



GROUP A *STREPTOCOCCUS*

1. Cause/Epidemiology

Group A *Streptococcus* (GAS) is a bacteria that is often found in the throat and on the skin.^[7.1] *Streptococci* are gram-positive cocci often occurring in chains of varying length.

Recent reports of GAS disease indicate an apparent increase in cases and severity. Cases have increased in otherwise healthy individuals and have been associated with severe outcomes such as death and limb loss. Cases of GAS infections tend to be higher in winter and spring months.

Invasive Group A *Streptococcus* (iGAS) disease is caused by *Streptococcus pyogenes* (*S. pyogenes*). *S. pyogenes* are beta hemolytic gram positive cocci that occur in pairs or chains. Other species of *Streptococcus* exist, but are not as invasive or virulent as *S. pyogenes*. *S. pyogenes* is often found in the throat and on the skin of asymptomatic individuals. It may be found in saliva, even following intense antibiotic therapy. iGAS infections are more likely to occur in children under one year of age, and the elderly. A small minority of people who come into contact with GAS organisms develop iGAS infections. Infections in children are an important reservoir for infections in adults.^[7.4]

2. Clinical Presentation

Symptoms of GAS infections vary based on the disease the infection causes. Presentation can range from no symptoms at all to very severe symptoms, including death. iGAS diseases, which include Necrotizing Fasciitis, Necrotizing Myositis and Streptococcal Toxic Shock Syndrome (STSS), are the more serious infections caused by GAS. The overall mortality rate for individuals with iGAS infections in Canada is approximately 10-15%, with a 25% mortality rate for Necrotizing Fasciitis, and a greater than 35% mortality rate for STSS.^[7.5]

The most common clinical presentations for iGAS are skin or soft tissue infections, bacteremia with no septic focus, pneumonia, STSS, and Necrotizing Fasciitis. The manifestations preceding the onset of iGAS 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.

Sequelae of severe iGAS disease may include death, organ system failure, need for extensive surgical debridement and amputation. Case fatality rates vary substantially by age and clinical syndrome. Mortality rates are higher in individuals five years of age and under and among those 65 years of age and over:



GAS infections include ^[7.1]

- Sore throat (pharyngitis)
- Strep throat
 - Symptoms may include a swollen red sore throat and tonsil, high fever, headache, and swollen lymph nodes in the neck.
 - In rare cases, strep throat can lead to rheumatic fever. Here, the infection damages the heart's valves and can cause congestive heart failure or swelling of the lining of the heart.
- Otitis media
- Necrotizing Fasciitis (sometimes called "flesh-eating disease")
 - Symptoms may include fever and intense pain, destruction of muscles, fat and skin tissue and rapidly spreading redness and swelling in the affected area. Often pain is disproportionate to (much worse than) the appearance of the infection. Death may occur in 12-24 hours, and there is a case fatality rate of 20%.
- Skin infections (impetigo)
 - Impetigo symptoms may include a red skin rash that looks like a group of small blisters or red bumps. When the blisters burst and fluid seeps out, the fluid dries and the blisters become coated with a yellow or grey crust.
- Scarlet fever
 - Infected individuals may experience a quickly spreading red rash that feels like sandpaper on the body. They may also have red swollen lips and red spots on the tongue.
- Puerperal infections (Endometritis)
- Pneumonia
- Septicemia
- STSS
 - STSS results in a rapid drop in blood pressure and organ failure. Symptoms may include fever, redness of the skin, dizziness, influenza-like symptoms, confusion, shock, diarrhea, vomiting and severe muscle pain. There is a case fatality rate of up to 81%, and survivors are often left with severe long-term disability.
 - STSS is not the same as the "toxic shock syndrome" due to the bacteria *Staphylococcus aureus* associated with tampon usage.
- Wound infections
- Sinusitis

Complications of iGAS infections include:

- Hypotension
- Acute respiratory distress syndrome (ARDS)
- Renal impairment
- Rapid onset of shock and multi-organ failure
- Toxic shock syndrome
- Soft tissue invasion, pneumonia, septic arthritis, primary bacteremia



3. Incubation Period

The incubation period of GAS may depend on the route of inoculation. The incubation period is usually short, 1 to 3 days, but may last as long as 7 days for non-invasive disease.^[7.3]

4. Transmission

Person-to-person transmission of *S. pyogenes* may occur through the spread of respiratory droplets. It may also spread through direct and indirect contact with body secretions/exudate from an infected person.^[7.2]

The portal of entry for iGAS infections is commonly the skin or soft tissue, and infection may follow minor or unrecognized trauma, without an obvious break in the skin. The mechanism by which GAS breaches mucosal barriers is unknown. The portal of entry is unknown in almost 50% of iGAS cases.

iGAS infections may be healthcare acquired, particularly following surgical procedures. Outbreaks have been traced to operating room personnel who are anal, vaginal, skin or pharyngeal carriers. Healthcare acquired cases of iGAS have also been linked to asymptomatic carriage of the organism by both the patient and healthcare workers. Needle sharing has also been found to be a contributing source of some iGAS infections.

In untreated uncomplicated cases GAS is communicable for 10-21 days; in untreated conditions with purulent discharge, weeks or months. With adequate treatment, transmissibility generally ends within 24 hours.^[7.3]

- Individuals with Group A *Streptococcus pneumoniae* are infectious until 24 hours of appropriate antimicrobial therapy is received.
- Individuals with pharyngitis and scarlet fever can be infectious for 10-21 days.
- Persons with untreated streptococcal pharyngitis may carry the organism in the pharynx for weeks or months, but infectivity decreases in 2-3 weeks after onset of infection.

Carriage of GAS organisms may persist for many months, but the risk of transmission to others is low. Individuals who carry the bacteria but have no symptoms are much less contagious than individuals with symptomatic infection. Patients are considered not contagious within 24 hours after initiation of appropriate antimicrobial therapy. Antimicrobial regimens that eradicate GAS organisms from the pharynx may not protect against infections occurring through a cutaneous portal of entry. Culture results from the site of infection of patients with STSS may remain positive for several days after appropriate antimicrobial agents have been initiated.^[7.4]



5. Infection Prevention and Control Practices

The transmission of GAS is best prevented by following good hand hygiene, proper respiratory etiquette and other Routine Practices at all times.

Refer to the [Routine Practices](#) section of the Infection Prevention and Control manual and/or the [Routine Practices Policy](#) for specific information.

Implement [Droplet/Contact Precautions](#) i.e., mask and eye protection when exposure to respiratory droplets is likely. ^[7.2]

Additional Precautions are required until 24 hours of effective antibiotic therapy has been administered for patients with GAS infection:

Type of Infection	Type of Precaution ^[7.5]
Skin (e.g., erysipelas, impetigo) Wound or burn	Contact Precautions for drainage not contained by dressings
Scarlet fever, pharyngitis	Adult: Routine Practices Pediatric: Droplet/Contact Precautions
Endometritis (puerperal fever)	Routine Practices
STSS, Necrotizing Fasciitis, Necrotizing Myositis, meningitis, pneumonia	Droplet/Contact Precautions

As most cases of healthcare acquired iGAS are sporadic, it is important to recognize clinical presentations compatible with iGAS early and implement Additional Precautions while awaiting laboratory confirmation.

6. Occupational Health

Contact Occupational and Environmental Safety and Health (OESH) for staff assessment and/or concerns.

7. References

- 7.1. Group A Streptococcus (GAS). (2016). Manitoba Health, Seniors and Active Living. Available at: <http://www.gov.mb.ca/health/publichealth/diseases/gas.html>.
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- 7.3. Streptococcal Disease – Group A, Invasive. Public Health Notifiable Disease Management Guidelines. (2011, August). Alberta Health and Wellness, Government of Alberta. Available at: <http://web.archive.org/web/20130530040130/http://www.health.alberta.ca/documents/Guidelines-Streptococcal-Disease-Group-A-Invasive-2011.pdf>.
- 7.4. Streptococcal Disease, Invasive, Group A. (2016). BC Centre for Disease Control. Available at: <http://www.bccdc.ca/health-info/diseases-conditions/streptococcal-disease-invasive-group-a>.
- 7.5. Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care. (2012, April). Manitoba Health. Available at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf>.

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