



Health and
Wellness

Prince Edward Island Guidelines for the Management and Control of Yersiniosis

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Department of Health and Wellness
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Yersiniosis

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Yersiniosis

Case Definition ¹

Confirmed Case

Laboratory confirmation, with or without clinical illness*:

- Isolation of *Yersinia* spp. (excluding *Yersinia pestis*) from an appropriate clinical specimen (e.g., stool, blood, rectal swab).^a

Probable Case

- Clinical illness in a person who is epidemiologically linked to a confirmed case
- OR**
- Detection of *Yersinia* spp. nucleic acid with or without clinical illness, in an appropriate clinical specimen (dependent on the test used) using a nucleic acid test (NAT), such as a polymerase chain reaction (PCR).^b

Note: Culture is required for public health and clinical management. Thus, culture must be performed on NAT-positive (NAT+) specimens to enable molecular typing (e.g., whole genome sequencing [WGS]) for surveillance, outbreak detection and response, as per [Canadian Public Health Laboratory Network \(CPHLN\) guidance](#). An isolate may also be required for antimicrobial susceptibility testing (AST) and/or antimicrobial resistance (AMR) predictions to guide clinical treatment and/or for AMR surveillance.

Note: NAT-positive (NAT+) and culture-negative (culture–) results would still be considered a probable case.

*Clinical illness typically manifests as acute febrile diarrhea, enterocolitis (fever, bloody diarrhea, severe abdominal pain), or acute mesenteric lymphadenitis mimicking appendicitis. Infection can be complicated by erythema nodosum, postinfectious arthritis, and systemic infection.

^a The confirmed case definition excludes *Y. pestis*, as this species is associated more with the “Plague” vs “Enteric Illness”. The confirmed case definition includes “stool” and “blood” as examples of appropriate clinical specimens, based on guidance from the Heymann Control of Communicable Diseases Manual (21st ed, 2022). It also includes “rectal swab” as this specimen type was included for all bacterial enteric pathogens. The confirmed case definition generalizes to *Yersinia* spp. as there is a vast diversity of *Yersinia* species that have been reported to the National Enteric Surveillance Program (NESP) (i.e., *Y. bercovieri*, *Y. enterocolitica*, *Y. frederiksenii*, *Y. intermedia*, *Y. kristensenii*, *Y. massiliensis*, *Y. mollaretii*, *Y. pseudotuberculosis*, *Y. rohdei*) (NESP Annual Reports, 2018 – 2020).

^b The probable case definition includes NAT, to facilitate a phased incorporation/use of NATs. • *Yersinia* serology and antigen testing were excluded from both case definitions, as their current performance characteristics do not merit their inclusion at this time. • Note that the current sensitivity and specificity of NATs for detection of yersiniosis are debated in the scientific literature; thus, a culture result would be crucial to confirm the case as yersiniosis.

Reporting Requirements

Laboratories

The Provincial Laboratory shall in accordance with the Prince Edward Island *Public Health Act*², report all positive laboratory results by phone and mail, fax, or electronic transfer as soon as the result is known to the Chief Public Health Officer (CPHO) (or designate).

Etiology³

Yersiniosis is an acute bacterial enteric disease caused by a gram-negative bacillus. There are two types of *Yersinia* which cause gastrointestinal illness: *Y. pseudotuberculosis* and *Y. enterocolitica*. *Y. enterocolitica* is the most common isolate in Canada. *Y. pseudotuberculosis* is the least likely to cause infection.

Yersini are susceptible to many disinfectants as well as moist and dry heat. Outside of the host, *Yersinia* can survive for up to 20 days in water and 540 days in soil.

Clinical Presentation

Yersiniosis is an acute bacterial enteric disease with a variety of presentations. Enterocolitis occurs in approximately two-thirds of reported cases of *Y. enterocolitica*. Infection is characterized by fever, diarrhea, and abdominal pain lasting 1 to 3 weeks. Nausea and vomiting occur in up to 40% of cases. There may be perforation of the ileum and rectal bleeding. In persons who develop mesenteric adenitis and/or terminal ileitis, high fever, leukocytosis, and right lower quadrant pain and tenderness occur. Many cases are misdiagnosed as acute appendicitis. The majority of cases of enterocolitis syndrome occur in young children. Mesenteric adenitis and terminal ileitis are more common in older children and adults.

Complications of infection with *Yersinia* include polyarthritits, erythema nodosum, exudative pharyngitis, and septicemia. Focal infections, abscess formation, and bacteremia may occur in individuals with predisposing conditions.

Diagnosis

Yersinia can be recovered from feces, throat swabs, mesenteric lymph nodes, peritoneal fluid, blood, vomit, and contaminated food. Stool cultures are generally positive during the first two weeks of illness. It is important that laboratories be notified that *Yersinia* infection is suspected as identification from stool specimens requires specific techniques.

Serology may be utilized as there can be difficulties in isolating *Yersinia* from feces. ELISA and agglutination tests may be ordered. The antibodies (against the O antigen) appear soon after

the onset of illness and wane over two to six months. Paired sera specimens taken two weeks apart indicating a rise in agglutinating antibodies can support the diagnosis.

Epidemiology³

1. Reservoir

Fresh water, contaminated food, wild and domestic animals (particularly pigs) including household pets (dogs and cats) are the principal reservoirs of *Y. enterocolitica*.

Y. pseudotuberculosis is a zoonotic disease of wild and domestic birds and mammals including turkeys, ducks, geese, pigeons, pheasants, and canaries. Humans are incidental hosts of *Yersinia* infection.

2. Transmission

Transmission of *Yersinia* is principally fecal-oral, by hand to mouth transfer of organisms following the handling of contaminated animals (and carcasses), ingestion of contaminated food and water, and very rarely by the transfusion of contaminated blood. Raw pork and pork products are known sources of infection. Fecal-oral transmission may account for reports of secondary infections in households. Advise that meat should not be refrigerated for long periods of time before consumption. *Y. enterocolitica* is able to multiply under refrigeration and microaerophilic conditions.

3. Incubation Period

The incubation period is most often 3 to 7 days, generally less than 10 days.

4. Period of Communicability

Fecal shedding occurs as long as symptoms persist, usually 2 to 3 weeks. If untreated, individuals may shed for 2 to 3 months. Prolonged asymptomatic carriage has been reported.

5. Host susceptibility

Universal susceptibility. The infection is generally more severe in children. People with excessive iron storage syndromes have a higher susceptibility to *Yersinia* bacteremia because the iron binding agents enhance the growth of the organism. The most susceptible populations for disease and possible complications are the very young, the debilitated, the very old, and immunocompromised individuals.

Occurrence

1. General

The highest rates are reported in cooler climates and occur more often in winter than summer. Yersiniosis is a common disease in Northern Europe, Scandinavia, and Japan. The majority of cases are related to the ingestion of raw or undercooked pork or pork products. Approximately 65% of *Y. enterocolitica* infections occur in infants and young children. The most common serotypes identified in Europe are O3 and O9 and, in Canada and the US, the most common types are O3 and O8 respectively. Five to 20 year olds account for approximately 75% of *Y. pseudotuberculosis*. Males are affected three times as often as females.

2. Canada

The number of cases is unknown as Yersiniosis is not a nationally notifiable disease.

3. Prince Edward Island

Yersiniosis has an uncommon occurrence on PEI.

Control

1. Management of a case

- All cases should be instructed about disease transmission and appropriate personal hygiene.
- Exclusion should be considered for symptomatic persons who are:
 - food handlers whose work involves:
 - touching unwrapped food to be consumed raw or without further cooking and/or
 - handling equipment or utensils that touch unwrapped food to be consumed raw or without further cooking
 - healthcare, daycare or other staff who have direct contact, or contact through serving food, with highly susceptible patients or persons, in who an intestinal infection would have particularly serious consequences
 - involved in patient care or care of young children, elderly or dependent persons
 - children attending daycares or similar facilities who are diapered or unable to implement good standards of personal hygiene, and
 - older children or adults who are unable to implement good standards of personal hygiene (e.g., mentally, or physically challenged).
- Exclusion applies until at least 48 hours after diarrhea has resolved or antibiotic therapy is complete.

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- Asymptomatic individuals who are indicated in the above categories are generally not excluded from work or daycare however the decision to exclude will be made by the CPHO.
- Reassignment to a low-risk area may be used as an alternative to exclusion.
- Contact precautions should be used in healthcare settings where children or adults have poor hygiene or incontinence which cannot be contained. Otherwise, routine practices are adequate.
- Public Health Nursing, Health PEI, will follow up all confirmed cases and environmental health officers may be consulted on cases as appropriate.

2. Treatment of a case

- Most infections are self-limited. Antibiotics should be given for severe cases. *Y. enterocolitica* isolates are usually susceptible to trimethoprim-sulfamethoxazole, aminoglycosides, third-generation cephalosporins, fluoroquinolones, and tetracyclines.
- They are typically resistant to first-generation cephalosporins and most penicillins.
- Antimicrobial therapy has no effect on postinfectious sequelae.

3. Management of contacts

- Contacts should be instructed about disease transmission and appropriate personal hygiene.
- Symptomatic contacts should be assessed by a physician.
- Contacts who are symptomatic may be excluded from daycare or similar facilities or occupations involving food handling, patient care or care of young, elderly, or dependent persons as per CPHO assessment.
- Asymptomatic contacts, in general, are not excluded from work or daycare however the decision to exclude will be made by the CPHO.

4. Preventative measures

- Provide public education about personal hygiene, especially the sanitary disposal of feces and careful hand washing after defecation and sexual contact, and before and after food handling, especially after handling pork or before eating food.
- Educate food handlers about proper food and equipment handling and hygiene, especially in avoiding cross-contamination from raw meat products and thorough hand washing.
- Educate the public on the dangers of consuming raw or undercooked meats, unpasteurized milk, and contaminated water.
- Advise that meat should not be refrigerated for long periods of time before consumption. *Y. enterocolitica* is able to multiply under refrigeration and microaerophilic conditions.

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- Test private water supplies for presence of bacterial contamination, if suspected.
- Educate high risk groups to avoid sexual practices that may permit fecal-oral contact.

References

1. Public Health Agency of Canada. (2023, December). National case definition: *Yersiniosis*.
2. Public Health Act of Prince Edward Island. Legislative Assembly of PEI. May 2022
https://www.princeedwardisland.ca/sites/default/files/legislation/p-30-1-public_health_act.pdf
3. Heymann, David L. 2015. *Control of Communicable Diseases Manual 20th Edition*. Washington : American Public Health Association, 2015.