Shigellosis (Bacillary Dysentery)

Disease Plan

Quick Links

Last updated: 02/16/2021, by Delaney Moore.

Questions about this disease plan?

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

✓ CRITICAL CLINICIAN INFORMATION

Clinical Evidence
Signs/Symptoms • Most common symptoms include diarrhea, fever, nausea, vomiting, and stomach cramps. • Complications include convulsions, toxic megacolon, intestinal perforation, hemolytic uremic syndrome (HUS), and reactive arthropathy (Reiter's syndrome).
Period of Communicability • Shigellosis is communicable for as long as the infected person excretes *Shigella* bacteria in his/her stool. This usually lasts for about four weeks from onset of illness. • Effective antibiotic treatment can decrease the shedding period to only a few days.
Incubation Period • Range 12 hours to 6 days (average of 2-4 days)
Mode of Transmission • Fecal-oral with person-to-person spread highly likely
Laboratory Testing
Type of Lab Test/Timing of Specimen Collection • Culture is the preferred method for *Shigella* diagnosis.   o 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. • PCR and other rapid tests are available and specimens should be collected as soon as possible. • Serologic evaluation is not recommended.
Type of Specimens • Stool or rectal swab
Treatment Recommendations
Type of Treatment • Supportive care • Caution is recommended when treating with antibiotics due to the growing number of antibiotic resistant strains of *Shigella spp*.
Prophylaxis • None
Contact Management
Isolation of Case • Food handlers with shigellosis must be excluded from work until 2 negative stool samples have been collected.   o A food handler is any person directly preparing or handling food, including those involved in patient care or childcare.
Quarantine of Contacts • Contacts with diarrhea who are food handlers should be considered the same as a case and shall be handled in the same fashion. • In outbreak circumstances, asymptomatic contacts who are food handlers may be required to submit stool specimens for testing.
Infection Control Procedures
• Enteric precautions

✓ WHY IS SHIGELLOSIS IMPORTANT TO PUBLIC HEALTH?

Shigellosis is a diarrheal disease cause by a group of bacteria called *Shigella*. Children in childcare facilities, residents of long-term care facilities, immunocompromised individuals, and men who have sex with men 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. DFA (direct fluorescent antibody) may be useful in detecting the organism in small numbers, however, culture is still preferred. Use of culture-independent diagnostic tests (CIDTs) have increased over the last several use. The most commonly used CIDT for *Shigella* in Utah is polymerase chain reaction (PCR) and most laboratories utilizing PCR use either the BioFire FilmArray® or the VERIGENE® multiplex panels. Serologic evaluation is generally not helpful because humoral antibodies do not develop before recovery.

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.

> **UPHL:** The Utah Public Health Laboratory (UPHL) accepts stool specimens for isolation, serotyping, and Whole Genome Sequencing (WGS). 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 worldwide. 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 immunocompromised 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 childcare, and the elderly and developmentally disabled living in residential facilities. Flies have been documented as potentially spreading the bacteria by landing on contaminated feces and then on food.

Transmission can also occur from person-to-person through certain types of sexual contact (i.e., oral-anal contact). This type of spread is commonly seen among men who have sex with men and has caused several national Shigellosis outbreaks over the past five years.

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,* follow these guidelines:
- Always wash hands thoroughly with soap and water before eating or preparing food, after using the toilet, and after changing diapers.

- Wash a child's hands as well as your 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: Utah Food Code requires that food handlers are restricted from work until one of the following three criteria are met:
1. Two (2) consecutive negative stool specimen cultures are taken:
   a. Not earlier than 48 hours after discontinuance of antibiotics, and
   b. At least 24 hours apart.
2. More than 7 days have passed since resolution of vomiting or diarrhea resolved.
3. More than 7 days have passed since diagnosis if the employee was asymptomatic.

NOTE: A food handler is any person directly preparing or handling food. This can include a patient 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.
- 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 spp.* isolated from a clinical specimen.
2. Any person with *Shigella spp.* detected in a clinical specimen using culture-independent diagnostic tests (CIDT).
3. Any person with diarrhea who is a contact of a shigellosis case or a member of a risk group defined by public health authorities during an outbreak investigation.
4. A person whose healthcare record contains a diagnosis of shigellosis.
5. A person whose death certificate lists shigellosis as a contributing or underlying cause of death.

Other recommended reporting procedures

- All cases of shigellosis should be reported according to state regulations.
- Reporting should be ongoing and routine.
- Frequency of reporting should follow the state health department's routine schedule.

Table 1: Criteria to determine whether a case should be reported

Criterion	Reporting	
Clinical Evidence		
Clinically compatible illness		N
Healthcare record contains a diagnosis of shigellosis	S	
Death certificate contains shigellosis as a contributing or underlying cause of death	S	
Laboratory Evidence		
Isolation of *Shigella spp.* from a clinical specimen	S	
Detection of *Shigella spp.* or *Shigella/*EIEC in a clinical specimen using a CIDT	S	
Epidemiologic Evidence		
Epidemiologically linked to a shigellosis case		O
Member of a risk group as defined by public health authorities during an outbreak investigation		O

Notes:

S = This criterion alone is Sufficient to report a case

N = All "N" criteria in the same column are Necessary to report a case.

O = At least one of these "O" (One or more) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to report a case.

* A requisition or order for any of the "S" laboratory tests is sufficient to meet the reporting criteria.

CSTE Case Definition
Shigellosis 2016

Clinical Criteria
An illness of variable severity commonly manifested by diarrhea, fever, nausea, cramps, and tenesmus. Asymptomatic infections may occur.

Laboratory Criteria
Supportive laboratory evidence: Detection of *Shigella spp.* or *Shigella/*EIEC in a clinical specimen using a CIDT.

Confirmatory laboratory evidence: Isolation of *Shigella spp*. from a clinical specimen.

Epidemiologic Linkage:
A clinically compatible case that is epidemiologically linked to a case that meets the supportive or confirmatory laboratory criteria for diagnosis.

Case Classification

> **Confirmed:** a case that meets the confirmed laboratory criteria or diagnosis

> **Probable:** a case that meets the supportive laboratory criteria for diagnosis, OR a clinically compatible case that is epidemiologically linked to a case that meets the supportive or confirmatory laboratory criteria for diagnosis.

Criteria to distinguish a new case of this disease or condition from reports or notifications which should not be enumerated as a new case for surveillance:
A case should not be counted as a new case if laboratory results were reported within 90 days of a previously reported infection in the same individual.

When two or more different serotypes are identified from one or more specimens from the same individual, each should be reported as a separate case.

Table 2: Criteria for defining a case of shigellosis

Criterion	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 spp.* from a clinical specimen.			N
Epidemiologic Evidence			
Epidemiologically linked to a confirmed or probable case of shigellosis with laboratory evidence.	O		

Member of a risk group as defined by the public health authorities during an outbreak investigation.	O		
Criteria to distinguish a new case			
Not counted as a new case if occurred within 90 days of a previously reported salmonellosis infection in same individual		N	N
Report separate serotypes as distinct cases.			N

Notes:

N = All "N" criteria in the same column are Necessary to classify a case.

O = At least one of these "O" (One or more) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column—in conjunction with all "N" criteria in the same column—is required to report a case.

Case Investigation Process

- Interview the patient to ascertain:
    - Whether the patient works in a high-risk setting (e.g., food service, childcare, healthcare)
    - Likely source of infection
- Provide education to the patient about disease transmission and prevention.
- Food handlers should be excluded from work until diarrhea has resolved. Negative stool specimens may also be required.
- 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." 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 a 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.

- o Enter neonate exposure as a contact of the mother.
- o 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 has 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 has 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 has resolved.

✓ REFERENCES

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✓ VERSION CONTROL

Updated August 2015: 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.

Updated December 2017: Minimum Data Set.

Updated May 2019: Updated Case Status Classification Table.

Updated February 2021: Added Critical Clinician Information and Electronic Laboratory Reporting Processing Rules. All other sections updated.

✓ UT-NEDSS (EpiTrax) Minimum/Required Fields by Tab

Demographic
- First Name
- Last Name
- Street Number
- Street Name
- City
- State
- County
- Zip Code
- Date of Birth
- Area Code
- Phone Number
- Birth Gender
- Ethnicity
- Race

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

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

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
  - Name of the facility
  - Location
  - Did the patient work/attend while ill?
  - Important information including dates
- Childcare Association
  - Name of the childcare
  - Location
  - Did the patient work/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

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)

Reporting
- Date first reported to public health

Administrative
- State Case Status
- Outbreak Associated
- Outbreak Name
- Probable Case?
  - (if yes) Epi linked or laboratory diagnosed?

✓ ELECTRONIC LABORATORY REPORTING PROCESSING RULES

Shigellosis Rules for Entering Laboratory Test Results

The following rules describe how laboratory results reported to public health should be added to new or existing events in UT-NEDSS (EpiTrax). These rules have been developed for the automated processing of electronic laboratory reports, although they apply to manual data entry, as well.

Test-Specific Rules

Test specific rules describe what test type and test result combinations are allowed to create new morbidity events in UT-NEDSS (EpiTrax), and what test type and test result combinations are allowed to update existing events (morbidity or contact) in UT-NEDSS (EpiTrax).

Test Type	Test Result	Create a New Event	Update an Existing Event
Culture	Positive	Yes	Yes
	Negative	No	Yes
	Equivocal	No	Yes
	Other	No	Yes
PCR/Amplification	Positive	Yes	Yes
	Negative	No	Yes
	Equivocal	No	Yes
	Other	No	Yes

Whitelist Rules

Whitelist rules describe how long an existing event can have new laboratory data appended to it. If a laboratory result falls outside the whitelist rules for an existing event, it should not be added to that event, and should be evaluated to determine if a new event (CMR) should be created.

Shigellosis Morbidity Whitelist Rule: If the specimen collection date of the laboratory result is 90 days or less after the last positive laboratory result, the laboratory result should be added to the morbidity event.

Shigellosis Contact Whitelist Rule: If the specimen collection date of the laboratory result is 30 days or less after the event date of the contact event, the laboratory result should be added to the contact event.

Graylist Rule

We often receive laboratory results through ELR that cannot create cases, but can be useful if a case is created in the future. These laboratory results go to the graylist. The graylist rule describes how long an existing event can have an old laboratory result appended to it.

Shigellosis Graylist Rule: If the specimen collection date of the laboratory result is 30 days before to seven days after the event date of the morbidity event, the laboratory result should be added to the morbidity event.

Other Electronic Laboratory Processing Rules

- If an existing event has a state case status of "not a case," ELR will never add additional test results to that case. New labs will be evaluated to determine if a new CMR should be created.