Shigellosis (Bacillary Dysentery)

Disease Plan

Quick Links:

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Questions about this disease plan?

Contact the Utah Department of Health Bureau of Epidemiology: 801-538-6191.

✓ WHY IS SHIGELLA IMPORTANT TO PUBLIC HEALTH?

Shigellosis is a diarrheal disease cause by a group of bacteria called *Shigella*. Children in daycares, residents of long term care facilities, and the immunocompromised are at an increased risk of getting shigellosis. Shigella has an extremely low infectious dose that allows it to spread rapidly. Food handlers can spread the disease if infected, and workers should submit negative stool samples before returning to work. It is a low volume enteric disease in Utah, but is important because of its severity and ease of spreading.

✓ DISEASE AND EPIDEMIOLOGY

Clinical Description
The most common symptoms of shigellosis are diarrhea (sometimes with blood and mucus due to inflammation of the bowel), fever, nausea, vomiting, and stomach cramps. Symptoms begin within 1–7 days, but can be as few as 12 hours after contact with the bacteria. Many cases present with watery diarrhea, however, some people who are infected may not have any symptoms at all. The disease is usually self-limiting, lasting 4–7 days. Dehydration may be severe, especially among infants and the elderly, but is uncommon. Complications include convulsions (usually in young children), toxic megacolon, intestinal perforation, hemolytic uremic syndrome (HUS), and reactive arthropathy (Reiter's syndrome).

Causative Agent
Shigellosis refers to disease caused by any bacteria in the genus *Shigella*. *Shigella* are small, non-motile, non-encapsulated, Gram-negative rods. There are four *Shigella* species: *S. dysenteriae, S. flexneri, S. boydii*, and *S. sonnei*. *S. dysenteriae, S. flexneri*, and *S. boydii* are further divided into serotypes and subtypes designated by Arabic numbers and lowercase letters (i.e., *S. flexneri* 2a). Utah typically sees *S. sonnei* (~80%) and *S. flexneri* (~20%).

Differential Diagnosis
Salmonella, E. coli O157:H7*, Campylobacter, Yersinia enterocolitica*, and bacterial food poisoning may show similar signs and symptoms.

Laboratory Identification
Culture of feces or rectal swabs is the preferred method for *Shigella* diagnosis. Specimens for culture should be collected as soon as possible, ideally within the first few days of illness, and should be processed as soon as possible to ensure bacterial isolation. DFA (direct fluorescent antibody) may be useful in detecting the organism in small numbers, however, culture is still preferred. Serologic evaluation is generally not helpful because humoral antibodies do not develop before recovery.

> **UPHL:** The Utah Public Health Laboratory (UPHL) accepts stool specimens for isolation and serotyping. All isolates from other laboratories should be submitted to UPHL.

Treatment

Shigella is typically a self-limiting disease lasting about a week; treatment is not always necessary. Antibiotics can effectively shorten the period of fecal excretion and can limit the clinical course of illness. However, there is a growing number of antibiotic resistant strains of *Shigella spp.* and caution is recommended when treating. As dehydration is a serious risk for cases, staying hydrated is helpful for recovery.

Case Fatality

Case fatality is rare in the U.S. and industrialized countries; however, shigellosis causes an estimated 600,000 deaths annually world-wide. The severity of the illness and the case-fatality rate are usually a function of the host (age and previous nutritional state) and the serotype, with the very young and the elderly experiencing the most severe illness. *S. dysenteriae* is usually associated with more severe disease and complications, with case fatality rates as high as 20% in hospitalized cases. *S. sonnei* has negligible case fatality rate except in immunocompomised hosts.

Reservoir

Humans are the only significant natural reservoir for *Shigella*.

Transmission

Shigellosis is the most communicable of the bacterial diarrheas and is transmitted via the fecal-oral route. The most common mode of transmission is person-to-person spread of the bacteria from a case or carrier. A very small dose (10–100 organisms) of *Shigella* is sufficient to cause illness in many cases. Individuals shedding the bacteria may also contaminate food by failing to wash their hands before food handling activities, potentially causing large numbers of people to become ill. Person-to-person spread typically occurs among household contacts, children in daycare, and the elderly and developmentally disabled living in residential facilities. Transmission can also occur from person-to-person through certain types of sexual contact (i.e., oral-anal contact). Flies have been documented as potentially spreading the bacteria by landing on contaminated feces and then on food.

Susceptibility

All people are susceptible. Host immunity is serotype-specific and protective against reinfection by the same serotype.

Incubation Period

The incubation period is usually 2–4 days, but can vary from 12 hours to six days. It can be up to one week for *S. dysenteriae.*

Period of Communicability

The disease is communicable for as long as the infected person excretes *Shigella* in his/her stool. This usually lasts for about four weeks from onset of illness. Effective antibiotic treatment has been shown to decrease the shedding period to only a few days.

Epidemiology

Shigellosis has a worldwide distribution. Secondary attack rates can be as high as 40% in households. Outbreaks occur in conditions of crowding and poor hygiene (prisons, childcare facilities, institutions for children, mental hospitals, refugee camps) and among men who have sex with men. Outbreaks have also been caused by contaminated imported food. Over the past five years, Utah has averaged roughly 40 cases of shigellosis per year. In Utah, *S. sonnei* is the most commonly isolated serotype, followed by *S. flexneri*.

✓ PUBLIC HEALTH CONTROL MEASURES

Public Health Responsibility

- Investigate all suspect cases of disease and fill out and submit appropriate disease investigation forms.
- Provide education to the general public, clinicians, and first responders regarding disease transmission and prevention.
- Identify clusters or outbreaks of this disease and determine the source.
- Identify cases and sources to prevent further transmission.

Prevention

Environmental Measures

Implicated food items must be removed from consumption. A decision about testing implicated food items can be made in consultation with the Enteric Epidemiologist at UDOH and UPHL. The general policy of UPHL is to test only food samples implicated in suspected outbreaks, not in single cases (except when botulism is suspected). If holders of food implicated in single case incidents would like their food tested, they may be referred to a private laboratory that will test food, or store the food in their freezer for a period of time in case additional reports are received. However, in certain circumstances, a single, confirmed case with leftover food that had been consumed within the incubation period may be considered for testing.

Personal Preventive Measures/Education

To avoid exposure to *Shigella,* persons should:
- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet, and after changing diapers.
- Wash the child's hands as well as their own hands after changing diapers, and dispose of diapers in a closed-lid garbage can.
- Wash hands thoroughly and frequently when ill with diarrhea or when caring for someone with diarrhea. Hands should be scrubbed for at least 15–20 seconds after cleaning the bathroom; after using the toilet or helping someone use the toilet; after changing diapers; before handling food; and before eating.
- Keep food that will be eaten raw, such as vegetables, from becoming contaminated by animal-derived food products.
- Do not go swimming with diarrhea.

- Avoid fecal contact that may result from oral-anal sexual contact. Latex barrier protection (i.e., dental dam) may prevent the spread of *Shigella* to a case's sexual partners and may prevent exposure to, and transmission of, other fecal-oral pathogens.

International Travel
The following recommendations can be helpful to travelers to developing countries:
- "Boil it, cook it, peel it, or forget it."
- Drink only bottled or boiled water, keeping in mind that bottled carbonated water is safer than non-carbonated bottled water.
- Ask for drinks without ice, unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.
- Eat foods that have been thoroughly cooked and are still hot and steaming.
- Avoid raw vegetables and fruits that cannot be peeled. Vegetables such as lettuce are easily contaminated and are very hard to wash well.
- Peel your own raw fruits or vegetables, and do not eat the peelings.
- Avoid foods and beverages from street vendors.

Chemoprophylaxis
None.

Vaccine
There is not currently a safe and effective *Shigella* vaccine commercially available. There are several vaccines in advanced stages of human trials.

Isolation and Quarantine Requirements

Isolation: Food handlers with shigellosis must be excluded from work. After diarrhea has resolved, food handlers may return to food handling duties only after producing two negative stool specimens, taken at least 24 hours apart. If a case was treated with an antimicrobial, the stool specimen should not be collected until at least 48 hours after cessation of therapy.

NOTE: A food handler is any person directly preparing or handling food. This can include a patient care or childcare provider.

Hospital: Enteric precautions.

Quarantine: Contacts who are food handlers and have diarrhea should be considered the same as a case, and should be handled in the same fashion. In outbreak circumstances involving a facility, asymptomatic contacts who are food handlers may be required to submit stool specimens for testing.

Childcare: Shigellosis is very contagious and childcare facilities are a high-risk location. (http://www.cdc.gov/shigella/general-information.html#transmission)

- Exclude any child with diarrhea from the childcare setting until the diarrhea has stopped.
- Children who have recently recovered from shigellosis can be grouped together in one classroom (cohorted) to minimize exposing uninfected children and staff to shigellosis.
- Assign separate staff to change diapers and prepare or serve food.
- Reassign adults with diarrhea to jobs that minimize opportunities for spreading infection (i.e., administrative work instead of food preparation).
- Establish, implement, and enforce policies on water-play and swimming that:
  - Exclude children ill with diarrhea from water-play and swimming activities.
  - Exclude children diagnosed with shigellosis from water-play and swimming activities for an additional week after their diarrhea has resolved.
- Have children and staff wash their hands before using water tables.
- Have children and staff shower with soap before swimming in the water.
- If a child is too young to shower independently, have staff wash the child, particularly the rear end, with soap and water.
- Take frequent bathroom breaks or check their diapers often.
- Change children's diapers in a diaper-changing area or bathroom and not by the water.
- Discourage children from getting the water in their mouths and swallowing it.
- Prohibit the use of temporary inflatable or rigid fill-and-drain swimming pools and slides because they can spread germs in childcare facilities.

✓ CASE INVESTIGATION

Reporting
Report any illness to public health authorities that meets any of the following criteria:
1. Any person with *Shigella* sp. isolated from a clinical specimen.
2. Any person with *Shigella* sp. detected using non-culture based methods.
3. A person with diarrhea who is a contact of a person with confirmed *Shigella* infection, or is a member of a risk group defined by public health authorities during an outbreak.

All cases of shigellosis should be reported. Reporting should be on-going and routine.

Case Definition (Shigellosis 2016)
Confirmed: A case that meets the confirmed laboratory criteria for diagnosis. (culture positive)
Probable: A clinically compatible case that is epidemiologically linked to a confirmed case, or member of a risk group defined by public health authorities during an outbreak. (symptoms and epi-link)
Suspect: A case that meets suspect laboratory criteria for diagnosis. (non-culture positive test)

Comment: Both asymptomatic infections and infections at sites other than the gastrointestinal tract, if laboratory confirmed, are considered confirmed cases that should be reported.

Case Status Classification Table				
Criterion	**Case Definition**			
	Probable		**Confirmed**	
Clinical Evidence				
Clinically compatible illness	N			
Laboratory Evidence				
Detection of *Shigella spp.* or *Shigella*/EIEC in a clinical specimen using a CIDT		N		
Isolation of *Shigella* from a clinical specimen				N
Epidemiologic Evidence				
Epidemiogically linked to a confirmed or probable shigellosis case with laboratory evidence	O			
Member of a risk group as defined by the public health authorities during an outbreak	O			
Criteria to distinguish a new case				
Not counted as a new case if occurred within 90 days of a previously reported infection in same individual		N		N
Report separate serotypes as distinct cases	N			

N = All "N" criteria in the same column are Necessary to classify a case.
O = At least one of these "O" (Optional) criteria in each category (i.e., clinical evidence and laboratory evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to classify a case.

Case Investigation Process

Report any illness to public health authorities that meets any of the following criteria:
1. Any person with *Shigella* isolated from a clinical specimen.
2. A person with diarrhea who is a contact of a person with confirmed *Shigella* infection, or is a member of a risk group defined by public health authorities during an outbreak.

Food handlers should be excluded from work until diarrhea has resolved and two stool specimens are negative. Assure isolate submission to UPHL.

Outbreaks

CDC defines a food-borne outbreak as "an incident in which two or more persons experience a similar illness resulting from the ingestion of a common food." In order to confirm an outbreak of shigellosis, the same *Shigella* species must be isolated from clinical specimens from at least two ill persons, or the species must be isolated from an epidemiologically implicated food. The source of the infection should be identified and measures to identify additional ill persons and/or to remove the source from consumers should be taken. Control of person-to-person transmission requires special emphasis on personal cleanliness and sanitary disposal of feces.

Identifying Case Contacts and Case Contact Management
Neonatal Infection/ Maternal Infant Transmission
When neonate is less than one month of age, please use the following data entry procedure:

UT-NEDSS/ EpiTrax Data Entry Example
- If the mother is the case-patient, or "parent" CMR
    - Enter mother's medical record number in parent CMR
    - Enter mother's symptoms in the parent CMR
    - Enter mother's exposure history in parent CMR
    - Add attachments and lab report(s) for mother on parent CMR
- Neonate is entered as a contact of the mother
    - Enter neonate medical record number as a contact of the mother
    - Enter neonate symptoms as a contact of the mother
    - Enter neonate exposure as a contact of the mother
    - Add attachments and lab report(s) for neonate as a contact of the mother
- Neonate may be promoted to own CMR as appropriate
- When searching UT-NEDSS/ EpiTrax for name of mother or neonate, both CMRs should come up in search results.

Childcare
Since shigellosis may be transmitted person-to-person through fecal-oral transmission, it is important to follow-up carefully on cases of shigellosis in a childcare setting. General recommendations include:
- Children with *Shigella* infection who have diarrhea should be excluded until their diarrhea is resolved and they have two negative stool tests collected 24 hours apart and at least 48 hours after completion of antibiotic therapy, if antibiotics are given.
- Children with *Shigella* infection who have no diarrhea are subject to the same testing requirements noted above.
- Most staff in childcare programs are considered food handlers. Those with *Shigella* in their stool (symptomatic or not) can remain on site, but must not prepare food or feed children until their diarrhea is gone and they have two negative stool tests collected 24 hours apart and at least 48 hours after completion of antibiotic therapy, if antibiotics are given.

School
Since shigellosis may be transmitted from person-to-person through fecal-oral transmission, it is important to follow up on cases in school settings. General recommendations include:
- Students or staff with *Shigella* infection who have diarrhea should be excluded until their diarrhea is resolved.
- Students or staff with *Shigella* infection who do not handle food, have no diarrhea or have mild diarrhea, and are not otherwise sick may remain in school if special precautions are taken.
- Students or staff who handle food and have *Shigella* infection (symptomatic or not) must not prepare food until their diarrhea is gone and they have two negative stool specimens collected 24 hours apart and at least 48 hours after completion of antibiotic therapy, if antibiotics are given.

Community Residential Programs

Actions taken in response to a case of shigellosis in a community residential program will depend on the type of program and the level of functioning of the residents.

In long-term care facilities, residents with shigellosis should be placed on standard (including enteric) precautions until their symptoms subside and they have two negative stool tests for *Shigella* collected 24 hours apart and 48 hours after completion of antibiotic therapy. Staff members who give direct patient care (i.e., feed patients, give mouth or denture care, or give medications) are considered food handlers and are subject to food handler restrictions. In addition, staff members with *Shigella* infection who are not food handlers should consider not working until their diarrhea is resolved.

In residential facilities for the developmentally disabled, staff and clients with shigellosis must refrain from handling or preparing food for other residents until their diarrhea has subsided and they have two negative stool specimens for *Shigella* collected 24 hours apart and at least 48 hours after completion of antibiotic therapy, if antibiotics are given. In addition, staff members with *Shigella* infection who are not food handlers should consider not working until their diarrhea is resolved.

✓ REFERENCES

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✓ VERSION CONTROL

V.08.15: Added new references. Redesigned Disease Plan to update it to the 2015 season. Added a Minimum Data Set. Updated *Shigella* Case Status from the 2005 to the 2011 version (this is the most recent version available from CSTE). Updated Clinical Description. Added information in the Causative Agent section regarding Utah trends, rather than just nationally. Changed Treatment information. The old version gave a very specific course of antibiotics. However, since then there have been antibiotic resistant strains, that advice is no longer useful. Vaccine information was updated to reflect current recommendations. DFA Acronym added. Merged old and new Case Fatality information. Added "no swimming" and corrected some text in the Personal Preventative section. Changed Public Health Control Measures and updated them to align with the CDC's recommendations. Added additional information about *Shigella* in childcare facilities.

V. 12.17: Minimum Data Set.

V. 05.19: Updated Case Status Classification Table

✓ UT-NEDSS Minimum/Required Fields by Tab

Demographic
- Last Name
- First Name
- State
- County
- Date of Birth
- Phone Number
- Birth Sex
- Ethnicity
- Race

Clinical
- Disease
- Onset Date
- Died
  - (if yes) Date of Death
  - (if yes) Did Shigellosis cause death?
- Visit Type
  - (if hospitalized) Did Shigellosis cause hospitalization?
- Symptoms:

Laboratory
- Lab Name
- Lab Test Date
- Collection Date
- Specimen Source
- Test Type
- Organism
- Test Result
- Accession Number

Contacts
- Does case's infection appear secondary to another person's infection? (if YES, please fill out info in contact table)
- Any contacts ill with similar symptoms? (if YES, please fill out info in contact table)

Epidemiological
- Food Handler
  - Name of facility where patient handled food:
  - Location:
  - Did the patient work while ill?
  - Important information including dates:
- Healthcare Worker
  - Name of healthcare facility:
  - Location:
  - Did the patient work while ill?
  - Important information including dates:
- Group Living
  - If case works at the facility, did they work while ill?
  - Important information including dates:
- Childcare Association
  - Name of Childcare:
  - Location:
  - Supervisor name:
  - Supervisor phone number:
  - Did the patient attend while ill?
  - Important information including dates:
- Imported From
- Risk Factors
- Risk Factor Notes

Investigation
- Date 6 days before disease onset:
- Date 12 hours before disease onset
- Did the patient travel outside the USA during the exposure period?
  - (if yes) Describe travel (location, dates, mode, if others were ill, etc.)
- Did the patient travel outside Utah, but inside USA during the exposure period?
  - (if yes) Describe travel (location, dates, mode, if others were ill, etc.)

Reporting
- Date first reported to public health

Administrative
- State Case Status
- Outbreak Associated
- Outbreak Name