

***Group A Streptococcus*, Invasive Infections, including Streptococcal Toxic Shock Syndrome (STSS) Investigation Guideline**

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Group A Streptococcus, Invasive Infections including Streptococcal Toxic Shock Syndrome Disease Management and Investigative Guidelines

CASE DEFINITION (CDC 1995) – Invasive, Group A *Streptococcus*

Clinical Description for Public Health Surveillance:

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, and nonfocal bacteremia.

Laboratory Criteria for Case Classification:

Isolation of group A *Streptococcus* (*S. pyogenes*) by culture, from a normally sterile site (e.g., blood or cerebrospinal fluid, or, less commonly, joint, pleural, or pericardial fluid).

Case Classification:

Confirmed: Case that is laboratory confirmed

CASE DEFINITION (CDC 2010) – Streptococcal Toxic-Shock Syndrome (STSS)

Clinical Description for Public Health Surveillance:

- Hypotension: a systolic blood pressure ≤ 90 mm Hg for adults or \leq fifth percentile by age for children aged ≤ 16 years.
- Multi-organ involvement characterized by two or more of the following:
 - Renal impairment: Creatinine ≥ 2 mg/dL (≥ 177 μ mol/L) for adults or \geq twice the upper limit of normal for age. In patients with preexisting renal disease, a greater than two-fold elevation over the baseline level.
 - Coagulopathy: Platelets $\leq 100,000/\text{mm}^3$ ($\leq 100 \times 10^6/\text{L}$) 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 $\geq 2x$ the upper limit of normal for the patient's age. In patients with preexisting liver disease, a greater than two-fold 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.

* Clinical manifestations do not need to be detected within the first 48 hours of hospitalization or illness, as specified in the 1996 case definition. The specification of the 48 hour time constraint was for purposes of assessing whether the case was considered nosocomial, not whether it was a case or not.

Laboratory Criteria for Case Classification:

Isolation of group A *Streptococcus*.

Case Classification:

Confirmed: Case meets the clinical case definition with isolation of group A *Streptococcus* from a normally sterile site (i.e., blood or cerebrospinal, joint, pleural, or pericardial fluid).

Probable: Case meets the clinical case definition in the absence of another identified etiology for the illness and with isolation of group A *Streptococcus* from a non-sterile site.

Laboratory Testing:

- Gram stains and cultures are performed routinely by commercial laboratories.
- Submission of **invasive** Group A *Streptococcus* isolates to the Kansas Health and Environmental Laboratories (KHEL) is required by law. (K.A.R. 28-1-18)
- Shipping of isolates: Use Miscellaneous Infectious Disease (IDS) Shipper.
- For additional information and/or questions concerning isolate submission call (785) 296-1620 or refer to www.kdheks.gov/labs/lab_ref_guide.htm.

EPIDEMIOLOGY

Approximately 9,000-11,500 cases of invasive Group A streptococcus (GAS) disease (3.2 to 3.9/100,000 population) occur each year in the U.S.; STSS and necrotizing fasciitis (NF) accounted for approximately 6%-7% of those cases. Over 10 million noninvasive GAS infections (primarily throat and superficial skin infections) occur annually. Worldwide, rates of severe invasive disease (STSS and NF) increased from the mid-1980s to early 1990s. Increases in the severity of disease were associated with increases in prevalence of M-1 and M-3 serotypes (emm types 1 and 3). Rates of invasive disease have been stable over the last 7 years in the United States. Resistance to erythromycin has increased worldwide. Those at highest risk of invasive disease include the elderly, immunosuppressed, persons with chronic cardiac or respiratory disease, diabetes or skin lesions (i.e. children with varicella [chicken pox], persons with penetrating trauma or surgical wounds, intravenous drug users) African-Americans and American Indians. Children (especially elementary school age) are at highest risk of noninvasive disease. Nasal, throat, skin, anal and vaginal carriers of GAS have been responsible for nosocomial outbreaks.

DISEASE OVERVIEW

A. Agent:

Bacterium, *Streptococcus pyogenes*, > 100 identified serological types.

B. Clinical Description:

While GAS is most often associated with streptococcal pharyngitis/tonsillitis and streptococcal skin infections (impetigo or pyoderma), there are several invasive clinical syndromes, including pneumonia, bacteremia and meningitis. Bacteremia can develop 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), peritonitis, osteomyelitis, septic arthritis, postpartum sepsis, and neonatal sepsis. Potential complications of GAS infections include acute rheumatic fever and glomerulonephritis.

STSS is a severe illness associated with invasive or noninvasive group A streptococcal 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%.

C. Reservoirs: Humans.

D. Mode(s) of Transmission:

Bacteria are transmitted person-to-person by large droplet spread or by contact with respiratory secretions. Casual contact can result in nasopharyngeal carriage without illness. Those with acute respiratory tract infections (particularly nasal) can transmit noninvasive infection (i.e. upper respiratory infections or pharyngitis). The invasive form of the disease is not transmitted person-to-person it only occurs after the bacteria have infected a person and then get past the immune defenses of the that person. Streptococcal pharyngitis has been associated with the ingestion of contaminated food.

E. Incubation Period:

Short, usually 1-3 days.

F. Period of Communicability:

As long as bacteria present in respiratory secretions. Cases treated with appropriate antibiotics are considered noninfectious after 24 hours of treatment.

G. Susceptibility and Resistance:

Immunity develops only against specific strains and/or exotoxins.

H. Treatment:

Treatment depends on type of infection. Penicillin is the drug of choice for uncomplicated infection. Clindamycin and cephalosporins are used as alternatives. For STSS and necrotizing fasciitis, high dose penicillin and clindamycin are recommended. For those with very severe illness, supportive care in an intensive care unit may also be needed. For persons with necrotizing fasciitis, early and aggressive surgery is often needed to remove damaged tissue and stop disease spread. Early, aggressive treatment may reduce the risk of death from invasive group A streptococcal disease. Antimicrobial therapy is usually not indicated for most GAS pharyngeal carriers, except in instances of outbreaks of rheumatic fever or post-streptococcal glomerulonephritis or GAS pharyngitis in a closed or semi-closed community or with families that have history of acute rheumatic fever or multiple episodes of documented symptomatic GAS pharyngitis during a period of many weeks despite appropriate therapy.

INVESTIGATOR RESPONSIBILITIES

- 1) Use current [case definition](#), to confirm diagnosis with the medical provider.
- 2) Conduct a [case investigation](#) to collect additional epidemiological data as required by current surveillance objectives. *
- 3) Ensure invasive [Group A streptococcal isolates](#) were sent to the state lab.
- 4) Complete all information requested on the [General Investigation Form](#) and, if necessary, the [Bacterial Meningitis Supplemental Form](#).
- 5) Report case information to KDHE using established methods. Meningitis cases require immediate notification within 4 hours of the initial report by calling the epidemiologist-on-call at 1-877-427-7317.
- 6) As appropriate, use notification letter(s) and/or the disease fact sheet.

- * **Note:** Routine contact and/or case investigation are not needed for isolated cases of invasive GAS cases. In most cases, the patient will not need to be contacted. Current surveillance objectives depend on:
- Laboratory submission of all invasive GAS isolates to the state laboratory.
 - The local health department's assistance with confirming cases.

STANDARD CASE INVESTIGATION AND CONTROL METHODS

Use the [Rapid Assessment Worksheet](#) to organize and collect important data, but report all data using the [General Investigation](#) and [supplemental forms](#).

Case Investigation

- 1) If there is no indication that the isolate has been sent to KHEL, call or send a reminder to the laboratory that performed the testing that they are required by law to submit all [invasive Group A streptococcal isolates](#) to the state lab.
- 2) Contact the medical provider who reported or ordered testing of the case to obtain the following from the patient's medical records.
 - Evidence of invasive disease based on case definition. (Refer to Section 1 of the [Rapid Assessment Worksheet](#) for assistance.)
 - Case's demographic data and contacting information (birth date, county, sex, race/ethnicity, address)
 - Hospitalizations: location and duration of stay
 - Outcomes: survived and date of recovery or date of death
- 3) If the invasive disease is identified as **Meningitis**, complete and submit a [Bacterial Meningitis Supplemental Form](#).
- 4) If the disease is identified as **Streptococcal Toxic Shock Syndrome**, include the information collected in Section 4 of the [Rapid Assessment Worksheet](#) in the "Notes" section of KS-EDSS or on the [General Investigation Form](#).
- 5) If **death** resulted directly or indirectly from varicella infection investigate as a varicella related death. (Refer to [Varicella Disease Investigation Guideline](#).)
- 6) Investigate epi-links among cases (clusters, household, co-workers, etc).
 - For suspected [outbreaks](#) refer to [Managing Special Situations](#).
 - For suspected cases associated to [postpartum females or for postsurgical infections](#) refer to [Managing Special Situations](#).

Contact Investigation

Contact investigation is of no practical value for routine situations.

Case Management

- If identified, report on any changes in patient status (i.e., date of death).
- Work with appropriate regulatory agency to assure compliance with any [work, school or daycare restrictions](#).

Contact Management

None required. Symptomatic household members should be instructed to seek medical attention for testing (i.e., throat cultures) to assess the need for treatment.

Isolation, Work and Daycare Restrictions

K.A.R 28-1-6 for Streptococcal disease, hemolytic; including erysipelas, scarlet fever, streptococcal sore throat:

- Each infected person shall remain in isolation for 10 days if untreated or for 24 hours following initiation of antibiotic therapy.

Kansas Food Code 2005:

- Food handlers diagnosed with streptococcal disease are subject to the isolation measures specified in K.A.R. 28-1-6 and are excluded[‡] from work during the isolation period.
- Food handlers symptomatic with sore throat and fever must be restricted[‡] from handling food, or be excluded[‡] from work if they serve high risk groups[™]. (Unless medical documentation is provided by an approved medical provider that they are free of the infectious agent of concern.)
- Food handlers symptomatic with lesions containing pus or an infected wound that is open and draining that cannot be covered or kept dry are restricted[‡] from handling food. (Unless medical documentation[§] is provided by an approved medical provider that they are free of the infectious agent of concern. (i.e. *S. pyogenes* or *S. aureus*))
- Reinstate restricted[‡] individuals (that were never diagnosed) after they are symptom free for 24 hours and have not been associated with food borne illness.
 - If they have been associated with foodborne illness, reinstate after symptom free and with written medical documentation[§] that they are free of the infectious agent of concern.
- Reinstate excluded[‡] individuals after they provide medical documentation[§] that they are free of the infectious agent of concern.
- Workers in schools, residential programs, daycare and healthcare facilities, who feed, give mouth care or dispense medications to clients, are subject to the same restrictions as food handlers.

[§] Written medical documentation would include information that the patient has been on antibiotics for 24 hours for *S. pyogenes*, has at least one negative throat culture for *S. pyogenes* or is free of the infectious agent of concern.

[‡] Exclusion is not allowing the employee to work at the food establishment. Restriction is not allowing the employee to work with food; to clean equipment, utensils or linens; or to un-wrap single-use articles in the food establishment.

[™] A highly susceptible population is more likely to experience foodborne disease because they are immunocompromised or older adults and in a facility that provides health care or assisted living services, such as a hospital or nursing home; or preschool age children in a facility that provides custodial care, such as a daycare center.

- Refer to Managing Special Situation for cases in [School and Childcare](#).
- Universal, droplet and contact precautions are recommended for all medical care personal taking care of patients with invasive disease.

Education

If cases or contacts call the health department to ask questions, instruct them to:

- Practice basic hygiene with an emphasis on proper hand washing technique.
- Avoid sharing food, beverages, cigarettes or eating utensils.
- Concerned contacts should also be instructed that
 - Invasive disease is not spread person-to-person;
 - Antibiotic treatment is not considered an effective way of protect contacts exposed to a meningitis case caused by bacteria other than *N. meningitidis* or *H. influenzae*; and
 - Medical attention should be sought immediately if they begin to exhibit signs and symptoms of illness.

MANAGING SPECIAL SITUATIONS

A. Outbreak Investigation:

Settings and/or locations that require prompt public health action includes:

- Clusters in military institutions, hospitals or long-term care facilities;
 - Outbreaks of invasive disease in childcare and/or school settings
1. Notify KDHE immediately, 1-877-427-7317.
 2. Case finding will be an important part of any investigation.
 3. Additional data collected on section 2 and 3 of the [Rapid Assessment Worksheet](#) may be required for the investigation of invasive cases.
 4. Utilize CDC's Investigating Clusters of Group A Streptococcal Disease, as needed. (www2.cdc.gov/ncidod/dbmd/abcs/calc/calc_new/index.htm)

B. School or Child Care Settings for Group A *Streptococcus*:

- Coordinate activities with school nurse and/or administration.
- Cases are excluded from school for 10 days if untreated or for 24 hours following initiation of antibiotic therapy.
- Parents of children who are in the same classroom as the case should be notified (preferably in writing) of the occurrence of GAS disease in the facility. The notice should advise parents to:
 - Watch their children carefully for a 5-day period for signs of illness, especially fever, and seek medical care if illness should occur.
 - Children with signs of GAS disease should be tested and if positive for GAS shall be excluded from school for 10 days if untreated or 24 hours following initiation of antibiotic therapy.
- Outbreaks of streptococcal pharyngitis occur in these settings but the risk of secondary transmission after a single case of mild or even severe invasive GAS infection remains low. Chemoprophylaxis for contacts after GAS infection in child care facilities generally is not recommended.
- Providers are advised to consult with the health department when high rates of streptococcal infection occur in child care facilities.

C. Postpartum or post-surgical group A streptococcal (GAS) infection:

- A single case of postpartum or post-surgical group A streptococcal (GAS) infection calls for a timely investigation to assure that an asymptomatic carrier is not causing nosocomial infection(s).
- Coordinate with infection control personnel.
- Utilize Section 3 of the [Rapid Assessment Worksheet](#), as needed.

DATA MANAGEMENT AND REPORTING TO THE KDHE

- A.** Organize, collect and report data with the “General Investigation Form(s)”.
• For meningitis cases also use the “Bacterial Meningitis Supplemental Form”
- B.** Report data electronically via KS-EDSS or by fax, include:
• At a minimum all essential data collected during the investigation that helps to confirm or classify a case ([Rapid Assessment Worksheet](#), Section 1 or Section 4).
• All information collected on General Investigation and supplemental forms.

Notes on KS-EDSS:

- 1) Invasive Streptococcal Group A cases are initially entered as “**Streptococcal Disease, Invasive, Group A**”.
- 2) Clinical manifestations of Toxic Shock Syndrome (i.e., signs of toxicity with rapid progression of disease) that are identified and reported during the local investigation will result in the case event being changed to “**Toxic Shock Syndrome, Streptococcus**.”
- 3) Deaths identified during the investigation of “**Streptococcal Disease, Invasive, Group A**” that are related to Varicella infections should also be reported and investigated as “**Varicella (Chicken pox)**” with the patient’s death information filled out on the “Varicella Supplemental Form.” Refer to the [Varicella Disease Investigation Guideline](#) for more information.
 - Varicella Death (1998 CDC Case Definition): probable or confirmed case of varicella which contributes directly or indirectly to acute medical complications which result in death

ADDITIONAL INFORMATION / REFERENCES

- A. Treatment / Differential Diagnosis:** American Academy of Pediatrics. 2009 Red Book: Report of the Committee on Infectious Disease, 28th Edition. Illinois, Academy of Pediatrics, 2009.
- B. Epidemiology, Investigation and Control:** Heymann. D., ed., Control of Communicable Diseases Manual, 19th Edition. Washington, DC, American Public Health Association, 2009.
- C. Child Care Guidelines:** American Academy of Pediatrics, American Public Health Association, and National Resource Center for Health and Safety in Child Care and Early Education. Caring for Our Children: National Health and Safety Performance Standards: Guidelines for Out-of-Home Child Care Programs, 2nd edition. Elk Grove Village, IL: American Academy of Pediatrics and Washington, DC: American Public Health Association, 2002: pg. 290. Also available at <http://nrckids.org>.
- D. Case Definitions:** CDC Division of Public Health Surveillance and Informatics, Available at: www.cdc.gov/ncphi/diss/nndss/casedef/case_definitions.htm
- E. Quarantine and Isolation:** Kansas Community Containment Isolation/ Quarantine Toolbox Section III, Guidelines and Sample Legal Orders www.kdheks.gov/cphp/comm_containment_sog.htm#attach
- F. Kansas Regulations/Statutes Related to Infectious Disease:** www.kdheks.gov/epi/regulations.htm
- G. Additional Information (CDC):** www.cdc.gov/health/default.htm

Investigation Form(s)

Invasive Group Strep A Infections Rapid Assessment Form

(Please refer to the Disease investigation Guideline for additional guidance.)

Section 1	Type(s) of infection: <input type="checkbox"/> UNKNOWN (Or check all that apply)		
	<input type="checkbox"/> Bacteremia without focus <input type="checkbox"/> Meningitis <input type="checkbox"/> Otitis media <input type="checkbox"/> Pneumonia <input type="checkbox"/> Other (Specify):	<input type="checkbox"/> Cellulitis <input type="checkbox"/> Epiglottitis <input type="checkbox"/> Abscess (not skin)	<input type="checkbox"/> Peritonitis <input type="checkbox"/> Pericarditis <input type="checkbox"/> Septic abortion <input type="checkbox"/> Chorioamnionitis <input type="checkbox"/> Endometritis <input type="checkbox"/> Osteomyelitis <input type="checkbox"/> Empyema <input type="checkbox"/> Endocarditis <input type="checkbox"/> STSS (*) <input type="checkbox"/> Necrotizing fasciitis <input type="checkbox"/> Puerperal sepsis <input type="checkbox"/> Septic shock
<i>* Report as Toxic Shock Syndrome, Streptococcal in KS-EDSS. Refer to the second page for data that will assist in classifying.</i>			
Section 2	Review of Laboratory Culture Reports:		
	Date first positive culture obtained: (Date Specimen Collected) □□/□□/□□□□ Mo. Day Year	Sterile Site from which isolated: <input type="checkbox"/> Blood <input type="checkbox"/> CSF <input type="checkbox"/> Pleural fluid <input type="checkbox"/> Peritoneal Fluid <input type="checkbox"/> Internal body site: <input type="checkbox"/> Other sterile site:	Other sites from which isolated: <input type="checkbox"/> Placenta <input type="checkbox"/> Amniotic fluid <input type="checkbox"/> Wound <input type="checkbox"/> Other (specify): <input type="checkbox"/> Pericardial Fluid <input type="checkbox"/> Joint <input type="checkbox"/> Bone <input type="checkbox"/> Muscle <input type="checkbox"/> Middle ear <input type="checkbox"/> Sinus
Section 3	Additional epidemiological data for special situations and possible outbreak situations:		
	At time of positive culture, was the patient: <input type="checkbox"/> Pregnant <input type="checkbox"/> Postpartum <input type="checkbox"/> Neither <input type="checkbox"/> Unknown		
	If postpartum, what was the outcome of fetus: <input type="checkbox"/> Survived, no apparent illness <input type="checkbox"/> Abortion /stillbirth <input type="checkbox"/> Live birth, but neonatal death <input type="checkbox"/> Survived, clinical infection <input type="checkbox"/> Induced abortion <input type="checkbox"/> Unknown		
	Date of delivery or abortion: □□/□□/□□ Birth weight/gestational age: □□□□(grams) □□(wks)		
	If pregnant, what was the gestational age of the fetus at the time of the first positive culture: □□(wks)		
	If hospitalized, date of admission: □□/□□/□□ Date of hospital discharge: □□/□□/□□		
	Did the patient survive the infection? <input type="checkbox"/> Yes <input type="checkbox"/> No If NO, date of death: □□/□□/□□		
Did the patient have surgery 7 days before first positive culture? <input type="checkbox"/> Yes <input type="checkbox"/> No If YES, date of surgery: □□/□□/□□ Surgery provider:			
Did the patient have any of the following risks: <input type="checkbox"/> Varicella rash <input type="checkbox"/> Penetrating trauma <input type="checkbox"/> Blunt trauma <input type="checkbox"/> Burn wound(s) <input type="checkbox"/> Surgical wound (Post-operative)			
Underlying Causes or Prior Illnesses: <input type="checkbox"/> NONE <input type="checkbox"/> Unknown, chart unavailable (Or check all that apply)			
<input type="checkbox"/> Current Smoker <input type="checkbox"/> Diabetes Mellitus <input type="checkbox"/> Cochlear Implant <input type="checkbox"/> Multiple Myeloma <input type="checkbox"/> Nephrotic Syndrome <input type="checkbox"/> Deaf/Profound Hearing Loss <input type="checkbox"/> Sickle Cell Anemia <input type="checkbox"/> Renal Failure/Dialysis <input type="checkbox"/> Asthma <input type="checkbox"/> Splenectomy/Asplenia <input type="checkbox"/> HIV Infections <input type="checkbox"/> Emphysema/COPD <input type="checkbox"/> Immunoglobulin Deficiency <input type="checkbox"/> AIDS or CD4 count <200 <input type="checkbox"/> Heart Failure/CHF <input type="checkbox"/> Immunosuppressive Therapy (Steroids, Chemotherapy, Radiation) <input type="checkbox"/> Systemic Lupus Erythematosus (SLE) <input type="checkbox"/> Atherosclerotic Cardiovascular Disease (ASCVD)/CAD <input type="checkbox"/> Leukemia <input type="checkbox"/> Cirrhosis/Liver Failure <input type="checkbox"/> Cerebral Vascular Accident /Stroke <input type="checkbox"/> Hodgkin's Disease/Lymphoma <input type="checkbox"/> Alcohol Abuse <input type="checkbox"/> Complement Deficiency <input type="checkbox"/> Bone Marrow Transplant (BMT) <input type="checkbox"/> IVDU <input type="checkbox"/> Chronic Skin Breakdown <input type="checkbox"/> Solid Organ Malignancy <input type="checkbox"/> Obesity <input type="checkbox"/> Premature (Gestational age (wks): □□ <input type="checkbox"/> Solid Organ Transplant <input type="checkbox"/> CSF Leak <input type="checkbox"/> Other (specify):			

Invasive Group Strep A Infections Rapid Assessment Form

(Please refer to the Disease investigation Guideline for additional guidance.)

Section 4

Additional data to evaluate Streptococcal Toxic Shock Syndrome (STSS):

Onset of initial illness: / / : AM / PM

Onset of first manifestation (**as listed below**): / / : AM / PM

Yes No **Hypotension present** (≤ 90 mmHg in adults or $\leq 5^{\text{th}}$ [percentile in children](#) ≤ 16 years)

Systolic Blood pressure (lowest measurement):

Multi-organ manifestations:

Yes No **Renal impairment present** (≥ 2 mg/dL (177 $\mu\text{mol/L}$) in adults **or** 2x the normal upper limit for age)

Creatinine level:

Yes No **Coagulopathy present** ($\leq 100,000/\text{mm}^3$ platelets **or** disseminated intravascular coagulopathy (DIC))

Platelet level (lowest):

Evidence of DIC indicated by:

- Prolonged clotting time reported, or
- Low fibrinogen level reported, or
- Fibrin degradation products detected

Yes No **Liver involvement present** (ALT, AST or Total bilirubin levels 2x normal upper limit for age)

Alanine aminotransferase (ALT) level:

Aspartate aminotransferase (AST) level:

Total bilirubin level:

Yes No **Acute respiratory disease present** (As shown by one of the following below)

- Acute onset of diffuse pulmonary infiltrates and hypoxemia in absence of cardiac failure, or
- Diffuse capillary leak manifested by acute onset of generalized edema, or
- Pleural / peritoneal effusions with hypoalbuminemia

Yes No **Generalized erythematous macular rash** that may desquamate

Yes No **Soft tissue necrosis** including necrotizing fasciitis or myositis, or gangrene.

Clinical Description of STSS for Public Health Surveillance:

- Hypotension: systolic blood pressure ≤ 90 mm Hg for adults or \leq fifth percentile by age for children aged ≤ 16 years.
- Multi-organ involvement characterized by two or more of the following:
 - Renal impairment: Creatinine ≥ 2 mg/dL ($\geq 177 \mu\text{mol/L}$) for adults or \geq twice the upper limit of normal for age. In patients with preexisting renal disease, a greater than two-fold elevation over the baseline level.
 - Coagulopathy: Platelets $\leq 100,000/\text{mm}^3$ ($\leq 100 \times 10^6/\text{L}$) 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 \geq twice the upper limit of normal for the patient's age. In patients with preexisting liver disease, a greater than two-fold 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.

* Clinical manifestations do not need to be detected within the first 48 hours of hospitalization or illness, as specified in the 1996 case definition. The specification of the 48 hour time constraint was for purposes of assessing whether the case was considered nosocomial, not whether it was a case or not.

Kansas Disease Investigation Guidelines

General Investigation Form

Investigation Information		
Case Type: <input type="checkbox"/> Human Case <input type="checkbox"/> Non-human Case	Disease Name: _____	
Classification: <input type="checkbox"/> Suspect <input type="checkbox"/> Probable <input type="checkbox"/> Confirmed	KS-EDSS Investigation ID: _____	
Outbreak: <input type="checkbox"/> Yes <input type="checkbox"/> No	Outbreak Name: _____	Outbreak #: _____
Onset Date: _____	Diagnosis Date: _____	Report Date: _____
Assigned to (Investigator): _____	Patient Died: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
Patient Information		
Name Type: <input type="checkbox"/> Default/Common <input type="checkbox"/> Legal <input type="checkbox"/> Maiden <input type="checkbox"/> Nickname		
Last: _____	First: _____	Middle: _____
Street: _____	City/State: _____	Zip: _____
Evening Phone #: _____	Daytime Phone #: _____	
Sex: <input type="checkbox"/> Failure to Report <input type="checkbox"/> Female <input type="checkbox"/> Male <input type="checkbox"/> Other <input type="checkbox"/> Transexual <input type="checkbox"/> Unknown		
Race: <input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black or African American <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> White <input type="checkbox"/> Unknown		
Hispanic / Latino Ethnicity: <input type="checkbox"/> Yes <input type="checkbox"/> No		
Date of Birth: _____	Age: _____	Age Unit: <input type="checkbox"/> Days <input type="checkbox"/> Weeks <input type="checkbox"/> Months <input type="checkbox"/> Years
Parent Information (if under 18)		
Last: _____	First: _____	Middle: _____
Street: _____	City/State: _____	Zip: _____
Evening Phone #: _____	Daytime Phone #: _____	
Work / Occupation or School / Grade		
Worksites / School: _____		
Occupations / Grade: _____		
Travel History		
1st	Destination: _____	Depart Date: _____ Return Date: _____
2nd	Destination: _____	Depart Date: _____ Return Date: _____
3rd	Destination: _____	Depart Date: _____ Return Date: _____
4th	Destination: _____	Depart Date: _____ Return Date: _____

Supplemental Laboratory Report Form

Lab Reports

Laboratory Name: _____

Lab Report Date: _____

Ordering Provider Name: _____

Phone: _____

Facility: _____

Specimen Accession Number: _____

Specimen Collection Date: _____

Organism Name: _____

Organism Species: _____

Organism Serogroup: _____

Organism Serotype: _____

PFGE Results

Pattern 1 KS: _____

Other State: _____

CDC: _____

Pattern 2 KS: _____

Other State: _____

CDC: _____

Pattern 3 KS: _____

Other State: _____

CDC: _____

Additional Results Information

Reported Test Name:

Coded Result:

Text Result:

Numeric Result:

Comments:

Supplemental Contact Form

Contacts

Last: _____ **First:** _____ **Middle:** _____

Street: _____ **City/State:** _____ **Zip:** _____

Evening Phone #: _____ **Daytime Phone #:** _____ **E-mail:** _____

Sex: Failure to Report Female Male Other Transexual Unknown

Race: American Indian or Alaska Native Asian Black or African American Native Hawaiian or Other Pacific Islander White Unknown

Hispanic / Latino Ethnicity: Yes No

Date of Birth: _____ **Age:** _____ **Age Unit:** Days Weeks Months Years

Worksites / School: _____

Occupations / Grade: _____

Exposure Information

Contact Type: Household Sexual Other: _____ **Partner / Cluster Code:** _____

Date of First Exposure: _____ **Date of Last Exposure:** _____ **Frequency:** _____

Nature of Exposure: _____ **Comments:** _____

Testing and Treatment Information

Clinic Code: _____ **Examination Date:** _____

Examination Test: _____ **Examination Result:** _____

Prophylaxis/empiric treatment date: _____ **Drug / Dosage:** _____

Provider (Name / Facility): _____

Disposition and Diagnosis Information

Initiation Date: _____ **Disposition Date:** _____ **Disposition:** _____

Diagnosis: _____ **Referral Type:** Patient Provider **Post-test Counseled :** Yes No

Currently Assigned To: _____ **Follow-up Date:** _____

Risk Factors

Pregnant: Yes No **If Yes, # of Weeks:** _____

Risk factors for complications in contact: None Pregnant Woman HIV Seropositive Unimmunized Index case is a super-spreader

Child younger than 5 Age > 65 Otherwise immunosuppressed (s/p transplant, high dose steroids, etc)

Supplemental Form

National Bacterial Meningitis and Bacteremia Supplemental Form

Kansas Department of Health and Environment

Epidemiologic Case History

* indicates required fields

Case Type* <i>Human Case Non Human Case</i>	Classification* <i>Confirmed Not a Case Probable Suspect Deleted Unknown</i>
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Supplemental Form Status
Not Done Form Complete Form in Progress Form Approved Form Sent to CDC

Report Date*
mm/dd/yyyy

Date Investigation Started
mm/dd/yyyy

Patient Demographic Information

* indicates required fields

Last Name*	First Name*	Middle Name	Name Type*	Age
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Age Unit <i>Days Weeks Months Years</i>	Date of Birth <small>mm/dd/yyyy</small>
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Race*
(Check all that apply)

*American Indian or Alaska Native Asian Black or African American
Native Hawaiian or Other Pacific Islander White Unknown*

Ethnicity*
Hispanic or Latino Not Hispanic or Latino Unknown

Sex*
Failure to Report Female Male Other Transexual Unknown

Street Address

City	County	State	Zip
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Evening Phone <small>###-###-####</small>	Daytime Phone <small>###-###-####</small>
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Occupation

Person Providing Report

Name of Reporting Facility*

National Bacterial Meningitis and Bacteremia Case Report

If <6 years of age, is the patient in daycare? <small>Daycare is defined as a supervised group of 2 or more unrelated children for greater than 4 hours per week</small> Yes No Unknown	Patient Outcome? Survived Died Unknown
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Type of Infection Caused by Organism <small>(Check all that apply)</small> Primary Bacteremia Meningitis Otitis media Pneumonia Cellulitis Epiglottitis Peritonitis Pericarditis Septic arthritis Conjunctivitis Septic abortion Amnionitis Other (specify) _____
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Bacterial Species Isolated From Any Normally Sterile Site Neisseria meningitidis Haemophilus influenzae Group A Streptococcus Group B Streptococcus Lysteria monocytogenes Streptococcus pneumoniae (pneumococcus) Escherichia coli Staph aureus Staph epidermidis Klebsiella species Enterobacter species Serratia species Acinetobacter species Group A streptococcus Group D streptococcus Other streptococcus Other Bacterial Species (Specify: include mycobacteria, fungi) _____
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Has Patient Received Cochlear Implants? Yes No Unknown	If yes, date <small>mm/dd/yyyy</small>	Physician
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-Important- Please Complete For The Following Organisms:

Haemophilus Influenzae Did the Patient Receive Haemophilus b Vaccine <small>If YES, please complete the list below.</small> Yes No Unknown

Dose	Date Given	Vaccine Name	Vaccine Manufacturer	Lot Number
	<small>mm/dd/yyyy</small>			
1				
2				
3				
4				

If H. Influenzae was isolated from blood or CSF, was it resistant to:		
Ampicillin Yes No Not Tested or Unknown	Chloramphenicol Yes No Not Tested or Unknown	Rifampin Yes No Not Tested or Unknown

Meningococcal vaccine

Did the patient receive meningococcal vaccine

Yes No Unknown

Dose	Date Given	Vaccine Name	Vaccine Manufacturer	Lot Number
	mm/dd/yyyy			
1				
2				
3				
4				

Did the patient receive the Streptococcus pneumoniae (pneumococcus) vaccine

Yes No Unknown

Dose	Date Given	Vaccine Name	Vaccine Manufacturer	Lot Number
	mm/dd/yyyy			
1				
2				
3				

If N. meningitidis was isolated from blood or CSF, was it resistant to:

Sulfa <i>Yes No Not Tested or Unknown</i>	Rifampin <i>Yes No Not Tested or Unknown</i>
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Supporting Materials

Fact Sheet

Supporting Materials are available under attachments:

CLICK HERE TO VIEW ATTACHMENTS

Then double click on the document to open.

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– OR –

Click on the “Paper Clip” icon on the right.