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https://youtu.be/nApJRSBa5Gk

Please scroll down this file to view a copy of the slides from the session.

Moving the needle on dental antibiotic overuse – a sustainable Canadian antimicrobial stewardship approach

PHO Rounds

November 18, 2025

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WORLD AMR AWARENESS WEEK
18-24 NOVEMBER

Declarations

- Choosing Wisely Canada Society Co-Lead
- Canadian Association of Hospital Dentists, CWC representative

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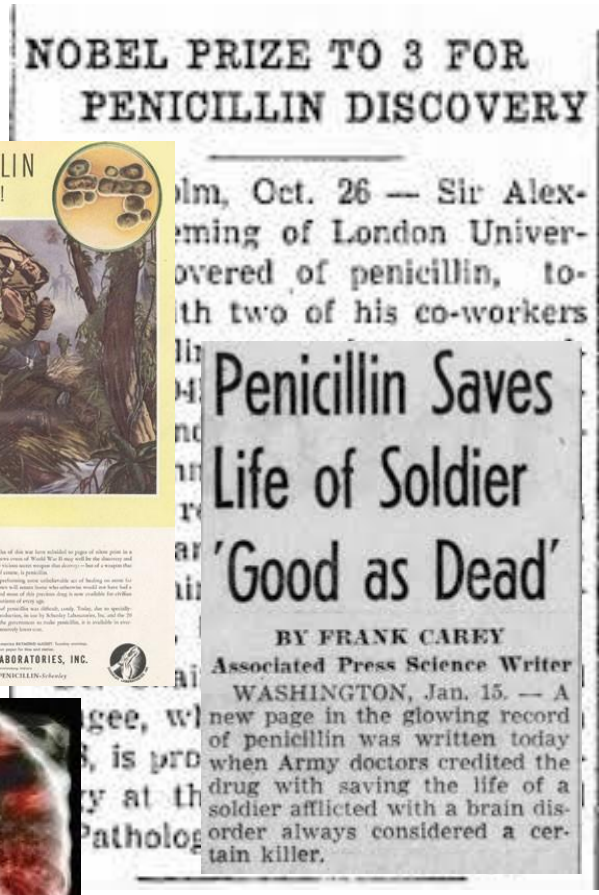
Objectives

By the end of this event, participants will be able to:

1. Define Antimicrobial Resistance (AMR) and antibiotic overuse in oral-health care, and list common drivers of inappropriate use.
2. Decide when antibiotics are and are not indicated for acute dental complaints.
3. Explain the latest evidence to support short course therapy when antibiotics are indicated.
3. Use Choosing Wisely tools to support non-antibiotic care, address patient expectations, and improve the quality of care for patients presenting with acute dental complaints.

Antibiotics changed the world…

- Medical practice was transformed
- Death from <u>odontogenic infections</u> now rare
  - "Teeth" 5th leading cause of death in the 1600's
  - 10-40% mortality from dental infections in 1908
- Industrial livestock farming and agriculture became possible
  - Changed the diet and lifestyle of the population.

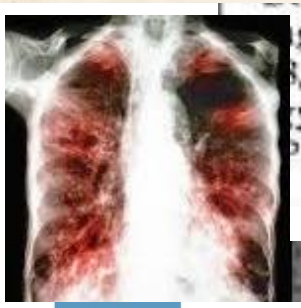

NOBEL PRIZE TO 3 FOR PENICILLIN DISCOVERY

lm, Oct. 26 — Sir Alex-
ming of London Univer-
overed of penicillin, to-
th two of his co-workers

Penicillin Saves Life of Soldier 'Good as Dead'

BY FRANK CAREY
Associated Press Science Writer

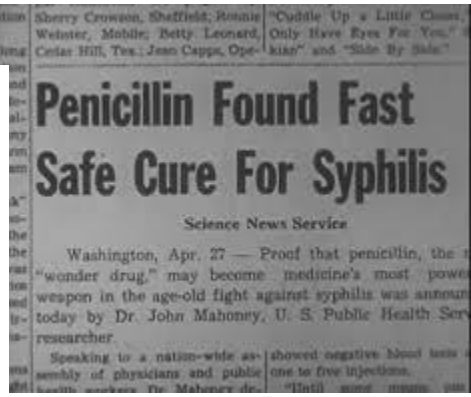
WASHINGTON, Jan. 15. — A new page in the glowing record of penicillin was written today when Army doctors credited the drug with saving the life of a soldier afflicted with a brain disorder always considered a certain killer.



1950

Introduction of Antibiotics in Agriculture

Antibiotics usage in farming for therapeutic purposes & for growth promotion and prophylaxis.


Penicillin Found Fast Safe Cure For Syphilis

Science News Service

Washington, Apr. 27 — Proof that penicillin, the "wonder drug," may become medicine's most powe weapon in the age-old fight against syphilis was announ today by Dr. John Mahoney, U. S. Public Health Ser researcher.

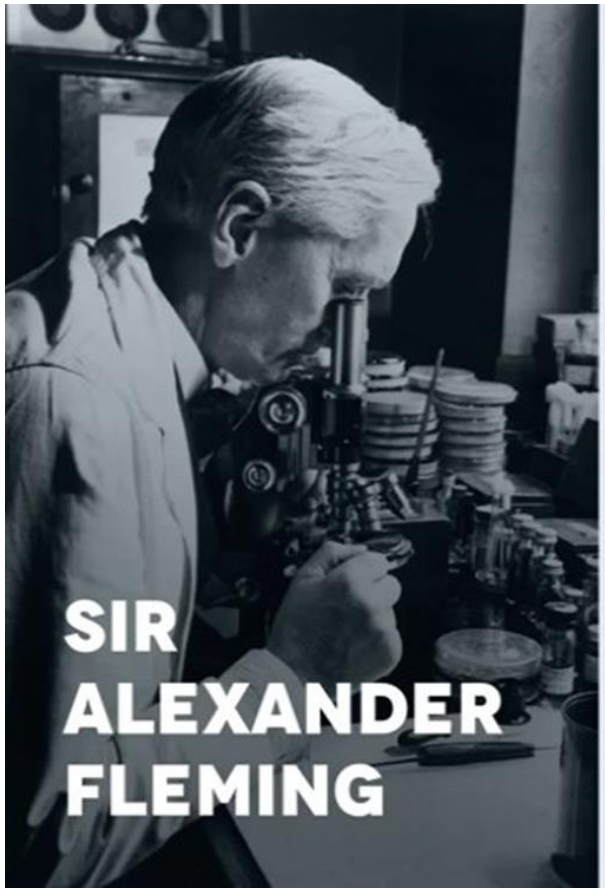
Speaking to a nation-wide assembly of physicians and public

showed negative blood tests one to five injections.

"Until more cases can

Brizuela M, Daley J. Oral Facial Infection of Dental Origin: A Guide for the Medical Practitioner. StatPearls Aug 9, 2025

BUT as early as 1940's, antibiotic resistance was observed and is now a world crisis



The thoughtless person playing with penicillin treatment is morally responsible for the death of the man who succumbs to infection with the penicillin-resistant organism.

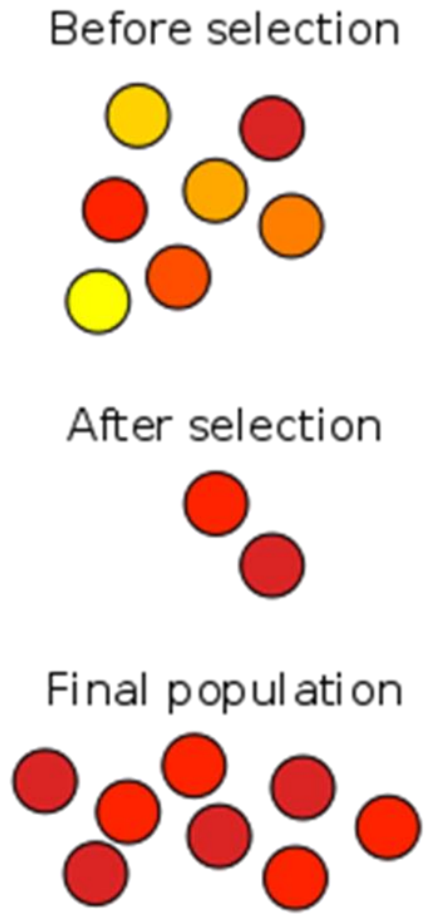
AMR remains a top global health threat

- 2019 (WHO)
- Annual deaths: 1.27M (direct); 4.95M (associated)
- 2025 Update(WHO)
  - Resistance to essential antibiotics, particularly Gram-bacteria, widespread and increasing
  - AMR ↑ in 40% of the pathogen-antibiotic combinations monitored 2018 and 2023
- Canadian data – an escalating problem
  - 26% of infections are resistant to 1st line antimicrobials
  - 6 deaths per day in Ontario attributed to AMR
  - Modelling of data indicates that by 2050,
    - resistance rates are likely to rise to 40%
    - resulting in 396,000 deaths, GDP decline of $388 billion

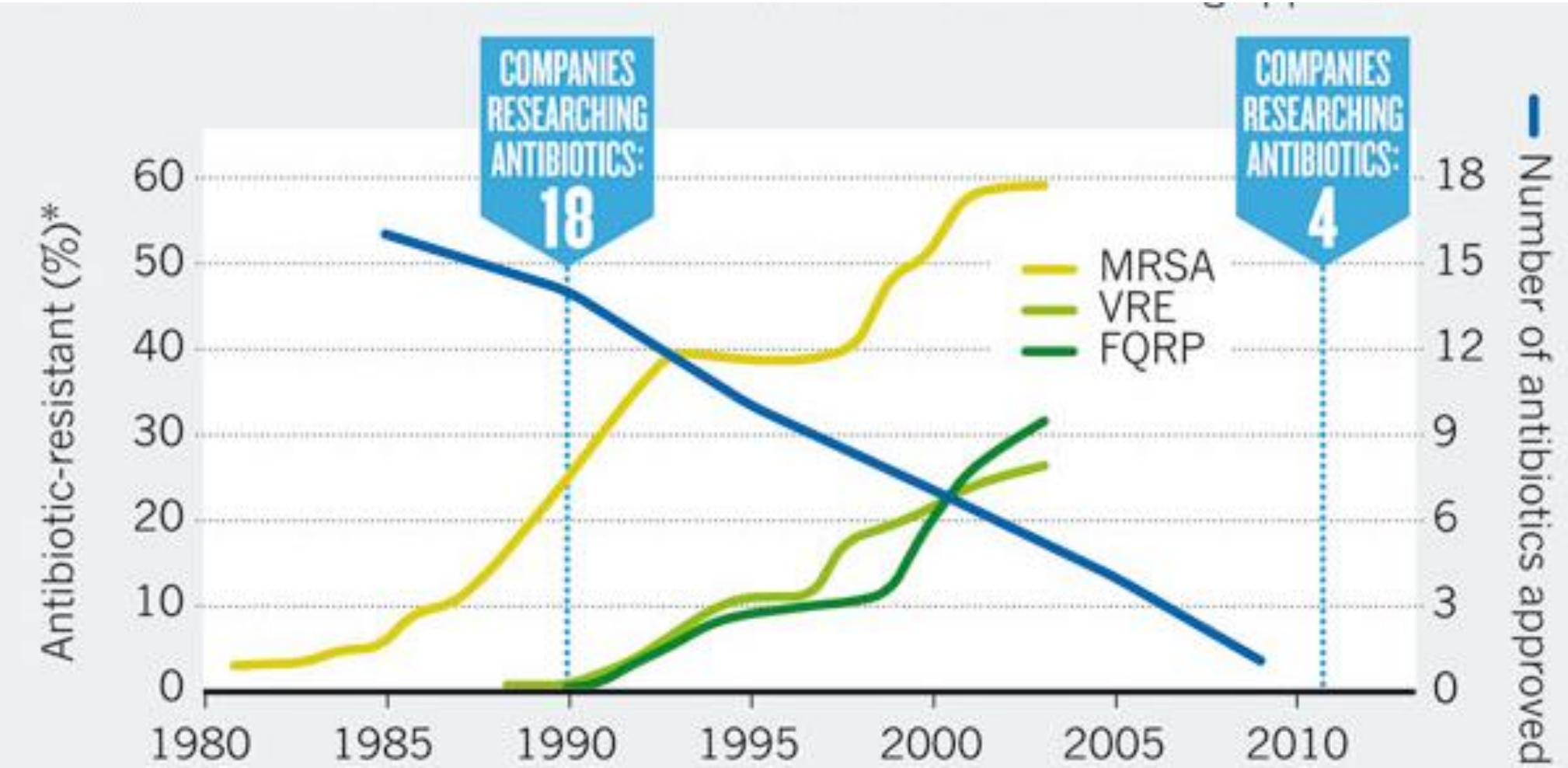
WHO. Global antibiotic resistance surveillance report October 13, 2025
Council of Canadian Academies, 2019. When Antibiotics Fail. Ottawa (ON): The Expert Panel on the Potential Socio-Economic Impacts of Antimicrobial Resistance in Canada, Council of Canadian Academies

What is Antimicrobial Resistance (AMR)?

- Antibiotics apply selective pressure to bacteria, killing the less resistant ones, allowing more resistant ones to survive
- The person is not resistant, the bacteria causing infection is resistant
- Resistant bacteria can spread from one person to another and to the community
- Resistance occurs at both the individual level and the population levels



A Perfect Storm:
Increased resistance, fewer new antibiotics



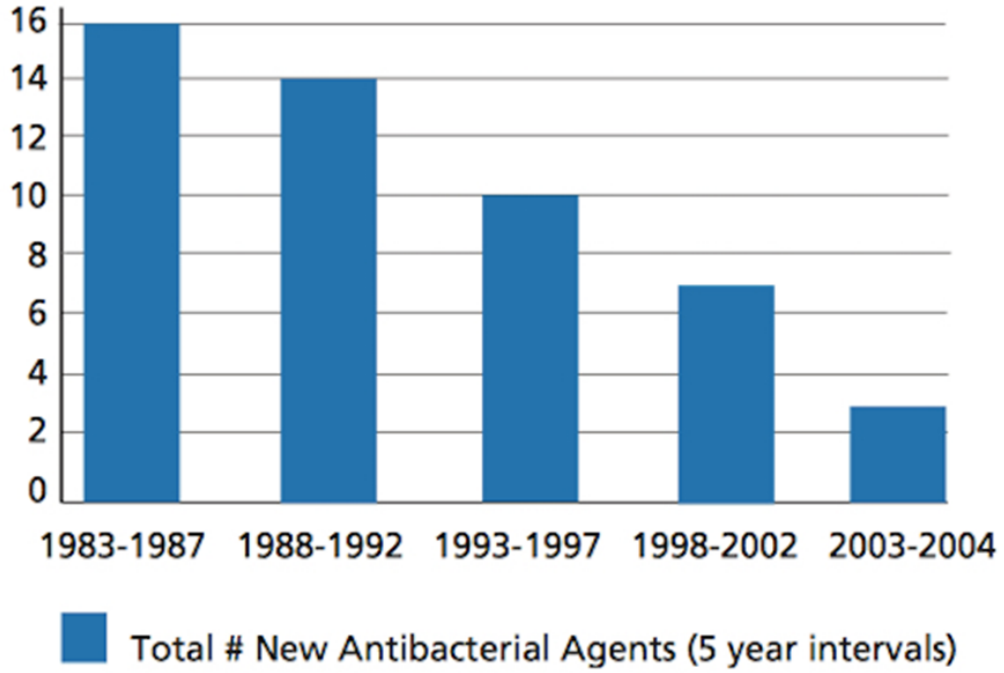
Cooper, M.A. and D. Shlaes, Fix the antibiotics pipeline. Nature, 2011. 472(7341): p. 32-32.

The Pipeline of New Antibiotics Is Drying Up

Few new antibiotics come to market

1942-1962 – 20 new classes

Since 1962 – only 2 new classes



WHY?

- High development costs - $900M per drug
- Regulatory bottlenecks - strict trial designs, safety requirements
- Lack of investment – economic realities
- Antibiotic resistance from overuse
- Poor financial return

Cooper, M.A. and D. Shlaes, Fix the antibiotics pipeline. Nature, 2011. 472(7341): p. 32-32.

Background- dentists and antibiotics

- Prolonged use ≥8 days of antibiotics frequent (42%-49%)
- Amoxicillin most frequently prescribed, followed by Clindamycin

Murphy AM et al Infect Control Hosp Epidemiol. 2024.
Carlsen DB, et al. Infect Control Hosp Epidemiol. 2021
Marra F et al. J Am Dent Assoc, 2016.

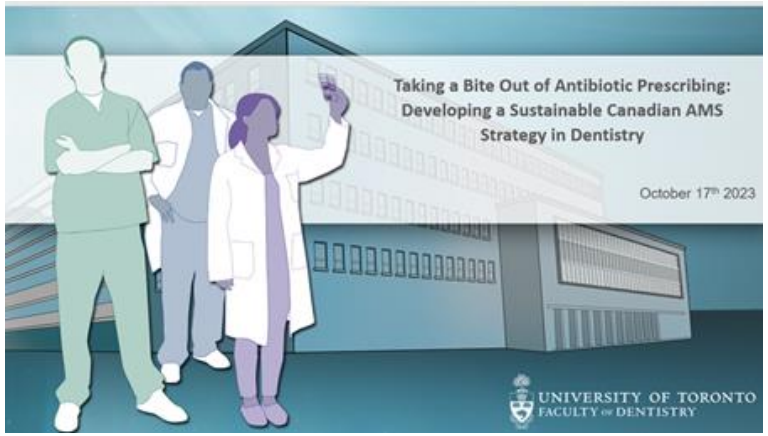
When do dentists prescribe antibiotics?

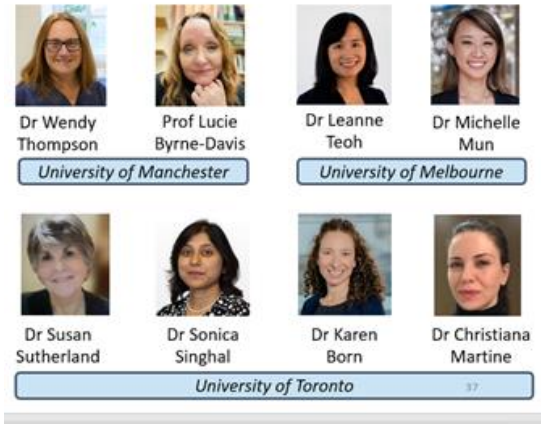
- Prevention of distant site infections → limited indications in healthy patients
  - AHA Guideline Prevention of Infective Endocarditis
  - Patients with Total Joint Replacements having Dental Procedures Consensus Statement

- Prevention of surgical site infections → limited indications in healthy patients

- As an adjunct to definitive treatment for infection
  - The treatment for dental infection is a surgical procedure (root canal, extraction, I&D)
  - Antibiotics only if cellulitis, systemic involvement

Drivers of dental antibiotic overuse





> JAC Antimicrob Resist. 2024 May 22;6(3):dlae082. doi: 10.1093/jacamr/dlae082. eCollection 2024 Jun.

Dental antimicrobial stewardship: a qualitative study of perspectives among Canadian dentistry sector leaders and experts in antimicrobial stewardship

Christiana Martine [1], Susan Sutherland [1], Karen Born [2], Wendy Thompson [3], Leanne Teoh [4], Sonica Singhal [1]

Old Patterns

I've always done this …it works

Not up to date

Instructors on clinic floor "just in case"

Old habits hard to break

Learned this in dental school

No guidelines

Pre-printed prescription pads

The patient expects it

ER/ Primary Care Realities

The dentist won't see me until I have had antibiotics.

I don't know what else I can do

I can save the cost of a dental visit

I can't afford the dentist.

There is no dentist available.

JY

Antibiotics as a Band-aid Solution

Time pressure, greater expertise needed, uncertainty, access to care, patient financial constraints

- *"You know there's no antibiotic indicated, but you feel like you have to do something to let's say, get them to the endodontist office"*
- *"Rather than try and squeeze them in at the end of the day, we prescribed an antibiotic to get them through to Monday"*
- *"When the dentist has a feeling that the patient might not come back because of either the distance or some other social factors and demographic factors, financial reasons"*
- *"We [family doctors] only have one solution. It's the antibiotics. We don't know what to do with those dental problems" . . . "*
- *"I work in long term care, and what am I supposed to do with somebody that has, you know, tooth pain, where there's no dentist that's gonna ever come?"*

Fear and risk aversion

- *"If I don't do it [prescribe antibiotics], then God forbid, this huge, horrible outcome happens. I'm better to just do it. Because what's really the risk of giving the antibiotic really, right?"*
- *"When there is risk of complication they feel bad when the complication in the patient reflects on their care, versus the person that gets C. diff? Well, you know, that's the antibiotics fault…"*

"You don't want to take a chance on something blowing up and then have the College come back at you later for not having done everything possible to prevent that …."

What we heard:

- “Toothache” with or without a localized abscess is a ubiquitous condition, for which antibiotics are prescribed inappropriately
- Lack of chair-side resources/toolkits available to clinicians
- Don’t re-invent the wheel

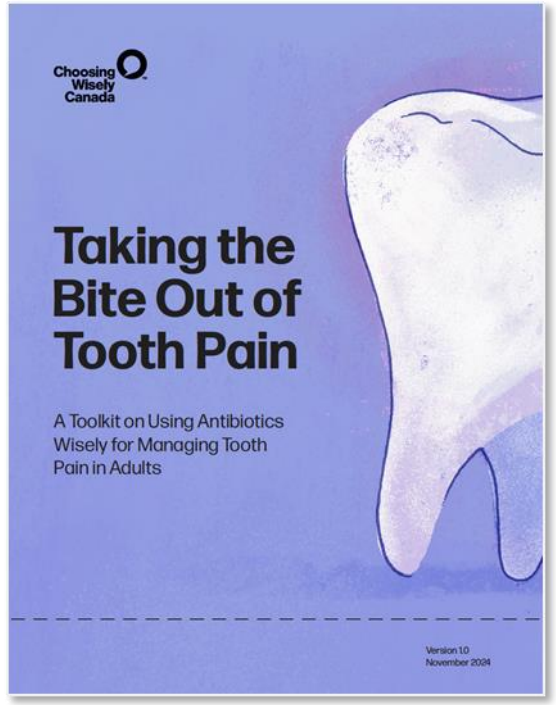
CWC dentistry recommendation:

“Don’t prescribe antibiotics for toothache or localized dental abscess”

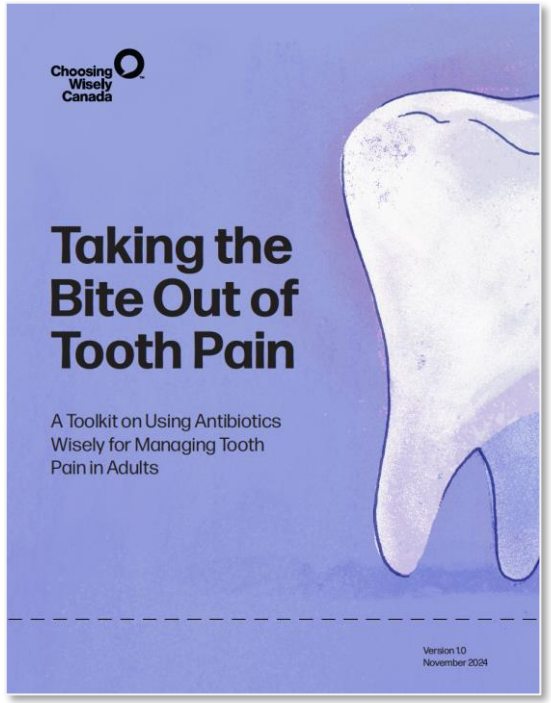
What we did:

Choosing Wisely Canada

Taking the Bite Out of Tooth Pain



CWC Toolkit For Dentists and Community Providers



Target Audience

- dentists, physicians, and other healthcare professionals managing adults presenting with tooth pain in settings where dental treatment may or may not be immediately available

Purpose

- reduce inappropriate prescriptions of antibiotics for tooth pain with useful chairside aids and patient engagement tools

https://bit.ly/cwc-toolkit-dental

Dental Settings

Standardized Approach to Managing Tooth Pain in Adults

Symptom(s)	Clinical Finding(s)	Treatment	Recommendation	Tools
Pain Only	**Vital Tooth**	Investigate further to identify and treat cause	Pain management[10,11,12]	Tooth Pain Prescription Poster FAQ - Patients
	Non-Vital Tooth	Root canal therapy or dental extraction		
Pain and Localized Swelling	**Non-vital tooth** with localized periapical abscess with/without drainage	Root canal therapy, or dental extraction +/- incision and drainage of the abscess	Pain management[10,11,12]	Antibiotics: Tooth Pain with Systemic Signs of Infection FAQ - Health Care Providers FAQ - Patients
	Non-vital tooth with periapical abscess and **systemic involvement** (i.e., fever, trismus, malaise, spreading facial swelling)	Root canal therapy or dental extraction +/- incision and drainage of the abscess	Pain management + antibiotic [13,14,15] Re-evaluate efficacy of treatment after 2 days/48 hours in person, virtually, or via phone call	

Non-Dental Settings

Standardized Approach to Managing Tooth Pain in Adults

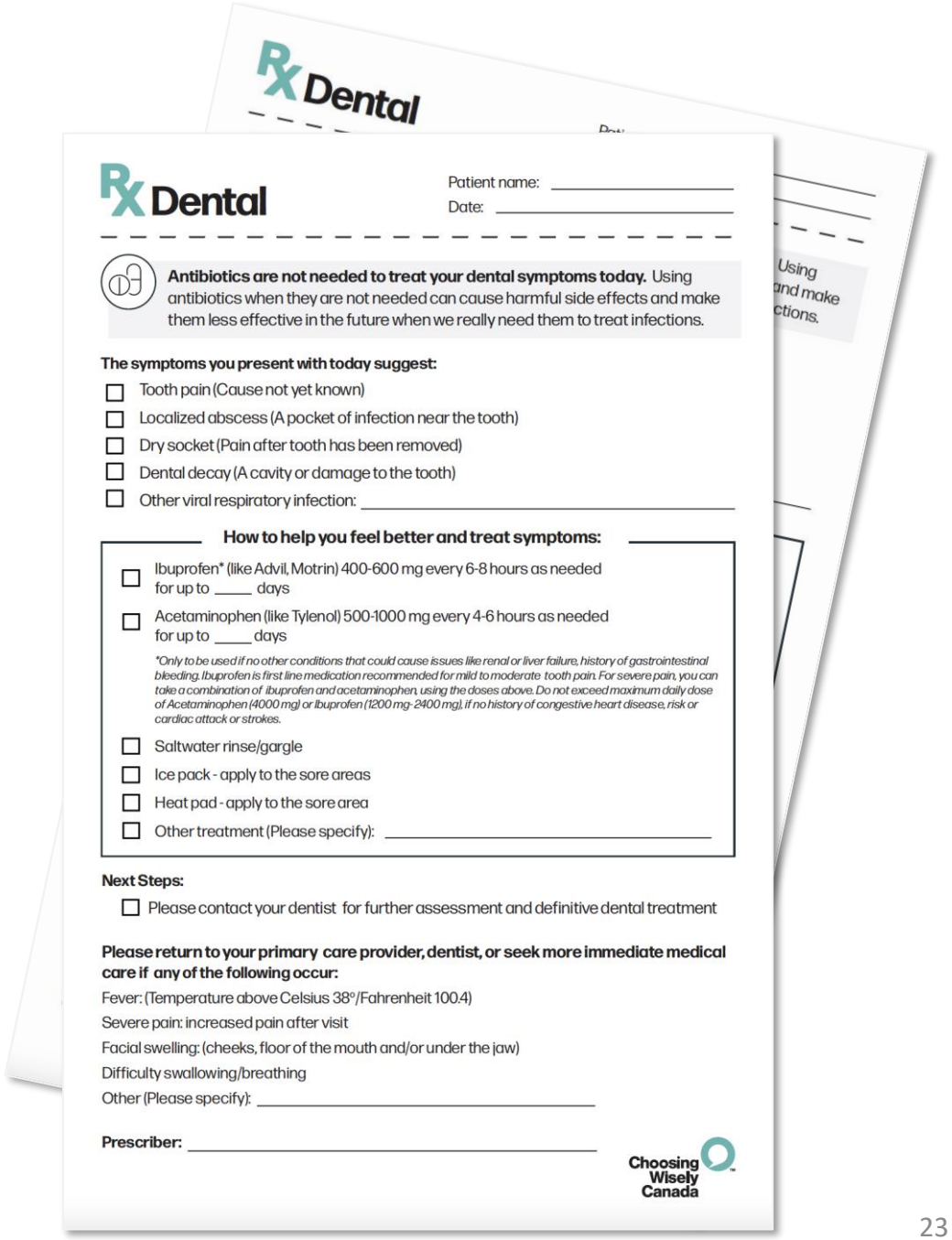
Symptom(s)	Recommendation	Tools
Pain +/- localized swelling (i.e., adjacent to the tooth root)	Pain management[10,11,12] + recommend dentistry follow up for definitive diagnosis and management	Tooth Pain Prescription Poster FAQ - Patients
Pain +/- localized swelling (i.e., adjacent to the tooth root) and **systemic involvement** (i.e., fever, malaise, trismus, spreading swelling to face)	Pain management[10,11,12] and antibiotic[13,14,15] + Recommend urgent dentistry follow-up for definitive diagnosis and management	Antibiotic Treatment For Tooth Pain with Systemic Signs Of Infection FAQ - Health Care Providers FAQ - Patients

Antibiotic Treatment for Tooth Pain with Systemic Signs of Infection

Condition	Indication
Without reported allergy to Penicillin, Ampicillin or Amoxicillin	Amoxicillin 500 mg oral every 8 hours x 5 days[13, 14] OR Penicillin V potassium 600 mg oral every 6 hours x 5 days[13, 14]
With **non-severe** reported allergy to Penicillin, Ampicillin or Amoxicillin Localized rash, itching, nausea, vomiting, diarrhea)[16]	Cephalexin 500 oral every 6 hours x 5 days[14,15]
With **severe** reported allergy to Penicillin, Ampicillin or Amoxicillin a. Immediate type reaction (i.e., hives, wheeze, shortness of breath, anaphylaxis):[15]	Consider Cefuroxime* 500 oral every 12 hours x 5 days **Very Low cross reactivity with Penicillin*[15] Azithromycin (loading dose of 500 mg oral on day 1, followed by 250 mg for an additional 4 days) + Metronidazole 500 mg oral every 12 hours x 5 days[14,15] For more information please refer to FAQ for Health Care Providers: Antibiotic treatment and Antibiotic prophylaxis
b. Other severe reaction to Penicillin: (i.e., delayed type reactions like Stevens Johnson Syndrome SJS/Toxic Epidermal Necrolysis (TEN), Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) OR severe allergy to other beta lactam (i.e., immediate type reaction to cephalosporin)[14,15]	Azithromycin (loading dose of 500 mg oral on day 1, followed by 250 mg for an additional 4 days) + Metronidazole 500 mg oral every 12 hours x 5 day[14,15]

Dental Prescription

Advice to patients on pain management without antibiotics



Rx Dental

Patient name: _____

Date: _____

Antibiotics are not needed to treat your dental symptoms today. Using antibiotics when they are not needed can cause harmful side effects and make them less effective in the future when we really need them to treat infections.

The symptoms you present with today suggest:

- ☐ Tooth pain (Cause not yet known)
- ☐ Localized abscess (A pocket of infection near the tooth)
- ☐ Dry socket (Pain after tooth has been removed)
- ☐ Dental decay (A cavity or damage to the tooth)
- ☐ Other viral respiratory infection: _____

How to help you feel better and treat symptoms:

- ☐ Ibuprofen* (like Advil, Motrin) 400-600 mg every 6-8 hours as needed for up to _____ days
- ☐ Acetaminophen (like Tylenol) 500-1000 mg every 4-6 hours as needed for up to _____ days

**Only to be used if no other conditions that could cause issues like renal or liver failure, history of gastrointestinal bleeding. Ibuprofen is first line medication recommended for mild to moderate tooth pain. For severe pain, you can take a combination of ibuprofen and acetaminophen, using the doses above. Do not exceed maximum daily dose of Acetaminophen (4000 mg) or Ibuprofen (1200 mg-2400 mg), if no history of congestive heart disease, risk or cardiac attack or strokes.*

- ☐ Saltwater rinse/gargle
- ☐ Ice pack - apply to the sore areas
- ☐ Heat pad - apply to the sore area
- ☐ Other treatment (Please specify): _____

Next Steps:

- ☐ Please contact your dentist for further assessment and definitive dental treatment

Please return to your primary care provider, dentist, or seek more immediate medical care if any of the following occur:

Fever: (Temperature above Celsius 38°/Fahrenheit 100.4)

Severe pain: increased pain after visit

Facial swelling: (cheeks, floor of the mouth and/or under the jaw)

Difficulty swallowing/breathing

Other (Please specify): _____

Prescriber: _____

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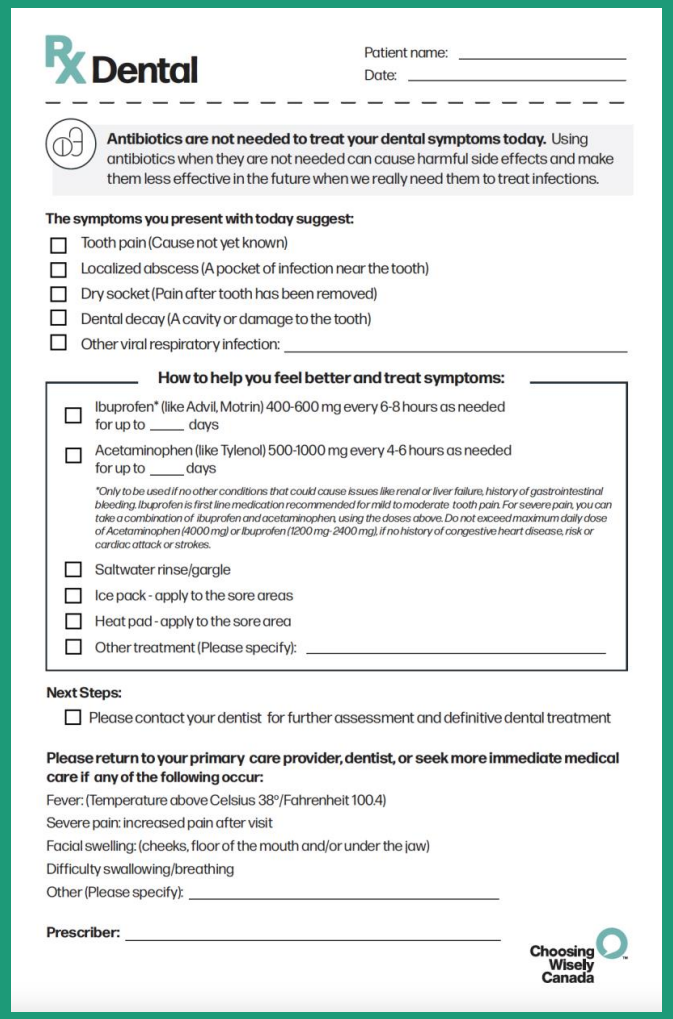
[Dental_Prescription_2024_3.pdf]



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The symptoms you present with today suggest:

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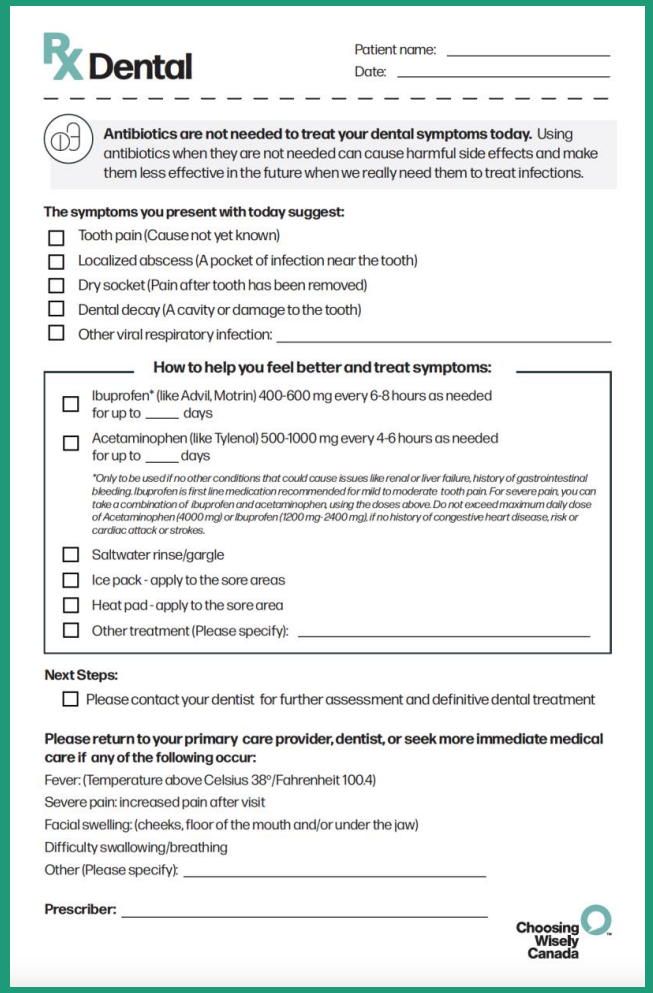
- ☐ Localized abscess (a pocket of pus near the tooth)
- ☐ Dry socket (pain after the tooth has been removed)
- ☐ Dental decay (a cavity)
- ☐ Post-operative pain (pain after dental surgery)
- ☐ Other: _____



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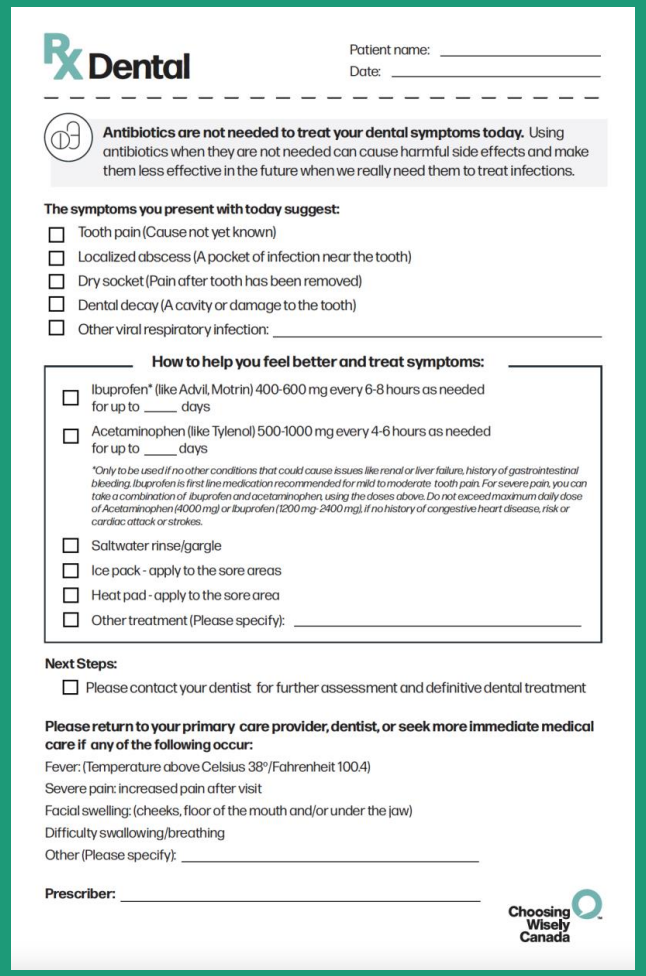

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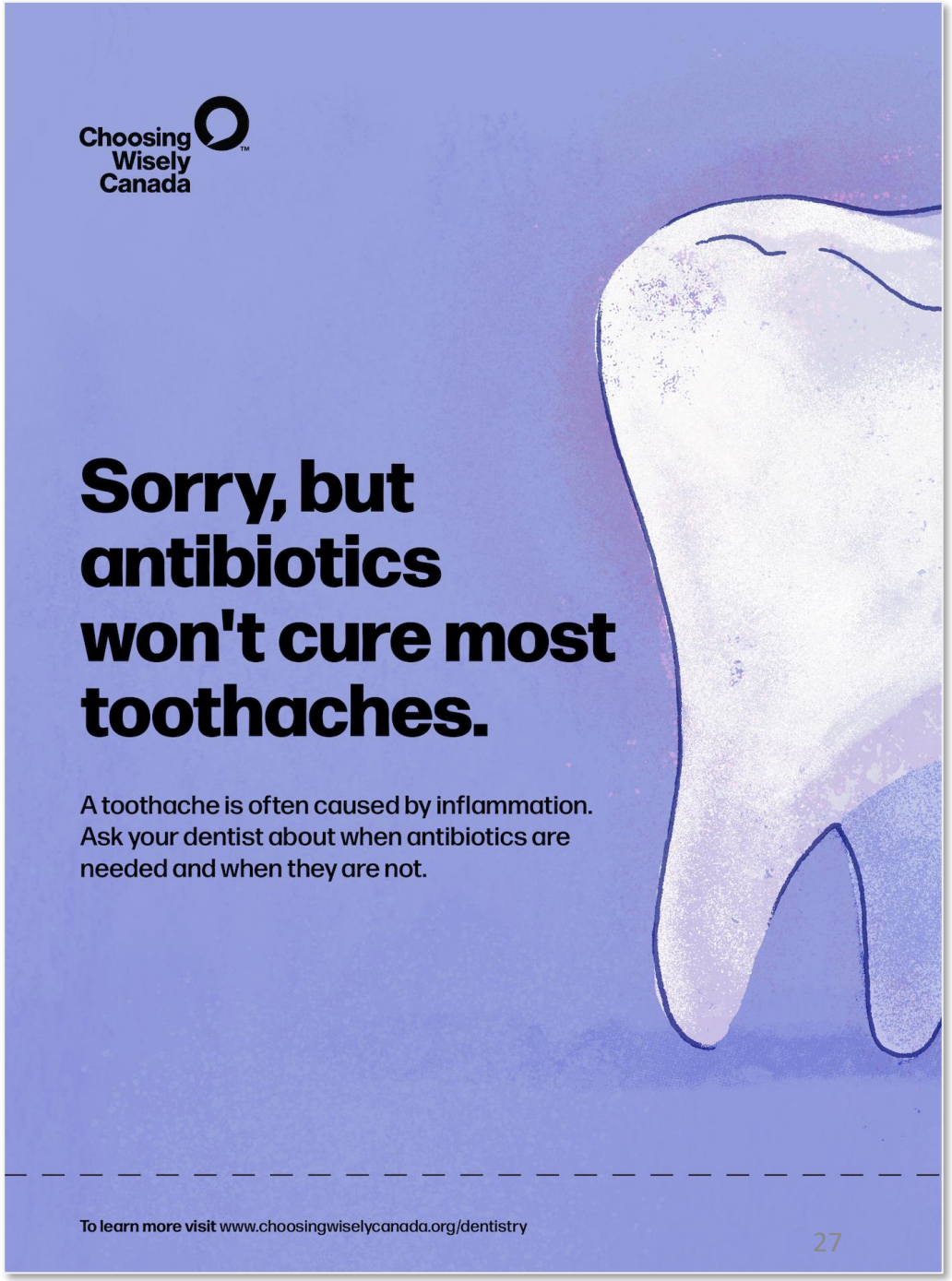
Choosing Wisely Canada

This prescription pad was adapted from the Saskatchewan Health Authority Antimicrobial Stewardship Program.

Poster

For waiting rooms and dental operatories
As a screensaver

[Dentist_Antibiotic_Poster_2024-1.pdf]



FAQ

For patients about antibiotics before a dental procedure

Antibiotics Before a Dental Procedure

Your Questions Answered

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Antibiotics won't help with tooth pain and should only be used in certain situations before dental procedures. Here are some examples of when to talk to your health care provider about antibiotics:

Do you have a penicillin allergy?

- If you had a mild reaction, like a rash, to penicillin more than 5-10 years ago, in most cases you will not be considered to have an allergy to it. Your provider might suggest a direct oral challenge, where you take a small dose check for a reaction. This is often as safe as a skin test, with less than a 1% chance of a serious reaction.
- If you had a reaction in the **last 5 years**, you'll need a skin test to check for the allergy.

Heart condition?

Antibiotics are only helpful for patients with certain congenital heart conditions, valve replacements, or history of heart valve infection. There is no evidence that antibiotics are helpful for patients with other types of heart conditions, but they can cause harmful side effects if used when they are not needed.

Heart device?

If you have a heart device not located in your heart valves or if you have other implanted devices, you do not need antibiotics before a dental procedure. There is no evidence that antibiotics help in these cases, but they can cause harmful side effects if used when they are not needed.

Joint replacement?

You do not need antibiotics before a dental procedure if you have a joint replacement, orthopedic pins, plates, and screws. There is no evidence that antibiotics help in these cases, but they can cause harmful side effects if used when they are not needed.

Medical condition?

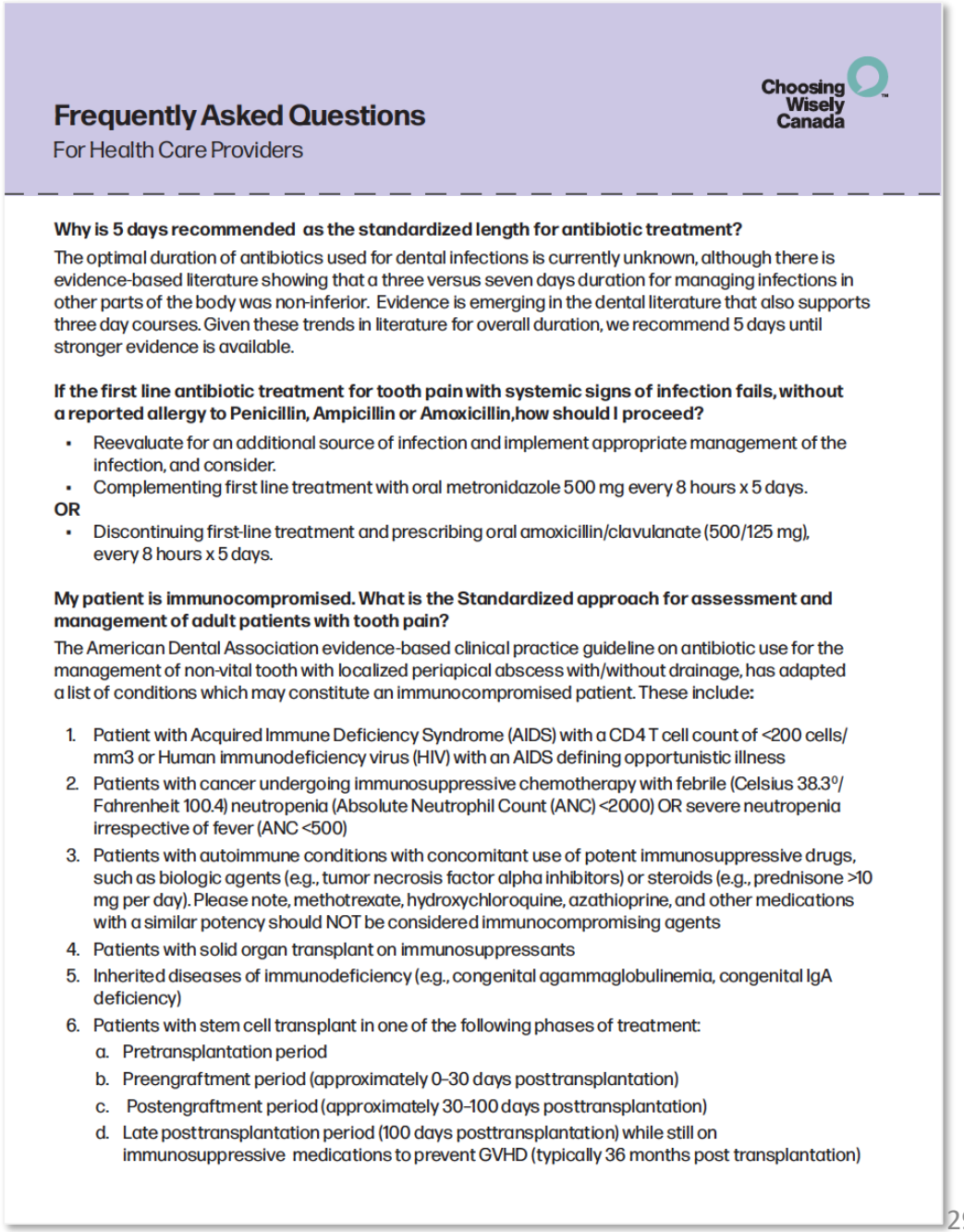
Some patients with certain medical conditions, like immunocompromised patients, might need antibiotics before dental procedures, even if they do not have signs of infection, like fever, trouble opening their mouth, feeling unwell, or facial swelling. Talk to your health care provider about your medical condition before a dental procedure.

This information is for you to use when talking with your health care provider. It is not a substitute for medical advice and treatment.

FAQ

For providers about antibiotics before a dental procedure

- Duration
- Failure of prescribed antibiotic
- Immunocompromised patients
- Penicillin Allergy
- Antibiotic prophylaxis – current guidelines



Frequently Asked Questions

For Health Care Providers

Choosing Wisely Canada

Why is 5 days recommended as the standardized length for antibiotic treatment?

The optimal duration of antibiotics used for dental infections is currently unknown, although there is evidence-based literature showing that a three versus seven days duration for managing infections in other parts of the body was non-inferior. Evidence is emerging in the dental literature that also supports three day courses. Given these trends in literature for overall duration, we recommend 5 days until stronger evidence is available.

If the first line antibiotic treatment for tooth pain with systemic signs of infection fails, without a reported allergy to Penicillin, Ampicillin or Amoxicillin, how should I proceed?

- Reevaluate for an additional source of infection and implement appropriate management of the infection, and consider.
- Complementing first line treatment with oral metronidazole 500 mg every 8 hours x 5 days.

OR

- Discontinuing first-line treatment and prescribing oral amoxicillin/clavulanate (500/125 mg), every 8 hours x 5 days.

My patient is immunocompromised. What is the Standardized approach for assessment and management of adult patients with tooth pain?

The American Dental Association evidence-based clinical practice guideline on antibiotic use for the management of non-vital tooth with localized periapical abscess with/without drainage, has adapted a list of conditions which may constitute an immunocompromised patient. These include:

1. Patient with Acquired Immune Deficiency Syndrome (AIDS) with a CD4 T cell count of <200 cells/mm3 or Human immunodeficiency virus (HIV) with an AIDS defining opportunistic illness
2. Patients with cancer undergoing immunosuppressive chemotherapy with febrile (Celsius 38.3°/ Fahrenheit 100.4) neutropenia (Absolute Neutrophil Count (ANC) <2000) OR severe neutropenia irrespective of fever (ANC <500)
3. Patients with autoimmune conditions with concomitant use of potent immunosuppressive drugs, such as biologic agents (e.g., tumor necrosis factor alpha inhibitors) or steroids (e.g., prednisone >10 mg per day). Please note, methotrexate, hydroxychloroquine, azathioprine, and other medications with a similar potency should NOT be considered immunocompromising agents
4. Patients with solid organ transplant on immunosuppressants
5. Inherited diseases of immunodeficiency (e.g., congenital agammaglobulinemia, congenital IgA deficiency)
6. Patients with stem cell transplant in one of the following phases of treatment:
   a. Pretransplantation period
   b. Preengraftment period (approximately 0–30 days posttransplantation)
   c. Postengraftment period (approximately 30–100 days posttransplantation)
   d. Late posttransplantation period (100 days posttransplantation) while still on immunosuppressive medications to prevent GVHD (typically 36 months post transplantation)

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Rationale for Shorter Duration

- Antibiotic treatment durations are not based on scientific reasoning or biologic basis; they stem from an artificially created number system
- Benefits of shorter course include:

↓AMR

↓AE

↓c. diff

Myths about “finish your antibiotics”

X Shorter courses of antibiotics are less effective

- shorter courses of antibiotics can be safely used for the majority of uncomplicated infections

X Shorter courses of antibiotics lead to more resistance

- mounting evidence supports the opposite
- prolonged exposure to antibiotics that provides the selective pressure to drive antimicrobial resistance
- longer courses are more likely to result in the emergence of resistant bacteria.

Langford BJ, Morris AM. Is it time to stop counselling patients to "finish the course of antibiotics"? Can Pharm J (Ott). 2017 Oct 5;150(6):349-350

The Evidence - Duration

Medicine

- >130 RCTs across 22 infectious conditions → shorter courses equivalent, or noninferior, to longer courses.

Dentistry

- 2022 SR (1 study)
  - Compared 3-5 vs 7 days for the treatment of odontogenic infection requiring tooth extraction: three-day course of amoxicillin was clinically non-inferior to 7 days
- 2025 SR (9 studies)
  - Prompt incision and drainage plus short-course antibiotic regimen of two to five days is generally effective for managing odontogenic maxillofacial space infections

- Grant. Duration of antibiotic therapy for common infections. J Assoc Med Microbiol Infect Dis Can2021
- Cooper. Optimum length of treatment with systemic antibiotics in adults with dental infections: a systematic review. Evid Based Dent. 2022
- Alhudaithi. Optimal Duration of Antibiotic Therapy for Space Infections in the Maxillofacial Region: A Systematic Review. Craniomaxillofac Trauma Reconstr. 2025

Recommendations on Duration

- CWC toolkit recommends five days
- Evidence-based literature showing that a three versus seven days duration for managing odontogenic infections
- Given these trends in literature for overall duration, we recommend 5 days until stronger evidence is available

Follow up evaluation

Focus groups with dentists who have used the toolkit

- Strengths – useful, easy to use, enabled patient engagement and shared decision making
- Improvement opportunities – pediatric component, expanded scope beyond tooth pain, translation to other languages
- Dissemination and uptake challenges

Dissemination

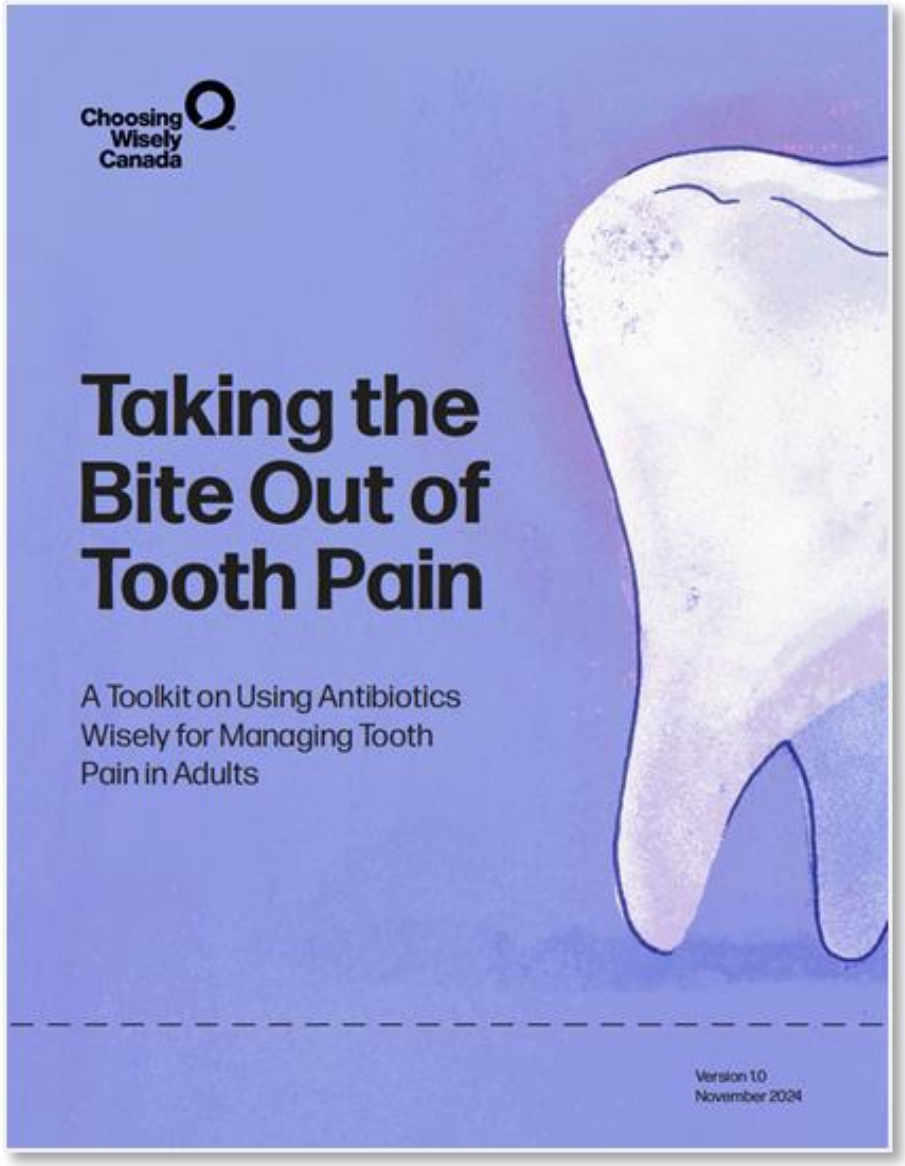
- Presentations to multiple dental groups, publications in dental journals
- Discussions with dental faculty and students at U of T
- Choosing Wisely at Sunnybrook

We are open to suggestions – pharmacy, medicine, others!!

Summary of key points

- AMR continues to be a global health threat, driven by overuse of antimicrobial drugs
- Up to 80%of antibiotics prescribed by dentists are deemed to be unnecessary
- Drivers of overuse practice patterns, desire for interim measures, risk aversion
- Toothache, a ubiquitous problem seen in medical and dental practice, is not treated with antibiotics
- Well-designed toolkits can help clinicians and patients reduce overuse of antibiotics

Thank you!


Choosing Wisely Canada
Taking the Bite Out of Tooth Pain
A Toolkit on Using Antibiotics Wisely for Managing Tooth Pain in Adults
Version 1.0
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