



**Ontario Health**  
Cancer Care Ontario

**Symptom Management Algorithm**

# **Oral Bacterial Infections**

**in Adults with Cancer**

## About the Oral Bacterial Infections Algorithm

- The purpose of this algorithm is to outline the best clinical practice for pharmacological interventions of oral bacterial infections. The patient must be properly diagnosed through conventional testing, including but not limited to: exam findings, visual exam, culture and sensitivity from oral swabs, blood cultures, X-rays, and biopsies as indicated
- This algorithm does not negate the need for consultation with the prescriber, dental provider, infectious disease specialist and/or pharmacist

## Considerations for All Patients

- Good oral care is important to prevent and decrease oral complications, to maintain normal function of the oral tissues, to maintain comfort, and to reduce the risk of local and systemic infection. See the basic oral care tables (pages 4 and 5)
- Significant risk factors for the development of oral complications include the type of cancer, type of cancer treatments, cumulative doses of chemotherapy or radiation treatment (current or prior), method of delivery, and duration of treatment
- Predisposing medical, dental, and lifestyle factors such as uncontrolled diabetes, pre-existing autoimmune conditions, polypharmacy, tobacco use, alcohol use, oral hygiene, and dental health may increase severity of oral complications
- Oral complications can significantly affect the patient's morbidity, ability to tolerate treatment, and overall quality of life
- Rigorous assessment, diagnosis and early intervention are important in preventing and decreasing oral complications; this includes the assessment of nutritional status and adequacy of oral intake
- A large variety of medications may cause oral complications. Consultation with the prescriber, dental provider, and/or pharmacist is recommended
- Some pharmaceuticals may be unaffordable, and alternatives should be offered where possible
- If odontogenic or periodontal infection is suspected, consultation with a oncology team is strongly recommended

## Risk Factors, Signs and Symptoms, Prevention, and Management

Risk Factors	Prevention
<ul style="list-style-type: none"> <li>• Neutropenia/immunosuppression</li> <li>• Poor oral hygiene</li> <li>• Poor dental health</li> <li>• Poor periodontal health</li> <li>• Tobacco use</li> </ul>	<p><i>Non-Pharmacological</i></p> <ul style="list-style-type: none"> <li>• Follow meticulous oral care, see the basic oral care tables (pages 4 and 5)</li> </ul> <p><i>Pharmacological—see dosing table (page 3)</i></p> <ul style="list-style-type: none"> <li>• Ciprofloxacin starting after chemotherapy</li> </ul>
Signs and Symptoms*	Management
<ul style="list-style-type: none"> <li>• Swelling</li> <li>• Pain</li> <li>• Tenderness</li> <li>• Pus</li> <li>• Redness</li> <li>• Fever</li> <li>• Fetid odor</li> </ul>	<p><i>Pharmacological—see dosing table (page 3)</i></p> <ul style="list-style-type: none"> <li>• Chlorohexidine can be complimentary to systemic or topical therapy, with the exception of patients on active head and neck radiation therapy. See the basic oral care tables (pages 4 and 5)</li> <li>• In addition to prescribing antibiotics, consult a dentist to remove the source of infection and provide ongoing follow-up</li> <li>• First line: amoxicillin or penicillin</li> <li>• Amoxicillin/clavulanic acid (Clavulin®)</li> <li>• Ciprofloxacin</li> <li>• If allergic: clindamycin</li> <li>• If history of c-difficile, recommendation against clindamycin or azithromycin</li> <li>• If infection is periodontal in origin, metronidazole is considered first line therapy. Consult with dentist for definitive diagnosis prior to prescribing</li> </ul>

## Follow-Up and Ongoing Monitoring

- Seek dental care in addition to prescribing medication. For ongoing infections not responding to prescribed treatment, request the assistance of an infectious disease specialist or consider a swab for culture and sensitivity, if feasible

\*See example photos (page 3)

## Oral Bacterial Infection Examples



Figure 1: Severe gingivitis



Figure 2: Extra oral infection



Figure 3: Periodontal abscess

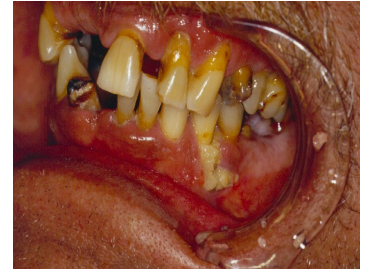


Figure 4: Advanced dental and periodontal disease

## Antimicrobial Stewardship

### Antimicrobial Stewardship

- Antimicrobial stewardship is the appropriate use of antimicrobials to optimize clinical outcomes, combat resistant infections, avoid adverse drug events, and minimize costs. It means that patients get the right antibiotic, only when needed and for only as long as needed
- Visit [Choosing Wisely Canada](#) and The [Canadian Association for Hospital Dentists](#) for best practices of antimicrobial stewardship

## Pharmacological Dosing Table for Management of Oral Bacterial Infections

Rx	Dispense	Dose and Route
Metronidazole 250mg	21 tablets	<ul style="list-style-type: none"> <li>• Take 1 tablet three times a day for 7 days</li> </ul>
Metronidazole 500mg	21 capsules	<ul style="list-style-type: none"> <li>• Take 1 capsule every eight hours until finished</li> </ul>
Ciprofloxacin 500mg	14 day supply	<ul style="list-style-type: none"> <li>• Take 1 tablet every 12 hours; begin on the fifth day after chemotherapy. Do not repeat</li> </ul>
Amoxicillin 500mg	7 day supply	<ul style="list-style-type: none"> <li>• Take 1 tablet two times a day</li> </ul>
Amoxicillin-pot clavulanate 500-125mg	14 tablets	<ul style="list-style-type: none"> <li>• Take 1 tablet two times a day</li> </ul>
Penicillin V potassium 300mg	84 tablets	<ul style="list-style-type: none"> <li>• Take 4 tablets (1200mg) now, and then 600mg four times a day, for 10 days</li> </ul>
Clindamycin 300mg	30 capsules	<ul style="list-style-type: none"> <li>• Take 1 tablet three times a day for 10 days</li> </ul>
Azithromycin 250mg	6 tablets	<ul style="list-style-type: none"> <li>• Take 2 tablets now and then 1 tablet a day until finished</li> </ul>
Chlorhexidine gluconate 0.12%	475mL bottle	<ul style="list-style-type: none"> <li>• Swish 15mL for 60 seconds and spit out, three times a day after meals. DO NOT SWALLOW. Avoid other rinsing, drinking, or eating for 30 minutes afterwards</li> </ul>

## Basic Oral Care Tables

### Flossing

<b>Basic</b>	<ul style="list-style-type: none"> <li>• Patients who have not flossed routinely before cancer treatment should not begin flossing at this time</li> <li>• Patients with mouth cancers, trismus, dysphagia, and/or dysgeusia may not be able to floss; use of interproximal brushes can replace flossing</li> <li>• Floss at least once daily</li> <li>• Waxed floss may be easier to use and minimize trauma to the gums</li> </ul>
<b>Intensified</b>	<ul style="list-style-type: none"> <li>• Continue with basic plan until discomfort becomes too great</li> </ul>
<b>End of Life</b>	<ul style="list-style-type: none"> <li>• Discontinue flossing if patient chooses</li> </ul>

#### Discontinue flossing if:

- Gums bleed for longer than two minutes

#### Restart flossing if:

- Platelet count is  $>20 \times 10^9$  cells/L, or as instructed by cancer care team

### Brushing

<b>Basic</b>	<ul style="list-style-type: none"> <li>• Use a small, ultra-soft-headed, rounded-end, bristle toothbrush (an ultrasonic toothbrush, may be acceptable)</li> <li>• Rinse toothbrush in hot water to soften the brush before using</li> <li>• Use a prescription strength fluoride toothpaste. Spit out the foam but do not rinse mouth</li> <li>• Use a fluoridated toothpaste and re-mineralizing toothpaste containing calcium and phosphate</li> <li>• Brush tongue gently from back to front, using a sweeping motion</li> <li>• Rinse brush after use in hot water and allow to air dry</li> <li>• Change toothbrush when bristles are not standing up straight</li> <li>• Brush within 30 minutes after eating and before bed. Ensure the gingival portion of the tooth and periodontal sulcus (where the tooth and gums meet) are included</li> <li>• Consider topical anesthetics (e.g. viscous lidocaine 2% or viscous xylocaine 2%, 2-5 mL) before brushing and eating to minimize pain</li> <li>• With continuous pain, a regularly prescribed oral analgesic allows for more thorough tooth brushing</li> </ul>
<b>Intensified</b>	<ul style="list-style-type: none"> <li>• Encourage patient to continue brushing through treatment phase even when it causes discomfort</li> <li>• If bleeding occurs, encourage gentler brushing</li> <li>• Use a non-flavoured, non-alcoholic chlorhexidine gluconate (CHX) 0.12% rinse to aid in plaque control, 2 times a day after meals</li> <li>• If unable to continue brushing with a toothbrush, use a moist gauze or foam swab</li> <li>• Discontinue use of toothpaste if it is too astringent and dip toothbrush in bland rinse</li> <li>• If there has been an oral infection, use a new toothbrush after infection has resolved</li> <li>• If unable to tolerate brushing, seek assistance from nursing or dental staff</li> </ul>
<b>End of Life</b>	<ul style="list-style-type: none"> <li>• Continue with basic and intensified mouth care plan, if possible</li> <li>• Instead of moist gauze may use a foam brush soaked in CHX</li> </ul>

#### Discontinue brushing if:

- Gums bleed for longer than two minutes

#### Restart brushing if:

- Platelet count is  $>20 \times 10^9$  cells/L, or as instructed by cancer care team

#### Bland rinse:

- 1 teaspoon salt, 1 teaspoon baking soda, 4 cups of water

#### Lidocaine alternative:

- Dyclonine 0.5 or 1% rinse (5 mL every 6 to 8 hours, swish and swallow) as needed for pain

#### Patients with head and neck cancers:

- Brushing may not be appropriate in the area of tumour involvement
- Consult with a dentist
- Patients should be assessed for the use of daily fluoride tray

#### Patients with dentures:

- Remove dentures, plates and prostheses before brushing
- Brush and rinse dentures after meals and at bedtime
- Remove from mouth nightly (at least 8 hours per 24 hours) and soak in bland rinse
- Leave dentures out as much as possible during radiation therapy
- Patients who have had head and neck surgery should not wear dentures post-surgery unless assessed by a dental specialist or head and neck surgeon, to prevent

## Rinsing

<b>Basic</b>	<ul style="list-style-type: none"> <li>Rinse the oral cavity with a bland rinse vigorously, at least twice a day to maintain mouth moisture, remove the remaining debris and toothpaste, and reduce the accumulation of plaque and infection</li> <li>Use a bland rinse to increase oral clearance for oral hygiene maintenance and improved patient comfort.</li> <li>Following emesis, rinse with bland rinse immediately to neutralize the mouth</li> <li>If allergic to lidocaine, dyclonine 0.5 or 1% rinse (5 mL every 6 to 8 hours, swish and swallow) may be used as needed for pain</li> </ul>
<b>Intensified</b>	<ul style="list-style-type: none"> <li>Rinse in place of brushing if patient is unable to brush</li> <li>Seek dental care where possible for removing plaque</li> <li>In addition to rinsing twice a day, encourage rinsing every 1 to 2 hours while awake and every 4 hours through the night if awake, to minimize complications of decreased saliva</li> <li>If unable to clean using moist gauze, or foam swab, consider rinsing via syringe if platelet count <math>&gt;20 \times 10^9</math> cells/L</li> </ul>
<b>End of Life</b>	<ul style="list-style-type: none"> <li>Continue with basic and intensified mouth care plan</li> <li>Consider sialagogues in instances of dry mouth for pharmacotherapy relief (pilocarpine, and anethole trithione)</li> </ul>

<p><b>Patients with dentures:</b></p> <ul style="list-style-type: none"> <li>After removing dentures, rinse mouth thoroughly with rinse solution</li> <li>Brush and rinse dentures after meals and at bedtime</li> <li>Rinse with rinsing solution before placing in mouth</li> <li>Remove from mouth nightly (at least 8 hours per 24 hours) and soak in rinsing solution</li> </ul>
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<p><b>Bland rinse:</b></p> <ul style="list-style-type: none"> <li>1 teaspoon salt, 1 teaspoon baking soda, 4 cups of water</li> </ul>
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<p><b>Avoid:</b></p> <ul style="list-style-type: none"> <li>Club soda due to the presence of carbonic acids</li> <li>Commercial mouthwashes with hydroalcoholic base or astringent properties</li> </ul>
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## Moisturizing the Oral Cavity

<b>Basic</b>	<ul style="list-style-type: none"> <li>Moisturize the mouth with water, artificial saliva products, or other water soluble lubricants</li> <li>Apply lubricant after each cleaning, at bedtime, and as needed. Water-based lubricant needs to be applied more frequently</li> <li>Frequent rinsing as needed with basic mouth rinse</li> <li>Patients may suck on xylitol lozenges (up to 6 grams a day), xylitol containing popsicles, or xylitol containing gum</li> </ul>
<b>Intensified</b>	<ul style="list-style-type: none"> <li>Continue with basic mouth care plan with increased frequency and intensity</li> <li>Increase frequency of bland mouth rinse to every hour</li> </ul>
<b>End of Life</b>	<ul style="list-style-type: none"> <li>Continue with basic mouth care plan with increased frequency and intensity, as needed</li> <li>Use a steam vaporizer at night</li> <li>May use a cool mist humidifier at night, but use should be weighed against the risk for fungal infection</li> </ul>

<p><b>Avoid:</b></p> <ul style="list-style-type: none"> <li>Glycerin or lemon-glycerin swabs as they dry the mouth</li> <li>Acidic or minty mouth products, if they burn</li> </ul>
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## Lip Care

<b>Basic</b>	<ul style="list-style-type: none"> <li>To keep lips moist and avoid chapping and cracking, use water soluble lubricants, lanolin (wax-based), or oil based lubricants (mineral oil, cocoa butter)</li> <li>Water soluble lubricants should be used inside and outside the mouth, and may also be used with oxygen (e.g. products compounded with Glaxal base or Derma base)</li> <li>Apply lubricant after each cleaning, at bedtime, and as needed. Water-based lubricants need to be applied more frequently</li> </ul>
<b>Intensified</b>	<ul style="list-style-type: none"> <li>Continue with basic mouth care plan with increased frequency and intensity</li> </ul>
<b>End of Life</b>	<ul style="list-style-type: none"> <li>Continue with basic mouth care plan with increased frequency and intensity, as needed</li> <li>May use a cool mist humidifier at night, but use should be weighed against the risk for fungal infection</li> </ul>

<p><b>Avoid:</b></p> <ul style="list-style-type: none"> <li>Touching any lip lesions</li> <li>Oil based lubricants on the inside of the mouth</li> <li>Petroleum based products</li> </ul>
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## Miscellaneous

<b>Basic</b>	<ul style="list-style-type: none"> <li>Dental evaluation and treatment as indicated prior to cancer therapy is desirable to reduce risk for local and systemic infections from odontogenic sources for hematologic, solid or head and neck cancers</li> </ul>
<b>Intensified</b>	<ul style="list-style-type: none"> <li>Continue with basic mouth care plan with increased frequency and intensity</li> </ul>
<b>End of Life</b>	<ul style="list-style-type: none"> <li>Continue with basic mouth care plan with increased frequency and intensity, as needed</li> </ul>

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## Disclaimer

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### Dr. Saunders BSc, DMD

Health Sciences North Sudbury  
(Oral Care Group Lead)

### Colleen Bedford, BSc

Ontario Health

### Alaa El-Danab, MSc.A, RD

Princess Margaret Cancer Centre

### Alexandra Fleury-Catterall, M.Sc.S, Speech-Language Pathologist, Reg. CASLPO

Health Sciences North Sudbury

### Anahita Djalilvand, RD, MScFN

Lakeridge Health

### Andrea Gomes, BSc, MCISc, S-LP (C), Reg. CASLPO

University Health Network

### Callie Gross, RD

Health Sciences North Sudbury

### Casey Kouvelas, MN, RN

Clinical Practice Manager, Windsor Regional  
Cancer Centre

Regional Oncology Nursing Lead, Erie St. Clair  
Regional Cancer Program

### Dr. Erin Watson, DMD, MHSc

Deputy Chief of Dentistry  
Princess Margaret Cancer Centre

### Karen Biggs, RD

Juravinski Hospital and Cancer Centre

### Lia Kutzscher, NP

London Health Sciences Centre

### Linda Hamelin NP-Adult, MN

The Ottawa Hospital

### Melissa Touw, Clinical Nurse Specialist

Kingston General Hospital

### Dr. Mireille Kaprilian, HBSc, DDS

Clinical Associate Dentist  
Princess Margaret Cancer Centre

### Nicole Chenier-Hogan RN(EC), BA, BNSc, MSc, CNN(c)

Nurse Practitioner; Radiation Oncology  
Cancer Centre Southeastern Ontario/Kingston  
Health Sciences Centre

### Olivia Lemenchick, RN

London Health Sciences Centre

### Rita Valvasori, Registered Dental Hygienist

Rosemary Rivera, Professional Practice Leader  
Markham Stouffville Hospital

### Wilf Steer BScPhm MBA

Outpatient Oncology Pharmacist  
Health Sciences North Sudbury