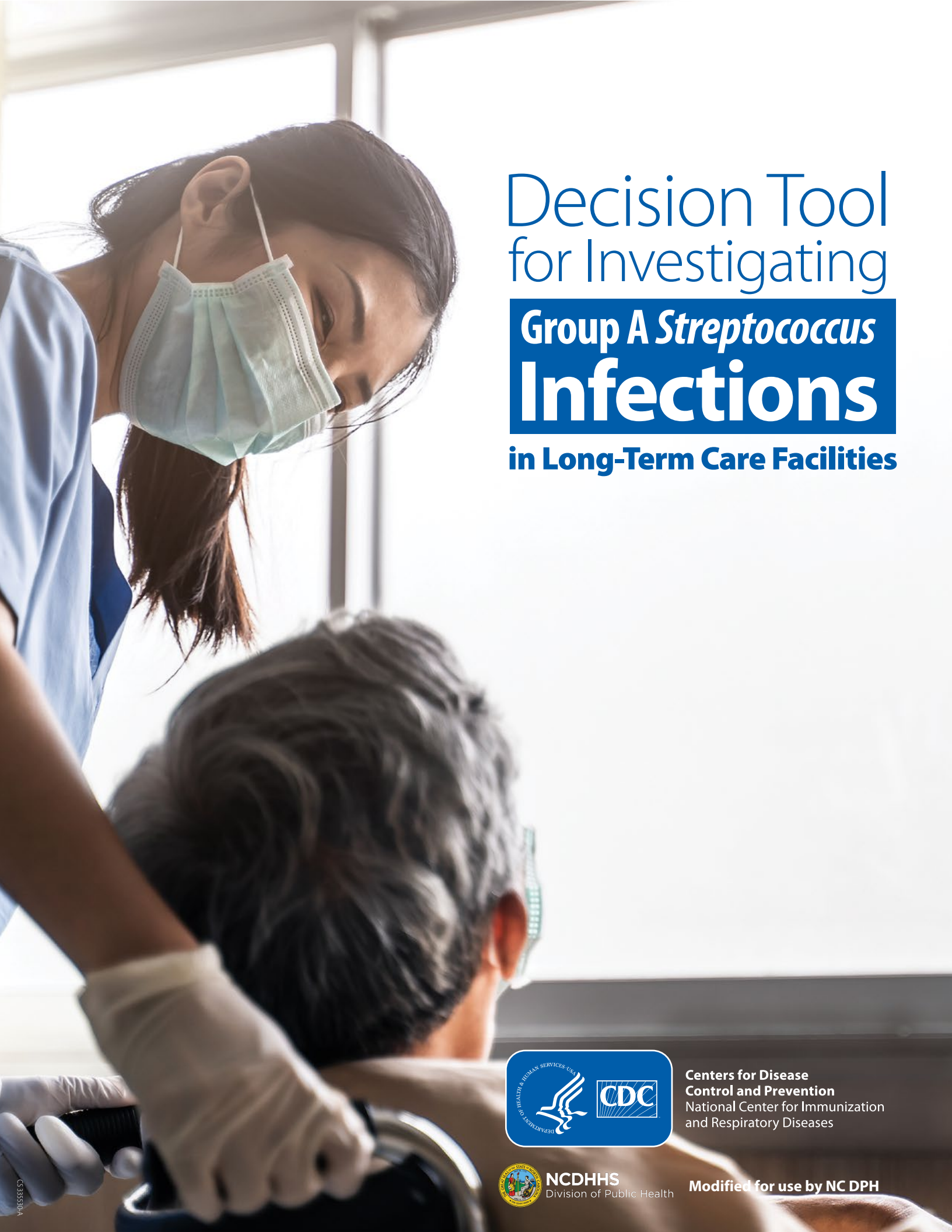

Decision Tool for Investigating Group A *Streptococcus* Infections in Long-Term Care Facilities

Centers for Disease Control and Prevention
National Center for Immunization and Respiratory Diseases

NCDHHS
Division of Public Health

Modified for use by NC DPH

CS 335530-A

Investigating 1 case of invasive group A *Streptococcus* infection

Modified for use by NC DPH

Setting: Identification of one case of invasive group A *Streptococcus*[a] (GAS) infection among long-term care facility (LTCF) residents. Given the potential for the prevention of additional cases, even one invasive case should prompt an epidemiological investigation by the LTCF's infection control personnel.

Footnotes referenced on this page are found on page 6.

⚠ Actions: Laboratory or LHD should…

1. **Lab or hospital[b] should report** the case to public health authorities
2. **LHD should notify** the LTCF
3. **LHD should request the GAS isolate** be shipped to the state lab

⚠ Actions: LTCF or LHD should…

1. Identify additional symptomatic cases

- Conduct a retrospective chart review of facility residents over previous month to identify other invasive or noninvasive cases.
- Survey all direct care staff, including consultants, for current symptoms of GAS infection.
- Culture symptomatic residents and staff as clinically indicated.
- Treat residents and staff 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, move to the algorithm for 2 cases.

2. Identify potential asymptomatic carriers

- Screen (by culture) close contacts of ill resident, including roommates and close social contacts. Sites to culture:[c]
  - ❑ Throat ❑ Skin lesions ❑ Ostomy sites
- Treat anyone with a positive culture. See table pg 5 for antibiotic regimens.
- Re-screen, by culturing same sites listed above, any positives 7-10 days after treatment is completed.

3. Assess infection control measures

Review and audit staff 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[e]
- Maintaining separation between clean and soiled equipment to prevent cross contamination
- Dedicating multidose medication containers to a single patient whenever possible. If multidose medication containers are used for more than one patient, restrict the medication containers to a centralized medication area and do not bring them into the immediate resident treatment area (e.g. resident room).[f] See recommendations in footnote *f* on pg 6 .
- Review IP practices for wound care, particularly if case had a wound. Please see and share the documents "Steps For a LTCF case", and "Handouts for facility" on the CD manual GAS toolkit page for these details.

Investigating 2 cases (at least 1 invasive) of group A *Streptococcus* infection

Modified for use by NC DPH

Setting: Identification of 2 symptomatic group A *Streptococcus*[a] (GAS) infections among long-term care facility (LTCF) residents with at least one invasive infection; symptom onset of the second case occurs within 4 months of the first case. **In NC, staff cases that could be related to resident cases count toward an outbreak. Consult DPH HAI team.**

Footnotes referenced on this page are found on page 6.

⚠ Actions: Laboratory or LHD should…

1. **Lab or hospital[b] should report** the case to public health authorities
2. **LHD should notify** the LTCF
3. **LHD should request** the GAS isolate be shipped to the state lab

⚠ Actions: LTCF or LHD should…

1. Identify additional symptomatic cases

- Conduct a retrospective chart review of facility residents over previous month to identify other invasive or noninvasive cases.
- Survey all direct care staff, including consultants, for current symptoms of GAS infection.
- Culture symptomatic residents and staff as clinically indicated.
- Treat residents and staff 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(s) is identified, move to the algorithm for 3+ cases.

2. Identify potential asymptomatic carriers

- Screen **all residents**[g] by culture, except those on GAS treatment within the last 14 days. Sites to culture for residents:[c]

  ❑ Throat ❑ Skin lesions ❑ Ostomy sites

- Consider screening **epidemiologically-linked HCP** by culture, except those on GAS treatment within the last 14 days. Sites to culture for HCP:

  ❑ Throat ❑ Skin lesions

- Treat anyone with a positive culture. See table pg 5 for antibiotic regimens.
- Re-screen, by culturing same sites listed above, anyone with a positive culture 7-10 days after they complete treatment.

3. Assess infection control measures

- Review and audit staff 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[e]
  - Maintaining separation between clean and soiled equipment to prevent cross contamination
  - Dedicating multidose medications to a single patient whenever possible. If multidose medications are used for more than one patient, restrict the medication containers to a centralized medication area and do not bring them into the immediate treatment area (e.g.resident room).[f]
- Review and audit infection control practices for wound care and respiratory care.
- Educate staff on signs and symptoms of GAS infection.
- Educate staff on the importance of not working while ill.
- Review sick leave policies.

4. Conduct an epidemiologic and laboratory investigation

- Investigate potential linkages between cases, including close contacts (roommates and close social contacts) and staff.
- If isolates from ≥2 cases available, *emm* typing and whole genome sequencing can be used to look for strain relatedness.[h]

Investigating 3+ cases (at least 1 invasive) of group A *Streptococcus* infection

Modified for use by NC DPH

Setting: Identification of 3 or more symptomatic group A *Streptococcus*[a] (GAS) infections among long-term care facility (LTCF) residents with at least one invasive infection; symptom onset of the most recent case occurs within 4 months of the prior case. **In NC, staff cases that could be related to resident cases count toward an outbreak. Consult DPH HAI team.**

Footnotes referenced on this page are found on page 6.

⚠ Actions: Laboratory or LHD should…

1. **Lab or hospital[b] should report** the case to public health authorities
2. **LHD should notify** the LTCF
3. **LHD should request** the GAS isolate be shipped to the state lab

⚠ Actions: LTCF or LHD should…

1. Identify additional symptomatic cases

- Conduct a retrospective chart review of facility residents over previous month to identify other invasive or noninvasive cases.
- Survey all direct care staff, including consultants, for current symptoms of GAS infection.
- Culture symptomatic residents and staff as clinically indicated.
- Treat residents and staff 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.

2. Identify potential asymptomatic carriers

- Screen **all residents**[g] by culture, except those on GAS treatment within the last 14 days. Sites to culture for residents:[c]

  ❑ Throat ❑ Skin lesions ❑ Ostomy sites

- Screen **epidemiologically-linked HCP** by culture and consider screening all HCP,[i] except those on GAS treatment within the last 14 days. Sites to culture for HCP:[j]

  ❑ Throat ❑ Skin lesions

- Treat anyone with a positive culture. See table pg 5 for antibiotic regimens.
- Re-screen, by culturing same sites listed above, anyone with a positive culture 7-10 days after they complete treatment.

3. Assess infection control measures

- Review and audit staff 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[e]
  - Maintaining separation between clean and soiled equipment to prevent cross contamination
  - Dedicating multidose medications to a single patient whenever possible. If multidose medications are used for more than one patient, restrict the medication containers to a centralized medication area and do not bring them into the immediate treatment area (e.g. resident room).[f]
- Review and audit infection control practices for wound care and respiratory care.
- Educate staff on signs and symptoms of GAS infection.
- Educate staff on the importance of not working while ill.
- Review sick leave policies.

- If there is concern that transmission is not controlled, consider restricting visitors for a limited time period and halting new admissions on affected units or floors (**in consultation with DPH**).

4. Conduct an epidemiologic and laboratory investigation

- Investigate potential linkages between cases, including close contacts (roommates and close social contacts) and staff.
- If isolates from ≥2 cases available, *emm* typing and whole genome sequencing can be used to look for strain relatedness.[h]

Antibiotic regimens for group A *Streptococcus* chemoprophylaxis, carriage eradication

Multiple antibiotic regimens have been recommended for chemoprophylaxis either in the 2002 U.S. guidelines for postpartum and post-surgical outbreaks or in Canada's guidelines for prevention and control of invasive group A *Streptococcus* (GAS) disease. Several have been used in previous outbreaks as chemoprophylaxis for GAS carriage eradication.

Choose regimen on a case-by-case basis

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 LTCF infection prevention and control personnel.

Multiple regimens are likely needed

It's likely necessary to choose multiple regimens, including a first-line regimen and alternative regimens for those who have allergies to antibiotics or who are at risk for drug-drug interactions with antibiotic regimens.

First-line regimens that do not need susceptibility test results

GAS is universally susceptible to beta-lactam antibiotics, including penicillin and cephalosporins. LTCFs and public health do not need to consider antibiotic susceptibility when selecting one of these treatment regimens.

The footnotes referenced in the following two tables are listed immediately following the tables.

Table 1. Universally susceptible antibiotic regimens, with dosages

Antibiotic regimen	Dosage(s)
Benzathine penicillin G (BPG) plus rifampin[1,3,5]	**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[2,3,5]	Cephalexin: 25-50 mg/kg/day (maximum daily dose 1000 mg/day) in 2–4 divided doses for 10 days

Alternative regimens that need susceptibility test results prior to use

LTCFs and public health should only consider clindamycin or macrolides if the outbreak strain is documented as susceptible to these antibiotics. Clindamycin and macrolide (e.g., azithromycin) resistance have been commonly reported. Among invasive disease isolates in 2021, 35% of GAS isolates were macrolide resistant and 34% of isolates were clindamycin resistant.

Table 2. Antibiotic regimens, with dosages, needing susceptibility testing

Antibiotic regimen	Dosage(s)
Azithromycin[1,4]	12 mg/kg/day (maximum daily dose 500 mg/day) in a single dose daily for 5 days
Clindamycin[1,3]	20 mg/kg/day (maximum daily dose 900 mg/day) in 3 divided doses for 10 days

[1] CDC. Prevention of Invasive Group A Streptococcal Infectio ns 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. *Clin Infect Dis*. 2002;35(8):950–9. Erratum in: *Clin Infect Dis*. 2003;36(2):243.

[2] Public Health Agency of Canada. Supplement - Guidelines for the prevention and control of invasive group A Streptococcal disease. *Can Commun Dis Rep*. 2006;32S2(October 2006).

[3] Dooling KL, Crist MB, Nguyen DB, et al. Investigation of a prolonged group A streptococcal outbreak among residents of a skilled nursing facility, Georgia, 2009–2012. *Clin Infect Dis*. 2013;57(11):1562–7.

[4] Morita JY, Kahn E, Thompson T, et al. Impact of azithromycin on oropharyngeal carriage of group A *Streptococcus* and nasopharyngeal carriage of macrolide-resistant *Streptococcus pneumoniae*. *Ped Infect Dis J*. 2000;19(1):41–6.

[5] Nanduri SA, Metcalf BJ, Arwady MA, et al. Prolonged and large outbreak of invasive group A *Streptococcus* disease within a nursing home: Repeated intrafacility transmission of a single strain. *Clin Microbiol Infect*. 2019;25(2):248.e241–7.

Footnotes

a. If GAS is isolated from a wound AND accompanied by necrotizing fasciitis or streptococcal toxic shock syndrome, then it is considered an invasive GAS infection case.
[return to either Investigating 1 case or Investigating 2 cases (at least 1 invasive) or Investigating 3+ cases (at least 1 invasive)]

b. Often cases of invasive GAS will first be identified either by an acute care hospital where the resident of an LTCF has been transferred for additional evaluation and medical care or by a laboratory that processes specimens collected at LTCFs. Thus, these facilities should ensure that invasive GAS infection or positive GAS cultures collected from normally sterile body sites are reported to local public health authorities and the LTCF where the patient resides. Additionally, these facilities should save the isolate for possible future assessments of strain relatedness in case additional cases are identified.
[return to either Investigating 1 case or Investigating 2 cases (at least 1 invasive) or Investigating 3+ cases (at least 1 invasive)]

c. Examples of ostomy sites that should be cultured when screening residents for GAS carriage include gastrostomy and nephrostomy. Collection of cultures should only be performed by personnel trained in the appropriate management of these types of devices and ostomy sites. In order to assure sterility of sterile lines or devices is not compromised, cultures should not be collected from insertion sites for sterile lines or devices in the absence of signs or symptoms of infection. Staff should monitor the insertion sites for invasive medical devices (e.g., peripherally inserted central catheters) visually when changing the dressing or by palpation through an intact dressing on a regular basis, depending on the clinical situation of the individual resident. If patients have tenderness at the insertion site, fever without obvious source, or other manifestations suggesting local or bloodstream infection, the dressing should be removed to allow thorough examination of the site.
[return to either Investigating 1 case or Investigating 2 cases (at least 1 invasive) or Investigating 3+ cases (at least 1 invasive)]

d. As part of Enhanced Barrier Precautions or EBP (https://www.cdc.gov/hai/containment/PPE-Nursing-Homes.html) use of a gown and gloves is recommended during high-contact care activities (e.g., wound care; central line, urinary catheter, feeding tube, tracheostomy or ventilator device care or use) for residents with a wound or invasive medical device.

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

Residents with suspected or confirmed GAS infection or colonization should be placed on appropriate Transmission-Based Precautions pending culture results:

Wound—Residents with GAS cultured from a wound, ostomy, or device-insertion site should remain on Contact and Droplet Precautions until 24 hours 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 EBP.

Throat—Residents with GAS cultured from their throat should remain on Droplet Precautions until 24 hours after the initiation of effective antibiotic therapy.

Note: 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.

HCP with suspected or confirmed GAS infection or GAS colonization should be managed as described in Epidemiology and Control of Selected Infections (https://www.cdc.gov/infectioncontrol/guidelines/healthcare-personnel/selected-infections/index.html#Strep).
[return to either Investigating 1 case or Investigating 2 cases (at least 1 invasive) or Investigating 3+ cases (at least 1 invasive)]

e. EPA-registered disinfectants or detergents/disinfectants that best meet the overall needs of the healthcare facility for routine cleaning and disinfection of environmental surfaces and resident care equipment and proper handling of indwelling medical devices should be selected. (https://www.epa.gov/pesticide-registration/selected-epa-registered-disinfectants)
[return to either Investigating 1 case or Investigating 2 cases (at least 1 invasive) or Investigating 3+ cases (at least 1 invasive)]

f. Multidose medication containers (e.g., creams, sprays, ointments) should be dedicated to a single resident whenever possible. If it is not possible to dedicate an entire tube or container of wound care medication to an individual resident, then a small amount should be allocated (e.g., into a medication cup) for single resident use prior to the wound care procedure. If multidose medication containers are used for more than one resident, the medication container should be restricted to a centralized medication area (e.g., clean medication cart) and should not be brought into the immediate resident treatment area (e.g., resident's room/cubicle). The remainder of the multidose container should be properly stored in a dedicated clean area. Any container entering resident care areas should be dedicated for single-resident use or discarded after use.
[return to either Investigating 1 case or Investigating 2 cases (at least 1 invasive) or Investigating 3+ cases (at least 1 invasive)]

g. In situations in which all case-patients reside in a single unit, floor, or building within the LTCF, screening by culture of residents may be limited to residents in that unit, floor, or building. This decision should be made on a case-by-case basis in consultation with the facility infection prevention and control team and public health. Factors to consider include whether cases are clustered by location, the size and layout of the facility, and the mobility of patients with GAS infection and people who are identified as GAS carriers.
[return to either Investigating 2 cases (at least 1 invasive) or Investigating 3+ cases (at least 1 invasive)]

h. Results from GAS strain characterization can provide additional evidence to support your recommendations. *emm* typing is used to characterize and measure the genetic diversity among GAS isolates. Finding 2 or more isolates from an outbreak of the same *emm* type may indicate that intrafacility transmission is occurring, although repeated introductions from the community of the same *emm* type can also occur. Whole genome sequencing (WGS) provides more detailed and precise data for identifying outbreaks. For example, WGS assesses *emm* type and antibiotic susceptibility at the same time and identifies important surface protein types/virulence traits and exotoxin profiles. WGS can be used to assess relatedness in outbreak investigations.
[return to either Investigating 2 cases (at least 1 invasive) or Investigating 3+ cases (at least 1 invasive)]

i. Whether to screen only epidemiologically-linked HCP by culture for GAS in the facility or all HCP is a decision that should be made on a case-by-case basis in consultation with the facility infection prevention and control team and public health. Factors to consider in making this decision should include the size, persistence, intractability, and severity of the outbreak, as well as feasibility and logistics of screening HCP.
[return to Investigating 3+ cases (at least 1 invasive)]

j. 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 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.
[return to Investigating 3+ cases (at least 1 invasive)]