

Yersiniosis

(*Yersinia* spp. Other than *Yersinia Pestis*)

NOTE: This chapter focuses on yersiniosis caused by *Yersinia* other than *Yersinia pestis*. For information about plague caused by *Y. pestis* refer to the chapter titled “Plague.”

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 yersiniosis 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://www.state.nj.us/health/lh/directory/lhdselectcounty.shtml>.

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.



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1 THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Yersiniosis is caused by the gram-negative bacteria *Yersinia enterocolitica* or *Y. pseudotuberculosis*. *Y. pseudotuberculosis* has six serotypes with four subtypes; *Y. enterocolitica* has over 50 serotypes and five biotypes (strains). Many of these are considered nonpathogenic.

B. Clinical Description and Laboratory Diagnosis

The most common symptoms of yersiniosis are fever and diarrhea, sometimes bloody. The disease may also be manifested by enterocolitis and acute mesenteric lymphadenitis mimicking appendicitis. Complications can include post infectious arthritis, systemic infections, and erythema nodosum. Abdominal pain is usually seen with yersiniosis caused by *Y. pseudotuberculosis*, while enterocolitis is more commonly seen with *Y. enterocolitica*.

Laboratory diagnosis is based on isolating *Yersinia* from stool, vomitus, or blood. Serological tests (agglutination and enzyme-linked immunosorbent assay [ELISA] tests) are available in research and reference laboratories.

C. Reservoirs

The reservoirs for *Yersinia* species are primarily animals, notably pigs for *Y. enterocolitica* and avian and mammalian hosts such as rodents and other small mammals for *Y. pseudotuberculosis*.

D. Modes of Transmission

Yersinia is transmitted via the fecal-oral route by ingestion of contaminated food or water or by contact with infected animals or people. Transmission can also occur person to person through certain types of sexual contact (e.g., oral-anal contact). Pathogenic strains of *Y. enterocolitica* have mostly been isolated from raw pork and pork products, including cold cuts. In contrast to many other foodborne pathogens, *Y. enterocolitica* is able to multiply

under refrigeration and microaerophilic conditions. There have also been reports of nosocomial transmission and of transmission via transfusion of blood from donors with asymptomatic or mild infection.

E. Incubation Period

The incubation period is generally less than ten days, usually from three to seven days.

F. Period of Communicability or Infectious Period

The disease is communicable for as long as the infected person is symptomatic and excretes *Yersinia* in stool (approximately two to three weeks), with untreated patients shedding for as long as three months. Children and adults have been reported with prolonged asymptomatic carriage.

G. Epidemiology

Y. enterocolitica is an uncommon cause of illness outbreaks in the United States. Of 7390 foodborne disease outbreaks reported to the Centers for Disease Control and Prevention (CDC) from 1990 through 1999, 5 (<0.1%) were reported to be caused by *Yersinia*. It is also a relatively uncommon cause of sporadic disease, accounting for <0.3% of all foodborne illness in the United States. *Y. enterocolitica* has been isolated from a variety of animal reservoirs, and outbreaks have been attributed to contaminated water, milk, bean sprouts, and pork intestines. Based on data from the Foodborne Diseases Active Surveillance Network (FoodNet), which measures the burden and sources of specific diseases over time, approximately one culture-confirmed *Y. enterocolitica* infection per 100,000 persons occurs each year. Children are infected more often than adults, with the highest isolation rates reported during the cold season in temperate climates (including North America). The most important source of infection of *Y. enterocolitica* may be pork. *Y. pseudotuberculosis* is primarily a zoonotic disease with humans as incidental hosts. The New Jersey Department of Health and Senior Services (NJDHSS) reports an average of ten cases of yersiniosis annually.

2 CASE DEFINITION

A. New Jersey Department of Health and Senior Services (NJDHSS) Case Definition

1. Clinical Description

Symptoms of yersiniosis include fever and diarrhea, sometimes bloody. The disease may also be manifested by enterocolitis and acute mesenteric lymphadenitis mimicking appendicitis. Complications can include postinfectious arthritis, systemic infections, and erythema nodosum.

2. Laboratory Criteria for Diagnosis

Isolation of *Yersinia spp.* from blood, stool, or other clinical specimen.

CONFIRMED

A clinically compatible case, AND

Isolation of *Y. spp.* (other than *Y. pestis*) from blood, stool, or other clinical specimen.

PROBABLE

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

POSSIBLE

Not used.

B. Difference from CDC Case Definition

There is no formal CDC surveillance case definition for yersiniosis, as yersiniosis is currently not nationally reportable. CDC case definitions are used by state health departments and CDC to maintain uniform standards for national reporting. When reporting a case to NJDHSS, always refer to the criteria in section 2.

3 LABORATORY TESTING AVAILABLE

The NJDHSS Public Health and Environmental Laboratories (PHEL) will test stool specimens for the presence of *Yersinia* species and confirm isolates from other laboratories. For more information, call the Enteric Laboratory at 609.292.7368. After authorization from the Division of Epidemiology, Occupational and Environmental Services, PHEL will test implicated food items from a cluster or outbreak.

4 PURPOSE OF SURVEILLANCE 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 provide education about reducing the risk of infection.
- 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 8:57-1.6) stipulates that laboratories report (by telephone, by confidential fax, or over the Internet using the Communicable Disease Reporting and Surveillance System [CDRSS]) all cases of yersiniosis 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. The report shall contain, at a minimum, the reporting laboratory's name, address, and telephone number; the age, date of birth, gender, race, ethnicity, home address, and telephone number of person tested; the test performed; the date of testing; the test results; and the healthcare provider's name and address.

C. Healthcare Provider Reporting Requirements

The New Jersey Administrative Code (NJAC 8:57-1.4) stipulates that healthcare providers report (by telephone, by confidential fax, or in writing) all cases of yersiniosis 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. The report shall contain the name of the disease; date of illness onset; and name, age, date of birth, race, ethnicity, home address, and telephone number of the person they are reporting. Additionally, name, address, institution, and telephone number of the reporting official, and other information as may be required by NJDHSS concerning a specific disease, should be reported.

D. Health Officer Reporting and Follow-up Responsibilities

The New Jersey Administrative Code (NJAC 8:57-1.7) stipulates that each local health officer must report the occurrence of any case of yersiniosis within 24 hours of receiving a report from a laboratory or healthcare provider to the NJDHSS, Infectious and Zoonotic Disease Program (IZDP). A report can be mailed or filed electronically over the Internet using the confidential and secure CDRSS.

5 CASE INVESTIGATION

A. Forms

It is the health officer's responsibility to complete a "GI Illness Worksheet" (Insert hyperlink here) by interviewing the patient and others who may be able to provide pertinent information. Much of the Clinical information can be obtained from the patient's healthcare provider or the medical record.

- When asking about exposure history (food, travel, activities, and so forth), use the incubation period range for yersiniosis (three to seven days). Specifically focus on the period beginning a minimum of three days before the disease onset date and back to no more than seven days before onset.

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- In a case of an outbreak, immediately notify the NJDHSS IZDP by telephone at 609.588.7500 during business hours and 609.392.2020 after business hours and on weekends and holidays.
- If there have been several unsuccessful attempts to obtain patient information, please fill out the report with as much information as possible. Please note on the report why it could not be completed as well as name and affiliation of the person submitting the report and the person reporting the illness.

After completing the investigation, mail the “GI Illness Worksheet” (in an envelope marked “Confidential”) to IZDP, or file the report electronically over the Internet using the confidential and secure CDRSS.

The mailing address is:

NJDHSS
Communicable Disease Service
Infectious and Zoonotic Diseases Program
PO Box 369
Trenton, NJ 08625-0369

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 yersiniosis 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
Patient Info	Enter disease name (“YERSINIOSIS”), patient demographics, patient onset and date report was made to the local health department. There are no subgroups for yersiniosis.
Addresses	Use as needed for additional addresses (e.g., work address, school, temporary NJ address for out-of-state case). Use the Comments 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.

CDRSS Screen	Required Information
<p>Clinical Status</p>	<p>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.</p> <p>(NOTE: 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 accessed by all infection control professionals (ICPs) covering these facilities.)</p>
<p>Signs/Symptoms</p>	<p>Make every effort to get complete information by interviewing the physician, family members, ICP, 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>
<p>Risk Factors</p>	<p>Enter complete information about risk factors including complete food history, travel history, any gatherings or outdoor activities attended, questions about water supply (yersiniosis may be acquired through water consumption), pet or other animal contact and record in the Comments section.</p> <p>When asking about exposure history (food, travel, activities, and so forth), use the incubation period range for yersiniosis (three to seven days). Specifically focus on the period beginning a minimum of three days before the disease onset date and back to no more than seven days before onset.</p>
<p>Laboratory Eval</p>	<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/not reactive.</p>

CDRSS Screen	Required Information
Contact Tracing	<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 yersiniosis 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, marital status, primary language, exposure risk i.e., close, casual, unknown, and LHD response activities are noted.</p> <p>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>
Case Comments	<p>Any additional case investigation findings that can not be entered in discrete data fields are documented in the general comment section.</p>
Epidemiology	<p>Select the route of transmission route, 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 NJDHSS assigned outbreak or investigation number is selected for all involved cases which automatically populates a summary of the initial report.</p>
Case Classification Report Status	<p>Case status options are:</p> <p>“REPORT UNDER INVESTIGATION (RUI),” “CONFIRMED,” “PROBABLE,” “POSSIBLE,” and “NOT A CASE.”</p> <ul style="list-style-type: none"> • All cases entered by laboratories (including LabCorp electronic submissions) should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).” • Cases still under investigation by the LHD should be assigned a case status of “REPORT UNDER INVESTIGATION (RUI).” • Upon completion of the investigation, the LHD should assign

CDRSS Screen	Required Information
	<p>a case status on the basis of the case definition. “CONFIRMED”, “PROBABLE” and “NOT A CASE” are the only appropriate options for classifying a case of yersiniosis.</p> <p>Report status options are: “PENDING,” “LHD OPEN,” “LHD REVIEW,” “LHD CLOSED,” “DELETE,” “REOPENED,” “DHSS OPEN,” “DHSS REVIEW,” and “DHSS APPROVED.”</p> <ul style="list-style-type: none"> • Cases reported by laboratories (including LabCorp electronic submissions) should be assigned a report status of “PENDING.” • Once the LHD begins investigating a case, the report status should be changed to “LHD OPEN.” • 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). • Once the LHD investigation is complete and all the data are entered into CDRSS, the LHD should change the report status to “LHD CLOSED.” • “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. <p>If a case is inappropriately entered as a case of yersiniosis the case should be assigned a report status of “DELETE.” A report status of “DELETE” should NOT be used if a reported case of yersiniosis simply does not meet case definition. Rather, it should be assigned the appropriate case status, as described above.</p>

C. Other Reporting/Investigation Issues

1. Case report forms (GI Illness Worksheet and/or labs) DO NOT need to be mailed to NJDHSS as long as mandatory fields in CDRSS indicated in section B are completed.
2. Once LHD completes its investigation and assigns a report status of “LHD CLOSED,” NJDHSS will review the case. NJDHSS will approve the case by changing the report status to “DHSS APPROVED.” At this time, the case will be submitted to CDC and the case will be locked for editing. If additional information is received after a case has been placed in “DHSS APPROVED,” you will need to contact NJDHSS to reopen the case. This should be done only if the additional information changes the case status of the report.

3. Every effort should be made to complete the investigation within three months of opening a case. Cases that remain open for three months or more and have no investigation or update notes will be closed by NJDHSS.

6 CONTROLLING FURTHER SPREAD

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

Food handlers with yersiniosis must be excluded from work.

1. Minimum Period of Isolation of Patient

After their diarrhea has resolved, food handlers may return to work only after producing one negative stool specimen. If a case-patient has been treated with an antimicrobial agent, the stool specimen shall not be submitted until at least 48 hours after cessation of therapy.

In outbreak circumstances, a second consecutive negative stool specimen may be required before returning to work.

2. Minimum Period of Quarantine of Contacts

Contacts with diarrhea who are food handlers shall be considered the same as case-patients and handled in the same fashion. No other restrictions need to be implemented otherwise.

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

B. Protection of Contacts of a Case

None.

C. Managing Special Situations

1. Daycare

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

- Children with *Yersinia* infection who have diarrhea should be excluded until their diarrhea has resolved.
- Children with *Yersinia* infection who have no diarrhea and are not otherwise ill may remain in the program if special precautions are taken (see below in section 8, “Personal Preventive Measures/Education”).

- Because most staff in childcare programs are considered to be food handlers, those with *Yersinia* in their stools (symptomatic or not) can remain on site, but must not prepare food or feed children until their diarrhea has resolved and they have one negative stool test (taken at least 48 hours after completion of antibiotic therapy, if antibiotics are given).

2. School

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

- Students or staff with *Yersinia* infection who have diarrhea should be excluded until their diarrhea has resolved.
- Students or staff with *Yersinia* infection who do not handle food, have no diarrhea or have mild diarrhea, and are not otherwise sick may remain in school if special precautions are taken (see below, “Personal Preventive Measures/Education”).
- Students or staff who handle food and have *Yersinia* infection (symptomatic or not) must not prepare food until their diarrhea has resolved and they have one negative stool test (taken at least 48 hours after completion of antibiotic therapy, if antibiotics are given).

3. Community Residential Programs

Actions taken in response to a case of yersiniosis 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 yersiniosis should be placed on standard (including enteric) precautions until their symptoms subside and they have one negative test for *Yersinia*. 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 *Yersinia* 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 yersiniosis must refrain from handling or preparing food for other residents until their diarrhea has subsided and they have one negative stool test for *Yersinia* (submitted at least 48 hours after completion of antibiotic therapy, if antibiotics are given). In addition, staff members with *Yersinia* infection who are not food handlers should not work until their diarrhea has resolved.

If an outbreak is detected or suspected in a long-term care facility or community residential program, the facility must report the outbreak to its LHD. Facility management should also report any such outbreak to the Division of Long-Term Care Compliance and Surveillance Program of Department of Health and Senior Services by telephone 800.792.9770 or fax 609.633.9060.

7 OUTBREAK SITUATIONS

If the number of reported cases of yersiniosis in a city is higher than usual, or if an outbreak is suspected, investigate to determine the source of infection and mode of transmission. A common vehicle (such as 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 NJDHSS IZDP at 609.588.7500. The Program staff can help determine a course of action to prevent further cases and can perform surveillance for cases that may cross several jurisdictions and therefore be difficult to identify at a local level.

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 IZDP and the 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). FDSP may be reached at 609.588.3123.

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 hazard analysis and critical control point risk assessment, initiating enforcement actions, and collecting food samples.

B. Personal Preventive Measures/Education

To avoid exposure, 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 touching their pets or other animals.
- In a daycare setting, dispose of feces in a sanitary manner.
- After changing diapers, wash the child's hands as well as their own.
- Keep food that will be eaten raw, such as vegetables, from becoming contaminated by animal-derived food products.
- Avoid letting infants or young children touch pets (especially puppies and kittens) that are sick with diarrhea.
- Make sure to thoroughly cook all food products from animals, especially pork products.

- Avoid sexual practices that may permit fecal-oral transmission. Latex barrier protection should be emphasized as a way to prevent the spread of yersiniosis to sexual partners as well as to prevent the exposure to and transmission of other pathogens.

Additional Information

Additional information can be obtained from the FDA's Center for Food Safety and Applied Nutrition Web site at www.cfsan.fda.gov.

A *Yersiniosis Fact Sheet* can be obtained at the NJDHSS Web site at <http://www.state.nj.us/health>.

References

- American Academy of Pediatrics 2000 *Red Book: Report of the Committee on Infectious Diseases*. Pickering LK, ed. 25th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2000.
- Centers for Disease Control and Prevention. *Yersinia enterocolitica*: frequently asked questions. Available at: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/yersinia_g.htm. Accessed June 2007.
- Chin J, ed. *Control of Communicable Diseases Manual*. 17th ed. Washington, DC: American Public Health Association; 2000.
- Mandell G, Bennett J, Dolin R, eds. *Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases*. 5th ed. Philadelphia, Pa: Churchill Livingstone; 2005.
- 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; Jamaica Plain, MA January 2001.