Streptococcal Toxic Shock Syndrome

Disease Category: Other (Bacterial)

Timeframe to follow-up: 1 week from initial report

Signs and Symptoms	Streptococcal Toxic Shock Syndrome (STSS) is caused by infection with *Streptococcus pyogenes.* Initial influenza-like symptoms include chills, fever, myalgia, nausea, and vomiting. As the disease progresses, symptoms quickly progress to sepsis and include hypotension, tachycardia, tachypnea, and other signs and symptoms that are suggestive of specific organ failure (blood, kidney, liver, lung).
Incubation	The incubation period varies depending on site of entry. Hypotension usually starts 24-48 hours after onset of symptoms.
Case Classification	Clinical criteria: 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 aged less than 16 years. • Multi-organ 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 µmol/L) for adults or 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/mm^3 (less than or equal to 100 x 10^9/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. * 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 Diagnosis Isolation of group A *Streptococcus.*

	Case Classification Probable: A case that 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. Confirmed: A case that meets clinical case definition and with a group A *Streptococcus* from a normally sterile site (e.g., blood or cerebrospinal fluid or, less commonly, joint, pleural, or pericardial fluid).
Differential Diagnosis	Other viral and bacterial infections (i.e., staphylococcal toxic shock, other GAS infections, pharyngitis, pneumonia, cellulitis, bacterial sepsis). Patients are often misdiagnosed.
Treatment	STSS infections are serious and require hospitalization for treatment of shock and organ failure. Antibiotics should be started as soon as possible and can be tailored once STSS is confirmed. Surgery may also be required to debride deep tissue infection. Another form of treatment is the use of intravenous immunoglobulin early in the clinical course in severely ill cases.
Duration	Duration depends on the severity of the infection and can be fatal if not treated promptly.
Exposure	Exposure occurs when any group A *Streptococcus* (GAS) enters through a compromised barrier (i.e., skin injury) or through a mucosal membrane. The bacteria may then spread to deep tissues and eventually into the bloodstream causing shock and organ failure.
Laboratory Testing	STSS is diagnosed based on clinical findings, laboratory results, and isolation of group A *Streptococcus* (*S. pyogenes).*
Control of Contacts	Physicians may choose to offer chemoprophylaxis to populations at higher risk of invasive GAS infections (e.g., people living with HIV infection, varicella, diabetes mellitus, or household contacts over the age of 65 years). Since secondary cases are rare in children, chemoprophylaxis is not recommended in schools or childcare facilities. Standard precautions are recommended for any patient with STSS.

Key areas of focus during investigation	• Blood pressure (hypotensive): systolic blood pressure ≤ 90 mm Hg
	• Laboratory results:
	  ○ Creatinine ≥ 2mg/dl(≥177 µmol/L)
	  ○ Platelets ≤ 100,000/mm^3 (≤ 100 x 10^9/L)
	  ○ Alanine aminotransferase (ALT) (≥ 112 U/L), aspartate aminotransferase (AST) (≥ 80U/L), or total Bilirubin (≥ ~2.4 mg/dL) levels that are greater than or equal to twice the upper limit of normal for patient's age.
	• Medical records mentioning acute respiratory distress (ARDS)
	• Mention of erythematous macular rash or soft-tissue necrosis (necrotizing fasciitis, myositis, or gangrene).
	• Prior surgeries or skin infection.
	• If case delivered a baby, vaginally or via C-section.

	• If case had varicella, penetrating trauma, blunt trauma, surgical wounds, or burns.
Public Health Actions	Reports of Streptococcal Toxic Shock cases must be made to the Local Health Authority during the regular business hours of the health authority on the first working day following the identification of the case. Local Health Authority to notify Office of State Epidemiology (dpbhepi@health.nv.gov) or call 775-684-5911/775-400-0333 (after hours) if outbreak suspected. For individual confirmed or probable cases: • Confirm diagnosis • Conduct case investigation using the 2023 CDC ABC case report form. Enter into EpiTrax. ○ Do not close case out while they are hospitalized. • Provide education about how to prevent transmission. To the best of the local health authority's ability, each step of the investigation should be completed within one working day or in alignment with NAC 441A.
Key Partner Agencies	• Nevada Hospitals and infection prevention staff • Local health authorities

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STREPTOCOCCAL TOXIC SHOCK SYNDROME (STSS)

I. DISEASE REPORTING

A. Legal Reporting Requirements

A report to the health authority may be made by telephone; telecopy (in the form prescribed by the health authority); or any form of electronic communication identified by the health authority, following the specified format and procedure.[1]

1. Health Care Providers and Health Care Facilities

Health providers and facilities must notify the health authority where provider is located within the first working day after identifying the case.[1–3]

2. *Laboratories*

Laboratories must notify the health authority within the first working day after identifying the case.[1] If the lab is located outside of Nevada, notify the Nevada Chief Medical Officer through the Office of State Epidemiology (OSE) within the same timeframe.[1,4]

3. Local Health Authority (LHA)

LHA's must notify the Office of State Epidemiology (OSE) within 7 days after completing the case investigation.[5]

II. THE DISEASE AND ITS EPIDEMIOLOGY

A. Background

Streptococcal toxic shock syndrome (STSS) is a rare, invasive infection that occurs when bacteria enter the bloodstream or deep tissue of the body and can lead to shock and organ failure. While anyone is susceptible to infection, certain groups are at higher risk for contracting STSS. Risk factors include adults over the age of 65 years, certain medical conditions (diabetes mellitus), use of non-steroidal anti-inflammatory drugs (NSAIDS), having had recent surgery or a viral infection that resulted in open sores (i.e., varicella), or having some sort of skin injury. STSS is often misdiagnosed, therefore it is important to seek medical care due to the serious nature of the infection. Even with proper antibiotic and therapeutic treatments, 1 in 10 people will die from complications of the infection. Mortality increases with age.[6,7]

B. Etiologic Agent

STSS is caused by infection with a toxin-producing group A *Streptococcus* (GAS), specifically *Streptococcus pyogenes.* Infections leads to shock and multisystem organ failure.[8]

C. Description of Illness

Initial influenza-like symptoms include chills, fever, myalgia, nausea, and vomiting. As the infection progresses, it can lead to sepsis with hypotension, tachycardia, tachypnea, and symptoms associated of specific organ system failure (blood, kidney, liver, and lung).[6,7]

D. Disease Burden in Nevada

STSS infections are rare. Over a five-year period (2019-2024), Nevada reported 166 cases of STSS. Southern Nevada accounted for the largest percentage of reported cases. During this period, those ages 60 years and above were impacted at a higher percentage compared to younger demographics. Men and women were impacted at a relatively even distribution.[9]

See the Nevada Office of State Epidemiology Communicable Disease Dashboard for Nevada specific data on Streptococcal Toxic Shock Syndrome ("Other" section).

E. Reservoirs

STSS is an invasive disease caused by a group A streptococcal (GAS) infection. Group A *Streptococca* l bacteria can found in the oropharynx, skin, rectal, and genital mucosa.[10]

F. Modes of Transmission

The group A *Streptococca* l bacteria can be spread by coming into contact with contaminated surfaces, respiratory droplets, or contact with secretions or infected wounds.[10,11]

G. Incubation Period

The incubation period can vary based on site of entry, typically hypotension begins 24-48 hours after onset of symptoms.[7]

H. Period of Communicability

I. **While Group A strep bacteria can spread from person to person through respiratory droplets or direct contact,** STSS itself is not transmitted from one person to another. **Instead, it develops in some individuals when the bacteria invade normally sterile body sites and release toxins that trigger widespread organ involvement. While the infection is bacterial, the** toxins are the main drivers of the **STSS** symptoms**.Testing**

Culturing blood samples is recommended to identify *Streptococcus pyogenes*. Provider should monitor blood pressure and lab values to assess for multiorgan system failure.

J. Treatment

Cases will need to be hospitalized to receive supportive treatment for shock and organ failure. Antibiotic therapies should be initiated as soon as possible, this can include use of vancomycin in addition to clindamycin. Once STSS is confirmed, antibiotics can be tailored to treat the infection using both clindamycin and penicillin. Depending on site of infection,

surgical debridement may be required. Other treatment can include the use of intravenous immunoglobulin therapy to treat severely ill patients.[8]

Provide most current treatment guidelines from Red Book to the healthcare provider or refer case to physician for proper treatment for Streptococcal Toxic Shock Syndrome.

III. EPIDEMIOLOGIC CASE INVESTIGATION

The public health authority should begin investigating the case of STSS, step by step, within one working day of notification or in alignment with NAC 441A.

A. Step 1: Review relevant information about the disease.

1. Review scientific information in Control of Communicable Diseases Manual, most recent edition.

2. Review Streptococcal Toxic Shock Syndrome (STSS) most recent case definition (2010 CDC).

B. Step 2: Begin investigating the case.

1. Contact Reporting Source and/or Reported Case

Upon receiving an initial case report, review lab test results and available clinical details and epidemiologic factors. Please make three attempts to contact the case (text and phone calls) on separate days, at different times of the day (morning, afternoon, late afternoon). Document all attempts to contact a reporting source and/or reported case, preferably in the "Encounters" tab of EpiTrax. Please use case report forms (CRF) to gather accurate information about the case. Focus on the key data elements listed above. Filling out an electronic version of the CRF in EpiTrax (called a Confidential Morbidity Report (CMR) in EpiTrax) is preferred. If used, the completed PDF version should be attached to the CMR in EpiTrax. The CRF should be completed within 7 days of completing the investigation of the case.[5]

While reviewing case, obtain vital signs to assess for hypotension and appropriate laboratory results to assess for multisystem organ failure (i.e., creatinine, AST/ALT, bilirubin, platelets).

C. Step 3: Identify potential sources of infection

When conducting investigation, focus on any prior skin traumas (surgeries, wounds, burns), open skin wounds caused by varicella (chicken pox or shingles), or childbirth (vaginally or C-section).

D. Step 4: Initiate control measures for case and/or for contacts (see Section IV – Section VI below).

E. Step 5: Provide Education and Prevention messaging to the case and/or contacts (see Section IX below).

IV. CONTROL OF CASE

STSS is not transmissible person-to-person. Standard precautions are recommended for any patients diagnosed with STSS.[12]

V. CONTROL OF CONTACTS

STSS is not transmissible person-to-person and thus no control measures are needed for contacts. The provider can choose to administer chemoprophylaxis for group A *Streptococcus* to high-risk household members.[12]

VI. CONTROL OF CARRIERS

Carriers not been identified for STSS and thus no carrier-specific control measures are needed. STSS itself is a clinical syndrome, not an organism. So, there are no "carriers of STSS.

VII. MANAGEMENT OF SPECIAL SITUATIONS/OUTBREAK CONTROL

STSS is not transmissible. However, if there is an increase in *Streptococca*l *pyogenes* infections in the same facility being reported, coordinate with senior epidemiology staff to determine if an outbreak is occurring. If so, notify DPBH Environmental Health, local health authorities, or infection control, as appropriate.

VIII. PREVENTION

- Prevent group A *Streptococcus* bacterial infections with standard infection control practices.
    - Clean and care for wounds
    - Practice good hand hygiene and respiratory etiquette
    - Take antibiotics as prescribed[13]
- Avoid hot tubs, natural bodies of water (e.g., lakes, rivers, oceans), and swimming pools with open wounds.[13]
- Teenage girls and women should use menstruation products as recommended.
    - Change tampons regularly (every 4 to 8 hour) and do not use for long periods of time
    - Wash hands before and after use
    - Use the lowest absorbency tampon needed[14]

IX. REFERENCES

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X. ACKNOWLEDGEMENTS

This document was developed based on the content and format of the disease investigation guidelines of several state and local health jurisdictions:

- Washington State Department of Health Reporting and Surveillance Guidelines

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XI. UPDATE LOG

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Chief Medical Officer

9/18/2025

Chief Medical Officer Approval Date