

Appendix A: Disease-Specific Chapters

Chapter: Group A Streptococcal disease, invasive

Group A Streptococcal disease, invasive

- Communicable
 Virulent

**Health Protection and Promotion Act:
Ontario Regulation 558/91 – Specification of Communicable Diseases**

**Health Protection and Promotion Act:
Ontario Regulation 559/91 – Specification of Reportable Diseases**

1) Aetiologic Agent:	Invasive Group A Streptococcal (iGAS) disease is caused by the gram-positive <i>B-hemolytic bacterium, Streptococcus pyogenes (S. pyogenes)</i> . More than 100 distinct M-protein serotypes of <i>S.pyogenes</i> have been identified (1, 4). Typing based on the M-protein sequence (emm typing) also is performed and is more discriminating than M-protein Serotyping (4).
2) Case Definition:	
Surveillance Case Definition	See Appendix B
Outbreak Case Definition	<p>An outbreak is defined as increased transmission of GAS causing invasive disease in a population. Outbreaks of invasive GAS disease do not occur in the community frequently and typically involve two cases (i.e. case-pairs) who have had close contact (2).</p> <p>The outbreak case definition varies with the outbreak under investigation. Consideration should be given to the following in establishing an outbreak case definition:</p> <ol style="list-style-type: none">1. Clinical, laboratory and/or epidemiological criteria2. A time frame for occurrence (i.e. increase in endemic rate of iGAS)3. A geographic location(s) or place(s) where cases live or became ill/exposed4. Special attributes of cases (e.g. age, underlying conditions, and risk behaviours) <p>Cases should be classified as confirmed, probable or suspect.</p>
3) Identification:	
Clinical Presentation	The most common clinical presentations for invasive group A streptococci are skin or soft tissue infections, bacteremia with no septic focus, pneumonia, streptococcal toxic shock syndrome (STSS) and necrotizing fasciitis (NF) (1,2).

	<p><i>Streptococcus pyogenes</i> may colonize the throat of individuals (carriers) without symptoms and may be passed from person to person (2).</p> <p>The manifestations preceding the onset of invasive GAS disease are variable. Symptoms may be vague and include pain of unusual severity, swelling, fever, chills, influenza-like symptoms, generalized muscle aches, generalized macular rash, bullae, nausea, vomiting, diarrhea, malaise or joint pain (2).</p> <p>Symptoms of NF and myositis include fever, and a red painful swelling of tissue, which spreads rapidly. Death may occur in 12-24 hours. NF and myositis are less severe than STSS, however they have a mortality rate of about 20% (2).</p> <p>Symptoms of STSS include the primary site of GAS and or NF, plus hypotension, adult respiratory distress syndrome, renal impairment, rapid onset of shock and multi organ failure. STSS has a mortality rate of up to 81%. Survivors may be left with severe long-term disability (2).</p>
Diagnosis	See Appendix B

4) Epidemiology:

Occurrence	In Ontario, similar to the rest of Canada, iGAS is most prevalent among older adults and in young children. IGAS follows a seasonal pattern with cases occurring more frequently in the winter and early spring. The most common risk factors for acquisition include injection drug use, pregnancy related risk factors, varicella, cancer, immunocompromised and HIV infection. Highest among adults greater than 60 years of age followed by children less than 1 year of age.
Reservoir	Humans, typically in their throat and skin (1).
Modes of Transmission	<p>Transmission is generally person to person most commonly by: (1, 2)</p> <ul style="list-style-type: none"> • Droplet spread when an infected individual coughs or sneezes • Direct or indirect contact of the oral or nasal mucus membranes with infectious respiratory secretions or with exudates from wounds or skin lesions • Direct or indirect contact of non-intact skin with infectious respiratory secretions or skin wound exudates • Sharing of contaminated needles
Incubation Period	Usually 1-3 days (1).
Period of Communicability	In untreated uncomplicated cases, 10-21 days; in untreated conditions with purulent discharges, weeks or months. With adequate treatment, transmissibility generally ends within 24 hours. Persons with untreated streptococcal pharyngitis may carry the

	organism for weeks or months, but infectivity decreases in 2-3 weeks after onset of infection (1).
Susceptibility and Resistance	<p>Susceptibility is general; however, the risk of iGAS disease is associated with several underlying conditions including HIV infection, cancer, heart disease, diabetes, lung disease and alcohol abuse. Older individuals, persons with chronic diseases, persons in institutions and pregnant women also appear to be at higher risk of invasive GAS (1, 2).</p> <p>Many persons who acquire iGAS infection have no underlying disease. Varicella is the most commonly identified risk factor in children and close contacts of persons with invasive GAS are at higher risk of infection (2).</p>

5) Reporting Requirements:

To local Board of Health	Confirmed and suspected cases shall be reported by phone to the medical officer of health by persons required to do so under the <i>Health Protection and Promotion Act, R.S.O. 1990</i> .
To Public Health Division (PHD)	<p>Report only case classifications specified in the case definition to PHD.</p> <p>Cases shall be reported using the integrated Public Health Information System (iPHIS), or any other method specified by the Ministry within one (1) business day of receipt of initial notification as per <i>iPHIS Bulletin</i> Number 17: Timely Entry of Cases (5).</p> <p>The minimum data elements to be reported for each case is specified in the following:</p> <ul style="list-style-type: none"> • <i>Ontario Regulation 569 (Reports)</i> under the Health Protection and Promotion Act (HPPA); • The disease-specific User Guides published by the Ministry, and • Bulletins and directives issued by the Ministry.

6) Prevention and Control Measures:

Personal Prevention Measures	<p>Prevention Measures:</p> <ul style="list-style-type: none"> • Educate the public and health care workers about reducing the spread of all types of infection by proper hand hygiene especially after coughing and sneezing and before preparing foods and eating. • Use of the varicella vaccine, as the risk of acquiring invasive GAS infection is higher in persons with antecedent varicella infection.
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<p>Infection Prevention and Control Strategies</p>	<p>Strategies:</p> <ul style="list-style-type: none"> • Prompt identification and aggressive treatment of GAS infections to prevent increased incidence of invasive GAS disease infections (4) • Individuals with confirmed streptococcal pharyngitis, especially school aged children should remain at home until at least 24 hours after beginning appropriate antimicrobial therapy • Droplet precautions for the first 24 hours after the start of appropriate antibiotic therapy is recommended for hospitalized cases
<p>Management of Cases</p>	<p>Investigation of reported cases should begin as soon as possible after receiving report. Refer to Regulation 569 under the HPPA for relevant data to collect and make sure to include at a minimum:</p> <ul style="list-style-type: none"> • Symptoms and date of symptom onset • History of varicella infection • Occupation • Residency/attendance at a facility or institution for institutional outbreaks • Risk factors/susceptibility for acquiring disease, such as homelessness, illicit drug use, and presence of wounds • Identification of close contacts of cases (see below), assessment of type of contact and probability of transmission <p>Ensure that early medical intervention with appropriate antibiotic therapy has started. Treatment is under the direction of the attending health care provider.</p> <p>Routine infection prevention and control practices, as well as contact and droplet precautions should be in effect until 24 hours after appropriate treatment was started.</p> <p>Provide education about the illness and how to prevent spread as above (2).</p> <p>More information on treatment and follow up investigations for specific settings is available in the resources and references listed below.</p>
<p>Management of Contacts</p>	<p>Close Contacts are defined as:</p> <ul style="list-style-type: none"> • Household contacts of a case who have spent at least 4 hours/day on average in the previous 7 days • Non-household persons who share the same bed with the case or had sexual relations with the case • Persons who have had direct mucous membrane contact with the oral or nasal secretions of a case such as, mouth to mouth resuscitation, open mouth kissing or unprotected direct contact with an open skin lesion of the case • Injection drug users who have shared needles with the case <p>All close contacts of invasive disease should be instructed about the</p>

signs and symptoms of GAS infection and advised to seek medical attention if they develop within 30 days after exposure to case (2).

Expert opinion regarding chemoprophylaxis of contacts of persons with invasive GAS disease varies. The efficacy and optimal regimen of antibiotic prophylaxis for contacts has not been well established, however the Provincial Infectious Diseases Advisory Committee (PIDAC) has stated that chemoprophylaxis should be offered to close contacts of a case of invasive disease with evidence of clinical severity such as in STSS, SNF, meningitis, pneumonia or death.

The purpose of prophylaxis is to eradicate nasopharyngeal colonization of GAS and prevent disease (2).

Recommended Chemoprophylaxis Regimens for Close Contacts (2)

Drug	Dosage	Comments
First-generation cephalosporins: cephalexin, cephadroxil, cephadrine	First line. Children and adults: 25 to 50 mg/kg daily, to a maximum of 1 g/day in 2 to 4 divided doses × 10 days	Recommended drug for pregnant and lactating women. Should be used with caution in patients with allergy to penicillin. Use of cephalosporins with nephrotoxic drugs (e.g. aminoglycosides, vancomycin) may increase the risk of cephalosporin-induced nephrotoxicity.
Erythromycin	Second line. Children: 5 to 7.5 mg/kg every 6 hours or 10 to 15 mg/kg every 12 hours (base) × 10 days (not to exceed maximum of adult dose) Adults: 500 mg every 12 hours (base) × 10 days	Erythromycin estolate is contraindicated in persons with pre-existing liver disease or dysfunction and during pregnancy. Sensitivity testing is recommended in areas where macrolide resistance is unknown or known to be ≥ 10%.
Clarithromycin	Second line. Children: 15 mg/kg daily in divided doses every 12 hours, to a maximum of 250 mg po bid × 10 days Adults: 250 mg po bid × 10 days	Contraindicated in pregnancy. Sensitivity testing is recommended in areas where macrolide resistance is unknown or known to be ≥ 10%.
Clindamycin	Second line. Children: 8 to 16 mg/kg daily divided into 3 or 4 equal doses × 10 days (not to exceed maximum of adult dose) Adults: 150 mg every 6 hours × 10 days	Alternative for persons who are unable to tolerate beta-lactam antibiotics.

For the management of selected LTCH contacts, selected child care contacts, or selected hospital contacts refer to the PHAC document listed below as well as the other resources and references.

Public Health Agency of Canada. (PHAC) *Guidelines for the Prevention and Control of Invasive Group A Streptococcal (GAS)*

	<p>Disease. Ottawa. October 2006 http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/06vol32/32s2/index.html</p>	
<p>Management of Outbreaks</p>	<p>Provide public health management of outbreaks or clusters to identify the source of illness, stop the outbreak and limit secondary spread. For outbreaks in Long Term Care Homes refer to the Ontario Nursing Home Association, <i>Guidelines for the management of residents with group A streptococcus infection in long term care homes</i>, October 1997.</p> <p>An outbreak is defined as increased transmission of GAS causing invasive disease in a population. Outbreaks of invasive GAS disease do not occur in the community frequently and typically involve two cases (i.e. case-pairs) who have had close contact (2).</p> <p>As per this Protocol, outbreak management shall comprise of but not be limited to the following general steps:</p> <ul style="list-style-type: none"> • Confirm diagnosis and verify the outbreak; • Establish an outbreak team; • Develop an outbreak case definition; • Implement prevention and control measures; • Implement and tailor communication and notification plans depending on the scope of the outbreak; • Conduct epidemiological analysis on data collected; • Coordinate and collect appropriate clinical specimens where applicable; • Prepare a written report, and • Declare the outbreak over in collaboration with the outbreak team. <p><u>Consideration for action for Outbreaks or Clusters:</u></p>	
	<p>Long-Term Care Home</p>	<ul style="list-style-type: none"> • An incidence rate of culture-confirmed iGAS infections of >1 per 100 residents per month, or • At least two cases of culture-confirmed iGAS infection in 1 month in facilities with fewer than 200 residents, or • An incidence rate of suggested invasive or non-invasive GAS infections of >4 per 100 residents per month
	<p>Child Care Centre</p>	<p>One severe case of iGAS disease in a child attending a child care centre</p>
	<p>Refer to the PHAC document listed below. Public Health Agency of Canada. (PHAC) <i>Guidelines for the Prevention and Control of Invasive Group A Streptococcal (GAS) Disease</i>. Ottawa. October 2006 http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/06vol32/32s2/index.html</p>	
<p>7) References</p>	<p>(1) Heymann D, editor. Control of communicable diseases manual. 18th ed. Washington: American Public Health Association; 2004.</p>	

	<p>(2) Public Health Agency of Canada. Guidelines for the prevention and control of invasive Group A Streptococcal (GAS) disease. Can Commun Dis Rep. 2006;32 Suppl 2:1-26. Available from http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/06pdf/32s2_e.pdf.</p> <p>(3) Ontario Hospital Association; Ontario Medical Association. Group A Streptococcal (GAS) disease surveillance protocol for Ontario hospitals. Toronto: Ontario Hospital Association; 2008. Available from http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/Communicable+Disease+Surveillance+Protocols/\$file/Group+A+Streptococcal+Protocol+-+Reviewed+Oct+2008.pdf.</p> <p>(4) Pickering LK, Baker CJ, Long SS, McMillan JA, editors. Red book: 2006 report of the Committee on Infectious Diseases. 27th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2006. Section 3, Summaries of infectious diseases; p. 610-20.</p> <p>(5) Ministry of Health and Long-Term Care. Timely entry of cases. iPHIS Bulletin. 2007 May 11;17.</p>
<p>8) Additional Resources</p>	<p>Ontario Nursing Home Association, GAS Task Force. Guidelines for the management of residents with Group A Streptococcus infection in long term care homes. Toronto: Ontario Nursing Home Association; 1997.</p> <p><i>Health Protection and Promotion Act</i>, R.S.O. 1990, c. H.7. Available from http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm.</p> <p>Gregg MB, editor. Field epidemiology. 2nd ed. New York: Oxford University Press; 2002.</p> <p>Ministry of Health and Long-Term Care. Infectious diseases protocol. Toronto: Queen's Printer for Ontario; 2009. Available from http://www.health.gov.on.ca/english/providers/program/pubhealth/oph_standards/ophs/infdispro.html (or as current)</p>

