prophylaxis Prior to Dental Procedures (ADA)
- Checklist for Antibiotic Prescribing in Dentistry (CDC)
- What is antibiotic prophylaxis? (The Journal of the American Dental Association)- For the Patient
- Antibiotics for Pain and Swelling (MouthHealthy/ADA) - For the Patient
- 2023 On-Demand OSAP Antibiotic Stewardship Summit

PRESCRIBING PEARLS

PEARL 1:
DELAYED PRESCRIBING CAN BE A USEFUL TOOL IF DCDT IS NOT READILY AVAILABLE.[5]

In adult immunocompetent patients with pulp necrosis and symptomatic apical periodontitis but no systemic involvement, a prescription can be given to a patient for use **IF** symptoms progress.

- What Is Delayed Prescribing? (CDC)

PEARL 2:
"TAKE ANTIBIOTICS UNTIL FINISHED" IS OLD NEWS.[5]

ADA advises antibiotic prescriptions for dental infections be prescribed for 3-7 days. Patients should be evaluated within 3 days (in person or by phone) and counseled to stop antibiotics 24 hours after symptoms resolve. Completing the full course of antibiotics is no longer the general recommendation.

PEARL 3:
CLINDAMYCIN IS NO LONGER RECOMMENDED FOR PROPHYLAXIS.[4]

A single dose of clindamycin can substantially increase the risk of developing *C. Diff* and should not be prescribed for antibiotic prophylaxis in the dental setting.

PEARL 4:
COUNSELING POINTS ON COMMONLY PRESCRIBED ANTIBIOTICS:

- Beta-Lactams (amoxicillin, penicillin VK, amoxicillin & clavulanate, and cephalexin): Take with or without food, severe allergic reactions are possible but rare.
- Azithromycin: Associated with QT prolongation and caution should be used in patients with a history or on other medications that can prolong QT interval, taking with food may decrease stomach upset
- Metronidazole: Take with food to decrease stomach upset, may cause metallic taste and peripheral neuropathy
- Clindamycin: Take with or without food, may cause diarrhea but if patient has 3 or more loose stools in 24 hours, they should reach out to their primary care provider.[12]

A QUICK GUIDE FOR NON-DENTAL PRESCRIBERS

The American Dental Association (ADA) has developed an Emergency Department Referral Program to provide resources for urgent and primary care providers to connect patients with preventative dental care.[14]

Urgent dental pain can force patients to seek care from non-dental providers who are generally unable to provide definitive dental care but still require immediate treatment. Below are ADA treatment recommendations that may be helpful in these cases (complete guidelines can be found here) :

Treatment of Urgent Oral Pain and Swelling in Immunocompetent Adults: When DCDT is Not Immediately Available[5]		
Pain Only	Vital pulp + Symptomatic irreversible pulpitis +/- symptomatic apical periodontitis	No antibiotics + referral for DCDT + interim monitoring
	Necrotic pulp + symptomatic apical periodontitis	No antibiotics + referral for DCDT + interim monitoring. *If DCDT in 1-2 days is not feasible- provide a delayed antibiotic prescription that may be filled if symptoms worsen or experience swelling or pus
Pain + Swelling	Necrotic pulp + localized acute apical abscess +/- systemic involvement	Antibiotics + urgent referral for DCDT
Recommended Treatment: Amoxicillin 500mg TID x 3-7 days OR Penicillin V potassium 500mg QID x 3-7 days (consult ADA guidelines for penicillin-allergic patients) Advise patients to discontinue antibiotics 24 hours after resolution of symptoms and report worsening symptoms or if DCDT is not available within 1-2 days		

ADA Definitions[5]:

- Symptomatic irreversible pulpitis: characterized by spontaneous pain that may linger with thermal changes due to vital inflamed pulp that is incapable of healing.
- Symptomatic apical periodontitis: characterized by pain with mastication, percussion, or palpation, with or without evidence of radiographic periapical pathosis, and without swelling.
- Localized acute apical abscess: characterized by spontaneous pain with or without mastication, percussion, or palpation, with formation of purulent material, localized swelling, and without evidence of fascial space or local lymph node involvement, fever, or malaise.
- Definitive, conservative dental treatment (DCDT): includes pulpotomy, pulpectomy, nonsurgical root canal treatment, or incision for drainage of abscess.

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