

# YERSINIA ENTEROCOLITICA (YERSINIOSIS)

Aetiology Epidemiology Diagnosis Prevention and Control  
Potential Impacts of Disease Agent Beyond Clinical Illness References

## AETIOLOGY

### **Classification of the causative agent**

*Yersinia enterocolitica* is a Gram-negative, zoonotic bacterium within the family *Enterobacteriaceae*. Clinical disease caused by *Y. enterocolitica* is termed yersiniosis. *Y. enterocolitica* is known for its role as a human enteric and foodborne pathogen, but it also commonly infects wildlife and domestic mammals.

### **Resistance to physical and chemical action**

Temperature: Immotile at 58-60°C; killed at -20°C

pH: Unable to grow <4.2 or >9.0

Chemicals/Disinfectants: Potassium sorbate; from most effective to least effective: acetic acid, lactic acid, citric acid, sulphuric acid

Survival: Facultatively anaerobic and relatively resistant to external factors; commonly resistant to penicillins due to beta-lactamase production

## EPIDEMIOLOGY

### **Hosts**

- Wild and domestic swine (most common)
- Wild and domestic canids
- Wild and domestic felines, including bobcats (*Felis rufus*)
- Wild and domestic horses
- Wild and domestic ovines
- Wild and domestic cervids
  - Farmed and wild deer (*Cervus elaphus*, *Dama dama*, *Odocoileus virginianus*)
  - Wapiti/Roosevelt elk (*Cervus canadensis roosevelti*)
- Rats (*Rattus rattus*), including brown rats (*R. norvegicus*)
- Senegal galagos/bush babies (*Galago senegalensis*)
- Humans (*Homo sapiens*)
- Nonhuman primates
  - Pottos (*Perodicticus potto*)
  - African green monkeys (*Chlorocebus aethiops ssp.*)
  - Woolly monkeys (*Lagothrix spp.*)
  - Black spider monkeys (*Ateles paniscus*)
  - Common marmosets (*Callithrix jacchus*)
  - Cottonhead tamarins (*Saguinus oedipus*)
  - Pigtailed macaques (*Macaca nemestrina*)

### **Transmission**

The epidemiology of *Y. enterocolitica* is not fully understood, but it is known to be shed in faeces (faecal-oral transmission).

## Sources

- Faeces and intestinal tracts of mammals (particularly swine), avian species, and ectotherms
- Contaminated (unchlorinated) water
- Contaminated feed and infected prey
- Soil

## Occurrence

*Y. enterocolitica* is found worldwide, predominantly in wild and domesticated swine. Although over 70 serotypes have been identified, their distributions have been known to be geographically restricted. For example, the bioserotype 4/O:3 strain is commonly found in Japan, Europe, Canada, and the United States.

For more recent, detailed information on the occurrence of this disease worldwide, see the OIE World Animal Health Information System - Wild (WAHIS-Wild) Interface [[http://www.oie.int/wahis\\_2/public/wahidwild.php/Index](http://www.oie.int/wahis_2/public/wahidwild.php/Index)].

## DIAGNOSIS

### Clinical diagnosis

The incubation period of *Y. enterocolitica* is between 3-10 days, and the infectious period is usually 2-3 weeks. Clinical signs in wild and domesticated mammals are highly variable and are dependent upon strain and bioserotype as well as host species (e.g., humans develop diarrhoeal disease more commonly). Infected animals may present with decreased thriftiness, diarrhoea, and dehydration. Livestock are not known to develop clinical signs aside from decreased thriftiness and sudden mortality.

*Y. enterocolitica* is an intracellular pathogen that survives within macrophages; infections may persist within lymph nodes and other lymphoid tissue for an extensive period of time. Specific invasion sites and survival times depend on a range of virulence factors. *Y. enterocolitica* produces a heat stable enterotoxin that causes diarrhoea in mammals, including humans.

### Lesions

- Mucohaemorrhagic diarrhoea
- Multifocal hepatic and splenic necrosis
- Mesenteric lymphadenopathy
- Ulcerative gastroenterocolitis

### Differential diagnoses

- Salmonellosis
- Shigellosis
- Appendicitis

### Laboratory diagnosis

#### Samples

*For isolation of agent*

- Faecal samples
- Whole blood
- Lymphoid tissue including tonsils
- Tongue

- Liver
- Heart
- Contaminated food

#### *Serological tests*

- Serum
- Whole blood

#### **Procedures**

##### *Identification of the agent*

- Recovery is facilitated by the use of Cefsulodin-Irgasan-Novobiocin (CIN) selective agar or *Y. enterocolitica* chromogenic agar (YECA)
  - If possible, isolates should be serotyped and/or bio-typed via biochemical assays
- Multiplex polymerase chain reaction (PCR)
- Pulsed-field gel electrophoresis (PFGE)
- Antigen capture enzyme-linked immunosorbent assay (ELISA)

##### *Serological tests*

- Antibody capture ELISA

## **PREVENTION AND CONTROL**

### **Sanitary prophylaxis**

- Refrain from feeding captive wildlife raw pork/game meat and undercooked chitlins
- Staff working with captive wildlife should practice good hand washing after contact with animals

### **Medical prophylaxis**

- No vaccination is available or recommended for wildlife

## **POTENTIAL IMPACTS OF DISEASE AGENT BEYOND CLINICAL ILLNESS**

### **Risks to public health**

- *Y. enterocolitica* is a zoonotic disease known to infect humans via ingestion of faeces-contaminated foods (raw and ready-to-eat) and/or handling undercooked meat, sewage-contaminated water, etc.
  - Due to the high prevalence of gastrointestinal illness, it serves as a major food safety concern, especially in low- and middle-income countries.
- Local or regional public health officials should be notified of clinical cases immediately

### **Risks to agriculture**

- If livestock facilities are infected, *Y. enterocolitica* can cause severe economic loss due to decreased thriftiness (meat production, milk production) and mortality. Developing countries are particularly at risk of economic consequences.

## **REFERENCES AND OTHER INFORMATION**

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<p>The OIE will periodically update the OIE Technical Disease Cards. Please send relevant new references and proposed modifications to the OIE Science Department (<a href="mailto:scientific.dept@oie.int">scientific.dept@oie.int</a>). Last updated 2019. Written by Marie Bucko and Samantha Gieger with assistance from the USGS National Wildlife Health Center.</p>
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