

SURVEILLANCE OF INFECTIOUS DISEASES

IN ANIMALS AND HUMANS IN SWEDEN 2022

*Chapter excerpt:
Yersiniosis*



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Reporting guidelines: Reporting guidelines were introduced in 2018 for those chapters related to purely animal pathogens. The guidelines build on experiences from several EU projects, and have been validated by a team of international experts in animal health surveillance. The aim is to develop these guidelines further in collaboration within the global surveillance community and they have therefore been made available in the form of a wiki on the collaborative platform GitHub (<https://github.com/SVA-SE/AHSURED/wiki>). Feel free to contribute!

Layout: The production of this report continues to be accomplished using a primarily open-source toolset. The method allows the source text to be edited independently of the template for the layout which can be modified and reused for future reports. Specifically, the chapter texts, tables and captions are authored in Microsoft Word and then converted to the LaTeX typesetting language using a custom package written in the R software for statistical computing. The package uses the pandoc document conversion software with a filter written in the lua language. Most figures and maps are produced using R and the LaTeX library pgfplots. Development for 2022 has focused on generalising the R package to accommodate conversion into formats other than LaTeX and PDF, with a focus on markdown files which can be published as HTML websites using the Quarto publishing system. The report generation R package and process was designed by Thomas Rosendal, Wiktor Gustafsson and Stefan Widgren.

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Yersiniosis

BACKGROUND

Bacteria of the genus *Yersinia* are associated with human and animal diseases and were first identified in the late 19th century and subsequently classified into a genus in the mid-20th century. Two enteropathogenic species of the genus are zoonotic: *Yersinia enterocolitica* and *Yersinia pseudotuberculosis*. Pigs are considered the main reservoir of *Y. enterocolitica*. *Yersinia* bacteria are widespread in nature, among which non-pathogenic strains are most frequent. The most common human pathogenic bioserotype is *Y. enterocolitica* 4/O:3.

Wild animals, especially rodents and birds are considered the principal reservoir of *Y. pseudotuberculosis*. Both *Y. enterocolitica* and *Y. pseudotuberculosis* are frequently found in pig tonsils and porcine intestinal contents. Infections caused by *Y. enterocolitica* are thought to be food-borne and pigs are considered the main source of infection. The sources and vehicles of *Y. pseudotuberculosis* infections in humans are not well understood but infections caused by consumption of contaminated carrots and iceberg lettuce have been described in Finland. *Yersinia* bacteria are destroyed by heating (pasteurisation and cooking) but can grow at refrigerator temperature and in vacuum and modified atmosphere packaging.

The most recent available information, from 2014–2015, indicates that the prevalence of *Y. enterocolitica* in the Swedish domestic pig population (30.5% of herds) is similar to that of other pig producing countries in Europe. Human yersiniosis is primarily a domestic infection with about three quarters of the cases reported to be infected in Sweden.

DISEASE

Animals

Pigs are asymptomatic intestinal carriers of pathogenic *Y. enterocolitica* and *Y. pseudotuberculosis*. Infection with *Y. pseudotuberculosis* in other animals may vary from asymptomatic to severe mesenteric lymphadenitis and lead to septicæmia and death. *Y. enterocolitica* has occasionally been isolated from cats and dogs with diarrhoea.

Humans

Y. enterocolitica causes gastrointestinal symptoms in humans ranging from mild self-limiting diarrhoea to acute mesenteric lymphadenitis, which might be difficult to differentiate from appendicitis. *Y. pseudotuberculosis* causes primarily abdominal pain, fever headache and erythema nodosum, a skin reaction. The infection can be complicated by long-term sequelae including reactive arthritis, uveitis and glomerulonephritis (kidney disease).

LEGISLATION

Animals

Y. enterocolitica and *Y. pseudotuberculosis* are not notifiable in animals.

Food

Detection of *Y. enterocolitica* and *Y. pseudotuberculosis* in food is not notifiable.

Humans

Yersiniosis (isolation or identification by PCR of *Y. enterocolitica* (other than biotype 1A) or *Y. pseudotuberculosis* from a clinical sample) is notifiable according to the Communicable Disease Act (SFS 2004:168 with the amendments of SFS 2022:217). Diagnosis of yersiniosis by serology is not notifiable.

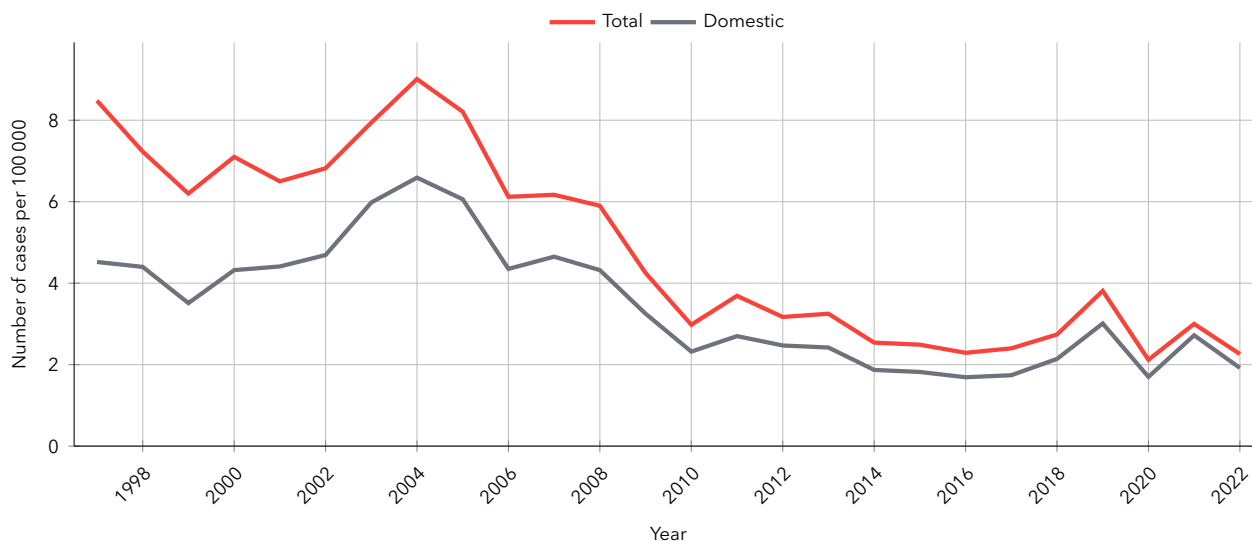


Figure 62: Notified incidence (per 100 000 inhabitants) of human cases of yersiniosis in Sweden, 1997–2022.

SURVEILLANCE

Animals

No active surveillance programme exists for *Yersinia spp.* in production animals. Some materials were submitted for routine health examinations or because of clinical disease, primarily from wildlife and zoo animals.

Food

No official control programme exists for *Yersinia spp.* National and local authorities may perform sampling as a part of extended official controls or targeted projects. Sampling may be performed by food business operators, but analysis results are not normally reported to the authorities.

Humans

The surveillance in humans is based on identification of the disease by treating physician and/or by laboratory diagnosis (i.e., passive surveillance). Both treating physicians and laboratories are obligated to report to the regional and national level to enable further analyses and adequate intervention measures.

RESULTS

Animals

In 2022, *Yersinia* species was isolated at the National Veterinary Institute (SVA) from 8 wild animals including 4 European hare, 1 fox, 1 crane, and 2 porpoises and 17 zoo animals including large felines, primates, canines, 1 brown bear and 1 Northern hawk-owl. A total of 62 animals including 9 wild animals and 57 zoo animals were investigated at SVA for *Yersinia spp.* during 2022.

Food

In 2022, two samples of carrots taken by local authorities were positive for *Y. enterocolitica* and *Y. pseudotuberculosis*.

Humans

During 2022, 238 cases were reported (2.3 cases per 100 000 inhabitants). This is similar to levels seen over the past decade except in 2019 and 2021 when major outbreaks occurred. The proportion of cases reported as infected in Sweden was 85% (Figure 62).

Like previous years, the incidence was highest among children younger than five years of age. The incidence was 5.7 cases per 100 000 inhabitants for infants and 5.3 for children 1–4 years old, compared to 2.3 for all cases. In 2022, the incidence was also higher than average among cases 25–29 years old (5.1).

Yersiniosis follows a minor seasonal variation with the highest number of cases infected during the summer and an additional increase in January. A similar pattern was also observed in 2022 although the variability between months was small (Figure 63). For the majority of cases, species was reported, with 169 being *Y. enterocolitica* and 17 *Y. pseudotuberculosis*.

The majority of yersiniosis cases are considered sporadic. However, *Yersinia spp.* is not part of the national microbial surveillance programme in Sweden. Therefore, there is no national monitoring of circulating subtypes and a limited ability to capture cross-regional outbreaks.

Outbreaks

No outbreaks in humans were identified in 2022.

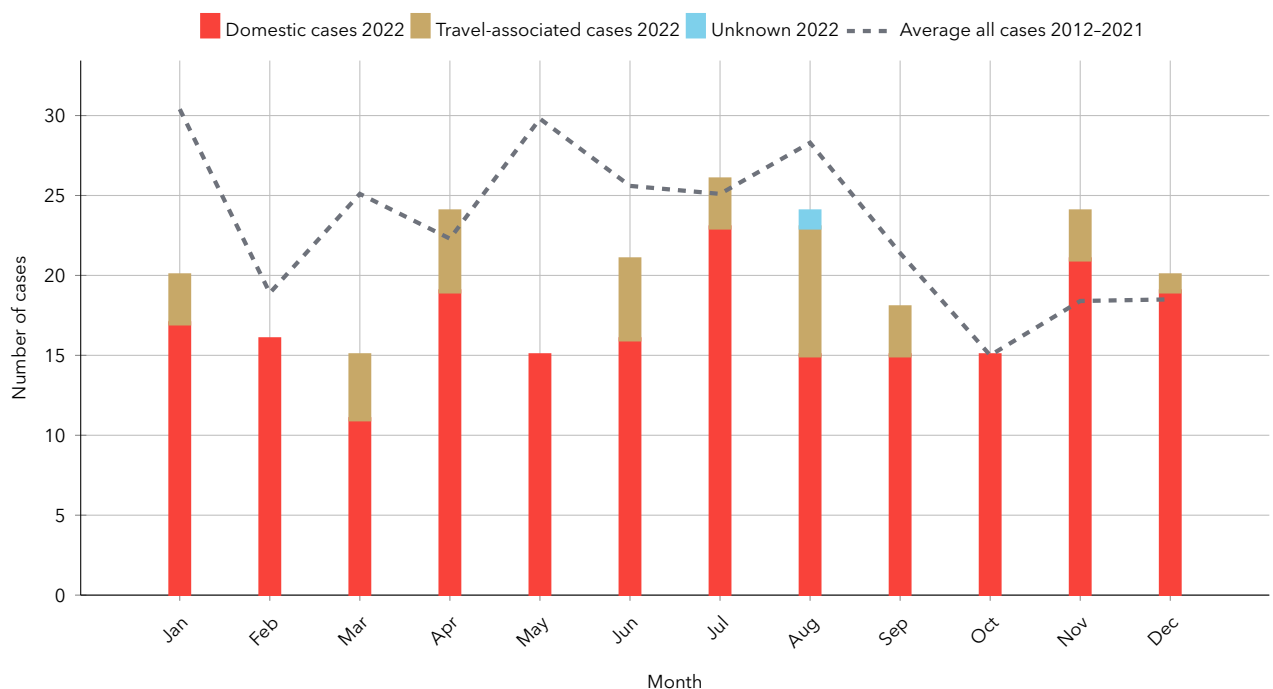


Figure 63: The monthly number of notified cases of yersiniosis of domestic, travel-associated and unknown country of origin in 2022 and the mean monthly number of all cases in 2012–2021.

DISCUSSION

In the beginning of the 2000s, the number of reported cases of yersiniosis decreased not only in Sweden but also in the other European countries. This decrease occurred without any active interventions in the food chain. In recent years, it has been difficult to assess any clear trend due to large outbreaks in 2019 and 2021 and the effects from the pandemic since 2020.

Yersiniosis in humans is considered foodborne and most infected cases are of domestic origin. Outbreaks in humans are rarely detected. Most infections are considered sporadic but under-reporting may be considerable. Case-control studies suggest that consumption of pork products is a risk factor, however vegetables should also be considered as a potential route for transmission as shown by a Swedish-Danish outbreak in 2019 linked to spinach (Espenhain et al., 2019) and a Swedish outbreak in 2021 likely caused by contaminated iceberg lettuce (National Veterinary Institute, 2022). Updated information on the prevalence of enteropathogenic *Yersinia* in Swedish production animals is lacking, the most recent in 2015. Similarly, recent studies in Swedish food have not been done. Good agricultural practices, as well as good slaughter hygiene and good manufacturing practices in food processing are essential for control of *Yersinia*.

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