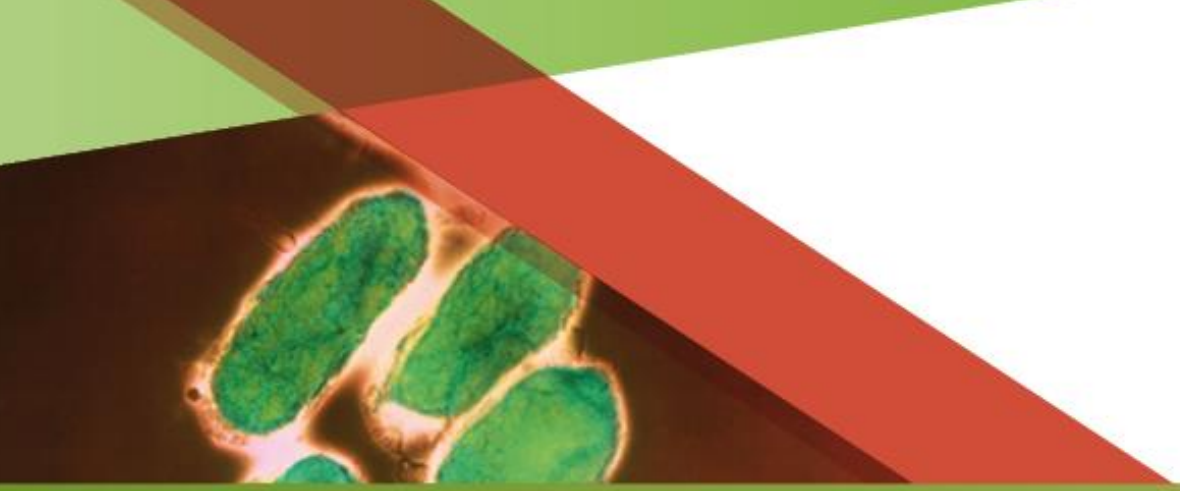


SURVEILLANCE REPORT

Yersiniosis

Annual Epidemiological Report for 2019

Key facts

- For 2019, 29 countries reported 7 048 confirmed yersiniosis cases in the EU/EEA.
- The overall notification rate of 1.7 per 100 000 population remained stable from 2015 to 2019.
- The highest rates were reported by Finland, Lithuania and Czechia.
- The highest rate was detected in 0–4 year-old children, with 7.2 per 100 000 population for males and 5.9 per 100 000 population for females.

Methods

This report is based on data for 2019 retrieved from The European Surveillance System (TESSy) on 5 October 2020. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases. For a detailed description of methods used to produce this report, please refer to the Methods chapter [1].

An overview of the national surveillance systems is available online [2].

A subset of the data used for this report is available through ECDC's online *Surveillance atlas of infectious diseases* [3].

This surveillance report is based on yersiniosis surveillance data collected by the European Food- and Waterborne Diseases and Zoonoses (FWD) Network. For 2019, yersiniosis data were reported by 29 EU/EEA countries. The notification of yersiniosis is mandatory in 23 EU/EEA countries, except for six Member States where notification is either voluntary (Belgium, France, Greece, Italy and Luxembourg) or based on another type of system (the United Kingdom). No yersiniosis surveillance system exists in the Netherlands. The surveillance systems for yersiniosis infections have national coverage in all reporting countries except for three: France, Italy and Spain. For these three countries no estimate for population coverage was provided, so no notification rates were calculated. Greece reported data on laboratory-confirmed cases collected from public hospitals from 2018 onwards. For 2019, Spain did not receive data from all regions that normally report and the case numbers are therefore lower than expected. Four countries used the latest (EU 2018) case definition, thirteen countries used the one from 2012, six countries used the 2008 case definition, five countries reported using another case definition and one country did not specify. The majority of countries (25) undertook passive surveillance and in 21 countries, cases were reported by both laboratories and physicians and/or hospitals. All countries provided case-based data except Belgium, Bulgaria and Greece, which reported aggregated data. Both reporting formats were included when calculating numbers of cases, notification rates, disease trends, and distributions by age and gender.

Suggested citation: European Centre for Disease Prevention and Control. Yersiniosis. In: ECDC. Annual epidemiological report for 2019. Stockholm: ECDC; 2021.

Stockholm, January 2021

Epidemiology

For 2019, 7 048 confirmed cases of yersiniosis (caused by *Yersinia enterocolitica* and *Y. pseudotuberculosis*) were reported by 29 EU/EEA countries with an overall rate of 1.7 cases per 100 000 population. As in previous years, Germany accounted for the highest number of cases, followed by France. These two countries accounted for 47% of all confirmed yersiniosis cases in the EU/EEA. Finland had the highest rate of 7.4 per 100 000 population, followed by Lithuania and Czechia (Table 1, Figure 1).

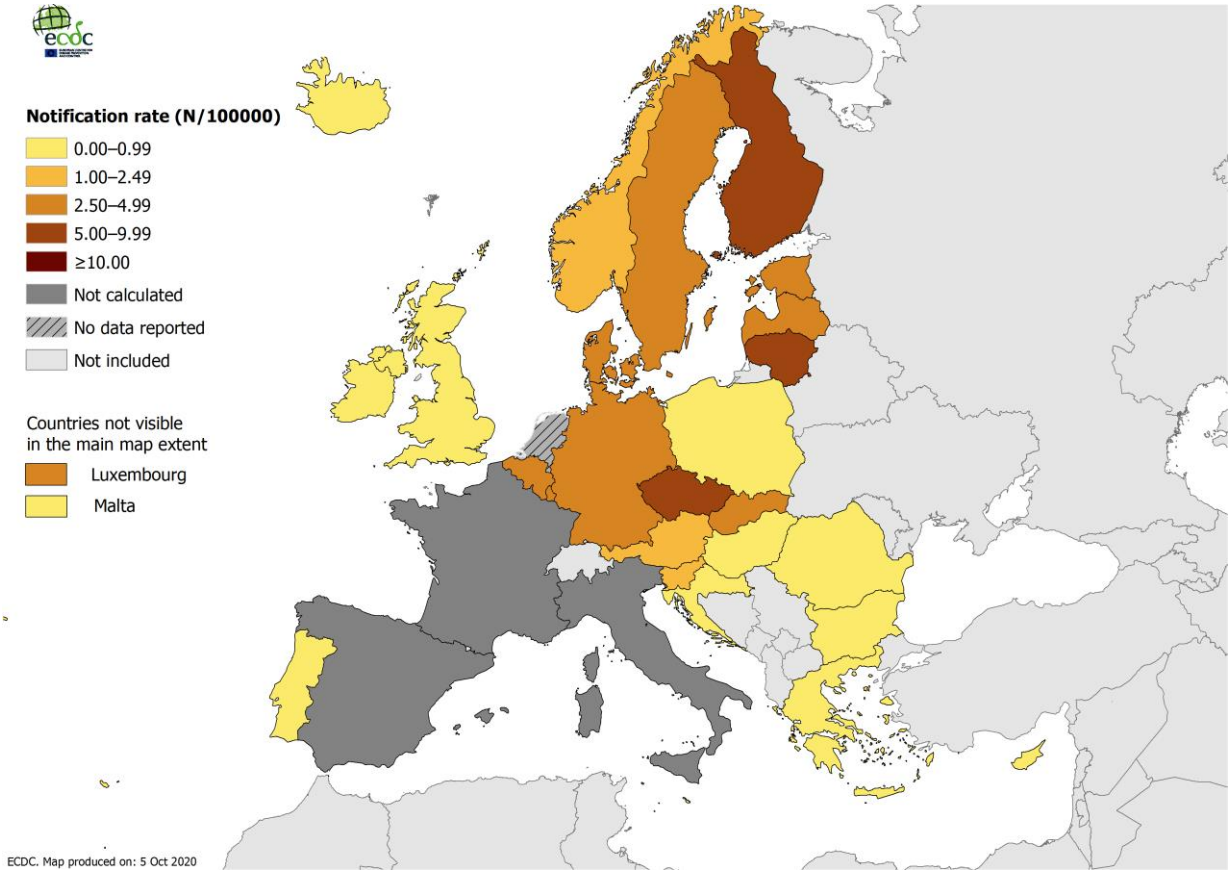
Thirty-four percent of 1 993 yersiniosis cases with known information were hospitalised. Of 4 028 cases with known outcome two were reported to have died, giving a case fatality of 0.05%. Both cases were males in the >65 years age group.

Table 1. Distribution of confirmed yersiniosis cases and rates per 100 000 population by country and year, EU/EEA, 2015–2019

Country	2015		2016		2017		2018		2019	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Austria	118	1.4	86	1.0	95	1.1	136	1.5	112	1.3
Belgium	350	3.1	355	3.1	317	2.8	392	3.4	406	3.5
Bulgaria	12	0.2	10	0.1	17	0.2	9	0.1	11	0.2
Croatia	16	0.4	22	0.5	29	0.7	20	0.5	12	0.3
Cyprus	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Czechia	678	6.4	608	5.8	611	5.8	622	5.9	618	5.8
Denmark	273	4.8	278	4.9	206	3.6	282	4.9	221	3.8
Estonia	53	4.0	45	3.4	43	3.3	63	4.8	42	3.2
Finland	582	10.6	407	7.4	423	7.7	529	9.6	406	7.4
France	624	-	735	-	738	-	929	-	1 135	-
Germany	2 741	3.4	2 763	3.4	2 581	3.1	2 193	2.6	2 154	2.6
Greece	-	-	-	-	-	-	21	0.2	13	0.1
Hungary	41	0.4	70	0.7	30	0.3	36	0.4	38	0.4
Iceland	1	0.3	1	0.3	0	0.0	2	0.6	2	0.6
Ireland	13	0.3	3	0.1	6	0.1	8	0.2	9	0.2
Italy	7	-	9	-	8	-	14	-	12	-
Latvia	64	3.2	47	2.4	47	2.4	68	3.5	60	3.1
Liechtenstein	.	.	.	.	.	.	.	.	.	.
Lithuania	165	5.6	155	5.4	174	6.1	139	4.9	181	6.5
Luxembourg	15	2.7	12	2.1	15	2.5	16	2.7	18	2.9
Malta	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Netherlands	.	.	.	.	.	.	.	.	.	.
Norway	76	1.5	57	1.1	67	1.3	105	2.0	85	1.6
Poland	172	0.5	167	0.4	191	0.5	170	0.4	196	0.5
Portugal	24	0.2	14	0.1	35	0.3	30	0.3	29	0.3
Romania	25	0.1	40	0.2	36	0.2	22	0.1	36	0.2
Slovakia	224	4.1	200	3.7	242	4.5	259	4.8	255	4.7
Slovenia	10	0.5	31	1.5	18	0.9	32	1.5	28	1.3
Spain	432	-	514	-	585	-	549	-	413	-
Sweden	245	2.5	230	2.3	236	2.4	278	2.7	393	3.8
United Kingdom	44	0.1	87	0.1	142	0.2	198	0.3	163	0.2
EU-EEA	**7 005**	**1.9**	**6 946**	**1.8**	**6 892**	**1.8**	**7 122**	**1.7**	**7 048**	**1.7**

Source: country reports.
ASR: age-standardised rate
.: no data reported
-: no rate calculated

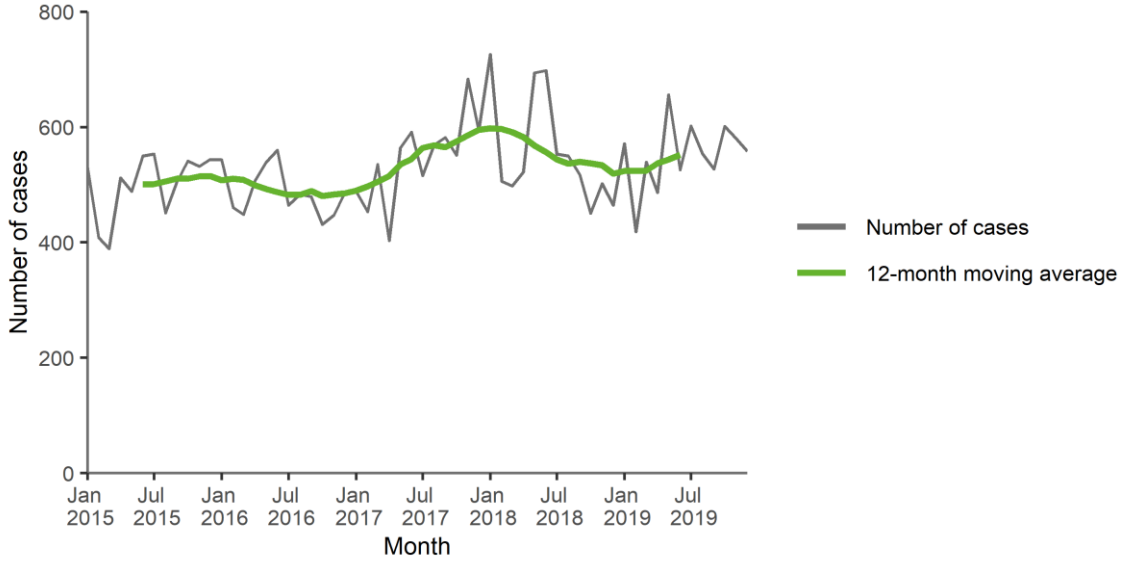
Figure 1. Distribution of confirmed yersiniosis cases per 100 000 population by country, EU/EEA, 2019



Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden, and the United Kingdom

From 2015 to 2019, the trend for confirmed yersiniosis cases remained stable in the EU/EEA (Table 1, Figure 2).

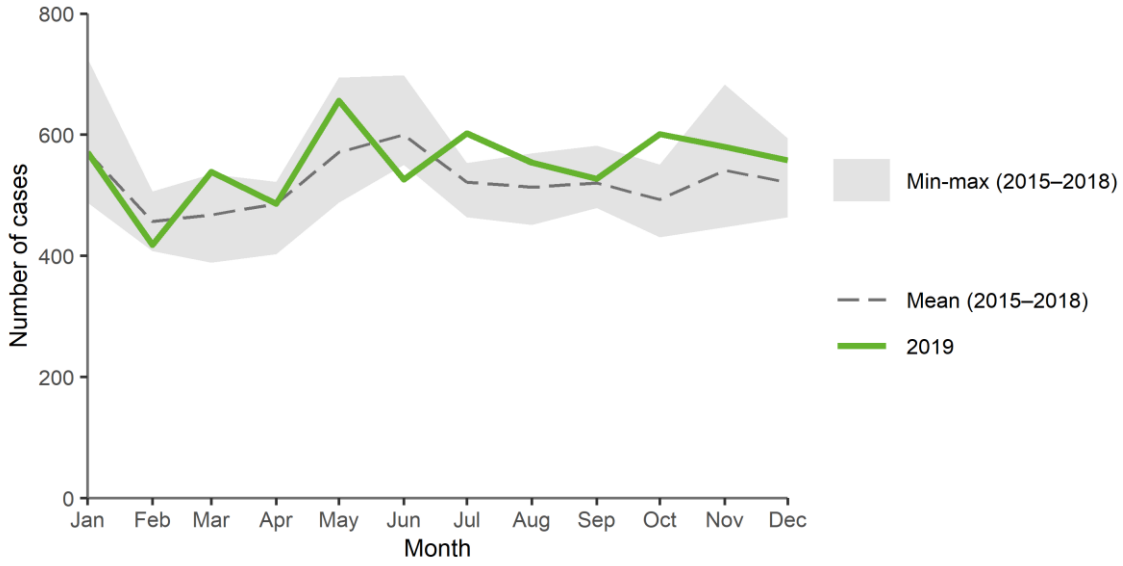
Figure 2. Distribution of confirmed yersiniosis cases by month, EU/EEA, 2015–2019



Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

As in previous years, cases of yersiniosis did not show a clear seasonal pattern in 2019. The highest number of cases was reported in May. Small peaks were reported in July and October, with higher number of cases than the average compared to the same months in the period 2015–2018 (Figure 3).

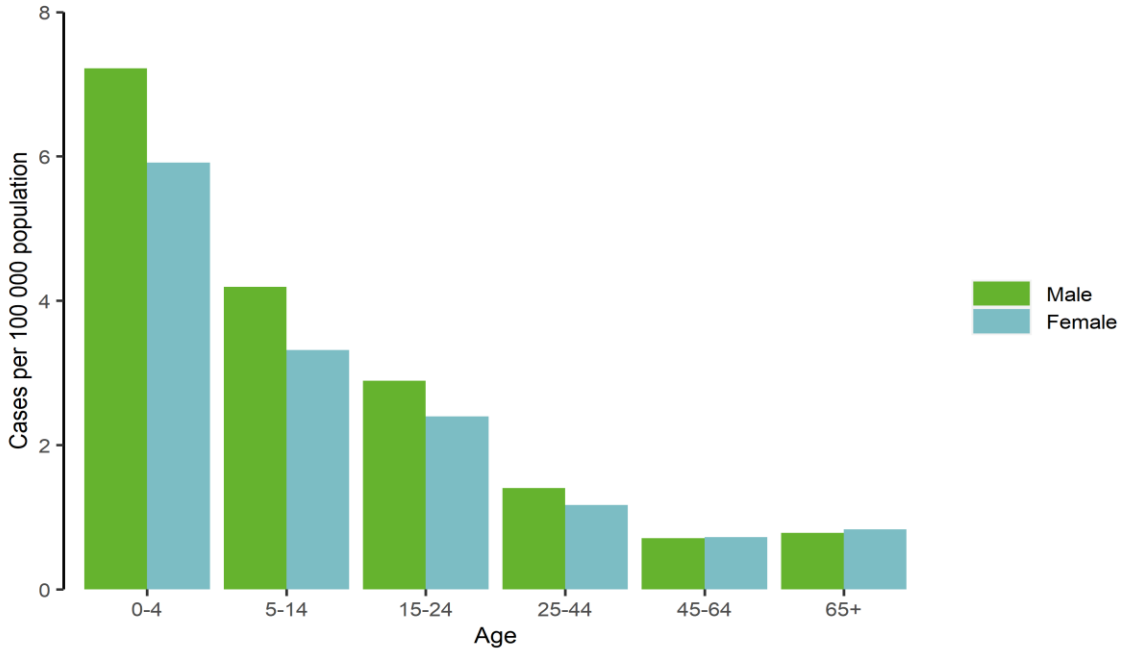
Figure 3. Distribution of confirmed yersiniosis cases by month, EU/EEA, 2019 and 2015–2018



Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

Among the 7 012 confirmed yersiniosis cases for which gender was reported, 54% were males and 46% were females, with a male-to-female ratio of 1.2:1. The highest notification rate per 100 000 population was detected in the age group 0–4-years, with 7.2 for males and 5.9 for females. This age group accounted for 1 590 (23%) of the 7 025 cases with information on age. The notification rate decreased with age and was lowest in the 45–64 years age group (0.7 per 100 000 population) for both genders (Figure 4).

Figure 4. Distribution of confirmed yersiniosis cases per 100 000 population, by age and gender, EU/EEA, 2019



Outbreaks and other threats

Two urgent inquiries on *Y. enterocolitica* infection were launched through ECDC's Epidemic Intelligence Information System for Food- and Waterborne Diseases and Zoonoses (EPIS-FWD) in 2019. The first was launched by Sweden and involved 37 cases with *Y. enterocolitica* bioserotype 4/O3 cases between February and April 2019. Denmark reported 20 cases of the same bioserotype in March. Whole genome sequencing (WGS) analyses confirmed a common outbreak strain in these two countries. Epidemiological and traceability studies in Denmark point to fresh spinach as the source [4]. The second urgent inquiry was launched by Norway on 13 genetically linked *Y. enterocolitica* cases of serotype O3 in May–June. Sweden reported five cases with isolates that were genetically closely related during the spring of 2019.This was potentially a multi-country outbreak, but it was not known whether the cases in the two countries shared any common exposure.

Discussion

In 2019, yersiniosis was the fourth most commonly reported foodborne zoonotic disease in the EU/EEA [3]. Among the two pathogenic species that are notified at the EU/EEA level, *Y. enterocolitica* caused the majority (99%) of human infections. Ten countries reported a total of 74 *Y. pseudotuberculosis* cases in 2019. From 2015 to 2019, the overall trend of reported yersiniosis cases remained stable. Surveillance of yersiniosis is mandatory and covers the whole population in most EU/EEA countries, but the absence of mandatory surveillance and national coverage in one-fourth of the Member States may contribute to lower notification rates in these countries. The age group most affected by *Yersinia* infection were infants and children up to four years of age who accounted for almost one-quarter of all confirmed cases in 2019.

The main reservoir for *Y. enterocolitica* is domestic pigs and the pathogenic *Y. enterocolitica* bioserotypes most frequently found in pigs and pork products are those most commonly reported in human infections. The *Y. pseudotuberculosis* reservoir is both domestic and wild animals (e.g. pigs, deer, wild birds and rodents). The ability of *Yersinia* spp. to survive and grow at low temperatures is of considerable significance for food hygiene. Refrigeration temperatures are generally insufficient to efficiently suppress the growth of these bacteria. All *Y. pseudotuberculosis* serotypes are considered pathogenic to humans. Although *Y. pseudotuberculosis* is a rare cause of human food-borne infections it typically causes outbreaks. The major vehicle of these outbreaks has been contaminated vegetables, particularly root vegetables which have been in cold storage for several months [5, 6]. In recent years, *Y. enterocolitica* outbreaks have also been reported from vegetables [4], suggesting that sources other than pork may play a role. In 2019, all 14 yersiniosis outbreaks reported to the European Food Safety Authority (EFSA) as part of the annual zoonoses data reporting were due to *Y. enterocolitica*. These outbreaks involved 149 cases in 15 outbreaks across seven countries, accounting for 0.3% of all reported food- and waterborne outbreaks at the EU level. It should be noted that the outbreaks were relatively small (mean 9.9 cases/outbreak) [7]. Three of the outbreaks were reported as a 'strong-evidence outbreak' with 'vegetables and juices' in two outbreaks, and 'buffet meals' in one outbreak as the incriminated vehicles of infection.

Biotype information, which is crucial for evaluating the pathogenicity of *Y. enterocolitica* isolates, was only provided by six countries for 23% of the reported *Y. enterocolitica* cases in 2019. This might be partly due to fact that phenotyping methods are laborious and the interpretation of biotype reactions can be subjective. More susceptible analytical techniques are needed for surveillance and outbreak investigations. Multiple-locus variable-number of tandem-repeats analysis (MLVA) and single nucleotide polymorphisms (SNP) analysis have demonstrated an acceptable discriminatory power for *Y. enterocolitica* and both methods were able to cluster epidemiologically associated isolates [8]. WGS is increasingly being used for the majority of food- and waterborne pathogens and also to subtype pathogenic *Yersinia* isolates in outbreak investigations [4, 9]. The benefits of WGS include the possibility to perform highly discriminatory analyses, as well as retrieving results for various characterisation and genetic analyses from the same raw data. The use of WGS for the typing of *Yersinia* isolates in animals and humans will facilitate the monitoring of animal-to-human transmission for these pathogens and improve public health surveillance of the pathogenic lineages [10].

Public health implications

Pigs are the most important sources of *Y. enterocolitica* infections and many cases are believed to be related to the consumption of undercooked contaminated pork or cross-contamination of other food items during the handling and preparation of raw pork meat. Pork should be properly cooked before consumption, especially when given to young children. Proper kitchen hygiene is required to avoid cross-contamination. Prolonged cold storage of contaminated food has facilitated the survival and growth of *Yersinia.* Outbreaks of *Y. pseudotuberculosis* have frequently been linked to raw vegetables and ready-to-eat vegetable products such as lettuce and carrots which have been subjected to long cold storage. In recent years, an increasing number of *Y. enterocolitica* outbreaks have been linked to vegetables. Good agricultural and hygiene practices in food storage and processing as well as proper washing and peeling of vegetables in home kitchens can decrease the contamination risk for fresh produce and prevent further infections.

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