

# Yersiniosis

## Section 1

### ABOUT THE DISEASE

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#### A. Etiologic Agent

Yersiniosis is caused by gram-negative bacteria, *Yersinia enterocolitica* or *Yersinia pseudotuberculosis*. *Y. pseudotuberculosis* includes 6 serotypes with 4 subtypes; *Y. enterocolitica* has over 60 serotypes and 6 biotypes (strains). Many of these are considered to be non-pathogenic.

#### B. Clinical Description

The most common symptoms of yersiniosis are fever and diarrhea; stool often contains blood, mucus, and leukocytes. The disease may also present as enterocolitis and acute mesenteric lymphadenitis, mimicking appendicitis. Complications can include systemic infections, post-infectious arthritis, and erythema nodosum. Abdominal pain is usually seen with yersiniosis caused by *Y. pseudotuberculosis*, while enterocolitis is more commonly seen with *Y. enterocolitica*.

#### C. Vectors and Reservoirs

The reservoir for *Yersinia* is primarily animals: notably, pigs for *Y. enterocolitica*, and birds, rodents and other small mammals for *Y. pseudotuberculosis*.

#### D. Modes of Transmission

*Yersinia* are acquired by ingestion of contaminated food or water, by contact with infected animals, or rarely, through person-to-person transmission. Pathogenic strains of *Y. enterocolitica* have been isolated from raw pork and pork products, such as cold cuts. There has also been nosocomial transmission and transmission via transfusion of blood products from donors with asymptomatic or mild infection.

#### E. Incubation Period

The incubation period is generally less than 10 days, and averages 3–7 days.

#### F. Period of Communicability or Infectious Period

The disease is communicable for as long as the infected person excretes *Yersinia* in stool, which is at least as long as symptoms exist (approximately 2-3 weeks); untreated cases may shed for as long as three months. Children and adults have been reported with prolonged asymptomatic carriage.

#### G. Epidemiology

Yersiniosis occurs worldwide, with the highest *Yersinia* isolation rates reported during the cold season in temperate climates (including North America). *Y. pseudotuberculosis* is primarily a zoonotic disease with humans as incidental hosts. The most important source of infection with *Y. enterocolitica* may be pork.

Approximately two-thirds of the reported *Y. enterocolitica* cases occur in infants and children, while three-fourths of *Y. pseudotuberculosis* cases are reported among 5–20 year olds. Cases of yersiniosis have been associated with disease in household pets.

## H. Bioterrorist Potential

This pathogen is not considered to be of risk for use in bioterrorism.

## Section 2

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### REPORTING CRITERIA AND LABORATORY TESTING

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

Report any evidence of *Y. enterocolitica* or *Y. pseudotuberculosis* from the patient's blood or feces.

*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 *Yersinia* and will perform confirmatory testing and speciation on isolates. In addition, the MA SPHL requests submission of all *Yersinia* isolates for further testing for disease surveillance purposes. For more information about testing and specimen submission, contact the MA SPHL at (617) 983-6607.

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.

## Section 3

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### 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

Yersiniosis is reportable to the local board of health (LBOH). The MDPH requests that health care providers immediately report to the LBOH in the community where the case is diagnosed, all confirmed or suspect cases of yersiniosis, as defined by the reporting criteria in Section 2A.

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of *Yersinia* infection shall report such evidence of infection directly to the MDPH within 24 hours.

### C. Local Board of Health (LBOH) Reporting and Follow-Up Responsibilities

#### Reporting Requirements

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MDPH regulations (*105 CMR 300.000*) stipulate that yersiniosis is reportable to the LBOH and that each LBOH must report any case of yersiniosis or suspect case of yersiniosis, 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 LBOH 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

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It is the responsibility of the LBOH to complete all questions in each of the question packages in MAVEN 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 calling the case, review all the information in this 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 get the case or parent talking. If you are unable to answer a question they have, don't hesitate to call the Division of Epidemiology and Immunization at 617-983-6800 for assistance, and call them 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

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##### Administrative Question Package

Monitor your "Online LBOH Notification for non-Immediate Disease" workflow in MAVEN for any new cases of yersiniosis. 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 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.

#### Risk Exposure/Control & Prevention Question Package

Accurately record all risk questions regarding travel and consumption of any high risk foods like undercooked meat. As you enter data into MAVEN, additional questions will appear for you to answer regarding risk/exposure. Accurately capture any travel history and outdoor activities.

#### Completing Your Investigation

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1. If you are finished with your 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**

4. Institution of disease control measures is an integral part of case investigation. It is the responsibility of the LBOH to understand, and if necessary, institute the control guidelines listed in Section 4.

## **Section 4**

### **CONTROLLING FURTHER SPREAD**

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#### **A. Isolation and Quarantine Requirements (150 CMR 300.200)**

Food handlers with yersiniosis must be excluded from work.

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

#### *Minimum Period of Isolation of Patient*

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After their diarrhea has resolved, food handlers may return to work after producing one negative stool specimen. If a case has been treated with an antimicrobial, the stool specimen shall not be collected until at least 48 hours after cessation of therapy. In outbreak circumstances, a second consecutive negative stool specimen shall be required prior to returning to work.

#### *Minimum Period of Quarantine of Contacts*

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

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

### **B. Protection of Contacts of a Case**

None.

### **C. Managing Special Situations**

#### *Daycare*

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Since yersiniosis may be transmitted from 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:

- Infected children infection who have diarrhea should be excluded until their diarrhea is resolved.
- Infected children, 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 *Yersinia* in their stools (symptomatic or not) can remain on site, but must not prepare food or feed children until their diarrhea is gone and they have one negative stool specimen (taken at least 48 hours after completion of antibiotic therapy, if antibiotics are given) (per *105 CMR 300.200*).
- Notifying parents/guardians of attendees should be considered when cases of yersiniosis occur in children or staff. Licensed daycare facilities must notify all parents in accordance with MDPH recommendations when any communicable disease or condition has been introduced into the program (606 CMR 7.11). MDPH epidemiologists are available to help determine whether notification is recommended and sample letters are available from the Division of Epidemiology and Immunization at (617) 983-6800.

## *School*

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Since yersiniosis may be transmitted from person-to-person through fecal-oral transmission, it is important to carefully follow up on cases of yersiniosis in a school setting. Chapter 8 of the MDPH [Comprehensive School Health Manual](#) provides detailed information on case follow-up and control of diseases spread through the intestinal tract in a school setting. General recommendations include:

- Infected students or staff who have diarrhea should be excluded until their diarrhea is resolved.
- Infected students or staff who do not handle food, who have no diarrhea or have mild diarrhea, and who are not otherwise sick, may remain in school if special precautions are taken.
- Students or staff who handle food and have *Yersinia* infection (symptomatic or not) must not prepare food until their diarrhea is resolved and they have one negative stool specimen (taken at least 48 hours after completion of antibiotic therapy, if antibiotics are given) (per *105 CMR 300.200*).
- The school nurse and school physician should consult with the LBOH and the MDPH epidemiologists to determine whether some or all parents/guardians and staff should be notified. Parent/guardian notification should be discussed with the school administrator prior to initiation. Sample letters are available from the Division of Epidemiology and Immunization at (617) 983-6800.

## *Community Residential Programs*

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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 maintained on standard (including enteric) precautions until their symptoms subside and they have one negative stool specimen for *Yersinia*. Refer to the MDPH Division of Epidemiology and Immunization Long Term Care Infection Control Guidelines <http://www.mass.gov/eohhs/gov/departments/dph/programs/id/epidemiology/providers/infection-control.html> for further actions. 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 *Yersinia* 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 yersiniosis must refrain from handling or preparing food for other residents until their diarrhea has subsided and they have one negative stool specimen for *Yersinia* (collected at least 48 hours after completion of antibiotic therapy, if antibiotics are given per *105 CMR 300.200*). In addition, staff members with *Yersinia* infection who are not food handlers should not work until their diarrhea is gone.

## *Reported Incidence Is Higher Than Usual/Outbreak Suspected*

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If the number of reported cases of yersiniosis 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 or venue (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 the epidemiologist on-call at the MDPH Division of Epidemiology and Immunization at (617) 983-6800. MDPH 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.

*Note: Refer to the MDPH Foodborne Illness Investigation and Control Reference Manual for comprehensive information on investigating foodborne illness complaints and outbreaks*

<http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/food-safety/foodborne-illness/tools/foodborne-illness-investigations-and-control.html>. For the most recent changes to the Massachusetts Food Code, contact the Food Protection Program (FPP) at (617) 983-6712 or through the MDPH website at [www.mass.gov/dph/fpp](http://www.mass.gov/dph/fpp).

## D. Preventive Measures

### *Environmental Measures*

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Implicated food items must be removed from consumption. A decision about testing implicated food items can be made in consultation with the Food Protection Program (FPP) or the MDPH Division of Epidemiology and Immunization. The FPP can help coordinate pick-up 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 food samples implicated in suspected outbreaks, not those implicated 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.

### *Personal Preventive Measures/Education*

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To avoid 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.
- Wash the child's hands as well as their own hands after changing a child's diapers, and dispose of the diaper in a sanitary manner.
- When caring for someone with diarrhea, scrub their hands with plenty of soap and water after cleaning the bathroom, after helping the person use the toilet, or after changing diapers, soiled clothes, or soiled sheets.

- 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 or have diarrhea.
- Make sure to cook all food products from animals thoroughly, especially pork products.

Discuss transmission risks that may result from oral-anal sexual contact. Latex barrier protection (e.g., dental dam) may prevent the spread of yersiniosis to a case's sexual partners as well as help prevent exposure to and transmission of other fecal-oral pathogens.

## Section 5

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### ADDITIONAL INFORMATION

There is no Centers for Disease Control and Prevention (CDC) surveillance case definition for yersiniosis. For reporting to the MDPH, always use the criteria outlined in Section 2A of this chapter.

### REFERENCES

American Academy of Pediatrics. [*Yersinia enterocolitica* and *Yersinia pseudotuberculosis* Infections.] In: Pickering L.K., ed. *Red Book: 2015 Report of the Committee on Infectious Diseases, 30th Edition*. Elk Grove Village, IL, American Academy of Pediatrics; 2015: 868-870.

Heymann, D., ed. *Control of Communicable Diseases Manual, 20th Edition*. Washington, DC, American Public Health Association, 2015.

"*Yersinia* General information." Centers for Disease Control and Prevention. November 10, 2009. <http://www.cdc.gov/nczved/divisions/dfbmd/diseases/yersinia/>