

# Shigellosis

*Shigella* spp

**NOTE:** Changes to this chapter include updated case definition (highlighted in yellow)

## **DISEASE REPORTABLE WITHIN 24 HOURS OF DIAGNOSIS**

Per N.J.A.C. 8:57, healthcare providers and administrators shall report by mail or by electronic reporting within 24 hours of diagnosis, confirmed cases of shigellosis to the health officer of the jurisdiction where the ill or infected person lives, or if unknown, wherein the diagnosis is made. A directory of local health departments in New Jersey is available at <http://localhealth.nj.gov/>.

If the health officer is unavailable, the healthcare provider or administrator shall make the report to the Department by telephone to 609.826-5964 between 8:00 A.M. and 5:00 P.M. on non-holiday weekdays or to 609.392.2020 during all other days and hours.



March 2015

# 1 THE DISEASE AND ITS EPIDEMIOLOGY

### A. Etiologic Agent

Shigellosis is caused by any bacteria in the species *Shigella*. There are four *Shigella* species or serogroups: *S. dysenteriae* (Group A), *S. flexneri* (Group B), *S. boydii* (Group C), and *S. sonnei* (Group D). Group A has 13 serotypes, group B has 6 serotypes, group C has 18 serotypes, and group D has 1 serotype. Geographic distribution and antimicrobial susceptibility varies with different species.

### B. Clinical Description

The most common symptoms of shigellosis are diarrhea (sometimes bloody), fever, nausea, vomiting and stomach cramps. Dehydration may be severe, especially in infants and the elderly. Asymptomatic infections can also occur. The disease is usually self-limiting, lasting four to seven days. The severity of the illness and the case-fatality rate are usually a function of the host and species, with the very young and the elderly experiencing the most severe illness. Antibiotics shorten the duration and severity of the illness and the duration of pathogen excretion; they should be used in individual cases if warranted by the severity of the illness or to protect contacts (e.g., in daycare centers or institutions) when epidemiologically indicated. *S. dysenteriae* is usually associated with more severe disease and complications including toxic megacolon and hemolytic-uremic syndrome. Laboratory diagnosis is based on isolation of *Shigella* from feces or rectal swabs.

### C. Reservoirs

*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. A very small dose of *Shigella* is needed to cause illness (probably ten to 200 organisms). Individuals shedding the bacteria may also contaminate food by failing to properly wash their hands before foodhandling 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 person to person through certain types of sexual contact (e.g., oral-anal contact) and contact with a contaminated inanimate object.

#### 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. A very small dose of *Shigella* is needed to cause illness (probably 10 to 200 organisms). Individuals shedding the bacteria may also contaminate food by failing to properly wash their hands before foodhandling 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 person to person through certain types of sexual contact (eg, oral-anal contact) and contact with a contaminated inanimate object.

#### E. Incubation Period

The incubation period can vary from 12 to 50 hours, but is usually about one to four 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 infected persons excrete *Shigella* in their stool. This usually lasts for about four weeks from onset of illness. Asymptomatic carriers may transmit infection; rarely, the carrier state may persist for months or longer. Effective antibiotic treatment has been shown to decrease the shedding period to a few days.

#### G. Epidemiology

Shigellosis has a worldwide distribution, with approximately 600,000 deaths reported annually throughout the world. Most of these deaths occur in children younger than ten years of age. Secondary attack rates can be as high as 40% in households. Outbreaks occur in daycare centers, among men who have sex with men, and in jails. Outbreaks have also been caused by contaminated imported food.

In New Jersey, approximately 600 cases are reported annually to the New Jersey Department of Health and Senior Services (NJDOH). *S. sonnei* is the most common *Shigella* species reported in New Jersey.

## 2 CASE DEFINITION

**NOTE: Case definitions establish uniform criteria for identifying and classifying cases for reporting purposes, and should NOT be used for establishing clinical diagnoses or determining the standard of care necessary for a particular patient. For many conditions of public health importance, action to contain disease should be initiated as soon as a problem is identified; in many circumstances, appropriate public health action should be**

**undertaken even though available information is insufficient to determine a clinical diagnosis or case status.**

## A. Case Definition

### 1. Clinical Description

An illness of variable severity characterized by diarrhea, fever, nausea, cramps, and tenesmus.

### 2. Laboratory Criteria for Diagnosis

Confirmed:

Isolation of *Shigella* from a clinical specimen.

Possible:

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

### 3. Case Classification

#### **CONFIRMED:**

Isolation of *Shigella* from a clinical specimen from any site of the human body, regardless of symptoms.

#### **PROBABLE:**

A clinically compatible case that is epidemiologically linked to a confirmed case.

#### **POSSIBLE:**

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

#### **COMMENT**

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

## B. Differences from CDC Case Definition

The NJDOH case definition of Possible is equivalent to the Centers for Disease Control and Prevention (CDC) case definition of Suspect.

## **3 LABORATORY TESTING AVAILABLE**

The Public Health and Environmental Laboratories (PHEL) will test stool specimens for the presence of *Shigella* and will also confirm and serotype isolates of *Shigella* obtained from clinical specimens at other laboratories. PHEL requests that all laboratories submit all isolates cultured for typing to aid in public health surveillance (NJAC 8:57-1.6[f]). For more information contact PHEL at 609.530.8392.

After authorization from the Division of Epidemiology, Occupational and Environmental Health, PHEL will test implicated food items from a cluster or outbreak.

## **4 PURPOSE OF SURVEILLANCE AND REPORTING AND REPORTING REQUIREMENTS**

### **A. Purpose of Surveillance and Reporting**

- To identify whether the patient 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 Reporting Requirements**

The New Jersey Administrative Code (NJAC) 8:57-1.8 stipulates that healthcare providers and laboratories report (by telephone, by confidential fax, over the Internet using the Communicable Disease Reporting System [CDRSS] or in writing) all cases of shigellosis to the local health officer having jurisdiction over the locality in which the patient lives or, if unknown, to the health officer in whose jurisdiction the healthcare provider requesting the laboratory examination is located.

### **C. Healthcare Provider Reporting Requirements**

Same as above for Laboratory (section 4B).

### **D. Health Officer Reporting and Follow-up Responsibilities**

NJAC 8:57-1.8 stipulates that each local health officer must report the occurrence of any case of shigellosis. A report can be filed electronically over the Internet using the confidential and secure CDRSS.

# 5 CASE INVESTIGATION

- A. It is the health officer’s responsibility to investigate the case by interviewing the patient and others who may be able to provide pertinent information. To obtain relevant information please use the *Shigellosis Case Report Worksheet* available at:

[http://nj.gov/health/cd/shigel/documents/shigella\\_worksheet.pdf](http://nj.gov/health/cd/shigel/documents/shigella_worksheet.pdf)

## B. Entry into CDRSS

The mandatory fields in CDRSS include: disease, last name, county, municipality, gender, race, ethnicity, case status, report status.

The following table can be used as a quick reference guide to determine which CDRSS fields need to be completed for accurate and complete reporting of shigellosis cases. The “Tab” column includes the tabs which appear along the top of the CDRSS screen. The “Required Information” column provides detailed explanations of what data should be entered.

CDRSS Screen	Required Information
<b>Patient Info</b>	Enter the disease name (“SHIGELLOSIS”) patient demographics, illness onset date, and the date the case was reported to the local health department (LHD). There are no subgroups for shigellosis.
<b>Addresses</b>	Determine whether the case-patient attends to works at a daycare facility and/or is a food handler. Use as needed for additional addresses (e.g., work address, school, temporary NJ address for out-of-state case). Use the <b>Comments</b> section in this screen to record any pertinent information about the alternate address (e.g., the times per week the case-patient attends daycare). Entering an alternate address will allow other disease investigators access to the case if the alternate address falls within their jurisdiction.
<b>Clinical Status</b>	Clinical information such as past medical history, any treatment that the patient received, name of medical facility(s) including date of initial healthcare evaluation and dates of hospitalization, treating physician(s), and mortality status are entered here.  <b>(NOTE:</b> If the patient received care from two or more medical facilities, be sure all are recorded in the case including admit/discharge dates so the case can be assessed by all infection control professionals (ICPs) covering these facilities).

CDRSS Screen	Required Information
<b>Signs/Symptoms</b>	<p>Make every effort to get complete information by interviewing the physician, family members, infection preventionist, or others who might have knowledge of the patient’s illness. Check appropriate boxes for signs and symptoms and indicate their onset and resolution.</p>
<b>Risk Factors</b>	<p>Enter complete information about risk factors including complete food history, travel history, any gatherings or outdoor activities attended, questions about water supply, or other close contacts and record in the Comments section.</p> <p>When asking about exposure history (food, travel, activities, and so forth), use the incubation period for <i>shigella</i> (12 to 50 hours). Specifically focus on the period beginning a minimum of 12 hours before the case’s onset back to at least 50 hours before onset. If possible, record any restaurants at which the case-patient ate, including food item(s) and date consumed.</p>
<b>Laboratory Eval</b>	<p>Laboratory test name “MICROORGANISM IDENTIFIED.” Lab Specimen ID, Specimen, Date specimen collected, Lab Name, Referring Physician Name, Referring Medical Facility name, Test Result i.e., Positive/reactive or Negative/no reactive.</p>
<b>Contact Tracing</b>	<p>All potentially exposed contacts are entered into the contact tracing tab for local, county and statewide surveillance efforts. CDRSS requires a “YES” response to one of the two <i>shigella</i> exposure questions in order to add case contacts.</p> <p>Contacts are added individually by selecting the Enter Contact By Name feature:</p> <p>Each contact record reflects the period of exposure, symptomatic or asymptomatic, contact demographics, telephone numbers, exposure risk i.e., close, casual, unknown, and LHD response activities are noted. An exposure setting is selected for each contact from the drop down to the right of the contact’s name.</p> <p>A summary reflecting the following contact details: total number, name, age, relationship, exposure specifics as well as all LHD recommendations to prevent further transmission of illness are entered into the contact tracing text box.</p> <p><b>NOTE:</b> If a contact to a confirmed case is symptomatic, the contact <b>MUST</b> be entered as a new case. If no lab work was done on this contact, the case status is <b>PROBABLE</b>.</p>

CDRSS Screen	Required Information
<p><b>Case Comments</b></p>	<p>Enter general comments (i.e., information that is not discretely captured by a specific topic screen or drop-down menu) in the <b>Comments</b> section. <b>NOTE:</b> Select pieces of information entered in the <b>Comments</b> section CANNOT be automatically exported when generating reports. Therefore, whenever possible, record information about the case in the fields that have been designated to capture this information; information included in these fields CAN be automatically exported when generating reports.</p>
<p><b>Epidemiology</b></p>	<p>Select the route of transmission, import status of infection i.e., whether the case was imported and from where (another county, state, country), LHD notification of illness and association with high-risk venue type, name, location and last day of attendance, whether case-patient is a daycare worker or attendee, foodhandler, or healthcare worker.</p> <p>The NJHDSS assigned outbreak or investigation number is selected for all involved cases which automatically populates a summary of the initial report.</p>
<p><b>Case Classification Report Status</b></p>	<p>Case status options are:</p> <p>“REPORT UNDER INVESTIGATION (RUI),” “CONFIRMED,” “PROBABLE,” <b>“POSSIBLE,”</b> and “NOT A CASE.”</p> <ul style="list-style-type: none"> <li>• All cases entered by laboratories (including LabCorp electronic submissions) should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).”</li> <li>• Cases still under investigation by the LHD should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).”</li> <li>• Upon completion of the investigation, the LHD should assign a case status on the basis of the case definition. “CONFIRMED,” “PROBABLE,” <b>“POSSIBLE,”</b> and “NOT A CASE” are the only appropriate options for classifying a case of shigellosis. (See section 2).</li> </ul> <p>Report status options are:</p> <p>“PENDING,” “LHD OPEN,” “LHD REVIEW,” “LHD CLOSED,” “DELETE,” “REOPENED,” “DHSS OPEN,” “DHSS REVIEW,” and “DHSS APPROVED.”</p> <ul style="list-style-type: none"> <li>• Cases reported by laboratories (including LabCorp electronic submissions) should be assigned a report status of “PENDING.”</li> </ul>

CDRSS Screen	Required Information
	<ul style="list-style-type: none"> <li>• Once the LHD begins investigating a case, the report status should be changed to “LHD OPEN.”</li> <li>• The “LHD REVIEW” option can be used if the LHD has a person who reviews the case before it is closed (e.g., health officer or director of nursing).</li> <li>• Once the LHD investigation is complete and all the data are entered into CDRSS, the LHD should change the report status to “LHD CLOSED.”</li> <li>• “LHD CLOSED” cases will be reviewed by DHSS and be assigned one of the DHSS-specific report status categories. If additional information is needed on a particular case, the report status will be changed to “REOPENED” and the LHD will be notified by e-mail. Cases that are “DHSS APPROVED” cannot be edited by LHD staff.</li> </ul> <p>If a case is inappropriately entered as a case of Shigellosis the case should be assigned a report status of “DELETE.” A report status of “DELETE” should NOT be used if a reported case of shigellosis simply does not meet case definition. Rather, it should be assigned the appropriate case status, as described above.</p>

- C. Institution of disease control measures is an integral part of case investigation. It is the local health officer’s responsibility to understand and, if necessary, institute the control guidelines listed below in section 6, “Controlling Further Spread”

## 6 CONTROLLING FURTHER SPREAD

### A. Isolation and Quarantine Requirements (NJAC 8:57-1.10)

Food handlers with shigellosis are excluded from handling food until they no longer have symptoms and they have at least **two** successive negative stool cultures (collected 24 or more hours apart, but not sooner than 48 hours following completion of antimicrobial therapy).

**NOTE: A case of shigellosis is defined by the reporting criteria in section 2A of this chapter.**

### B. Protection of Contacts

Contacts with diarrhea who are foodhandlers shall be isolated and quarantined in the same manner as a patient (see above paragraph) and handled in the same fashion.

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

## C. Managing Special Situations

### 1. Daycare

Because shigellosis may be transmitted person to person through fecal-oral transmission, it is important to carefully follow up cases in a daycare setting.

General recommendations include the following:

- When *Shigella* infection is identified in a childcare attendee or staff person, stool specimens from other symptomatic attendees, staff and household members must be cultured. Symptomatic persons with positive stool cultures for *Shigella* may receive antibiotic therapy. The decision to use antibiotics is based on the severity of the case and potential to spread infection.
- Children and staff members with shigellosis should be excluded until their diarrhea has resolved and two successive stool cultures are negative for *Shigella species*. These stool specimens should be collected 24 hours or more apart but not sooner than 48 hours after completion of antibiotic therapy.
- Infection control procedures including proper handwashing, sanitary disposal of diapers and feces, proper food handling and environmental sanitation should be implemented.
- If more than one person is infected, cohorting should be considered until stool tests are negative.

### 2. School

Because shigellosis may be transmitted person to person through fecal-oral transmission, it is important to carefully follow up cases in a school setting. General recommendations include the following:

- 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, 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 has resolved and they have **two** negative stool cultures collected 24 hours or more apart but not sooner than 48 hours after completion of antibiotic therapy, if antibiotics are given.

### 3. 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 addition to reporting the outbreak to the local health department, facility management should also report any such outbreak to the NJDOH Division of Long-Term Care (LTC) Compliance and Surveillance Program by telephone at 800.792.9770 or fax at 609.633.9060.

In long-term care facilities, residents with shigellosis should be placed on standard (including enteric) precautions until their symptoms subside and they have **two** consecutive negative cultures for *Shigella*. 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 (see section 6A above). In addition, staff members with *Shigella* infection who are not food handlers should not work until their diarrhea has 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 resolved and they have two negative stool cultures collected 24 hours or more apart but not sooner than 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 has resolved.

## 7 OUTBREAK SITUATIONS

If the number of reported cases in an institutional setting or jurisdiction is higher than usual for the time of year, an outbreak might be occurring. In accordance with NJAC 8:57, the local health department must be notified immediately. This situation may warrant an investigation of clustered cases to determine a course of action to prevent further cases. In contrast to what routinely occurs at the local level, CDS staff can perform surveillance for clusters of illness that may cross several jurisdictions and thereby be better able to assess the extent of an outbreak during its infancy.

## 8 PREVENTIVE MEASURES

### A. Environmental Measures

Implicated food items must be removed from the environment. A decision about testing implicated food items can be made in consultation with CDS and the NJDOH Food and Drug Safety Program (FDSP). FDSP can help coordinate pickup and testing of food samples. If a commercial product is suspected, FDSP will coordinate follow-up with relevant outside agencies (e.g., US Food and Drug Administration [FDA], US Department of Agriculture).

**NOTE: The role of FDSP is to provide policy and technical assistance with the environmental investigation such as interpreting the New Jersey Food Code, conducting a hazardous analysis and critical control point risk assessment, initiating enforcement actions and collecting food samples.**

General policy of PHEL is to test only food samples implicated in suspected outbreaks, not in single cases (except when botulism is suspected). The health officer 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 special circumstances.

## **B. Personal Preventive Measure/Education**

To avoid future exposure, recommend that individuals:

- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet, and after changing diapers.
- After changing diapers, wash the child's hands as well as their own.
- In a daycare setting, dispose of feces in a sanitary manner.
- When caring for someone with diarrhea, scrub their hands with plenty of soap and water after cleaning the bathroom; helping the person use the toilet; or changing diapers, soiled clothes or soiled sheets.
- 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 to prevent the exposure to and transmission of other pathogens.
- Keep flies from contaminating food.
- Anyone with diarrhea should not use a pool or swim in a pond.

## **C. International Travel**

The following recommendations can be helpful to travelers in 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 noncarbonated 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 see the CDC's website at: <http://www.cdc.gov/travel>.**

## **Additional Information**

A Shigellosis Fact Sheet can be obtained at the NJDHSS Website at <http://www.state.nj.us/health>. Click on the “Topics A to Z” link and scroll down to the subject *Shigellosis*.

The formal CDC surveillance case definition for shigellosis is the same as the criteria outlined in section 2A of this chapter. CDC case definitions are used by state health departments and CDC to maintain uniform standards for national reporting. For reporting to NJDOH, always refer to section 2A.

## References

- American Academy of Pediatrics, *2012 Red Book: Report of the Committee on Infectious Diseases* (29th ed). Elk Grove Village, IL: Academy of Pediatrics.
- Centers for Disease Control and Prevention. Shigellosis: frequently asked questions. <http://www.cdc.gov/nczved/divisions/dfbmd/diseases/shigellosis/> Updated May 14, 2013.
- Centers for Disease Control and Prevention. Diagnosis and management of foodborne illnesses: a primer for physicians. *MMWR Morb Mortal Wkly Rep.* 2004; 53: RR-4.
- Heyman D.L. 2008 *Control of Communicable Diseases Manual* (19th ed). Washington, DC: American Public Health Association.
- Mandell G, Benett J, Dolin R. 2000 *Principles and practice of infectious diseases*. New York, NY: Churchill Livingstone.
- Massachusetts Department of Public Health, Division of Epidemiology and Immunization. *Guide to Surveillance and Reporting*. Massachusetts Department of Public Health, Division of Epidemiology and Immunization; June 2006. Boston, Massachusetts.
- Wallace, R.B. (1998) Maxey-Rosenau-Last *Public health and preventive medicine* (14th ed). 1998. Stamford, CT: Appleton & Lange.
- Vital signs: Incidence and trends of infection with pathogens transmitted commonly through food-foodborne diseases active surveillance network, 10 U.S. sites, 1996-2010. CDC *MMWR Morb Mortal Wkly Rep.* Jun 10 2011; 60(22):749-55.
- Jaya Sureshbabu, MBBS, DCh, MRCPCH(UK), MRCPI(Paed), MRCPS(Glasg), DCH(Glasg); Chief Editor: Russell W Steele, MD. *Shigella Infection*. <http://emedicine.medscape.com/article/968773-overview#a0101>. Updated June 25, 2012