

TOXIC SHOCK SYNDROME

Also known as: TSS

Responsibilities:

Hospital: Report by IDSS, facsimile, mail, or phone.

Infection Preventionist: Report by IDSS, facsimile, mail, or phone. Assists with case investigation

Lab: Report by IDSS, facsimile, mail, or phone.

Physician: Report by facsimile, mail, or phone.

Local Public Health Agency(LPHA): Report by IDSS, facsimile, mail, or phone.

Iowa Department of Public Health

Disease Reporting Hotline: (800) 362-2736

Secure Fax: (515) 281-5698

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Agent

Toxic shock syndrome (TSS) is a serious complication of infection with strains of *Staphylococcus aureus* that produce TSS toxin-1 (TSST-1) or strains of *Streptococcus pyogenes* that produce pyrogenic exotoxin A. *S. pyogenes* is more commonly known as group A *streptococcus* (GAS).

B. Clinical Description

TSS is a severe toxin-mediated illness with sudden onset of high fever, vomiting, profuse watery diarrhea, and myalgia, followed by hypotension and potentially shock. During the acute phase of the illness, a "sunburn-like" rash is present. One to two weeks after onset, desquamation of the skin occurs, especially on the soles and palms. Typically, the fever is higher than 102°F, the systolic blood pressure is <90 mm Hg and three or more of the following organ systems are involved:

- gastrointestinal,
- muscular,
- mucous membranes (including vagina, pharynx, conjunctiva),
- renal,
- hepatic,
- respiratory,
- hematologic, or
- central nervous system.

Blood, cerebrospinal fluid and throat cultures are negative for pathogens other than *S. aureus* or GAS. Rocky Mountain spotted fever, leptospirosis and measles should be ruled out. TSS can be fatal.

C. Reservoirs

Humans are the primary reservoir for both *S. aureus* and GAS.

D. Modes of Transmission

While TSS itself is not communicable from person-to-person, the organisms that cause TSS are. *S. aureus* is transmitted from person-to-person through direct contact with lesions or contaminated respiratory secretions. Airborne transmission is rare but has been documented in small children with respiratory disease.

GAS is transmitted from person-to-person through large respiratory droplets or direct contact with infected lesions. GAS can also be transmitted through ingestion of contaminated food, most commonly eggs, milk and milk products, resulting in outbreaks of GAS pharyngitis.

With both *S. aureus* and GAS, indirect contact through objects is rarely associated with illness, but it has occurred in schools through contaminated wrestling mats and in child care centers through play food and other shared toys.

D. Incubation period

The incubation period for *S. aureus* infection is variable, with a 4 - 10 day average. For GAS infection it is approximately 1 to 3 days. The median incubation period for post-surgical TSS is 2 days.

E. Period of Communicability or Infectious Period

TSS itself is not communicable from person-to-person. With *S. aureus*, the infectious period lasts as long as lesions drain or the carrier state exists. In untreated, uncomplicated GAS cases, the infectious period may be 10 - 21 days; if purulent discharge is present, the infectious period may be extended to weeks or months. Persons with untreated GAS pharyngitis may carry and transmit the bacteria for weeks or months, with decreasing contagiousness 2 - 3 weeks after illness onset.

F. Epidemiology

In 1980, TSS became widely recognized when an association between TSS and the use of tampons was established. Since that time, the proportion of TSS cases associated with menstruation has decreased. Cases of TSS 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 source of infection is unknown in up to one-third of cases. Cases are seen in both males and females.

Persons considered at risk for TSS include: 1) menstruating women using tampons or other inserted vaginal devices (such diaphragms or contraceptive sponges), and 2) persons with focal *S. aureus* or GAS infections.

G. Bioterrorism Potential

None.

2) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify household and other close contacts for possible culture and treatment of the underlying bacterial cause.
- To identify transmission sources of public health concern (*e.g.*, contaminated food or a healthcare worker who is a GAS carrier) and to stop transmission from such sources.

B. Laboratory and Healthcare Provider Reporting Requirements

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the healthcare provider must report. The preferred method of reporting is by utilizing IDSS. However, if IDSS is not available, the reporting number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736; fax number (515), 281-5698, mailing address:

IDPH, CADE
Lucas State Office Building, 5th Floor
321 E. 12th St.
Des Moines, IA 50319-0075

Laboratory Testing Services Available

The State Hygienic Laboratory (SHL) does not provide services for the testing to confirm TSS. However, SHL will test specimens for the presence of *S. aureus* or Beta Strep Group A. In some outbreak circumstances, isolates may be sent to Centers for Disease Control and Prevention (CDC) for toxin testing. For more information contact SHL at (319) 335-4500, or visit: www.shl.uiowa.edu/

C. Hospital Infection Preventionist will have the information necessary to initiate case follow-up.

The hospital Infection Preventionist usually completes the investigation, utilizing the Iowa Disease Surveillance System (IDSS).

- a. Use the following guidelines to complete the investigation:
 - 1) Record the demographic information, date of symptom onset, and hospitalized dates. If the case is a menstruating woman, collect information on tampon and sanitary napkin/minipad use, including the brand and style of product, as well as date of onset of last menstrual period.
 - 2) Clinical findings, laboratory data and culture information are all important in defining a case. Collect the data for these sections of the case investigation as completely as possible.
 - 3) If several attempts have been made to obtain case information, but have been unsuccessful, fill out the form with as much information as possible. Enter into the Notes section the reason why it could not be filled out completely. If using IDSS, select the appropriate reason under the Event tab in the Event Exception field.
 - 4) After completing the investigation, enter the information into IDSS or fax to (515) 281-5698 or mail (in an envelope marked "Confidential") to IDPH/CADE, mailing address:
Iowa Department of Public Health
Center for Acute Disease Epidemiology
Lucas State Office Building
321 East 12th St.
Des Moines, IA 50319-0075
 - 5) Local public health shall assist with case follow-up as necessary and review the investigation and assure it is complete.
- d. Institution of disease control measures is an integral part of case investigation. It is the LPHA responsibility to understand, and, if required by IDPH, to institute the control guidelines listed below.

3) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements

None.

B. Protection of Contacts of a Case

If it has been determined that the case was caused by GAS, household contacts of the case should have throat cultures taken, and if positive for GAS, be treated with antibiotics. Other close contacts should be evaluated and cultured if symptomatic.

C. Managing Special Situations

Child Care

If the TSS is caused by GAS, consider throat cultures for all symptomatic child care attendees and staff who are contacts of the case, with subsequent antibiotic treatment of those found to be GAS culture positive. Contact the Center for Acute Disease Epidemiology (CADE) for assistance in managing follow-up of a case in child care.

School

If the TSS is caused by GAS, consider throat cultures for all symptomatic classroom members and other close contacts of the case, with subsequent antibiotic treatment of those found to be GAS culture-positive. Contact the Center for Acute Disease Epidemiology (CADE) for assistance in managing follow-up of a case in a school.

Reported Incidence Is Higher than Usual/Outbreak Suspected

If you suspect an outbreak, investigate to determine the source of infection and mode of transmission. Seek a common exposure, such as association with a child care center, and institute applicable preventive or control measures. Control of person-to-person transmission requires special emphasis on personal cleanliness and handwashing. Consult CADE for assistance.

H. Preventive Measures

Environmental Measures

Advise child care centers to clean toys daily using an approved disinfectant and to discourage the use of play food, which facilitates the transmission of not only this bacterium but many others as well. Also advise schools to frequently sanitize shared sports equipment, such as wrestling and gymnastics mats.

I. Personal Preventive Measures/Education

To avoid exposure, advise individuals to:

- Use the lowest absorbency tampon and change frequently. Discontinue tampon use *immediately* and call their healthcare provider if they develop a high fever and vomiting or diarrhea during menstruation.
- Follow directions for use of diaphragms or contraceptive sponges and do not leave the device in place for more than 30 hours.
- Complete the full course of treatment if prescribed antibiotics for *staphylococcus* or *streptococcus* infections.

4) ADDITIONAL INFORMATION

The Council of State and Territorial Epidemiologists (CSTE) surveillance case definitions for Toxic Shock Syndrome can be found at: www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis.htm#top

CSTE case definitions should not affect the investigation or reporting of a case that fulfills the criteria in this chapter. (CSTE case definitions are used by the state health department and the CDC to maintain uniform standards for national reporting.)

References

American Academy of Pediatrics. *1997 Red Book: Report of the Committee on Infectious Diseases, 24th Edition*. Illinois, American Academy of Pediatrics, 1997.

CSTE Position Statement Number: 10-ID-14

Heymann, D.L., ed. *Control of Communicable Diseases Manual, 19th Edition*. Washington, DC, American Public Health Association, 2008.