

Shigellosis

Section 1

ABOUT THE DISEASE

A. Etiologic Agent

Shigellosis is a disease caused by bacteria in the genus *Shigella*. There are four *Shigella* species: *S. dysenteriae*, *S. flexneri*, *S. boydii*, and *S. sonnei*.

B. Clinical Description

The most common symptoms of shigellosis are diarrhea, fever, nausea, vomiting, and stomach cramps. Stools may contain blood or mucus. The disease may be severe, especially among infants and the elderly. Asymptomatic infections also occur. The disease is usually self-limiting, lasting 4–7 days. The severity of the illness and the case-fatality rate are usually a function of the host and the species, with the very young and the elderly experiencing the most severe illness. Occasionally, patients experience vomiting, seizures (young children), or postinfectious arthritis. *S. dysenteriae* is usually associated with more severe disease and complications. Hemolytic uremic syndrome can occur after infection with *S. dysenteriae* serotype 1.

C. Vectors and Reservoirs

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

D. Modes of Transmission

Shigella 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; transmission also occurs indirectly through contaminated food, water, or fomites. A very small dose (probably 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, preschool 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 (e.g., oral-anal contact). Outbreaks have also been traced to contaminated drinking water and swimming or playing in contaminated lakes or ponds, untreated wading pools or splash fountains, and swimming pools without enough chlorine.

E. Incubation Period

The incubation period can vary from 12–96 hours, but is usually about 1–3 days. It can be up to one 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 his/her stool. This usually lasts for about four weeks from onset of illness. Effective antibiotic treatment has been shown to decrease shedding to a few days.

G. Epidemiology

Shigellosis has a worldwide distribution, causing approximately 125 million illnesses and 14,000 deaths per year. Most of these deaths occur in children. Secondary attack rates can be as high as 40% in households. Approximately 300 cases are reported in Massachusetts annually. Transmission of *Shigella spp.* is most likely when hygiene and sanitation are insufficient. Outbreaks occur in childcare settings, among men who have sex with men, and in jails. Outbreaks have also been caused by contaminated imported food. *S. sonnei* is the most common *Shigella* species causing reported disease in Massachusetts.

H. Bioterrorist Potential

Shigella is listed by the CDC as a Category B bioterrorist agent. If acquired and properly disseminated, *Shigella* could cause a serious public health challenge.

Section 2

REPORTING CRITERIA AND LABORATORY TESTING

A. What to Report to the Massachusetts Department of Public Health (MDPH)

Report detection of *Shigella* species from any clinical specimen.

Note: See Section 3C for information on how to report a case.

B. Laboratory Testing Services Available

The MDPH Massachusetts State Public Health Laboratory (MA SPHL) will test stool specimens for the presence of *Shigella sp.* and will perform confirmatory testing and speciation on isolates from clinical specimens.

The MA SPHL Food Microbiology Laboratory, at (617) 983-6610, will test implicated food items from case clusters or outbreaks. See Section 4D for more information.

For more information about testing and specimen submission, contact the MA SPHL at (617) 983-6609.

Section 3

REPORTING RESPONSIBILITIES AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify whether the case may be a source of infection for other persons (e.g., a diapered child, daycare attendee, or food handler), and if so, to prevent further transmission.
- To identify transmission sources of public health concern (e.g., a restaurant or a commercially distributed food product), and to stop transmission from such sources.

B. Laboratory and Health Care Provider Reporting Requirements

Shigellosis is reportable to the local board of health (LBOH). Health care providers should immediately report to the LBOH in the community where the case is diagnosed, all confirmed or suspect cases of shigellosis, as defined by the reporting criteria in Section 2A.

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of *Shigella* shall report such evidence of infection directly to the MDPH within 24 hours. Additionally, all laboratories performing examinations on any specimens derived from Massachusetts residents are required to submit all *Shigella sp.* isolates directly to the MA SPHL for further examination

C. Local Board of Health Reporting and Follow-Up Responsibilities

Reporting Requirements

MDPH regulations (*105 CMR 300.000*) stipulate that shigellosis is reportable to the LBOH and that each LBOH must report any confirmed or suspect case, as defined by the reporting criteria in Section 2A. Cases should be reported to the MDPH Bureau of Infectious Disease and Laboratory Sciences (BIDLS), Office of Integrated Surveillance and Informatics Services (ISIS) via MAVEN.

Refer to the List of Diseases Reportable to Local Boards of Health for information on prioritization and timeliness requirements of reporting and case investigation

<http://www.mass.gov/eohhs/docs/dph/cdc/reporting/rprtbdiseases-lboh.pdf>

Case Investigation

It is the responsibility of the LBOH to complete questions in each of the MAVEN question packages or case report forms by interviewing the case and others who may be able to provide information. Much of the information required can be obtained from the health care provider or from the medical record.

Calling the provider

If the case was hospitalized (i.e. reporting facility is a hospital), call infection control at the named hospital. A list of infection preventionists can be found in the help section of MAVEN. If the case was seen at a clinician's office, ask to speak to a nurse working with the ordering provider.

Calling the case or parent/guardian of the case

Before contacting the case, review the disease fact sheet by clicking on the Help Button located in MAVEN and/or review this entire chapter. The call may take a few minutes, so in order to maximize the chance of getting the information needed, it might be good to note the potential length of the call with your contact, and offer the opportunity to call back when it is more convenient. Asking questions about how the case or child is feeling may help to establish a rapport with the case or parent of the case. If you are unable to answer a question they have, don't hesitate to call the Epidemiology Program at 617-983-6800 for assistance, and call the case back with the answer later. People are often more than willing to talk about their illness, and they may be very happy to speak with someone who can answer their questions.

Using MAVEN

Administrative Question Package

Monitor your “Online LBOH Notification for Routine disease” workflow in MAVEN for any new cases of shigellosis. Once a new event appears in this workflow, open the Administrative Question Package (QP) and under the “Local Health and Investigation” section, answer the first question “**Step 1** - LBOH acknowledged” by selecting “Yes”. The “LBOH acknowledged date” will then auto populate to the current day. Completing this first step will move the event out of this workflow and into your “Online LBOH notified but Case Report Forms (CRF) are pending” workflow. Note the date you started your investigation by answering “**Step 2** – Investigation started” as “Yes” and then note the date where shown. Record your name, agency, and phone numbers where shown in “**Step 3** - LBOH/Agency Investigator.”

Demographic Question Package

Record all demographic and employment information. It is particularly important to complete the Race/Ethnicity and Occupation questions.

Clinical Question Package

Complete the “Diagnosis/Clinical Information” section, providing the diagnosis date, symptom information and date of symptom onset and other medical information.

In the “Hospitalization/Clinician/PCP Information” section, note whether the case was hospitalized and if “Yes” record the date hospitalized, date discharged and medical record number. You can select the name of the hospital by clicking on the magnifying glass to the right of the question. Accurate information regarding hospitalization is important to determine whether the case is healthcare-acquired. Healthcare-acquired shigellosis cases may require additional follow-up as described in Section 4.

Risk Exposure/Control & Prevention Question Package

The incubation period for shigellosis is 1-3 days, but depending on the species causing the disease, it can be as long as a week; therefore, when you are answering the questions in this section focus on 2-7 days prior to the case becoming ill. Determine if the case spent any time away from home, including travel out of the state or out of the country. Please record their departure date(s), arrival date(s), hotel(s) names and addresses or other accommodation information. It is important to get as many details as possible, as these cases get reported to the Centers for Disease Control and Prevention to help identify travel-associated outbreaks. Ask the patient if they performed any outdoor activities, had animal contacts, were exposed to a supervised care setting, is a food handler, have a close household member who is a food handler, and provide those details in the space provided.

If a patient lives or visited an assisted living facility or senior living center, please provide this information in the next table. Include visit dates, facility type, facility name, and address. Indicate the type of exposure, such as whether the patient is a resident, visitor, volunteer, or employee of the facility.

Other information

Any additional information on the case you would like recorded in MAVEN can be included in the “Notes” section which is located to the right of the Event Summary on the dashboard. However, do not include any information in the Notes section which can already be captured in a QP (i.e., hotel accommodation details).

Completing Your Investigation

1. If you were able to complete a case investigation and follow-up is complete, mark “**Step 4 – Case Report Form Completed**” as “Yes” and then choose Local Board of Health (LBOH) –Ready for MDPH review for the Completed by variable.
2. If you have made several attempts to obtain case information but have been unsuccessful (e.g., the case or health care provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please complete “**Step 4 - Case Report Form Completed**” as “No” and then choose a primary reason why the case investigation was not completed from the choices provided in the primary reason answer variable list.
3. If you are not online for MAVEN you may submit a paper case report form. After completing the form, attach laboratory report(s) and fax or mail (in an envelope marked “Confidential”) to ISIS. The confidential fax number is (617) 983-6813. Call ISIS at (617) 983-6801 to obtain a copy of the case report form and to confirm receipt of your fax.

The mailing address is:

MDPH, Office of Integrated Surveillance and Informatics Services (ISIS)
 305 South Street, 5th Floor
 Jamaica Plain, MA 02130
 Fax: (617) 983-6813

Section 4

CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (105 CMR 300.200)

Food handlers with shigellosis must be excluded from work.

Note: A case of shigellosis is defined by the reporting criteria in Section 2A.

Minimum Period of Isolation of Patient

After diarrhea has resolved, food handlers may return to food handling duties only after producing two negative stool specimens, taken at least 48 hours apart. If a case was treated with an antimicrobial, the stool specimen shall not be collected until at least 48 hours after cessation of therapy.

Minimum Period of Quarantine of Contacts

Contacts who are food handlers and have diarrhea shall be considered the same as a case and shall be handled in the same fashion. In outbreak circumstances, asymptomatic contacts who are food handlers shall be required to produce two negative stool specimens, taken 24 hours apart. No restrictions otherwise.

Note: A foodhandler is any person directly preparing or handling food. This could include the food handling facility owner, individual having supervisory or management duties, person on the payroll, family member, volunteer, person performing work under contractual agreement, or any other person working in a food handling facility. This also includes any person handling clean dishes or utensils. Any person who dispenses

medications by hand, assists in feeding, or provides mouth care shall be considered food handlers for the purpose of these regulations. In health care facilities, this includes those who set up trays for patients to eat, feed or assist patients in eating, give oral medications or give mouth/denture care. In day care facilities, schools and community residential programs, this includes those who prepare food for clients to eat, feed or assist clients in eating, or give oral medications. This term does not include individuals in private homes preparing or serving food for individual family consumption.

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

Daycare

Since shigellosis may be transmitted from person to person through fecal-oral transmission, it is important to follow-up carefully on cases of shigellosis in a daycare setting. General recommendations include:

- Children with *Shigella* infection who have diarrhea should be excluded until their diarrhea is resolved.
- Children with *Shigella* infection who have no diarrhea and are not otherwise ill may be excluded or may remain in the program if special precautions are taken.
- Since 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 diarrhea is resolved and they have two negative stool specimens, taken at least 48 hours apart and collected at least 48 hours after completion of antibiotic therapy, if antibiotics are given (per 105 CMR 300.200).

School

Since shigellosis may be transmitted from person to person through fecal-oral transmission, it is important to follow-up carefully on cases of shigellosis in a school setting. The MDPH *Comprehensive School Health Manual* provides detailed information on case follow-up and control in a school setting. 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* who do not handle food, have no diarrhea or 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 resolved and they have two negative stool specimens, taken at least 48 hours apart and collected at least 48 hours after completion of antibiotic therapy, if antibiotics are given (per 105 CMR 300.200).

Refer to Chapter 8 of the MDPH *Comprehensive School Health Manual* for complete guidelines on handling diseases spread through the intestinal tract.

<https://massclearinghouse.ehs.state.ma.us/SCH/SH3001R.html>

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 test negative for *Shigella*. Refer to the MDPH Division of Epidemiology and Immunization's *Control Guidelines for Long-Term Care Facilities* at <http://www.mass.gov/eohhs/gov/departments/dph/programs/id/epidemiology/providers/infection-control.html> for further information.

Staff members who give direct patient care (e.g., feed patients, give mouth or denture care, or give medications) are considered food handlers and are subject to food handler restrictions under *105 CMR 300.200*. (See Section 4A for more information.) In addition, staff members with *Shigella* infection who are not food handlers should not work 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 residents until their symptoms have subsided and they have two negative stool specimens, taken at least 48 hours apart and collected 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 not work until their diarrhea is resolved.

Reported Incidence in Higher than Usual/Outbreak Suspected

If the number of reported cases of shigellosis in your city/town is higher than usual or if you suspect an outbreak, investigate to determine the source of infection and the mode of transmission. A common vehicle (e.g., water, food, or association with a daycare center) should be sought, and applicable preventive or control measures should be instituted. Control of person-to-person transmission requires special emphasis on personal cleanliness and sanitary disposal of feces. Consult with the epidemiologist on-call at the MDPH Epidemiology Program at (617) 983-6800 or (888) 658-2850. Program epidemiologists can help determine a course of action to prevent further cases and can perform surveillance for cases across town lines, which would otherwise be difficult to identify at the local level.

D. Preventive Measures

Environmental Measures

Implicated food items must be removed from consumption. A decision about testing implicated food items can be made in consultation with the MDPH Food Protection Program (FPP) or the MDPH Epidemiology Program. The FPP can help coordinate pickup and testing of food samples. If a commercial product is suspected, the FPP will coordinate follow-up with relevant outside agencies.

Note: The role of the FPP is to establish policy and to provide technical assistance with the environmental investigation, such as interpreting the Massachusetts Food Code, conducting a Hazard Analysis and Critical Control Point (HACCP) risk assessment, initiating enforcement actions, and collecting food samples.

The general policy of the MA SPHL is to test only food samples implicated in suspected outbreaks, not in single cases (except when botulism is suspected). The LBOH may suggest that the holders of food implicated in single case incidents locate 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, a single, confirmed case with leftover food consumed within the incubation period may be considered for testing under certain circumstances.

Note: Refer to the MDPH Foodborne Illness Investigation and Control Reference Manual for comprehensive information on investigating foodborne illness complaints and outbreaks. It can be located on the MDPH website in PDF format at <http://www.mass.gov/eohhs/docs/dph/environmental/foodsafety/ref-manual/intro-pages.pdf> . For the most recent changes to the Massachusetts Food Code, contact the FPP at (617) 983-6712 or through the MDPH website at www.mass.gov/dph/fpp .

Personal Preventive Measures/Education

To avoid future exposures, recommend that individuals:

- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet, after changing diapers, and after contact with animals, especially cattle.
- Wash the child's hands as well as their own hands after changing a child's diapers, and dispose of feces in a sanitary manner.
- Wash their 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 flies from contaminating food.

Discuss transmission risks that may result from oral-anal sexual contact. Latex barrier protection (e.g., 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.

A *Shigella* Public Health Fact Sheet is available from the MDPH Epidemiology Program or on the MDPH website at

<http://www.mass.gov/eohhs/gov/departments/dph/programs/id/epidemiology/factsheets.html>

The fact sheet is also available in Spanish and Portuguese.

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.

Note: For more information regarding international travel, contact the Center for Disease Control and Prevention (CDC) Traveler’s Health Office at (877) 394-8747 or through the CDC website at www.cdc.gov/travel.

ADDITIONAL INFORMATION

The formal CDC surveillance case definition for shigellosis is the same as the criteria outlined in Section 2A of this chapter. It is provided for your information only and should not affect the investigation and reporting of a case that fulfills the criteria in Section 2A of this chapter. For reporting to the MDPH, always use the criteria outlined in Section 2A.

Note: The most up-to-date CDC case definitions are available on the CDC website at <http://wwwn.cdc.gov/nndss/conditions/>

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