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Overview^{1, 2, 3, 5, 6, 7}

Shigellosis is an infectious disease caused by a group of bacteria called *Shigella*. There are four *Shigella* species: Group A: *Shigella dysenteriae*, Group B: *Shigella flexneri*, Group C: *Shigella boydii*, Group D: *Shigella sonnei*, with more than 40 serotypes that have been identified. *Shigella sonnei* accounts for 72% of the shigellosis cases reported in United States and most of the shigellosis cases reported in Missouri. Most shigellosis cases are the result of the bacterium passing from stools or soiled fingers (inadequately washed hands) of an infected person, to the mouth of a susceptible person. Transmission can occur during certain types of sexual activity. Shigellosis may also be acquired from eating contaminated food. Contaminated food usually looks and smells normal.

A small inoculum (10 to 200 organisms) is sufficient to cause shigellosis. Most people with shigellosis will develop diarrhea, fever, and stomach cramps starting a day or two after they are exposed to the bacteria. The diarrhea is often bloody. The incubation period depends on the serotype. It varies from twelve hours to seven days but is usually one to three days.

Shigellosis is diagnosed by isolation of the organism from bacterial culture of stool specimens. Shigellosis is usually a self-limiting diarrheal illness, if left untreated, generally lasts one day to one month, with an average of 7 days. Persons with mild infections usually recover without antibiotic treatment. However, appropriate antibiotic treatment is effective in shortening the duration of diarrhea and eradicating organisms from feces. Antibiotic treatment is recommended for patients with severe disease, bloody diarrhea, dysentery, or underlying immunosuppressive conditions; in these patients, empiric therapy should be provided while awaiting culture and susceptibility results. In mild disease, the primary indication for treatment is to prevent spread of the organism. Antimicrobial susceptibility testing of clinical isolates is indicated, because resistance to antimicrobial agents is common and susceptibility data can guide appropriate therapy. Anti-motility drugs are thought to increase the risk of prolonged carriage. *NOTE: Shigella bacteria are present in the diarrheal stools of infected persons and generally can be excreted in feces for 1 to 4 weeks in persons without antimicrobial therapy.* Transmission can occur as long as the bacteria are present in the feces.^{1, 3}

Persons with shigellosis in the United States rarely require hospitalization. A severe infection with high fever may be associated with seizures in children less than 2 years old. Some persons who are infected may have no symptoms at all, but may still pass the *Shigella* bacteria to others. Persons with diarrhea usually recover completely, although it may be several months before their bowel habits are entirely normal. About 2% of people, who are infected with *Shigella flexneri*, later develop pains in their joints, irritation of the eyes, and painful urination. This is called post-infectious arthritis. It can last for months or years, and can lead to chronic arthritis. Post-infectious arthritis is caused by a reaction to shigellosis that happens only in people who are genetically predisposed to it. Bacillary dysentery caused by *Shigella dysenteriae* 1 is a very serious disease that can cause [Hemolytic uremic syndrome](#) (HUS) in patients because of the virulent shiga-toxin that it produces.

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In the United States, groups at increased risk of shigellosis include children in child care centers and persons in custodial institutions, where personal hygiene is difficult to maintain; orthodox Jews; international travelers; men who have sex with men; and those in homes with inadequate water for handwashing.

The spread of shigellosis can be difficult to control, prompt reporting of cases by health care providers to public health agencies, and the implementation of prompt control measures is essential. Strict attention to hand hygiene is crucial to limit spread. Other important control measures include the exclusion of persons with known shigellosis and ill contacts from food handling, and the care of children or patients until appropriately screened. Infected persons should refrain from recreational water venues (e.g., swimming pools, water parks) until after symptoms resolve.¹

For a more complete description of shigellosis, refer to:

- *Control of Communicable Diseases Manual (CCDM)*, American Public Health Association, 20th ed; 2015.
- American Academy of Pediatrics. *Red Book: 2015 Report of the Committee on Infectious Diseases*. 30th ed; 2015.
- Bennett JE, Dolin R, Blaser MJ, eds. *Mandell, Douglas, and Bennett's Principles and Practices of Infectious Diseases: Vol. 2*. 8th ed; 2015.

2012 Case Definition – Shigellosis (*Shigella* spp.)⁴ – (7/15)

Clinical Description

An illness of variable severity characterized by diarrhea, fever, nausea, cramps, and tenesmus. Asymptomatic infections may occur.

Laboratory Criteria for Diagnosis

Suspect: Detection of *Shigella* from a clinical specimen using a non-culture based method.

Confirmed: Isolation of *Shigella* from a clinical specimen.


Case Classification

Suspected: A case that meets the suspect laboratory criteria for diagnosis.

Probable: A clinically compatible case that is epidemiologically linked, i.e., is a contact of a confirmed case or a member of a risk group defined by public health authorities during an outbreak.

Confirmed: A case that meets the confirmed laboratory criteria for diagnosis. When available, O antigen serotype characterization should be reported.

Comment(s): Both asymptomatic infections and infections at sites other than the gastrointestinal tract, if laboratory confirmed, are considered confirmed cases that should be reported. *Shigella dysenteriae*, while rare in Missouri, is a serious illness. If a case of *Shigella dysenteriae* is reported, contact the [District Communicable Disease Coordinator](#) immediately.

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Information Needed for Investigation

Verify the diagnosis. Obtain demographic, clinical and laboratory information on the case from the attending physician, hospital, and/or laboratory. Obtain the other epidemiological information necessary to complete the [Disease Case Report](#) (CD-1) and the [Record of Investigation of Enteric Illness](#) (CD-2C) from the patient or a knowledgeable family member.

Establish the extent of illness. Ask about illnesses among household, childcare, hospital or long term care, sexual and other contacts. Ask if the case provided child or patient care, or prepared food for anyone outside the household. Ask if the case lived or spent significant time in another household. If ill persons are identified, advise them to alert their medical provider that they may have been exposed to shigellosis; stool specimens and or treatment may be needed.

Identifying the source of infection. The Information obtained from the public health investigation will be used to help identify the source.


- Does the case or a member of the case's household attend a childcare center or nursery school?
- Does the case, or a member of the case's household, work as a food handler or healthcare provider?
- Has the case traveled to an area where shigellosis is known to be endemic or where there is a known outbreak occurring?
- Does the case engage in sexual practices or other activities that may place him/her or others at increased risk of infection? *NOTE: Sometimes the source cannot be identified.*

Provide shigellosis information to persons at risk for infection and the general public as needed. Efforts should be made to promote shigellosis awareness and provide prevention information to the public to reduce the risk of shigellosis. Meticulous hand hygiene is the single most important measure to decrease transmission.² Information on shigellosis prevention can be found on CDC's website at: <http://www.cdc.gov/shigella/prevention-control.html>.

Shigellosis Surveillance. Review WebSurv to determine whether there have been other shigellosis cases in the same geographic area or facility. When cases are related by person, place, or time, efforts should be made to identify a common source. Information obtained through the public health investigation will be used to identify a possible source of infection and to characterize persons or geographic areas in which additional efforts are needed to raise awareness (promote strict attention to meticulous hand hygiene) and reduce disease incidence. When investigating a suspected outbreak of gastrointestinal illness of unknown etiology, see the [Outbreak Investigation](#) section of this manual.

Notification

Immediately contact the [District Communicable Disease Coordinator](#), or the [Senior Epidemiology Specialist for the District](#), or the Missouri Department of Health and Senior Services (MDHSS) - BCDCP, phone (573) 751-6113, Fax (573) 526-0235, or for afterhours

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notification contact the MDHSS/ERC at (800) 392-0272 (24/7) if an outbreak* of shigellosis is suspected. If the case is in a high-risk setting or job such as food handling, childcare or health care, contact the District Communicable Disease Coordinator and the appropriate organization below:

- If a case(s) is associated with a childcare center, BCDPC or the LPHA will contact the Bureau of Environmental Health Services, phone (573) 751-6095, Fax (573) 526-7377 and the Section for Child Care Regulation, phone (573) 751-2450, Fax (573) 526-5345.
- If a case(s) is associated with a foodhandler, BCDPC or the LPHA will contact BEHS, phone (573) 751-6095, Fax (573) 526-7377.
- If a case(s) is associated with a long-term care facility, BCDPC or the LPHA will contact the Section for Long Term Care Regulation, phone (573) 526-8524, Fax (573) 751-8493.
- If a case is associated with a hospital, hospital-based long-term care facility, or ambulatory surgical center BCDPC or the LPHA will contact the Bureau of Health Services Regulation phone (573) 751-6303, Fax (573) 526-3621.
- Contact the Department of Natural Resources, Public Drinking Water Branch, at (573) 751-1187, Fax (573) 751-3110 if cases are associated with a public water supply, or BEHS, phone (573) 751-6095, Fax (573) 526-7377, if cases are associated with a private water supply.


*An outbreak is defined as the occurrence in a community or region, illness(es) similar in nature, clearly in excess of normal expectancy and derived from a common or a propagated source.

Control Measures^{2, 5, 6, 8, 9}

General Control Measures:

Currently, no vaccines are available for shigellosis. The best defense against shigellosis is thorough, frequent handwashing and proper cooking and storage of food. Attention to hand hygiene is essential to limit spread. Wash hands with soap carefully and frequently, especially after going to the bathroom, after changing diapers, and before preparing food, beverages, or caring for children or patients.

- Dispose of soiled diapers properly and wash, rinse and sanitize diaper changing areas after using them.
- Supervise handwashing of toddlers and small children after they use the toilet.
- Keep children with diarrhea out of child care settings.
- Daycare centers should not provide shared water-play areas.²
- Breastfeeding provides some protection for infants.²
- Travelers should follow [food and water precautions](#).
- Do not prepare food for others while ill with diarrhea.
- Shigellosis cases and ill contacts should be excluded from food handling, the care of children or patients, and other occupations that pose significant risk of transmission until diarrhea ceases and appropriate medical documentation is provided showing the person is free of shigellosis based on test results.
- Avoid swallowing water from ponds, lakes, or untreated pools.

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- Infected persons should refrain from recreational water venues (e.g. swimming pools, water parks) until after symptoms resolve.²
- Prompt case reports to public health authorities by health care providers are essential.

NOTE: Shigella bacteria are present in the diarrheal stools of infected persons and generally can be excreted in feces for 1 to 4 weeks in persons without antimicrobial therapy.

Transmission can occur as long as the bacteria are present in the feces.^{1,3}

High-risk Settings:

Foodhandlers⁸

2-201.12 Exclusions and Reinstatement.

(B) A food employee diagnosed with:

(3) An infection from *Shigella* spp.^P shall be:

(a) Excluded by the person in charge^P; and

(b) Reinstated if the person in charge obtains approval from the regulatory authority and the food employee meets one of the following conditions^P:

- (i) Provides to the person in charge written medical documentation from a health practitioner stating that the food employee is free of a *Shigella* spp. infection based on test results showing two (2) consecutive negative stool specimen cultures that are taken no earlier than forty-eight (48) hours after discontinuance of antibiotics and at least twenty-four (24) hours apart^P;
- (ii) Has been asymptomatic for more than seven (7) calendar days^P; or
- (iii) Did not develop symptoms and more than seven (7) calendar days have passed since the food employee was diagnosed.^P

2-201.13 Restrictions and Reinstatement.


(A) A food employee exposed to, or is the suspected source of, a confirmed foodborne disease outbreak, because they consumed or prepared food implicated in the outbreak; consumed food at an event or food establishment prepared by a person infected or ill with an illness listed in this section; attended or worked in a setting where there is a confirmed foodborne disease outbreak, is living in the same household as, and has knowledge about an individual who works or attends a setting where there is a confirmed foodborne disease outbreak, or living in the same household as, and has knowledge about, an individual diagnosed with an illness caused by^P:

(2) *Shigella* spp.^P shall be:

(a) Restricted by the person in charge^P; and

(b) Reinstated by the person in charge if one of the following conditions are met:

- (i) More than three (3) calendar days have passed since the last day the food employee was potentially exposed^P; or
- (ii) More than three (3) calendar days have passed since the food employee's household contact became asymptomatic^P.

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^P = Priority item: an item that requires the incorporation of specific actions, equipment or procedures to attain control of risk factors that contribute to foodborne illness or injury such as personnel training, infrastructure or necessary equipment, HACCP plans, documentation or record keeping, and labeling.

Child Care^{2, 5, 9}

Shigellosis outbreaks involving groups of young children, especially those who are not yet toilet trained, can be difficult to control. Due to the potential for rapid spread in the child care setting, special measures are recommended when shigellosis is diagnosed in an attendee or employee of a child care facility. Increased surveillance within the child care facility to identify others with diarrheal illness is essential.

- Emphasize handwashing. Because good hand hygiene is the best preventive measure, supervised handwashing after visiting the bathroom and before eating is essential for all children. Waterless hand sanitizers may also be helpful as an adjunct to washing hands with soap and water.
- If several cases occur in a daycare center, the local public health agency should coordinate efforts to improve handwashing among the staff, children, and their families.⁵
- Employees handling food in child care settings should follow the criteria listed above in the [Missouri Food Code](#).
- Staff who prepares food should not change diapers, or assist children in using the toilet.
- If a child in diapers has shigellosis, everyone who changes the child's diapers should be sure the diapers are disposed of properly in a closed-lid garbage can, and should wash his or her hands and the child's hands carefully with soap and warm water immediately after changing the diapers. After use, the diaper changing area should be wiped down with a disinfectant such as diluted household bleach, Lysol or bactericidal wipes.
- Other surfaces and objects should be decontaminated regularly; daily during an outbreak of shigellosis.
- Access to shared water-play areas and contaminated diapers should be eliminated.²
- Centers should avoid new admissions when shigellosis has been identified and transmission has been epidemiologically linked to the center.²
- Children and child care staff with diarrhea should be excluded from day care until they are well. Shigellosis is transmitted easily and can be severe, so all symptomatic persons (employees and children) should be excluded from the childcare setting in which *Shigella* infection has been identified, until diarrhea has ceased for 24 hours; and one (1) stool culture is free of *Shigella spp.*; specimens should not be obtained earlier than 48 hours after discontinuation of antibiotics.⁹ *NOTE: Antimicrobial therapy is effective in shortening the duration of diarrhea and eradicating organisms from feces.*
- Infected persons should refrain from recreational water venues (e.g. swimming pools, water parks) while symptomatic.¹

Contact the [Section for Child Care Regulation](#) for an Environmental Public Health Specialist to perform an assessment of the childcare facility. The inspection should **include**

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emphasis on the items listed in [“Day Care Establishment Inspection Related to Enteric Infection” \(CD-8\)](#).

To prevent the spread of infection, efforts should be made to avoid the transfer of children to other child care centers. Closure of affected child care centers may lead to placement of infected children in other centers (with subsequent transmission in those centers) and is counterproductive. If several persons are infected, a cohort system can be considered until one negative stool culture shows the person is free of shigellosis and can be returned to normal care.

Health Care Providers

Infected health care workers and ill contacts should be excluded from patient care, and other occupations that pose significant risk of transmission, until diarrhea ceases for 24 hours and obtain 2 consecutive negative stool cultures; not earlier than 48 hours after discontinuation of antibiotics, and at least 24 hours apart. In residential institutions ill residents, if possible should be housed in separate areas. Newly admitted residents should not be housed in areas with ill residents.

Schools and Preschools

In the school setting, hand hygiene is the most important control measure. Teachers and students with any diarrheal illness should be excluded from the school until 24 hours after their diarrhea has ceased.

If an outbreak in a school cannot be controlled with improved hygiene and exclusion of those with diarrhea, then additional intervention may be necessary.


Laboratory Procedures

Specimens: Collect specimens in Cary-Blair media using the Enteric Specimen Collection Kit supplied by the Missouri State Public Health Laboratory (MSPHL). Specimens should be shipped refrigerated.

Identification of *Shigella* requires the collection of a fecal specimen as early in the course of the illness as possible and before antibiotic therapy begins. Blood specimens and rectal swab specimens are **not** acceptable specimens for analysis by the MSPHL. *NOTE:* Additional information on the collection or shipment of specimens for *Shigella* testing by the MSPHL may be viewed at: <http://health.mo.gov/lab/enterics.php>.

Testing: The search for unrecognized mild cases (without diarrhea) and convalescent carriers among contacts may be unproductive, and seldom contributes to the control of an outbreak. Cultures of contacts should generally be confined to food employees, attendants and children in hospitals, child care and other situations where the spread of infection is likely.¹

NOTE: Shigella species are frequently resistant to antibiotics. Antibiotic sensitivity testing, while not performed by the MSPHL, is routinely available through commercial labs and is

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indicated because resistance to antimicrobial agents is common and susceptibility data can guide appropriate therapy.²

Reporting Requirements


Shigellosis is a reportable disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services (DHSS) within one (1) day of first knowledge or suspicion, by telephone, facsimile, or other rapid communication.

As a Nationally Notifiable Condition, confirmed and probable cases are a **STANDARD** report to the CDC. **STANDARD** reporting requires the MDHSS to report to CDC by electronic transmission via WebSurv within the next normal reporting cycle.

1. For confirmed and probable cases, complete a “[Disease Case Report](#)” (CD-1), and a “[Record of Investigation of Enteric Infection](#)” (CD-2C).
2. Entry of the completed CD-1 and CD-2C into WebSurv negates the need for the form(s) to be forwarded to the District Health Office.
3. MDHSS will notify CDC as discussed above (see box).
4. All outbreaks or suspected outbreaks must be reported as soon as possible (by phone, fax, or e-mail) to the District Communicable Disease Coordinator. This can be accomplished by completing the [Missouri Outbreak Surveillance Report](#) (CD-51).
5. If an outbreak is associated with food, person-to-person transmission, environmental contamination, animal contact, or indeterminate/other/unknown etiology, complete a [National Outbreak Reporting System – Foodborne Disease Transmission](#) (CDC 52.13) and submit the form to the District Communicable Disease Coordinator at the conclusion of the outbreak.
6. If an outbreak is associated with the consumption or use of water for drinking, or with ingestion, contact, or inhalation of recreational water, a CDC 52.12 form ([National Outbreak Reporting System - Waterborne Disease Transmission](#)) is to be completed and submitted to the District Communicable Disease Coordinator at the conclusion of the outbreak.
7. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the District Communicable Disease Coordinator.

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