

Which Antibiotic Prophylaxis Guidelines for Infective Endocarditis Should Canadian Dentists Follow?

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Dental providers must keep up to date with antibiotic prophylaxis guidelines for infectious endocarditis (IE) as these guidelines represent standards of care and determine medicolegal standards. A survey of Canadian dentists revealed that practitioners tend to employ antibiotic prophylaxis according to the guidelines in place at the time of their graduation from dental school — guidelines that often do not meet the current standards,¹ as both the American Heart Association (AHA)² and the British Society for Antimicrobial Chemotherapy (BSAC)³ have currently updated their recommendations.

Host factors that increase the risk of IE include specific cardiac abnormalities, a previous episode of IE and the extent of the dental procedure to be undertaken (**Table 1**). In the 2007 revision of its recommendations, the AHA limited the conditions for which endocarditis prophylaxis is recommended before dental treatment to those associated with the highest risk (**Table 2**). It is important to note that valvular disease independent of regurgitation is not a condition for which the AHA recommends prophylaxis.² This will result in considerable reduction in the use of IE antibacterial prophylaxis.

It is believed that invasive dental procedures associated with bleeding increase the risk of oral bacteria entering the blood circulation. Although there is evidence that the risk of infection due to treatment-related bacteremia may occur during a short window of less than

2 weeks following a procedure, dental procedures conducted even months earlier may be questioned as causative of IE.⁴ Furthermore, periodontal and dental disease increase the risk of bacteremia with activities of daily living and may more commonly cause bacteremia; therefore, good oral care is of paramount importance in patients with conditions that place them at risk for IE.

To reduce the risk of IE following dental procedures, prophylactic measures have been developed by experts in the fields of microbiology, epidemiology, cardiology and dentistry. The principle preventive measure recommended is the use of prophylactic antibiotics before certain dental procedures in patients identified as at risk.

The first AHA-recommended prophylaxis regimen was issued in 1955; the most current recommendations were issued in 2007.² The British Cardiac Society⁵ and the BSAC³ have also recently updated their recommendations for IE prophylaxis (in 2004 and 2006, respectively). This article provides a summary of those guidelines and notes the differences among them.

The continuing evolution of IE prophylaxis guidelines has recognized the natural history of the condition, risk factors, animal research, epidemiology and review of antibiotic prophylaxis failures. The guidelines also reflect an increasing need to guard against overuse of antibiotics. In Canada, using either the current British or American guidelines may

Table 1 Guidelines for the identification of patients who may require prophylaxis for infective endocarditis before dental procedures

American Heart Association ²	British Society for Antimicrobial Chemotherapy ³	British Cardiac Society ⁵
<p>High risk</p> <ul style="list-style-type: none"> • Prosthetic cardiac valve • Previous infective endocarditis • Congenital heart disease (CHD) if 1 of the 3 conditions listed below: <ol style="list-style-type: none"> 1. Unrepaired cyanotic CHD, including palliative shunts and conduits 2. 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 3. Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibit endothelialization) • Cardiac transplantation recipients who develop cardiac valvulopathy 	<p>High risk</p> <ul style="list-style-type: none"> • Previous infective endocarditis • Cardiac valve replacement surgery, i.e., mechanical or biologic prosthetic valves • Surgically constructed systemic or pulmonary shunt or conduit 	<p>High risk</p> <ul style="list-style-type: none"> • Prosthetic heart valves • Previous infective endocarditis • Complex cyanotic congenital heart disease • Transposition of great arteries • Fallot’s tetralogy • Gerbode’s effect • Surgically constructed systemic pulmonary shunts or conduits • Mitral valve prolapse with clinically significant mitral regurgitation or thickened valve leaflets <p>Moderate risk</p> <ul style="list-style-type: none"> • Acquired valvular heart disease, e.g., rheumatic heart disease • Aortic stenosis • Aortic regurgitation • Mitral regurgitation • Other structural cardiac defects, e.g., ventricular septal defect • Bicuspid aortic valve • Primum atrial septal defect • Patent ductus arteriosus • Aortic root replacement • Coarctation of aorta • Atrial septal aneurysm/patent foramen ovale

provide justifiable patient care and, therefore, may manage the medicolegal necessities of practice (Tables 3 to 5).

Providers must choose the most recent guidelines from recognized authorities. In the United States, this is limited to AHA guidelines, but in Canada, either the AHA or one of the British societies could be chosen as the authoritative body. Whichever guidelines are employed, it is imperative that they be followed as promoted and that the most recent version be used.

Before considering antibacterial prophylaxis, both the patient and the procedure should be defined as at risk (i.e., bleeding risk, bacteremia risk and subject at risk).

When a dental provider consults with a physician, it is important for the dentist to provide detailed information on the current guidelines to be used, as the dental community may be more aware of these, the patient’s dental condition and the risk of bleeding or bacteremia anticipated with the procedure.

Table 2 Dental procedures for which antibiotic prophylaxis is recommended

American Heart Association ²	British Society for Antimicrobial Chemotherapy ³	British Cardiac Society ⁵
<p>Manipulation of gingival, periodontal and periapical tissues; incision of mucosa including:</p> <ul style="list-style-type: none"> • surgery • periodontal procedures • endodontic instrumentation beyond the apex or apical surgery • subgingival placement of antibiotic fibres or strips • initial placement of orthodontic bands but not brackets • intraligamentary local anesthetic injections • prophylactic cleaning of teeth or implants where bleeding is anticipated <p>Excluding: local anesthetic placement (unless through site of infection)</p>	<p>Dental procedures involving dento- gingival manipulation and endodontics. A risk assessment, which involves the patient, is important and factors like the oral hygiene status of the patient are important considerations for deciding on prophylaxis.</p>	<p>Examination procedures</p> <ul style="list-style-type: none"> • periodontal probing <p>Investigation procedures</p> <ul style="list-style-type: none"> • sialography <p>Anesthetic procedures</p> <ul style="list-style-type: none"> • intraligamentary local anesthesia <p>All surgical procedures</p> <p>Restorative procedures^a</p> <ul style="list-style-type: none"> • rubber dam placement • matrix band and wedge placement • gingival retraction cord placement <p>Periodontal procedures</p> <p>Professional cleaning procedures</p> <ul style="list-style-type: none"> • polishing teeth with a rubber cup • oral irrigation with water jet • scaling, root planing • antibiotic fibres or strips placed subgingivally^b <p>Endodontic procedures</p> <ul style="list-style-type: none"> • root canal instrumentation beyond the root apex <p>Avulsed tooth reimplantation^c</p> <p>Orthodontic procedures</p> <ul style="list-style-type: none"> • tooth separation • exposure or exposure and bonding of tooth or teeth

^aFor multiple dental visits, alternating antibiotics are recommended, e.g., amoxicillin–clindamycin–amoxicillin. For young children the sequence would be amoxicillin–azithromycin–amoxicillin. If penicillin or penicillin-like antibiotics are used, at least 1 month must be allowed between visits. Dentists should provide as much treatment as is feasible each visit.

^bNo data, but procedure is similar to gingival retraction cord placement.

^cThe avulsed tooth can be quickly washed and reimplanted immediately by a parent or other responsible person and the antibiotic prophylaxis administered afterward, provided this is within 2 hours of the reimplantation. Antibiotic prophylaxis may be successful if administered shortly after the bacteremic episode.

Table 3 American Heart Association regimens for infective endocarditis prophylaxis²

Patient group	Antibiotic	Route	Dose		Timing before procedure
			Adults	Children	
Standard general prophylaxis for patients at risk	Amoxicillin	PO	2 g	50 mg/kg	1 hour
Unable to take oral medication	Ampicillin	IV or IM	2 g	50 mg/kg	Within 30 minutes
Allergic to penicillin/ amoxicillin/ampicillin	Clindamycin	PO	600 mg	20 mg/kg	1 hour
	Cephalexin or cephadroxil ^a	PO	2 g	50 mg/kg	1 hour
	Azithromycin or clarithromycin	PO	500 mg	15 mg/kg	1 hour
Allergic to penicillin/ amoxicillin/ampicillin and unable to take oral medications	Clindamycin	IV	600 mg	20 mg/kg	Within 30 minutes
	Cefazolin	IV	1 g	25 mg/kg	Within 30 minutes

Note: IV = intravenous; PO = oral.

^aCephalosporins should not be used with penicillin or ampicillin in those with a history of anaphylaxis, angioedema or urticaria.

Table 4 Recommendations for infective endocarditis prophylaxis regimen by the British Society for Antimicrobial Chemotherapy³

Patient group	Antibiotic	Route	Dose according to age of patient; years			Timing of dose before procedure
			> 10	5–10	< 5	
General	Amoxicillin	PO	3 g	1.5 g	750 mg	1 hour
Allergic to penicillin	Clindamycin	PO	600 mg	300 mg	150 mg	1 hour
Allergic to penicillin and unable to swallow capsules	Azithromycin	PO	500 mg	300 mg	200 mg	1 hour
IV regimen expedient	Amoxicillin	IV	1 g	500 mg	250 mg	Just before the procedure or at induction of anesthesia
IV regimen expedient and allergic to penicillin	Clindamycin	IV	300 mg ^a	150 mg ^a	75 mg ^a	Just before the procedure or at induction of anesthesia

Note: IV = intravenous; PO = oral.

^aGiven over at least 10 minutes before the dental procedure.

Preoperative mouth rinse may be used: chlorhexidine gluconate 0.2% (10 mL for 1 minute).

Table 5 British Society for Antimicrobial Chemotherapy recommendations for infective endocarditis prophylaxis for highest risk patients (patients with prosthetic heart valves or previous infective endocarditis)³

Age group; years	Antibiotic	Route	Dose	After the procedure
Adults and children > 10	Amoxicillin and gentamicin	IV	2 g	1 g PO or IV, 6 h after procedure
		IV	1.5 mg/kg	None
Children < 10	Amoxicillin and gentamicin	IV	1 g	1 g PO
		IV	1.5 mg/kg	None
Adults and children > 10 allergic to penicillin	Vancomycin and gentamicin	IV	1 g	None
		IV	1.5 mg/kg	None
Children < 10 allergic to penicillin	Vancomycin and gentamicin	IV	20 mg/kg	None
		IV	1.5 mg/kg	None

Note: IV = intravenous; PO = oral.

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