

Yersiniosis

Surveillance Protocol

Provider Responsibilities

1. Report all cases to your local health department within the timeframe indicated:
Sporadic case of Yersiniosis – should be reported within 72 hours of diagnosis

Outbreaks of Yersiniosis – should be reported immediately (see definition of outbreaks in public health action section).

Laboratory Responsibilities

1. Report all positive *Yersinia enterocolitica* tests to the local health department in the patient's county of residence within 72 hours of result. Send or fax a copy of the laboratory result to the local health department in the county of residence of the case patient.
2. Submit all isolates to the Office of Laboratory Services (OLS) for further testing at 167 11th Avenue, South Charleston, WV 25303. Telephone (304) 558-3530. For forms and other information, visit www.wvdhhr.org/labservices

Public Health Action

For investigation of sporadic cases

Initial report must be filed within 72 hours of first notification.

1. Complete the WVEDSS Foodborne Disease Reporting Form. Use of the WVEDSS Foodborne Disease Reporting Form will prompt a complete and appropriate investigation, to include:
 - Exposure to animals, including farm animals, puppies, and kittens
 - Three day food history
 - Identification of high-risk persons or symptomatic individuals for further investigation
 - Identification of specific behaviors that may be associated with *Yersinia* infection

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2. Identify other cases, including probable cases (symptomatic persons who are epidemiologically linked to a culture-confirmed case), and investigate completely as in above.
3. Enter case investigation and laboratory information into WVEDSS. Print a copy and store according to your local records retention policies. Mail or fax a copy of the laboratory report to IDEP.
4. Institute appropriate control measures:

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 day care setting. **If the case patient works in or attends a day care facility:**

- Exclude symptomatic day care attendees.
- Exclude symptomatic individuals who are involved in care of young children.
- Since most staff in childcare programs are considered food handlers, exclude symptomatic individuals from preparing food or feeding children until their symptoms are resolved.
- Exclude asymptomatic employees with questionable hygiene habits from preparing food, feeding children or caring for young children.
- Interview the manager/operator and check attendee records to identify suspect cases that occurred within the past month.
- Provide educational information to the manager/operator and staff regarding proper food handling and hand washing, especially after changing diapers.
- Conduct an environmental inspection if there are any other suspected cases.
- Instruct the manager/operator to notify the local health department if new cases of diarrhea occur.

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If the case is a food handler:

- Conduct an environmental inspection of the facility. Interview the manager/operator and check attendee records to identify suspect cases that occurred in the previous month. Ask if there have been any complaints from any patrons during the past month.
- Exclude symptomatic individuals who are involved in food handling as per the food code (Refer to SF-7D).
- Exclude asymptomatic individuals with questionable hygienic habits.
- Asymptomatic food handlers with adequate hygienic habits do not need to be excluded but should be counseled on the importance of good handwashing, personal hygiene, and removing themselves from working and notifying their supervisor whenever they have diarrheal illness.
- Excluded food handlers should only return to work after symptoms resolve.

If the case works at a health care or residential care facility:

- Exclude symptomatic individuals who are involved in direct patient care until symptoms resolve.
- Asymptomatic individuals with adequate hygienic habits do not need to be excluded but should be counseled on the importance of good handwashing, personal hygiene, and removing themselves from working and notifying their supervisor whenever they have diarrheal illness.
- Identify any abnormal incidence of diarrheal illness within the past month. If so, identify any common source outbreaks or sources of exposure.
- Conduct an environmental inspection of the facility if additional cases are identified.

For investigation of a suspected outbreak

Outbreak is defined as greater than expected numbers of cases reported during a certain time frame, OR, 2 or more epidemiologically-linked cases from 2 or more households.

Foodborne Disease Outbreak is defined as two or more persons who experience a similar illness after ingestion of a common food. Please note

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exceptions: one case of botulism, *Vibrio cholerae*, or chemical poisoning constitutes an outbreak.

1. Obtain case histories of preliminary reports as in sporadic cases above. Focus on possible common source exposures.
2. Verify the diagnosis.
3. Gather a 72 hour food history and history of commonly associated exposures for 2 weeks prior to onset of illness.
4. Contact IDEP and notify of suspected outbreak.
5. Consult outbreak investigation protocol for complete instructions on investigation of an outbreak, which can be found at:
http://www.wvidep.org/Portals/31/PDFs/IDEP/Outbreaks/Outbreak%20Investigation%20protocol_2008.pdf

Epidemiologic investigations may be necessary in cases involving common sources, day care centers, or institutions. Consult with an epidemiologist at IDEP if a common source outbreak is suspected.

Disease Control Objectives

Reduce the incidence of secondary cases of Yersiniosis by:

- Appropriate investigation of outbreaks and clusters to identify and remove any common source of disease.
- Identification and exclusion of cases and probable cases (symptomatic epi-linked contacts) from high-risk settings such as daycare and food preparation.
- Identify cases which might be a source of infection for other persons (e.g. a diapered child, daycare attendee, or foodhandler) and prevent further transmission.
- Identify transmission sources of public health concern (e.g. restaurant or a contaminated water supply) and stop transmission from such sources.

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Disease Prevention Objectives

Reduce the incidence of Yersiniosis by education of the general public to:

- Practice good hand washing as a primary means of preventing person-to-person transmission
- Practice proper food handling, including thorough cooking of meats (especially pork), washing of fruits and vegetables prior to consumption, and avoidance of cross-contamination
- Avoid unsafe foods, such as raw pork or unpasteurized milk
- Practice proper handling of animals followed by thorough handwashing; dispose of human, dog, and cat feces appropriately
- Control rodents and birds
- Protect water supplies from animal and human feces; purify water appropriately
- During slaughter, remove the head and neck of pigs from the body to avoid contaminating meat from the heavily colonized pharynx

Disease Surveillance Objectives

- Determine the incidence of Yersiniosis in West Virginia
- Identify demographic characteristics of persons with Yersiniosis
- Identify behavioral risk factors associated with Yersiniosis
- Determine the proportion of isolates sent to OLS for further testing

Public Health Significance

Yersinia enterocolitica and *Yersinia pseudotuberculosis* are the two species that cause most yersiniosis infections. *Yersinia* infections are uncommon in the United States. *Yersinia pseudotuberculosis* is primarily a zoonotic disease of wild birds and mammals. The primary source of *Yersinia enterocolitica* appears to be pigs, as the pharynx of pigs can be heavily colonized with the organism. Globally, *Yersinia enterocolitica* is the species most commonly associated with human infection. Human cases have been reported in association with disease in household pets, particularly puppies and kittens.

Clinical Description

Infection caused by enteropathogenic *Yersinia* is typically manifested by acute febrile diarrhea with abdominal pain, especially in young children. Relapsing disease and rarely necrotizing enterocolitis have been described. Other clinical

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manifestations include a pseudoappendicitis syndrome (fever, abdominal pain, right lower quadrant tenderness and leucocytosis) which occurs most frequently in older children and adults. Bacteremia can also manifest and most often occurs in children under 1 year of age and in older children with predisposing conditions, such as excessive iron storage and immunosuppressive states.

Focal manifestations are uncommon, but may include pharyngitis, meningitis, osteomyelitis, pyomyositis, conjunctivitis, pneumonia, empyema, endocarditis, acute peritonitis, abscesses of the liver and spleen, and primary cutaneous infection. Post-infection complications include erythema nodosum, proliferative glomerulonephritis, and reactive arthritis. Bloody diarrhea occurs in up to 25% of patients with *Yersinia* enteritis; however, diarrhea may be absent in up to 1/3 of *Yersinia enterocolitica* infections. Ileitis is the characteristic lesion induced by *Yersinia enterocolitica*.

Etiologic Agent

Yersinia is a gram negative bacillus with numerous serotypes, subtypes, and biotypes; however, many of them are non-pathogenic. The distribution of pathogenic biotypes of *Yersinia enterocolitica* varies geographically. Biotype 1B strains were responsible for most outbreaks in the United States. Since the 1990's, however, bioserotype 4/O3 emerged and is now the most common type.

Reservoir

Pigs are the main reservoir of *Yersinia enterocolitica*. *Yersinia pseudotuberculosis* is widespread among many avian and mammalian hosts, particularly rodents and other small mammals.

Mode of Transmission

Yersinia is transmitted via the fecal-oral route through consumption of contaminated food or water, or through contact with infected people or animals. It has been isolated from many foods, commonly from raw pork or pork products. It can multiply under refrigeration and microaerophilic conditions, and there is an increased risk of infection if uncured meat that was stored in plastic bags is undercooked. Nosocomial transmission has occurred, as has transmission by transfusion of stored blood from donors who were asymptomatic or had mild GI illness at the time of blood donation.

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Incubation Period

Probably 3 – 7 days, usually under 10 days.

Period of Communicability

Fecal shedding occurs at least as long as symptoms exist, usually for 2-3 weeks. Untreated cases may excrete the organism for 2-3 months. Prolonged asymptomatic carriage has been reported in both children and adults. Secondary transmission appears to be rare.

Outbreak Recognition

An outbreak is defined as greater than expected numbers of cases reported during a specific time frame or when clusters of *Yersinia* cases are reported. Since 20% of infections in older children and adolescents can mimic acute appendicitis, outbreaks can sometimes be recognized by local increases in appendectomies.

Highest isolation rates have been reported during the cold season in temperate climates, including northern Europe, North America, and temperate regions of South America. Vehicles implicated in outbreaks include soybean cake (tofu) and pork chitterlings (large intestine) in the United States, and feeding of raw pork to infants in Europe. Contamination through milk is less common.

Case Definition

Laboratory Criteria for Diagnosis

Isolation of *Yersinia enterocolitica* from a clinical specimen.

Case Classification

Confirmed: case that meets the laboratory criteria for diagnosis

Probable: case that is symptomatic and epi-linked to a confirmed case

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Preventive Interventions

- Wash hands well after using the toilet, cleaning the toilet, after changing diapers, and after handling soiled towels or linens.
- Wash hands well before, during, and after fixing food.
- Thoroughly cook all foods from animal sources, especially pork.
- After preparing raw meat, thoroughly wash and rinse all utensils, bowls, counters, and hands.
- Use a separate cutting board to prepare raw meats. Use a clean plate for cooked meat. Never return cooked meat to the same plate used for raw meat.
- Marinade or BBQ sauce used on raw meat should not be used on cooked meat.
- Thoroughly rinse or wash fruits and vegetables that will be eaten raw.
- Avoid the use of untreated manure as a fertilizer for fruits and vegetables.
- Drink only pasteurized milk and milk products.
- Keep food at proper refrigeration temperatures.
- Wash hands after handling pets, pet toys, pet feces, pet beds, and pet cages.
- Keep pets out of food preparation areas.
- Control rodents and birds.
- Protect water supplies from animal and human feces; purify appropriately.
- During the slaughter of pigs, the head and neck should be removed from the body to avoid contamination of the meat from the heavily colonized pharynx.

Treatment

Treatment may be indicated for GI symptoms, but is definitely indicated for septicemia and other invasive disease. The organisms are sensitive to many antibiotics, but are generally resistant to penicillin and its semisynthetic derivatives. Agents of choice are the aminoglycosides (gentamicin), SXT, the quinolones (ciprofloxacin), and tetracycline.

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Surveillance Indicators

- Proportion of investigations with complete demographic information
- Proportion of investigations with complete information on high-risk occupations
- Proportion of cases with complete risk factor investigation including three-day food history

References

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3. Aronson SS, Shope TR, ed. Managing Infectious Disease in Child Care and Schools. American Academy of Pediatrics; 2005: 27-29, 55-56.
4. Procedures to Investigate Foodborne Illness. 5th ed. International Association for Food Protection; 1999.

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