

Group A *Streptococcus* (GAS), Invasive Disease

Including Streptococcal Toxic Shock Syndrome (STSS)

DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS

Per N.J.A.C. 8:57, healthcare providers and administrators shall report by mail or by electronic reporting within 24 hours of diagnosis, confirmed cases of invasive GAS disease to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. A directory of local health departments in New Jersey is available at <http://localhealth.nj.gov>

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to 609.826.5964, between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.



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1 THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Invasive GAS disease is caused by the gram positive bacterium, *Streptococcus pyogenes*. There are well over 100 serologically distinct types of *S. pyogenes*. Streptococcal toxic shock syndrome (STSS) is a serious complication that may be associated with either invasive or non-invasive GAS infections. STSS is caused by bacterial toxins and virulence factors which lead to the development of shock.

B. Clinical Description and Laboratory Diagnosis

Streptococcus pyogenes (Group A Strep) is ubiquitous and causes a range of illness. Pharyngitis (“strep throat”) is the most common result of infection with GAS. Skin infections (impetigo or pyoderma) are also common. In those two conditions, infection of the deeper tissue or blood is very uncommon. However, in some cases the bacteria may become invasive and cause more severe illness. Invasive GAS may manifest as any of several clinical syndromes, including: (1) pneumonia, (2) bacteremia in association with cutaneous infection, (3) deep soft tissue infection (i.e., necrotizing fasciitis [colloquially referred to as “flesh-eating bacteria”]), (4) meningitis, (5) peritonitis, (6) osteomyelitis, (7) septic arthritis, (8) postpartum sepsis (i.e., puerperal fever), (9) neonatal sepsis, and (10) bacteremia alone. Case-fatality ratios for some of these syndromes can be very high (between 30-50%).

STSS is a severe toxin-mediated illness characterized by sudden onset of high fever (usually temperature > 102°F), vomiting, profuse watery diarrhea, and myalgia, followed by hypotension (systolic blood pressure < 90 mm Hg) and, potentially, shock. During the acute phase of the illness, a sunburn-like rash may be present. A hallmark of the disease is multiorgan involvement characterized by renal impairment, coagulopathy, acute respiratory distress syndrome, and/or liver involvement (i.e., elevated aminotransferase and bilirubin levels).

Isolation of GAS in the context of the above signs and symptoms is diagnostic; however, Rocky Mountain spotted fever, leptospirosis, and measles may present in similar ways and should be ruled out when clinically relevant. STSS can be fatal; the case fatality ratio may exceed 50% if diagnosis is delayed.

Reservoirs

Humans are the only reservoir for GAS.

Modes of Transmission

The primary mode of transmission of GAS bacteria is person-to-person via large respiratory droplets through direct contact with patients or carriers, as well as via contact with saliva or nasal secretions, and with open sores and wounds. GAS may also, much less commonly, be transmitted through ingestion of contaminated food. Foodborne transmission of GAS should be suspected if clusters of cases of acute pharyngitis are seen, all within a short period of time. Foodborne transmission is typically due to contamination during preparation by an infected food handler and when foods are left to stand at room temperature for several hours between preparation and consumption. Indirect contact through objects (fomites) is rarely associated with transmission, but it cases have has occurred in schools where GAS bacteria have been transmitted via contaminated wrestling mats and in daycare centers through play food and other shared toys.

Nasal, throat, skin, anal and vaginal carriers of GAS can all serve as sources of infection. While asymptomatic carriers may transmit the bacteria, people with active infection are more likely to be a source of transmission. STSS in and of itself is not transmitted from person to person, but the causative GAS bacteria are. STSS may follow infection anywhere on the body, but the most common sites of entry for the streptococci causing STSS are the vagina, pharynx, mucosa and skin/soft tissue.

C. Incubation Period

The incubation period for GAS pharyngitis is usually one to five days, rarely longer. The incubation period for invasive GAS disease is variable but may be as short as 14 hours in some cases of STSS associated with penetrating trauma or other methods of subcutaneous inoculation. Post-partum and post-surgically acquired iGAS infections usually present within 7 days.

D. Period of Communicability or Infectious Period

Communicability of individuals with GAS is highest during acute infection, and in untreated people, gradually diminishes over time but they may remain infectious for a week. Individuals are generally no longer infectious within 12-24 hours after the initiation of antibiotic therapy. Among persons with asymptomatic pharyngeal carriage of GAS, the risk of transmission to others is much lower compared to those with symptomatic infection, but carriage may persist for months. Untreated purulent GAS skin lesions may be infectious for weeks or months.

E. Epidemiology

The Centers for Disease Control and Prevention (CDC) estimates that approximately 14,000 to 25,000 cases of invasive GAS disease occur each year in the United States. Since 2010, there have been an estimated 700 to 1,150 cases of necrotizing fasciitis and 2,000 to 3,000 cases of STSS each year. Healthcare-associated outbreaks and cases of invasive GAS are frequently associated with lapses in infection prevention and control measures and have been traced to healthcare workers who were anal, vaginal, skin or throat carriers of GAS.

The New Jersey Department of Health (NJDOH) has required reporting of invasive GAS disease since 1995. Electronic reporting was implemented in 2001.

Cases of invasive GAS occur year-round with a peak incidence typically reported during September – April. Invasive GAS infections can occur in anyone, but people who have chronic cardiac or pulmonary disease, peripheral vascular disease, diabetes mellitus, systemic or local immunocompromise, or who inject drugs or abuse alcohol are believed to be at higher risk. Among adults, increase in age is also a risk factor for invasive GAS infection. In children, *varicella* infection has been identified as a significant risk factor, and other viral illnesses such as influenza may also be associated with iGAS infections. In addition, the specific strain of the bacteria may influence the severity of disease, with some strains more likely to cause invasive infections. Cases of STSS have been associated with childbirth, abortions, vaginal infections, surgical wound infections, focal lesions of the bone or respiratory tract, and cutaneous or subcutaneous lesions. The route of entry for the infection is unknown in up to one half of STSS cases. Cases are observed in both sexes.

According to CDC, between 1,500 and 2,300 people die annually due to invasive group A strep disease. Mortality rates for those with necrotizing fasciitis are 11% to 22%, and 30% to 70% for STSS. Organ system failure (STSS) and amputation (necrotizing fasciitis) also may result. Infection with non-invasive or invasive GAS may be followed by the noninfectious complications of rheumatic fever (characterized by arthritic, cardiac, neurologic signs and symptoms) or glomerulonephritis. Prompt identification and treatment of GAS cases (with at least ten days of antibiotic therapy) is essential to prevent these sequelae.

2 CASE DEFINITION: iGAS

Invasive GAS is defined as either the isolation of group A Streptococcus from a normally sterile site, or the isolation of group A Streptococcus from a wound culture accompanied by necrotizing fasciitis or streptococcal toxic shock syndrome (see 2.A.2 for clinical case definition of STSS). This definition of iGAS is also used by states participating in CDC's Emerging Infections Program.

A. Clinical Description

1. Invasive GAS Infections

Invasive GAS infections may manifest as any of several clinical syndromes, including pneumonia, bacteremia in association with cutaneous infection (e.g., cellulitis, erysipelas, or infection of a surgical or nonsurgical wound), deep soft-tissue infection (e.g., myositis or necrotizing fasciitis), meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum sepsis (i.e., puerperal fever), neonatal sepsis, non-focal bacteremia and STSS (see below).

2. STSS

STSS is a severe illness associated with invasive or noninvasive GAS infection. STSS may occur with infection at any site but most often occurs in association with infection of a cutaneous lesion. Signs of toxicity and a rapidly progressive clinical course are characteristic, and the case-fatality rate may exceed 50%; mortality is substantially lower in children than in adults.

STSS Clinical Case Definition

- An illness with the following clinical manifestations: Hypotension defined by a systolic blood pressure less than or equal to 90 mm Hg for adults or less than the fifth percentile by age for children younger than 16 years **AND**
- Multiorgan involvement characterized by **two or more of the following**:
 - *Renal impairment*: Creatinine greater than or equal to 2 mg/dL (greater than or equal to 177 $\mu\text{mol/L}$) for adults or in children, greater than or equal to twice the upper limit of normal for age. In patients with preexisting renal disease, a greater than twofold elevation over the baseline level.
 - *Coagulopathy*: Platelets less than or equal to $100,000/\text{mm}^3$ (less than or equal to $100 \times 10^6/\text{L}$) or disseminated intravascular coagulation, defined by prolonged clotting times, low fibrinogen level, and the presence of fibrin degradation products.
 - *Liver involvement*: Alanine aminotransferase, aspartate aminotransferase, or total bilirubin levels greater than or equal to twice the upper limit of normal for the patient's age. In patients with preexisting liver disease, a greater than twofold increase over the baseline level.
 - *Acute respiratory distress syndrome*: defined by acute onset of diffuse pulmonary infiltrates and hypoxemia in the absence of cardiac failure or by evidence of diffuse capillary leak manifested by acute onset of generalized edema, or pleural or peritoneal effusions with hypoalbuminemia.
 - A generalized erythematous macular rash that may desquamate.
 - Soft-tissue necrosis, including necrotizing fasciitis or myositis, or gangrene.

A. Laboratory Criteria for Diagnosis

Isolation of *S. pyogenes* by culture from a normally sterile site OR from a wound culture of a patient with necrotizing fasciitis or streptococcal toxic shock syndrome confirms a case of invasive GAS. Normally sterile sites are defined as:

- Blood
- Bone and bone marrow
- Cerebrospinal fluid (CSF)
- Internal body sites (specimen obtained from surgery or aspirate from one of the following: brain, heart, kidney, liver, lymph node, ovary, pancreas, spleen, vascular tissue, vitreous fluid)
- Joint fluid: includes synovial fluid and needle aspirate or culture of any specific joint
- Muscle
- Pericardial fluid
- Peritoneal fluid: includes abdominal fluid and ascites
- Pleural fluid: includes chest fluid, thoracentesis fluid

Isolation of *S. pyogenes* from a sterile site in association with a clinical presentation of STSS supports a confirmed case of STSS. Isolation of *S. pyogenes* from a nonsterile site in association with a clinical presentation of STSS supports a probable case of STS.

B. Case classification

CONFIRMED INVASIVE GAS

A case that is laboratory confirmed with the isolation of *S. pyogenes* from a normally sterile site or from a wound culture accompanied by necrotizing fasciitis or streptococcal toxic shock syndrome.

CONFIRMED STSS

A case that meets the clinical case definition of STSS and with laboratory confirmed isolation of group A *Streptococcus* from a normally sterile site.

PROBABLE STSS

A case that meets the clinical case definition of STSS and with laboratory confirmed isolation of group A *Streptococcus* from a nonsterile site.

SUSPECT/POSSIBLE GAS OR STSS

Not used.

A confirmed case of iGAS is one that is laboratory confirmed with the isolation of *S. pyogenes* from a normally sterile site, e.g. blood, cerebrospinal fluid, joint, pleural or pericardial fluid **OR** from a wound culture associated with necrotizing fasciitis or streptococcal toxic shock syndrome. A positive wound culture in the absence of necrotizing fasciitis or STSS is **NOT** a confirmed case. This is not indicative of invasive GAS and is therefore not considered a case. In addition, positive throat cultures are not considered a confirmed iGAS case as the throat is not a normally sterile site.

3 LABORATORY TESTING SERVICES AVAILABLE AT PHEL

The New Jersey Department of Health Public Health and Environmental Laboratories (PHEL) does not conduct routine testing on suspected *S. pyogenes* isolates. Hospital and commercial labs have the capability to conduct testing on these specimens. PHEL can perform *emm*-typing and genome sequencing of GAS isolates that are part of an outbreak or healthcare transmission-related investigation but approval for this testing must be obtained from CDS.

4 PURPOSE OF SURVEILLANCE AND REPORTING REQUIREMENTS

A. Purpose of Surveillance and Reporting

1. To provide information about the disease, its transmission, and methods of prevention.
2. To identify close contacts of the case and provide recommendations for appropriate preventive measures and thus prevent: a) infection and complications in close contacts and b) further spread of disease.
3. To promptly identify clusters or outbreaks of disease in order to initiate appropriate prevention and control measures. If an outbreak of invasive GAS is identified in a community or organization such as a school or daycare center, *varicella* vaccination might be recommended if cases are associated with chickenpox, or prophylactic antibiotics might be recommended to certain groups depending on the number of cases and the community or organization involved.
4. To identify and interrupt potential healthcare-related transmission by investigating post-partum or post-operative invasive GAS cases as well as cases occurring in individuals who reside in long-term care facilities (see Section 6.C.3 and 6.C.4 for further details)

B. Laboratory and Healthcare Provider Reporting Requirements

1. The New Jersey Administrative Code (N.J.A.C.) 8:57 stipulates that healthcare providers and laboratories report (by telephone, confidential fax, over the Internet using Communicable Disease Reporting and Surveillance System [CDRSS] or in writing) all invasive cases of GAS to the local health officer having jurisdiction over the locality in which the patient lives, or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located.
2. The N.J.A.C. 8:57 stipulates that each local health officer must report the occurrence of any case of invasive GAS, as defined by the reporting criteria in Section 2A above. Current requirements are that cases be reported to the NJDOH Infectious and Zoonotic Diseases Program (IZDP) electronically using the confidential and secure CDRSS.

5 CASE INVESTIGATION

A. Form

There is no paper form used to report invasive GAS/STSS.

B. Laboratory Reports

1. If the local health department receives a report of GAS from the laboratory or healthcare provider, local health department staff should enter the report into CDRSS, and investigate the case by contacting the patient, a family member, or the healthcare provider by telephone to complete the required information (see C. below)

Communicable Disease Service Manual

- LHD staff should immediately ascertain whether the case is a resident of a long-term care facility, and/or whether they gave birth, or had any surgical procedure in the 7 days prior to onset of symptoms. Specific guidelines for investigating cases that fall into these categories can be found below (see Section 6.C.3 and 6.C.4 for further details); such cases should be investigated as soon as possible in order to identify and prevent additional cases.
2. If a report of GAS from the laboratory or healthcare provider is received by NJDOH and includes the patient's address, NJDOH will enter the report into CDRSS as PENDING; the report will not be mailed to the local health department.
 3. If a report of GAS from the laboratory or healthcare provider received by NJDOH does not include the patient's address, NJDOH will either return the report to the sending laboratory or healthcare provider or call the sender to obtain a complete address. Once this information is received, the report will be entered into CDRSS as PENDING.

C. CDRSS

The following sections/fields within CDRSS should be completed/populated when investigating GAS cases:

- Disease Information (including Illness onset date, Case status, Report status, and Subgroup)
- Patient Personal Information (including Birth date, Race, and Ethnicity as well as Pregnancy status)
- Laboratory and Diagnostic Test Information (including Test, Specimen, Specimen source (to determine if sterile or non-sterile site), Lab Name, Date Specimen Collected, and Result)
- Medical Facility and Provider Information
- Signs and Symptoms (all signs and symptoms should be asked and response other than "not asked" should be selected including asymptomatic)

D. Other Reporting/Investigation Issues

1. It is not always possible to obtain all the information necessary to classify a case. A minimum of three attempts (not necessarily to the same person) should be made to obtain necessary information. If information cannot be obtained after these three attempts, the case should be entered into CDRSS if it has not been already. The number of attempts and the dates and outcomes of the attempts should be documented in the Comments section. The case status should be changed to "NOT A CASE" and the report status changed to "LHD CLOSED."

2. Every effort should be made to complete the investigation within three months of opening a case when the case **is not** associated with a LTCF, recent surgery or recent delivery. Cases that may be associated with healthcare transmission call for time-sensitive action including holding lab specimens and conducting facility-based investigations. Cases which remain open for three months or more and have no investigation or update notes will be closed by NJDOH and assigned a case status of “NOT A CASE.”
3. Once an LHD completes its investigation and assigns a report status of “LHD CLOSED,” NJDOH will review the case. NJDOH will change the report status to “DHSS APPROVED,” if appropriate, upon completion of its review. At this time, the case will be locked for editing. If additional information is received after a case has been assigned a report status of “DHSS APPROVED,” an LHD will need to contact NJDOH to reopen the case. This should be done only if the additional information changes the case status.

6 CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (NJAC 8:57)

None.

B. Protection of Contacts of a Case

Depending on the number of cases of invasive GAS, in certain settings or situations, recommendations may include antibiotic prophylaxis for potential carriers, *varicella* vaccination for susceptible children, and throat or other cultures for contacts. See “Managing Special Situations,” directly below.

C. Managing Special Situations

1. Daycare/School

One case of invasive GAS in a daycare center or school does not necessarily indicate transmission within the center/school, but a risk assessment should be conducted to better characterize the situation. The following items should be addressed as part of the assessment:

- Ascertain if any other cases of iGAS have been reported at the daycare/school in the past 30 days, or if any cases of pharyngitis, impetigo or scarlet fever have been reported in the previous two weeks. If so, determine the number of cases and the dates of illness onset. Investigators will be required to develop a line list to document information about all cases of known and suspect GAS illness. The information to be included in the line list should include, at a minimum, the date of birth of case-patients, symptoms, dates of illness onset, laboratory testing performed, dates of absence from

daycare/school, and whether there are other known cases of GAS involving close contacts (e.g., family members). When attempting to identify cases of GAS in toddlers, be aware of the potential for atypical clinical presentations. Children younger than age 3 do not frequently present with typical pharyngitis but may instead present with rhinitis and a protracted illness with moderate fever, irritability, and anorexia.

- Determine if the case-patient's illness was preceded by *varicella* or other viral infection, and if any *varicella*, *influenza*, *COVID-19* or other virus cases have been reported in the daycare center or school in the previous two weeks. Determine the numbers and the dates of illness onset.
- The recommendations for control will depend on the answers to the above questions and the information obtained via the line list. Control measures will include review of hand hygiene protocols for attendees and staff, cleaning protocols, as well as recommendations for notification of contacts and exclusion of symptomatic attendees and staff. A sample notification letter is available from the NJDOH; please consult with your local health department or the NJDOH for further guidance prior to distributing notification letters for an iGAS case. The public health response may also include obtaining throat cultures for all symptomatic daycare contacts, with subsequent antibiotic treatment of those who are culture-positive for GAS.
- If children or staff are identified with recent varicella infections, recommendations for managing varicella in a childcare or school setting and guidance to protect contacts of a case of varicella (<https://www.nj.gov/health/cd/topics/varicella.shtml>) should be followed.
- The childcare or school facility should conduct surveillance for additional iGAS cases for up to 30 days from the last case.
- LHD staff should contact IZDP at 609.826.5964 to report suspected or confirmed cases in a daycare center, school, or any other childcare setting. The IZDP staff will work with LHD staff to ensure all contacts are identified and notified.

2. Hospital and Other Acute Care Facilities: Post-Partum and Post-Surgical GAS

GAS is a rare cause of surgical site or postpartum infections, but these infections may lead to severe disease or mortality when they occur. Postpartum iGAS is defined as isolation of GAS, during the postpartum period in association with a clinical postpartum infection (e.g., endometritis), or from either a sterile site or a wound infection during the time frame that includes all inpatient days and the first seven days after discharge. Postsurgical iGAS is defined as isolation of GAS during the hospital stay or the first seven days after discharge from a sterile site or a surgical wound in a postsurgical patient for whom the indication for surgery was not a preexisting GAS infection.

Since transmission may, in some cases, be healthcare associated and may be traced to carriers of GAS involved in direct patient care, **even a single case of postpartum or postsurgical GAS infection should be vigorously investigated because of the potential to prevent additional cases.** It is important to identify postsurgical and postpartum iGAS cases in a timely fashion, in order to effectively undertake an epidemiological investigation and to prevent further transmission. NJ Department of Health guidance for the investigation and prevention of postpartum and postsurgical iGAS infections in healthcare facilities can be found in Appendix 2 or at the NJDOH/CDS website at [Guidance GroupAStrep Inv and Prevention Post-Partum Surgical.pdf \(nj.gov\)](#). Applicable facilities may include acute care hospitals, ambulatory surgical centers, birthing centers or other healthcare facilities where surgical procedures or deliveries are performed.

3. Long-Term Care (LTC) Facilities

Early recognition of iGAS infections in LTCF residents is important as this population is particularly at risk for severe infection and death from these infections, and GAS can spread easily in long-term care facilities once it has been introduced. Strong infection prevention and control practices are critical to stopping GAS transmission and preventing outbreaks, and a thorough investigation should be initiated when even a single case of iGAS has been identified in a LTCF resident. When more than one case has been identified in a facility within a four-month timeframe, more extensive investigations are recommended. Detailed guidance for identifying and managing GAS cases and outbreaks in long-term care facilities should be reviewed in APPENDIX 1 and on the NJDOH CDS website at [Guidance GroupAStrep Cases and Outbreaks LTC.pdf \(nj.gov\)](#)

4. Reported Incidence Is Higher than Usual/Outbreak Suspected

If the number of reported cases in the city/town is higher than usual, or if an outbreak in a school, daycare center, or healthcare facility is suspected, LHD staff should immediately contact the Communicable Disease Service (CDS) of the NJDOH at 609.826.5964. This situation may warrant an investigation of clustered cases to determine a course of action to prevent further cases. CDS staff can also perform surveillance for clusters/outbreaks that involve multiple jurisdictions, which would otherwise be difficult to detect at the local level.

D. Preventive Measures

1. Environmental Measures

Daycare centers should be advised to clean toys daily using an approved disinfectant (i.e., an EPA-registered sanitizing solution safe for use in the daycare setting) and to discourage the use of play food and other shared toys, which facilitates the transmission of not only this bacterium but other infectious agents as well. Schools should be advised to frequently sanitize shared sports equipment, such as wrestling or gymnastic mats. Healthcare facilities should ensure adherence to all applicable infection prevention and control measures.

2. Personal Preventive Measures/Education

To protect themselves from potential future exposures, advise individuals to:

- Practice good hygiene, including frequent hand washing
- Avoid sharing food, beverages, cigarettes or eating utensils

Communicable Disease Service Manual

- Receive *varicella* vaccine if indicated

3. Prophylaxis

Most individuals who are exposed to someone with group A strep do not require antibiotic therapy. However, in some situations, prophylaxis may be recommended for certain individuals exposed to someone with an invasive GAS infection. Due to the increased risk of invasive GAS disease among certain high-risk groups, (e.g., individuals >65 years old and immunocompromised individuals), and the risk of death among persons aged 65 and older who develop invasive GAS disease, health care providers may recommend chemoprophylaxis to these groups who are household contacts of patients with invasive GAS infection.

7 OUTBREAK SITUATIONS

If the number of reported cases in an institutional setting or jurisdiction is higher than usual for the time of year, an outbreak might be occurring. In accordance with NJAC 8:57, CDS should be contacted immediately at 609.826.5964. This situation may warrant an investigation of clustered cases to determine a course of action to prevent further cases. In contrast to what routinely occurs at the local level, CDS staff can perform surveillance for clusters of illness that may cross several jurisdictions and thereby be better able to assess the extent of an outbreak during its infancy.

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APPENDIX 1. NJDOH Guidance for Managing Group A Streptococcus Cases and Outbreaks in Long-term Care Facilities

Overview

Group A *Streptococcus* (GAS) infections are a serious cause of illness and death for adults 65 years of age or older in the United States. Residents of long-term care facilities (LTCFs) are particularly at risk for severe infection and death from GAS infections. Early recognition of GAS infections in LTCF residents is important as infections can rapidly progress and result in increased morbidity and mortality. Strong infection prevention and control practices are critical to stopping GAS transmission and preventing outbreaks. This guidance is applicable to the following LTCF settings: nursing homes, skilled nursing facilities, and assisted living facilities.

GAS can cause a [spectrum of syndromes](#) and severity of infections in residents of LTCFs. Infections can rapidly progress within a matter of hours to days. [Cellulitis](#) and wound infections are common types of GAS infections among older adults and residents of LTCFs; less common but more severe GAS infections may also occur.

A GAS case is defined as invasive GAS or “iGAS” when the Group A *Streptococcus* bacteria is isolated by culture from a normally sterile site, or if a wound culture is positive in a patient with necrotizing fasciitis or streptococcal toxic shock syndrome. Examples of iGAS infections may include pneumonia, bacteremia in association with cutaneous infection, deep soft tissue infection, meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum or neonatal sepsis and non-focal bacteremia.

Among adults, rates of iGAS infections increase with age. iGAS-associated mortality also increases with age, with the highest rates seen among adults aged 65 years or older. Approximately 14% of people aged 65 years or older die from their invasive GAS infection.⁸

Older adults living in LTCFs are at higher risk of GAS infection and death compared to older adults living in the community. Compared to age-matched adults living in the community, residents of LTCFs have a 3- to 8-fold higher incidence of iGAS infections and are 1.5 times more likely to die from GAS infections.⁸

Common Routes of GAS Transmission in LTCFs

Once introduced into a LTCF, GAS can easily spread through multiple routes. GAS can be transmitted via residents, visitors or healthcare personnel (HCP) from an infected or colonized person through:

- Respiratory droplets
- Contact with saliva or nasal secretions.
- Contact with open sores or wounds.

Spread of GAS among residents in LTCFs has been associated with the following:

- Having a roommate who is infected or colonized with GAS
- Being cared for by the same HCP as a resident who is infected or colonized with GAS
- Residing on the same unit as a resident who is infected or colonized with GAS

GAS outbreaks in LTCFs frequently involve multiple routes of transmission and are rarely point source or common source. Multiple outbreaks have occurred in which transmission was linked to HCP with GAS pharyngitis who cared for patients while ill. Asymptomatically colonized residents and healthcare personnel can serve as sources of GAS transmission. Residents with wounds are at particular risk of developing iGAS. Contamination of the wound with GAS during provision of care may be a significant transmission factor in LTCFs.

Case and Outbreak Reporting

Reporting communicable disease cases and outbreaks serves many purposes. **The immediate goal is to control further spread of the disease.** Information gained from outbreak investigations can help healthcare facilities and public health agencies identify and eliminate infection sources, learn about emerging problems, identify carriers to mitigate their role in disease transmission, and implement new strategies for prevention within facilities. A single case of iGAS in a LTCF resident could indicate an outbreak and requires timely public health investigation.

Reporting refers not only to the initial notification, but also to the provision of routine updates on the status of the investigation. The facility and the LHD shall be in frequent contact regarding case numbers, control measures taken, and other pertinent information. LHDs should maintain frequent communication with the NJDOH Communicable Disease Service (CDS) throughout the investigation.

The facility shall:

- Immediately contact their LHD to report all cases of iGAS and any suspected or confirmed GAS outbreak by phone. Contact information for LHD can be found at: www.localhealth.nj.gov and after-hours at: <https://www.nj.gov/health/lh/documents/LocalHealthDirectory.pdf>
- If LHD staff cannot be reached, the facility shall make the report by phone directly to NJDOH/CDS. Call (609) 826-5964 during business hours and (609) 392-2020 during after-hours and weekends.
- Notify the New Jersey Division of Health Facilities Evaluation and Licensing at 609-292- 0412. (This applies to Assisted Living Facilities, Assisted Living Programs, Comprehensive Personal Care Homes, Residential Health Care Facilities, and Adult and Pediatric Day Health Services Facilities ONLY.)

The LHD shall:

- Immediately notify NJDOH.

LTCF iGAS Investigation/Outbreak Definitions

iGAS Investigation/Suspect Outbreak (I#): 1 iGAS case (see Overview for iGAS case definition) identified in a LTCF resident

iGAS Outbreak (E#): ≥ 2 symptomatic cases of GAS among residents AND at least 1 of them is an iGAS case AND the illness onset dates are within 4 months of each other.

GAS Investigation in Long-Term Care Facilities

Communicable Disease Service Manual

A timely and thorough investigation of iGAS infections can help to prevent further transmission in LTCFs. Given the potential to prevent additional cases and the risk of severe outcomes in this population, a facility and public health investigation is warranted for even a single case of iGAS infection in a LTCF resident.

Purpose of the investigation:

1. Identify any additional symptomatic cases among residents and staff
2. Identify and treat asymptomatic carriers
3. Assess and improve current infection control practices in the facility
4. Identify potential transmission routes

Strategies for investigating iGAS cases and outbreaks, and the associated control recommendations vary by the number and type of cases that have been identified. **An increase in cases necessitates a larger response to control the outbreak.**

1. One case – 1 case of iGAS infection
2. Two cases - 2 cases (at least 1 invasive) of GAS infection in a 4-month period
3. Three or more cases - 3 or more cases (at least 1 invasive) of GAS infection in a 4-month period

Investigating one case of iGAS infection in a LTCF resident

iGAS Investigation (I#): 1 iGAS case identified in a LTCF resident

Upon notification of a positive iGAS culture in a resident, the LHD should instruct the performing laboratory to save the GAS isolate. CDS will determine the need for emm typing and whole genome sequencing and will provide instructions for the isolate to be sent to PHEL. The LHD should advise the LTCF to do the following:

- Identify additional symptomatic cases:
 - Conduct a retrospective chart review to identify any other cases of symptomatic invasive or noninvasive GAS infection among facility residents for the **one month prior to the onset of the iGAS case**. Review records for residents at LTCF, referral hospitals, and referral laboratories. Notify the LHD of any additional cases identified.
 - Survey all current residents and healthcare personnel (HCP), including consultants, for symptoms of GAS infection.
 - Culture symptomatic residents and HCP as clinically indicated. Include all symptomatic cases in the line list and report any cases to the LHD.
 - Treat symptomatic residents and HCP as clinically indicated.
 - Maintain active surveillance for additional invasive or noninvasive cases among LTCF residents for **4 months from onset of most recent GAS case**. If another case is identified, notify the LHD and move to the algorithm for 2+ cases.
- Identify potential asymptomatic carriers:
 - Screen (by culture) close contacts of ill resident, including roommates and close social contacts (with prolonged close exposure to the ill resident). Sites to culture:
 - Throat
 - Skin lesions
 - Ostomy sites – gastrostomy, ileostomy, colostomy and nephrostomy. (Collection of cultures should only be performed by personnel trained in the appropriate management of these types of devices and ostomy sites).

- Treat anyone with a positive culture with an appropriate antibiotic regimen according to CDC guidance and notify the LHD of any positive cultures.
- After consulting CDS, asymptomatic carriers who screened positive and underwent antibiotic treatment should be re-tested by culture 7-10 days after finishing the antibiotic regimen.
- Assess infection control measures
 - Review and audit HCP adherence to infection control practices:
 - Hand hygiene, preferably using alcohol-based hand rub/sanitizer
 - Appropriate selection and proper use of personal protective equipment (PPE)
 - use of gown and gloves during high contact care activities for residents with wounds or invasive medical devices. Also, appropriate PPE for residents with suspected or confirm GAS infection or colonization (Wound – contact and droplet precautions; throat – droplet precautions.)
 - Cleaning and disinfection of environmental surfaces and reusable wound care equipment (when not an option to use single use or dedicated equipment) according to manufacturer’s instructions for use for contact time.
 - Maintaining separation between clean and soiled equipment to prevent cross contamination
 - Dedicating multidose vials to a single patient whenever possible. If multidose vials are used for more than one patient, restrict the medication vials to a centralized medication area and do not bring them into the immediate patient treatment area (e.g., operating room, patient room/cubicle).
 - Increasing audits and observations during an outbreak

Investigating Two cases (at least 1 invasive) of iGAS infection in LTCF residents

iGAS Outbreak (E#): ≥ 2 symptomatic cases of GAS have been identified among residents AND at least 1 of them is an iGAS case AND the illness onset dates are within 4 months of each other. Upon notification of two symptomatic cases of GAS occurring within 4 months of each other, where at least one of the cases is invasive, the LHD should instruct the performing laboratory to save the GAS isolates. CDS will determine the need for emm typing and whole genome sequencing. The LHD should advise the LTCF to do the following:

- Identify additional symptomatic cases
 - Conduct a retrospective chart review to identify any other cases of symptomatic invasive or noninvasive GAS infection among facility residents for the **one month prior to the onset of the first iGAS case**. Review records for residents at LTCF, referral hospitals, and referral laboratories. Notify the LHD of any additional cases identified.
 - Survey all current residents and healthcare personnel (HCP), including consultants, for symptoms of GAS infection.
 - Culture symptomatic residents and HCP as clinically indicated. Include all symptomatic cases in the line list and report any cases to the LHD.
 - Treat residents and HCP as clinically indicated.
 - Maintain active surveillance for additional invasive or noninvasive cases among LTCF residents for **4 months from onset of most recent GAS case**. If

Communicable Disease Service Manual

another case is identified, report to the LHD and move to the algorithm for 3+ cases.

- Identify potential asymptomatic carriers
 - Screen **all residents** by culture, except those treated for GAS within the last 14 days. (In situations in which all case-patients reside in a single unit, floor, or building within the LTCF, screening may be limited to residents in that unit, floor, or building. This decision will be made on a case-by-case basis in consultation between the facility infection prevention team and the health department and may take into account where cases are located within the facility, the size and layout of the facility, and the mobility of patients with GAS infection or asymptomatic carriage). Sites to culture for residents:
 - Throat
 - Skin lesions
 - Ostomy sites - gastrostomy, ileostomy, colostomy and nephrostomy. (Collection of cultures should only be performed by personnel trained in the appropriate management of these types of devices and ostomy sites).
 - Consider screening **epidemiologically linked HCP** by culture, except those treated for GAS within the last 14 days. Sites to culture for HCP:
 - Throat
 - Skin lesions
 - Notify the LHD of screening plans, as well as of any positive results and treatment regimens used.
 - Treat anyone with a positive culture with an antibiotic regimen per CDC guidelines for GAS eradication (see below).
 - After consulting CDS, asymptomatic carriers who screened positive and underwent antibiotic treatment should be re-tested by culture 7-10 days after finishing the antibiotic regimen.
- Assess infection control measures
 - Review and audit HCP adherence to infection control practices.
 - Hand hygiene, preferably using alcohol-based hand rub/sanitizer
 - Appropriate selection and proper use of personal protective equipment (PPE)^d
 - Cleaning and disinfection of environmental surfaces and reusable wound care equipment
 - Maintaining separation between clean and soiled equipment to prevent cross contamination
 - Dedicating multidose vials to a single patient whenever possible. If multidose vials are used for more than one patient, restrict the medication vials to a centralized medication area and do not bring them into the immediate patient treatment area (e.g., operating room, patient room/cubicle).
 - Review and audit infection control practices for wound care and respiratory care.
 - Educate HCP on signs and symptoms of GAS infection.
 - Educate HCP on the importance of not working while ill.
 - Review sick leave policies.
- Conduct an epidemiologic and laboratory investigation
 - Investigate potential linkages between cases, including close contacts (roommates and close social contacts) and HCP.

- Labs should be asked to store any positive cultures for iGAS or GAS and LHDs should work with CDS to send these isolates to PHEL for *emm* typing and whole genome sequencing

Investigating 3+ cases (at least 1 invasive) of iGAS infection in LTCF residents

Upon notification of three or more symptomatic cases of GAS occurring within 4 months of each other, where at least one of the cases is invasive, the LHD should instruct the performing laboratory to save the GAS isolates. CDS will determine the need for *emm* typing and whole genome sequencing. The LHD should advise the LTCF to do the following:

- Identify additional symptomatic cases
 - Conduct a retrospective chart review to identify any other cases of symptomatic invasive or noninvasive GAS infection among facility residents for the **one month prior to the onset of the first iGAS case**. Review records for residents at LTCF, referral hospitals, and referral laboratories. Notify the LHD of any additional cases identified.
 - Survey all current residents and healthcare personnel (HCP), including consultants, for symptoms of GAS infection.
 - Culture symptomatic residents and HCP as clinically indicated. Include all symptomatic cases in the line list and report any cases to the LHD.
 - Treat residents and HCP as clinically indicated.
 - Maintain active surveillance for additional invasive or noninvasive cases among LTCF residents for **4 months from onset of most recent GAS case**. If another case is identified, report to the LHD for additional guidance.
- Identify potential asymptomatic carriers
 - Screen **all residents** by culture, except those treated for GAS within the last 14 days. (In situations in which all case-patients reside in a single unit, floor, or building within the LTCF, screening may be limited to residents in that unit, floor, or building. This decision will be made on a case-by-case basis in consultation between the facility infection prevention team and the health department and may take into account where cases are located within the facility, the size and layout of the facility, and the mobility of patients with GAS infection or asymptomatic carriage). Sites to culture for residents:
 - Throat
 - Skin lesions
 - Ostomy sites
 - Consider screening **epidemiologically-linked HCP** by culture, except those treated for GAS within the last 14 days. Sites to culture for HCP:
 - Throat
 - Skin lesions
 - For outbreaks that persist despite other outbreak control measures, consider screening HCP with strong epidemiologic links to case patients by self-collected vaginal and anal or rectal cultures in addition to throat and skin lesion cultures. GAS can colonize throat, skin lesions, vagina, and anus and rectum. Previous outbreaks in healthcare settings have been linked to HCP who were colonized at one or more of these sites. For example, in outbreaks with a predominance of case-patients who have wounds and are receiving

Communicable Disease Service Manual

- wound care, the wound care team members might be considered for screening for GAS carriage by culture from throat and skin lesions and self-collected vaginal and anal or rectal swabs. Notify the LHD of screening plans, as well as of any positive results and treatment regimens used.
- Treat anyone with a positive culture with an appropriate antibiotic regimen, according to CDC guidelines for GAS eradication.
- After consulting CDS, asymptomatic carriers who screened positive and underwent antibiotic treatment should be re-tested by culture 7-10 days after finishing the antibiotic regimen.
- Assess infection control measures
 - Review and audit HCP adherence to infection control practices.
 - Hand hygiene, preferably using alcohol-based hand rub/sanitizer
 - Appropriate selection and proper use of personal protective equipment (PPE)^d
 - Cleaning and disinfection of environmental surfaces and reusable wound care equipment
 - Maintaining separation between clean and soiled equipment to prevent cross contamination
 - Dedicating multidose vials to a single patient whenever possible. If multidose vials are used for more than one patient, restrict the medication vials to a centralized medication area and do not bring them into the immediate patient treatment area (e.g., operating room, patient room/cubicle).
 - Review and audit infection control practices for wound care and respiratory care.
 - Educate HCP on signs and symptoms of GAS infection.
 - Educate HCP on the importance of not working while ill.
 - Review sick leave policies.
- Conduct an epidemiologic and laboratory investigation in collaboration with the LHD.
 - Investigate potential linkages between cases, including close contacts (roommates and close social contacts) and HCP.
 - Labs should be asked to store any positive cultures for iGAS or GAS and LHDs should work with CDS to send these isolates to PHEL for *emm* typing and whole genome sequencing

GAS Outbreaks in Multiple Facilities

LTCFs, especially those in close geographic proximity, may share HCP, which could be a GAS transmission link between facilities. If cases are identified in multiple nearby LTCFs, LHDs should consult with CDS to coordinate investigation of a potential single, multi-facility outbreak.

In LTCFs experiencing cases of iGAS, it's especially important for LHDs to inquire about wound care service providers and other external consultants. External consultants often work in multiple LTCFs.

Whenever possible, LTCFs with shared HCP should seek to

- Align policies and procedures (e.g., flexible sick leave policies) to ensure that HCP do not report to work when ill; and
- Establish procedures for communication when shared HCP are placed on work restrictions.

Antibiotic Regimens for GAS Carriage Eradication during Outbreaks

Which antibiotic regimen to use for GAS carriage eradication during an outbreak depends on multiple considerations, and LTCFs and public health should carefully consider the pros and cons of each regimen on a case-by-case basis with the LTCF medical director and infection prevention and control personnel. GAS is universally susceptible to beta-lactam antibiotics, including penicillin and cephalosporins. Table 1 includes a list of universally susceptible antibiotic regimens recommended by the CDC.

Multiple regimens may be needed, including a first-line regimen and alternative regimens for those who have allergies to antibiotics or who are at risk for drug-drug interactions. Susceptibility may need to be considered when using select alternative antibiotic regimens as clindamycin and macrolide resistance have been commonly reported in GAS isolates. Table 2 includes a list of alternative antibiotic regimens recommended by the CDC.

Table 1: Universally susceptible antibiotic regimens, with dosages

Antibiotic regimen	Dosage(s)
Benzathine penicillin G (BPG) plus rifampin	BPG: 600,000 units for patients <27 kilograms (kg) or 1,200,000 units for patients ≥27 kg intramuscular (IM) in a single dose Rifampin: 20 mg/kg/day (maximum daily dose 600 mg/day) oral in 2 divided doses for 4 days
First-generation cephalosporins, such as cephalexin	Cephalexin: 25-50 mg/kg/day (maximum daily dose 1000 mg/day) in 2–4 divided doses for 10 days

Table 2: Alternative Antibiotic regimens, with dosages, which need susceptibility testing prior to use

Antibiotic regimen	Dosage(s)
Azithromycin	12 mg/kg/day (maximum daily dose 500 mg/day) in a single dose daily for 5 days
Clindamycin	20 mg/kg/day (maximum daily dose 900 mg/day) in 3 divided doses for 10 days

Infection Prevention and Control

Lapses in infection prevention and control practices, including lapses in hand hygiene and during wound care, have been identified in multiple GAS outbreak investigations in LTCFs. Wound care can lead to shedding or spray of GAS into the environment or onto HCP performing wound care. Continued use of a facemask by HCP during all wound care activities or when handling invasive medical devices is recommended until the outbreak is over.

Additional PPE use, as described below, is recommended to control a GAS outbreak.

- I. Residents with suspected or confirmed GAS infection or who are colonized (presence of GAS in the throat or on the skin of a person who has no signs or symptoms of infection) should be placed on appropriate Transmission-Based Precautions pending culture results:
 - i. Wound—Residents with GAS cultured from a wound, ostomy, or device-insertion site should remain on [Contact and Droplet Precautions](#) until 24 hours

Communicable Disease Service Manual

after the initiation of effective antibiotic therapy and any wound drainage stops or can be contained by a dressing. HCP should then return to use of [Enhanced Barrier Precautions](#), where the use of personal protective equipment is required during high-contact resident care activities, such as dressing, bathing, and the provision of device and/or wound care.

- ii. Throat—Residents with GAS cultured from their throat should remain on [Droplet Precautions](#) until 24 hours after the initiation of effective antibiotic therapy.

Infection prevention and control is critical for preventing GAS outbreaks in LTCFs. Strengthening of infection control practices, with special attention to good hand hygiene and wound care practices, is key to interrupting transmission of GAS in ongoing outbreaks. Increasing audits and observations (hand hygiene and wound care practice) especially during an outbreak can help to identify any lapse or breach in IC practice. Additional resources on wound care and infection control auditing are provided below in “References and Resources.”

Specimen Submission for Strain Typing at CDC

Healthcare facilities should save all GAS isolates associated with a LTCF outbreak. CDS will facilitate testing at CDC to assess strain relatedness during an outbreak when indicated. LHDs and healthcare facilities should promptly notify CDS regarding any outbreak-associated GAS isolates.

References & Resources

1. New Jersey Administrative Code, Title 8. Department of Health, Chapter 57: Communicable Diseases. Available at <http://www.nj.gov/health/cd/reporting.shtml>. <https://www.cdc.gov/groupastrep/outbreaks/ltof/index.html>
2. Center for Disease Control and Prevention, Investigate All Outbreaks of Group A *Streptococcus* Infections in Long-Term Care Facilities. Available at <https://www.cdc.gov/groupastrep/outbreaks/LTCF/investigate.html>
3. Center for Disease Control and Prevention, Investigating 1 case of invasive group A *Streptococcus* infection. Available at <https://www.cdc.gov/groupastrep/outbreaks/ltof/investigating-1-case.html>
4. Center for Disease Control and Prevention, Investigating 2 cases (at least 1 invasive) of group A *Streptococcus* infection. Available at <https://www.cdc.gov/groupastrep/outbreaks/ltof/investigating-2-cases.html>
5. Center for Disease Control and Prevention, Investigating 3+ cases (at least 1 invasive) of group A *Streptococcus* infection. Available at <https://www.cdc.gov/groupastrep/outbreaks/ltof/investigating-3-cases.html>
6. Center for Disease Control and Prevention, Residents of long-term care facilities are at increased risk for disease and death from group A *Streptococcus*. Available at <https://www.cdc.gov/groupastrep/outbreaks/LTCF/risk.html>
7. Center for Disease Control and Prevention, Outbreaks and Public Health Response. Available at <https://www.cdc.gov/groupastrep/outbreaks.html>
8. Center for Disease Control and Prevention, For Laboratorians. Available at <https://www.cdc.gov/groupastrep/lab.html>
9. Center for Disease Control and Prevention, Decision Tool for Investigating Group A *Streptococcus* Infections in Long-Term Care Facilities. Available at <https://www.cdc.gov/groupastrep/downloads/ltof-decision-tool-508.pdf>

10. Center for Disease Control and Prevention, Infection Control. Available at <https://www.cdc.gov/infectioncontrol/index.html>
11. New Jersey Communicable Disease Services, Infection Prevention Audit Tool Development. Available at https://www.nj.gov/health/cd/documents/topics/hai/infection_control_auditing.pdf
13. NJ Department of Health Wound Care Audit Tool
https://www.nj.gov/health/cd/documents/topics/hai/ICAR_Wound_Care_Audit_Tool.pdf
14. Center for Disease Control and Prevention, Infection Control Assessment and Response (ICAR) Tool for General Infection Prevention and Control (IPC) Across Settings. Available at <https://www.cdc.gov/infectioncontrol/pdf/icar/ipc-obs-form-wound-care.pdf>

APPENDIX 2. NJDOH Guidance for the Investigation and Prevention of Post-Partum / Post-Surgical Invasive Group A Streptococcus Infections in Healthcare Facilities

Background:

While group A *Streptococcus* (GAS) is an uncommon cause of surgical site or postpartum infections, it may lead to severe disease or mortality. Since healthcare associated transmission may in some cases be traced to carriers of GAS involved in direct patient care, even a single case of postpartum or postsurgical GAS infection should be investigated because of the potential to prevent additional cases. Any case of iGAS in a postpartum or postsurgical patient could be a warning sign that other potential healthcare-associated infections may exist. Clinicians should remain alert for the possibility of other postpartum or postsurgical infections, and evaluate and treat suspected cases promptly. Invasive group A Streptococcus (iGAS) refers to infection with GAS involving a normal sterile area of the body (see Case Definitions). Healthcare facilities include acute care hospitals, ambulatory surgical centers, birthing centers or other healthcare facilities where surgical procedures or deliveries are performed.

Case Definitions:

1. *iGAS – postpartum*: Isolation of GAS during the postpartum period in association with a clinical postpartum infection (e.g., endometritis), or from either a sterile site or a wound infection during the time frame that includes all inpatient days and the first seven days after discharge.
2. *iGAS – postsurgical*: Isolation of GAS during the hospital stay or the first seven days after discharge from a sterile site or a surgical wound in a postsurgical patient for whom the indication for surgery was not a preexisting GAS infection.

Recommendations for a Healthcare Facility with one or more associated Postpartum or Postsurgical iGAS Cases:

1. If a case of postpartum or postsurgical iGAS is identified, the local health department (LHD) and the infection control department at the health care facility should both be notified.
2. iGAS Isolates from all postpartum/postsurgical cases should be held by the clinical laboratory. NJDOH's Communicable Disease Service (CDS) will work with facilities to facilitate molecular analysis for strain relatedness if indicated – typically when two or more potentially linked isolates are available.
3. The facility should establish retrospective surveillance of cases for six months before the earliest case and active surveillance for six months after the latest case. Surveillance includes reviewing microbiology records from the previous six months, consulting with obstetricians and/or the surgical teams, review of records to identify additional possible cases, identifying any symptomatic HCP/staff (pharyngitis, skin infections), and obtaining a culture on all suspected new cases. Any additional culture-positive isolates should also be held by the lab while the investigation is ongoing.

4. If more than one healthcare facility may be involved in the care of a case (e.g., a long-term care facility and a hospital), LHD consultation with NJDOH/CDS should occur.
5. Facilities should notify their LHD if additional cases are identified through either retrospective review or prospective surveillance
6. Screening of healthcare providers (HCPs) with a potential epidemiological link to the case may be considered when one case has been identified; it is strongly recommended to screen HCP when two or more linked cases have been identified. Screening should be done VIA CULTURE (to enable molecular-level epidemiologic analysis). When HCP screening is undertaken, sites from which specimens should be obtained and cultured include all the following: throat, anus, vagina, and any skin lesions. (See Figure 1 for recommended public health action, based on CDC guidance, for the management of postpartum/postsurgical iGAS infections).²
 - a. Screening of HCPs should include all those who were present at delivery and those who performed vaginal examinations before delivery (for postpartum cases), all HCPs present in the operating room during surgery and those who changed dressings on open wounds (for postsurgical cases). Screening of all other HCPs who have had contact with the patient(s) during the postpartum/post-surgical period is also recommended if the onset of symptoms occurs 72 hours or more after delivery/surgery. Additional screening may be recommended for other specific scenarios.
 - b. When screening of HCPs is undertaken, screened asymptomatic HCPs may continue to work pending the culture results; however, HCPs who are symptomatic, or who are asymptomatic and identified as colonized with GAS who are epidemiologically linked to transmission of the organism in the healthcare setting should be treated following CDC recommendations AND
 - Should be excluded from work until 24 hours after the start of **effective** antimicrobial therapy⁴ AND
 - Should culture the affected site for GAS 7 to 10 days after completion of chemoprophylaxis if HCP is determined to be linked to transmission; if positive, they should receive additional administration of chemoprophylaxis, further investigation of contacts and repeat exclusion from work until 24 hours after the start of effective antimicrobial therapy.
7. Assess infection control measures, and review and audit adherence to the following infection control practices.
 - Hand hygiene, preferably using alcohol-based hand rub/sanitizer
 - Appropriate selection and proper use of isolation protocols and personal protective equipment (PPE)
 - Cleaning and disinfection of environmental surfaces and reusable wound care equipment
 - Maintaining separation between clean and soiled equipment to prevent cross-contamination
 - Dedicating multidose vials to a single patient whenever possible. If multidose vials are used for more than one patient, restrict the medication vials to a

Communicable Disease Service Manual

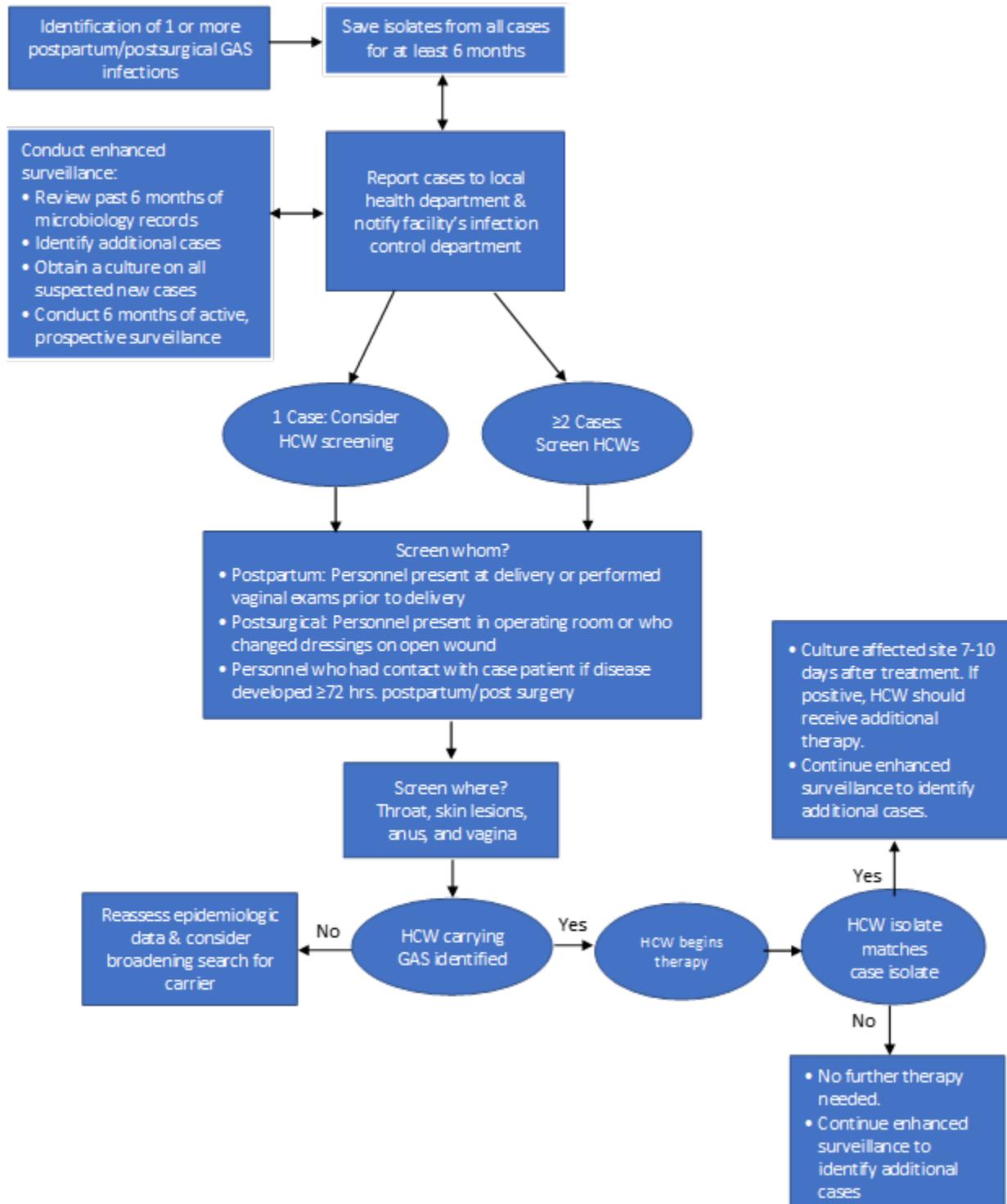
centralized medication area and do not bring them into the immediate patient treatment area (e.g., operating room, patient room/cubicle).

- Wound care and respiratory care.
- Educating HCP on signs and symptoms of GAS infection manifestations (pharyngitis, impetigo).
- Reviewing sick leave policies and educating HCPs on the importance of not working while ill.

Post-exposure prophylaxis

Post-exposure prophylaxis (PEP) is not necessary for healthcare workers who have been exposed to GAS. Close household contacts of a patient with iGAS are not routinely recommended to receive PEP, but in consultation with their healthcare provider, PEP may be considered for those who are at high risk for severe outcomes from GAS infection.

Figure 1. Recommended public health action for cases of postpartum/post-surgical GAS infections.



Adapted from: The Prevention of Invasive Group A Streptococcal Infections Workshop Participants, Prevention of Invasive Group A Streptococcal Disease among Household Contacts of Case Patients and among Postpartum and Postsurgical Patients: Recommendations from the Centers for Disease Control and Prevention, Clinical Infectious Diseases, Volume 35, Issue 8, 15 October 2002, Pages 950–959, <https://doi.org/10.1086/342692>

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3. Harris K, Proctor LK, Shinar S, Philippopoulos E, Yudin MH, Murphy KE. Outcomes and management of pregnancy and puerperal group A streptococcal infections: A systematic review. *Acta Obstet Gynecol Scand.* 2023 Feb;102(2):138-157. doi: 10.1111/aogs.14500. Epub 2023 Jan 12. PMID: 36636775; PMCID: PMC9889326.
4. Group A Strep: Infection Control in Healthcare Personnel: Epidemiology and Control of Selected Infections Transmitted Among Healthcare Personnel and Patients [Group A Streptococcus Infections | Epidemiology and Control of Selected Infections | Infection Control | CDC](#)