



# Group A Streptococcal Infections, Invasive (iGAS)

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The following chapter is adapted with permission from Alberta Health, for additional guidance related to the management of Invasive Group A Streptococcal Infections see Alberta [Public Health Disease Management Guidelines : Streptococcal Disease Group A Invasive](#)

## 1. CASE DEFINITION

### Confirmed Case

- Isolation of Group A Streptococcus (*Streptococcus pyogenes*) from a normally sterile site\* with or without severe invasive disease.

### Probable Case

- Isolation of Group A Streptococcus from a non-sterile site and with severe invasive disease\*\* in the absence of another identified etiology.

\* Normally sterile site specimens are defined as,

- Blood,
- Cerebrospinal fluid (CSF),
- Pleural fluid,
- Peritoneal fluid,
- Pericardial fluid,
- Bone,
- Joint fluid



- Specimens taken during surgery (e.g., muscle collected during debridement for necrotizing fasciitis or fluid from a deep abscess).

NOTE: A specimen taken from a non-sterile site collected during a sterile procedure is not considered a “normally sterile site”.

**\*\* Severe invasive Disease**

Severe invasive disease may manifest as several conditions, including:

- Streptococcal toxic shock syndrome
  - Hypotension **AND AT LEAST 2 OF THE FOLLOWING**
    - Systolic Blood Pressure <90 mmHg in adults or < 5<sup>th</sup> percentile for age in children
    - Check Healthnet Viewer and hospital records for hypotensive treatment or contact patient’s ward
  - Renal impairment
    - Creatine levels >177 µmol/L for adults
    - Check Healthnet viewer clinical flowsheet
  - Coagulopathy
    - Platelet count < 100,000/mm<sup>3</sup> or disseminated intravascular coagulation
    - Check Healthnet viewer clinical flowsheet
  - Liver function abnormality
    - AST, ALT, or total bilirubin > 2x upper limit of normal
    - Check Healthnet viewer clinical flowsheet
  - Adult respiratory distress syndrome (ARDS)
    - Check the patient’s Clinical Healthnet viewer, hospital records or contact ward to consult with physician.
  - Generalized erythematous macular rash that may desquamate.
    - Check patient Clinical Healthnet Viewer, hospital records, or contact ward to consult with physician
- Soft tissue necrosis, including necrotizing fasciitis, myositis, or gangrene
  - Determined through consultation with surgeon
- Meningitis
  - Found on patient’s Clinical Healthnet Viewer, hospital records, or through consultation with physician
- GAS pneumonia
  - NOTE: Pneumonia with isolation of GAS from bronchoalveolar lavage (BAL) when no other cause has been identified should be regarded as a form of severe invasive disease for the purposes of public health management
  - Found on patient’s Clinical Healthnet Viewer, hospital records, or through consultation with physician
- Other life-threatening conditions (as determined on a case-by-case basis)
  - Found on patient’s Clinical Healthnet Viewer, hospital records or through consultation with physician
- Death



- Found on Clinical Healthnet viewer, hospital records or through consultation with physician

**! It is important to establish the sample site sterility BEFORE determining the severity of disease and both should be assessed before continuing with iGAS investigation!**

## 2. DIAGNOSIS

- Diagnosis of invasive Group A Streptococcal Infections (iGAS) is confirmed through laboratory testing of specimens taken from normally sterile sites (as defined above).
- Positive samples must be submitted by the laboratory to the National Centre for Streptococcus (NCS) for serotyping (204-789-6063 or irene.martin@canada.ca).
- For more information, refer to
  - Government of Canada [Guide to Services](#)
  - Alberta: [Streptococcal Disease Group A Invasive](#)

## 3. REPORTING

### Health Care Professionals

- Confirmed or probable cases are to be reported to the Office of the Chief Public Health Officer (OCPHO) by telephone (867) 920-8646, **immediately** after diagnosis is made or opinion is formed, **AND**
- Complete and fax the [NWT Communicable Disease Report Form](#) to the OCPHO (867) 873-0442 within **24 hours**
- **Immediately** report all outbreaks or suspect outbreaks by telephone to the OCPHO

### Laboratories

- Report all positive results to the OCPHO by telephone (867) 920-8646 **immediately AND**
- Fax all positive results to the OCPHO (867) 873-0442 within 24 hours

## 4. OVERVIEW

### Causative Agent

- Group A streptococcal (GAS) disease is caused by *Streptococcus pyogenes*, a gram positive, non-spore forming, non-motile bacterium.
- Distinct group A streptococcal serotypes have been identified through emm typing and emm serotyping.
  - There are over 120 serotypes or genotypes.



- The M protein, which is encoded by the emm gene, is an important virulence factor and is also an epidemiological marker that is used worldwide to characterize GAS isolates.
- Certain emm types are correlated with specific manifestations of group A streptococcus disease.

### Clinical Presentation and Major Complications

- For Clinical Presentation and Major complications see [Alberta Public Health Disease Management Guidelines: Streptococcal Disease Group A invasive](#).

### Transmission

- Transmission is generally person-to-person by large respiratory droplets or by direct contact with patients or carriers.
- Extremely rarely transmission can occur through indirect contact with objects.
- Foodborne outbreaks of pharyngitis have been reported.
- This is generally a consequence of human contamination of food along with improper food preparation or refrigeration.

### Incubation Period

- The incubation period is not clearly defined and may depend on the route of inoculation.
- It has been described as short, typically 1–3 days, but may be as long as 7 days in cases of non-invasive disease.
- In cases associated with the accidental subcutaneous inoculation of organisms, such as during childbirth or after penetrating trauma, the incubation period may be as short as 14 hours.

### Clinical Guidance

- For patient-specific clinical management consult a local healthcare professional, paediatrician, infectious disease specialist, [the NWT Clinical Practice Guidelines](#) manual (Section 11: Page 18-19), Alberta Public Health Disease Management Guidelines: [Streptococcal Disease Group A Invasive](#) and/or [Bugs and Drugs](#).

## 5. PUBLIC HEALTH MEASURES

**Public Health Measures are only needed when the specimen is found on a normally sterile site AND the patient's clinical presentation can be considered Severe Invasive Disease**

### Management of Cases

- Confirm that the case has received appropriate antimicrobial therapy.



- Contact and droplet precautions should be instituted when caring for hospitalized patients with known or suspected invasive GAS until 24 hours of effective antibiotic therapy is complete.
  - Refer to the [NWT Infection Prevention & Control Manual](#) for more information on routine and contact precautions.

### Health Care Workers

- The infection control practitioner (or designate) should be notified immediately if a health care worker (HCW) with suspected or confirmed GAS disease (invasive or non-invasive) worked while the infection was communicable or if there is any possibility that the infection might have been occupationally acquired.

### Management of Contacts

- The case (or a proxy for the case) should be interviewed to determine close contacts.
- Close contacts are defined as:
  - Household contacts of a case who have spent at least
    - 4 hours a day on average in the past 7 days or,
    - 20 hours a week with the case
  - Non-household contacts who share the same bed with the case, or who have had sexual relations with the case
  - Persons who have had direct mucous membrane contact with the oral or nasal secretions of the case (e.g. direct 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
  - Selected childcare facility contacts
  - Selected long term care facility contacts
  - Selected hospital contacts
- Educate all close contacts about disease transmission, appropriate personal hygiene, routine practices, and contact precautions.
- Educate all close contacts about signs and symptoms of disease, and advise to seek medical attention immediately if they develop a febrile illness or another clinical manifestation of GAS within 30 days of diagnosis in the index case.
- Offer chemoprophylaxis to close contacts of cases with **severe invasive disease** (i.e., a case of STSS, soft tissue necrosis [including NF, myositis, or gangrene], meningitis, GAS pneumonia, other life-threatening conditions, or a confirmed case resulting in death).
- Chemoprophylaxis is provided to eradicate nasopharyngeal colonization of GAS and prevent secondary cases.
- Chemoprophylaxis should be administered as soon as possible and preferably within 24 hours of case identification but may be offered up to 7 days after the last exposure unless the exposure occurred after the case has completed 24 hours of appropriate antibiotic therapy.



- Refer to [Bugs and Drugs](#) for chemoprophylaxis recommendations
  - Refer to [ANNEX A](#) for management in childcare attendees and staff
  - Refer to [ANNEX B](#) for management in Long Term Care Facility (LTCF) residents and staff
  - Refer to [ANNEX C](#) for hospital patients and staff
  - Consult with the Communicable Disease Control Unit in the Office of the Chief Public Health Officer for atypical situations that do not fall under the above scenarios.

### Prevention

- Educate the public and Healthcare Workers about the modes of transmission.
- Maintain appropriate infection control practices.
- Transmission is most effectively prevented by strict adherence to good hand hygiene and other routine practice.
- Offer varicella vaccine as per the current [NWT Immunization Schedule](#)
  - Universal varicella immunization could potentially prevent up to 15% of all paediatric iGAS disease.

## 6. PUBLIC & HEALTH PROFESSIONAL EDUCATION

### For more information about Invasive Group A Streptococcal Infections:

- Health Canada: [Canada/Guidelines For iGAS](#)
- Centres for Disease Control and Prevention: [CDC/GAS](#)
- Alberta Public Health Disease Management Guidelines: [Streptococcal Disease Group A Invasive](#)

## 7. EPIDEMIOLOGY

- Important risk factors for iGAS include diabetes, hepatitis C, non-surgical wounds, addiction, alcohol abuse, drug use and homelessness
- For more information on the epidemiology of Invasive Group A Streptococcal infections in the Northwest Territories (NWT) see: [Epidemiological Summary of Communicable Diseases HSS Professionals](#)

## 8. REFERENCES

Information in this chapter is based on Alberta Health's [Public Health Disease Management Guidelines: Streptococcal Disease Group A invasive](#)



## **ANNEX A- Responding to iGAS in a Hospital**

- Most cases of nosocomial invasive GAS are sporadic.
- It is important to recognize clinical presentations compatible with invasive GAS and institute additional precautions while waiting for confirmation.

### **Key Investigation**

- Active surveillance for early identification of outbreaks may also be effective in preventing some cases.
- Prevention of a hospital outbreak of GAS infection requires very rapid investigation and intervention once a single hospital-acquired case has been identified.
- If, within one month of a confirmed invasive GAS case, one or more possibly linked invasive or non-invasive cases are identified in patients or staff, the situation should be treated as an outbreak.

### **Management of Cases and Contacts**

- Contact and droplet precautions should be implemented when caring for patients with known or suspected invasive GAS until 24 hours of effective antimicrobial therapy is complete.
- For more information on droplet precautions refer to [NWT Infection Prevention Control Manual](#).

### **Management of Healthcare Worker (HCW) Exposed to GAS**

- An occupational exposure of a HCW is defined as secretions from the nose, mouth, wound or skin of the infected person coming into contact with the mucous membranes or non-intact skin of the HCW within 7 days before the onset of GAS until 24 hours after effective antibiotic therapy.
- The risk of an exposed HCW developing GAS infection and the efficacy of prophylaxis is unknown.
- HCW who have an occupational exposure to a patient with severe invasive disease may be offered chemoprophylaxis.
- Recommendations for chemoprophylaxis can be found in [Bugs and Drugs Edition online](#).
- HCW who have an occupational exposure to any case of GAS should be counselled about symptoms associated with GAS and advised to seek care immediately if symptoms develop within 21 days of exposure.
- No screening, treatment, modifications of work practices or work restrictions for HCW in contact with a patient with GAS infection are required when there has not been an occupational exposure.



- If the appropriate personal protective equipment was worn, there was no occupational exposure of the HCW.

#### **Management of HCW Colonized or Infected with GAS**

- There is no need for modifications to work practices or work restrictions for HCW who are colonized with GAS and are asymptomatic if they are not epidemiologically linked to patient transmission.
- Asymptomatic colonized HCW who are epidemiologically linked to transmission of GAS to patients resulting in invasive or non-invasive disease should be offered chemoprophylaxis and should be excluded from care duties until 24 hours after the start of treatment with an effective antibiotic therapy.
- HCW with symptomatic GAS infection (invasive or non-invasive) should be offered therapy and should be excluded from patient care duties until 24 hours after the start of antibiotic therapy.
- HCW with symptomatic GAS infection and colonized HCW linked epidemiologically to an outbreak should be informed of the potential for transmission of GAS within households and be advised that symptomatic family members should seek medical evaluation.

#### **Management of Possible or Confirmed GAS Outbreaks in Hospitals**

- Detailed information on the management of possible or confirmed [GAS outbreaks in hospitals](#) can be found on the Public Health Agency of Canada website





## **ANNEX B - Responding to iGAS in a Long-Term Care Facility (LCTF)**

- Residents of LCTF are at increased risk of morbidity and mortality due to invasive GAS disease because of their older age and/or higher prevalence of underlying conditions.
- When a confirmed case of invasive GAS occurs in a LCTF, there is 38% likelihood that a second positive blood culture-confirmed case of the same strain will be detected in the facility within six weeks.

### **Key Investigation**

When a confirmed case of invasive GAS disease occurs in a LCTF, the facility should:

- Report the case to the OCPHO in accordance with the NWT Public Health Act.
- Conduct a retrospective chart review of the entire facility's residents over the previous 4–6 weeks for culture confirmed cases of GAS disease and suggested cases of non-invasive or invasive GAS infection, including skin and soft tissue infections (e.g., pharyngitis and cellulitis), and excluding pneumonia and conjunctivitis not confirmed by culture.

### **Management of Contacts**

- Chemoprophylaxis is recommended for close contacts (See [Public Health Measures](#)) of cases who have severe iGAS.
- Recommendations for chemoprophylaxis can be found in [Bugs and Drugs Edition online](#).
- Persons who share a room with a case are not considered contacts unless they meet the criteria of close contacts i.e., the roommate has had direct mucous or non-intact skin contact with respiratory tract secretions or skin lesions of the case (assess on a case by case basis).
- HCWs are not considered contacts unless they meet the criteria of close contact i.e., infection control practices are breached, or direct contact of mucous membranes or non-intact skin with fluid from the nose, mouth or wound of a case as described above has occurred (e.g., direct mouth to mouth resuscitation).



## **ANNEX C -Responding to iGAS in a Child Care Centre/Day Care**

- An investigation may be warranted if one case of invasive GAS disease with [severe invasive disease](#) occurs in a child care centre.
- Consideration should be taken as to:
  - Nature of the facility (e.g., type of centre including size and physical structure, number, and ages of children, interaction of children),
  - Characteristics of the case (e.g., secondary to varicella infection),
  - Potential for a source of infection within the centre including:
    - whether there have been any known streptococcal infections (e.g., other cases of invasive GAS, pharyngitis, impetigo), **AND**
    - potential of a point source of infection
  - Presence of varicella cases within the centre in the previous two weeks, **AND**
  - Potential for a source of infection from outside the centre (e.g., exposure to a family member with GAS infection)

### **Management of Contacts**

- Chemoprophylaxis is generally not recommended when only one case of invasive GAS is identified in a childcare centre.
- In such a situation:
  - alert parents/guardians to the signs and symptoms of invasive GAS
  - advise them to seek medical attention should the child develop a febrile illness or any other clinical manifestation of GAS
- Recommendations for chemoprophylaxis can be found in [Bugs and Drugs Edition online](#).
- Screening of attendees and staff is not required.
- Encourage staff of day care centres to notify local public health or community health centre if further cases of invasive GAS infection occur within 1 – 2 months of the source case.
- Chemoprophylaxis may be recommended in situations where there is one case of invasive GAS **AND**
  - A subsequent confirmed case of invasive GAS occurs in children or staff of the childcare centre within 1 month **OR**
  - There is a concurrent varicella outbreak in the childcare centre
  - A test of cure is not required for persons (children or staff) receiving chemoprophylaxis