

# Shigellosis

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## 1) THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Shigellosis refers to disease caused by any bacteria in the genus *Shigella*. There are four *Shigella* species (or serogroups): *S. dysenteriae* (A), *S. flexneri* (B), *S. boydii* (C), and *S. sonnei* (D).

### B. Clinical Description

The most common symptoms of shigellosis are diarrhea (sometimes bloody), fever, nausea, vomiting and stomach cramps. Dehydration may be severe, especially among infants and the elderly. Asymptomatic infections also occur. The disease is usually self-limiting, lasting 4–7 days. *S. dysenteriae* is usually associated with more severe disease and complications.

### C. Reservoirs

Humans are the only significant reservoir.

### D. Modes of Transmission

*Shigella* bacteria are transmitted via the fecal-oral route through person-to-person transmission or ingestion of food, drinking water or recreational water that is contaminated with human feces. A very small dose of *Shigella* is needed to cause illness (probably 10–100 organisms). The most common mode of transmission is person-to-person spread of the bacteria from a case or carrier, which typically occurs among household contacts, preschool and diapered children in childcare, and the elderly and developmentally disabled living in residential facilities. Individuals shedding the bacteria may also contaminate food by failing to properly wash their hands before handling food, potentially causing large numbers of people to become ill. Recreational water venues such as lakes and ponds can be a source of infection when they are contaminated with human sewage or where persons ill with *Shigella* are swimming. Flies can potentially spread the bacteria by landing on contaminated feces and then on food. Transmission can also occur person-to-person through certain types of sexual contact (e.g., oral-anal contact).

### E. Incubation Period

The incubation period can vary from 12 to 96 hours, but is usually about 1–3 days. It can be up to a week for *S. dysenteriae*.

### F. Period of Communicability or Infectious Period

The disease is communicable for as long as the infected person excretes *Shigella* in their stool. This usually lasts for less than 4 weeks after onset of illness. While persons are most infectious while they have diarrhea, the disease can be transmitted by persons who have no symptoms. Effective antibiotic treatment has been shown to decrease the shedding period to a few days.

### G. Epidemiology

During 2007-2011, approximately 80-150 cases were reported in Colorado each year. *S. sonnei* is the most common *Shigella* species reported in Colorado. Outbreaks in the US have occurred in child

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care centers, in recreational water settings, among men who have sex with men, and in correctional facilities. Outbreaks have also been caused by contaminated food, such as raw produce.

Colorado Statistics are available at the CDPHE website:

[www.colorado.gov/cs/Satellite/CDPHE-DCEED/CBON/1251607755473](http://www.colorado.gov/cs/Satellite/CDPHE-DCEED/CBON/1251607755473)

## 2) CASE DEFINITION

### **Clinical Description**

An illness of variable severity commonly characterized by diarrhea, fever, nausea, cramps, and tenesmus (constant feeling of needing to have a bowel movement). 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.

Note: In an outbreak or in a food service, child care, or institutional setting where antibiotic treatment may be indicated, obtain the antibiotic susceptibilities of the organism from the clinical laboratory.

### **Case Classification**

Suspect: A case that meets the suspect laboratory criteria for diagnosis

Probable: A clinically-compatible case that is epidemiologically-linked to a confirmed case

Confirmed: A case that meets the confirmed laboratory criteria for diagnosis. Confirmed cases include asymptomatic infections and infections at sites other than the gastrointestinal tract that are laboratory confirmed (rare).

## 3) REPORTING CRITERIA

### **What to Report to the Colorado Department of Public Health and Environment (CDPHE) or local health agency**

- Confirmed, probable, and suspect shigellosis cases.
- Shigellosis cases should be reported within 7 days of diagnosis or a positive laboratory test.
- Cases should be reported using the Colorado Electronic Disease Reporting System (CEDRS), or fax or telephone to CDPHE or local health departments. See below for phone and fax numbers.
- Suspected foodborne/enteric disease outbreaks should be reported to CDPHE or local health departments within 24 hours, even if the causative agent is not yet known.

### **Purpose of Surveillance and Reporting**

- To identify cases for investigation and potential outbreaks
- To monitor trends in disease incidence

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## **Important Telephone Numbers and Web Resources**

- CDPHE Communicable Disease Epidemiology Program
  - Phone: 303-692-2700 or 800-866-2759
  - Fax: 303-782-0338
  - After hours: 303-370-9395
- CDPHE Microbiology Laboratory: 303-692-3480
- Communicable Disease (CD) Manual website  
<http://www.colorado.gov/cs/Satellite/CDPHE-DCEED/CBON/1251607755419>

## **4) STATE LABORATORY SERVICES**

### **Laboratory Testing Services Available**

*The services listed below are for public health purposes; clinical laboratories are **not** charged for these services.*

- The CDPHE Laboratory requests all *Shigella* isolates from clinical laboratories be submitted for serogrouping.
- The CDPHE Laboratory will test bulk stool or rectal swab specimens for *Shigella* for public health follow-up purposes or outbreak investigations.
- Pulsed Field Gel Electrophoresis (PFGE) testing (i.e., molecular typing) is performed on *Shigella* isolates upon request from the Communicable Disease Program when clusters are suspected.
- For more information on *Shigella* testing, contact the CDPHE Microbiology Laboratory.
- **Note:** Authorization by the CDPHE Communicable Disease Program is required before submitting bulk stool, rectal swabs, or implicated food items to the CDPHE Laboratory.
- See Section 6 (E)--Environmental Measures, for more information about food testing.

## **5) CASE INVESTIGATION**

Interview all shigellosis cases including symptomatic contacts of confirmed cases and others whose symptoms are suspected to be caused by *Shigella* to determine:

- Potential source of infection, and to implement control measures as appropriate
- If others are ill (i.e. Could this be an outbreak?)
- If the case may be a source of infection for others (e.g. a high-risk worker or a diapered child), and if so, to prevent further transmission

Local public health agencies have primary responsibility for interviews of sporadic cases in their jurisdictions. Smaller agencies should consult with regional epidemiologists to establish primary responsibility for interviews of sporadic cases.

### **A. Case Investigation / Forms**

For single cases, complete the CDPHE [Shigellosis Case Investigation Form](#) or a similar local health agency form. Local health departments are encouraged to use the standard CDPHE investigation form. Following patient interviews, complete the CEDRS record for all confirmed and probable cases. If an outbreak is suspected, outbreak-specific interview forms should be used. Please contact CDPHE for assistance.

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For agencies that choose to use their own case investigation forms, the following information should be collected:

- *Demographics (including address, date of birth, ethnicity and race)*
- *Occupation (**High risk occupations include: food service, child care, and health care**)*
- *Child care or School Attendance*
- *Symptoms and Onset Date*
- *Laboratory (date of specimen collection)*
- *Hospitalization and Medical Treatment Received*
- *Food History (during the 3 days prior to onset)*
- *Restaurant History (include food items and date consumed)*
- *Travel History (locations and dates)*
- *Drinking Water Source*
- *Recent Group Activities*
- *Contacts with Persons with Gastrointestinal Illness*

## **B. Identify and Evaluate Contacts**

### **1. Symptomatic Contacts**

- Contacts of a confirmed case, who have diarrhea, are probable cases and are treated the same as confirmed cases for disease control purposes. See Section 6--Disease Control Measures.
- Complete a case investigation form on all epidemiologically-linked individuals having symptoms compatible with shigellosis.
- Refer symptomatic individuals who have not previously been tested (especially if they are high-risk workers) to their health care providers for stool cultures. If testing will be performed by CDPHE, refer to the [Food and Stool Collection Instructions](#) on the Infectious Disease Guidelines and Resources website.
- CDPHE recommends that people who are experiencing symptoms submit stool specimens through their health care provider rather than to the state laboratory for several reasons:
  - The patient will receive appropriate medical care for the illness, including antimicrobial therapy, if appropriate.
  - Results will be known more quickly if stool is tested by a commercial laboratory than if tested at the state laboratory.
  - Commercial labs generally perform antimicrobial susceptibility testing, whereas, the state lab does not routinely perform such testing.
- Symptomatic contacts without laboratory confirmation should be entered into CEDRS as probable shigellosis cases. (It is helpful if you enter the CEDRS ID numbers of the lab-confirmed cases to whom probable cases are epi-linked in the CEDRS case notes.)
- If a common source of infection is suspected, please notify CDPHE.

### **2. Asymptomatic Contacts**

- Ask about sensitive occupations, food handling, child care, and/or school.
- Provide information about symptoms and preventive measures. See Section 6 (C)--Education.

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- Counsel asymptomatic high-risk workers (e.g., food handlers). Stress importance of good handwashing, personal hygiene, and that they should not work and should notify their supervisor whenever they have a diarrheal illness.
- If an asymptomatic contact is a high-risk worker, consider obtaining stool specimens for testing and asking the contact to wear gloves until culture results are known, especially if there is any question about the worker's or the facility's hygienic practices (e.g. based on prior environmental health inspections).
- If an asymptomatic contact who is a high-risk worker develops diarrhea, exclude him/her from work, obtain a stool sample, and notify the worker's supervisor.
- Consult with Environmental Health staff and issue a glove order if necessary.

### **C. Reported Incidence Is Higher than Usual/Outbreak Suspected**

If the number of reported cases of shigellosis in your jurisdiction is higher than usual, or if an outbreak is suspected, investigate to determine the source of infection and mode of transmission. Consult with a CDPHE Communicable Disease Epidemiologist. CDPHE staff can assist local public health agencies to investigate outbreaks and determine a course of action to prevent further cases, and can coordinate surveillance of cases that cross county lines.

## **6) DISEASE CONTROL MEASURES**

A [shigellosis fact sheet](#) is available on the CDC website.

### **A. Treatment**

Most infections with *Shigella* are self-limited and do not require antimicrobial therapy. However, antimicrobial therapy is effective in shortening the duration of diarrhea and eradicating organisms from feces. Treatment is recommended for patients with severe disease, dysentery, or underlying immunosuppressive conditions. In mild disease, the primary indication for treatment is to prevent spread of the organism. Because antimicrobial resistance is common in *Shigella*, when treatment is indicated, it is important to obtain the antimicrobial susceptibility pattern of the isolate from the clinical microbiology laboratory.

### **B. Prophylaxis**

No prophylactic treatment of close contacts is recommended.

### **C. Education**

- Educate case and household contacts on proper hand washing techniques.
- Always wash hands thoroughly with soap and water before eating or preparing food, after using the toilet, and after changing diapers.
- After changing diapers, wash your hands AND the child's hands.
- In a child care setting, dispose of stool and soiled diapers in a sanitary manner.
- Cases should not prepare food for other individuals until symptoms resolve.
- Avoid sexual practices that may permit fecal-oral transmission. Latex barrier protection should be emphasized as a way to prevent the spread of shigellosis to sexual partners as well as being a way to prevent the exposure to and transmission of other pathogens.
- Keep flies from contaminating food.
- Educate case on healthy swimming practices, including not swimming while symptomatic with diarrhea.

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## D. Managing Special Situations

### 1. Food Handlers

- When a case of shigellosis occurs in a food handler, **immediate involvement of public health authorities is critical.**
- **All** food handlers must be **excluded** from work until at least 24 hours after diarrhea has resolved and adequate hygiene can be maintained, ideally as verified by environmental health. "Exclude" means to prevent a person from working as an employee in a food establishment or entering a food establishment as an employee.
- Food handlers who work in an establishment not serving a highly susceptible population must then be **restricted** until the food handler has had two consecutive negative stool specimens taken at least 24 hours apart. "Restrict" means to limit the activities of a food employee so that there is no risk of transmitting a disease that is transmissible through food and the food employee does not work with exposed food, clean equipment, utensils, linens, or unwrapped single-service or single-use articles.
- Food handlers who work in a food establishment serving a highly susceptible population must be **excluded** until the food handler has had two consecutive negative stool specimens taken at least 24 hours apart.
- "Highly Susceptible Population" means persons who are more likely than other people in the general population to experience foodborne disease because they are immunocompromised, preschool age children, or older adults; and they obtain food at a facility that provides services such as custodial care, health care, or assisted living, such as a child or adult day care center, kidney dialysis center, hospital or nursing home, or nutritional or socialization services such as a senior center.
- Please consult with your local environmental health specialist for questions about whether a facility is classified as serving a highly susceptible population.
- If a case has been treated with an antibiotic, the stool specimen should not be submitted until at least 48 hours after cessation of therapy.
- A letter or memo should be sent to the food service facility documenting the requirements for the infected food handler.

### 2. Child care/Preschool

When a case of shigellosis occurs in a child care center attendee or worker, **immediate involvement of public health authorities is critical.** *Shigella* spreads very quickly through child care centers, but can be controlled if appropriate action is taken.

- Refer child care providers to the CDPHE [Infectious Disease in Child Care and School Settings](#) guidelines for an overview of shigellosis.
- For details on disease control and investigation in child care centers, local health departments should refer to the CDPHE guidelines [Shigellosis Outbreak Investigation and Control in Child Care Centers/Preschools](#) that can be found at: <http://www.colorado.gov/cs/Satellite/CDPHE-DCEED/CBON/1251607755419>.
- For a single case of shigellosis: Children with shigellosis should not be permitted to re-enter the child care center until at least 24 hours after diarrhea has resolved **and either** the child has been treated with an effective antibiotic for 3 days *or* there are 2 consecutive negative stool cultures obtained at least 24 hours apart.

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- It is important to obtain the antibiotic susceptibility pattern for the isolate from the physician or the clinical laboratory that performed the test in order to determine if a child has been treated with an effective antibiotic.
- Parents of cases should be counseled not to take their children to another child care center during this period of exclusion.
- Public health or environmental health staff should visit the facility, review hygienic procedures, and reinforce the importance of meticulous handwashing with child care center staff.
- Look for symptoms consistent with *Shigella* infection (diarrhea and fever) in other children or staff during the 3 weeks previous to the report of the index case.
- If the index case is the only child or worker in the classroom or facility who has been ill, that child may return as outlined above and no further action is indicated for other children in that classroom or facility.
- If others in the facility are identified with *Shigella*-like symptoms, refer to [Shigellosis Outbreak Investigation and Control in Child Care Centers/Preschools](#).
- Since many child care center staff assist with food preparation and/or feeding children, those with *Shigella* infection should be excluded from work until at least 24 hours after diarrhea has resolved and they have two consecutive negative stool tests taken at least 24 hours apart (and submitted at least 48 hours after cessation of antibiotics, if antibiotics are given). In this situation it is important for Environmental Health staff to work closely with the center to ensure that affected staff are excluded until cleared by public health. See Section 6 (D1)--Food Handlers above. Staff with no role in food preparation or feeding (e.g. office staff) may return to work after diarrhea has been resolved for at least 24 hours. Stool testing will not be required for these workers.

### 3. School

Refer school personnel to the CDPHE [Infectious Disease in Child Care and School Settings](#) guidelines for an overview of shigellosis.

- Students or staff with *Shigella* infection should be excluded until at least 24 hours after their diarrhea has resolved.
- If there are concerns about the case's hygiene (e.g. the case has developmental disabilities or behavioral problems) consider obtaining two consecutive negative stool cultures at least 24 hours apart before a case returns to class.
- Students or staff who handle food and have a *Shigella* infection must not prepare food until at least 24 hours after their diarrhea has resolved and they have two consecutive negative stool cultures obtained at least 24 hours apart. See Section 6 (D1)--Food Handlers.
- If case being re-tested has received antibiotics, stool should be collected at least 48 hours after antibiotics are completed.

### 4. Community Residential Programs (facilities serving the developmentally disabled)

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 general:

- Residents with shigellosis should be placed on contact precautions until at least 24 hours after their symptoms subside and two consecutive negative stool cultures have been obtained at least 24 hours apart.

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- If case being re-tested has received antibiotics, stool should be collected at least 48 hours after antibiotics are completed.
- Residents with shigellosis must be excluded from handling or preparing food for other residents until at least 24 hours after their diarrhea has resolved and they have two consecutive negative cultures for *Shigella*.
- For staff members who provide direct patient care (e.g., feed patients, give mouth or denture care, or give medications) follow guidelines for staff in health care facilities below.
- Staff members with *Shigella* infection who are not food handlers and do not provide direct patient care should be excluded from work until at least 24 hours after their diarrhea has resolved.

## **5. Patients in Health Care Facilities (Hospitals and Long Term Care Facilities)**

Hospitals and long term care facilities generally have written infection control policies and procedures for handling cases of communicable disease among patients and staff members. If a facility does not have such policies in place, provide the following recommendations:

- Patients with shigellosis should be placed on contact precautions until at least 24 hours after their symptoms subside and two consecutive negative stool cultures have been obtained at least 24 hours apart.
- Health care workers who provide direct patient care are generally required to be symptom-free and have two consecutive negative stool cultures taken 24 hours apart before returning to work providing patient care.
- If case being re-tested has received antibiotics, stool should be collected at least 48 hours after antibiotics are completed.

## **E. Environmental Measures**

- Implicated food items must be removed from the environment.
- A decision about testing suspect/implicated food items must be made in consultation with CDPHE Communicable Disease Program.
- If a commercial product is suspected, the CDPHE Communicable Disease Program will coordinate follow-up with the CDPHE Division of Environmental Health and Sustainability and relevant outside agencies.
- The CDPHE [Food and Stool Specimen Collection Instructions](#) can be found on the Infectious Disease Guidelines and Resources website.
- The general policy of the CDPHE Laboratory and the Communicable Disease Program is only to test food samples associated with outbreaks, not in single cases.
- For single cases, CDPHE may suggest that the holders of food locate a private laboratory that will test food, or that they store the food in their freezer for a period of time in case additional reports are received.
- The CDPHE laboratory can test food samples associated with isolated cases of illness on a fee-for-service basis. For more information, contact the CDPHE Microbiology Laboratory.

## **REFERENCES**

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Case Definitions for Infectious Conditions Under Public Health Surveillance.

[http://www.cdc.gov/nndss/document/2012\\_Case%20Definitions.pdf](http://www.cdc.gov/nndss/document/2012_Case%20Definitions.pdf)

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