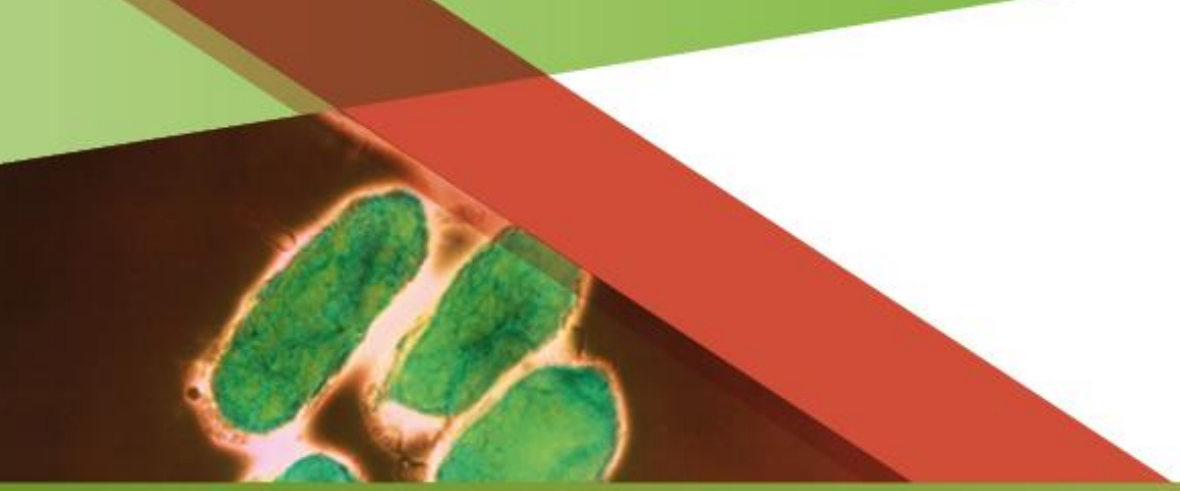


SURVEILLANCE REPORT

Yersiniosis

Annual Epidemiological Report for 2018

Key facts

- For 2018, 29 countries reported 7 204 confirmed yersiniosis cases in the EU/EEA.
- The overall notification rate was 1.7 per 100 000 population and remained stable from 2014 to 2018.
- The highest rates were reported by Finland, Belgium and the Czech Republic.
- The highest rate was detected in 0-4 year-old children; 7.9 per 100 000 population for males and 6.8 per 100 000 population for females.

Methods

This report is based on data for 2018 retrieved from The European Surveillance System (TESSy) on 17 September 2019. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

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 2018, yersiniosis data were reported by 29 EU/EEA Member States. The notification of yersiniosis is mandatory in most 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). The surveillance systems for yersiniosis infections have national coverage in all EU/EEA countries except for three: France, Italy and Spain. No estimate for population coverage was provided, so no notification rates were calculated for these three countries. No yersiniosis surveillance system exists in the Netherlands. In Belgium, full national coverage was established in 2015, and rates before this year are not displayed. Greece reports data from 2018 onwards. One Member State used the latest (EU 2018) case definition, thirteen countries used the one from 2012, eight countries used the 2008 case definition, five Member States reported using another case definition, and two countries did not specify the definition they used. The majority of Member States (26) undertook passive surveillance; in 19 countries, cases were reported by both laboratories and physicians and/or hospitals. All countries provided case-based data except two (Belgium and Bulgaria), which reported aggregate data. Both reporting formats were included when calculating numbers of cases, notification rates, and distributions by age and gender.

Suggested citation: European Centre for Disease Prevention and Control. Yersiniosis. In: ECDC. Annual epidemiological report for 2018. Stockholm: ECDC; 2019.

Stockholm, November 2019

Epidemiology

For 2018, 7 204 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 39% of all confirmed yersiniosis cases in the EU/EEA. Finland had the highest rate of 9.6 per 100 000 population, followed by Belgium and the Czech Republic (Table 1, Figure 1).

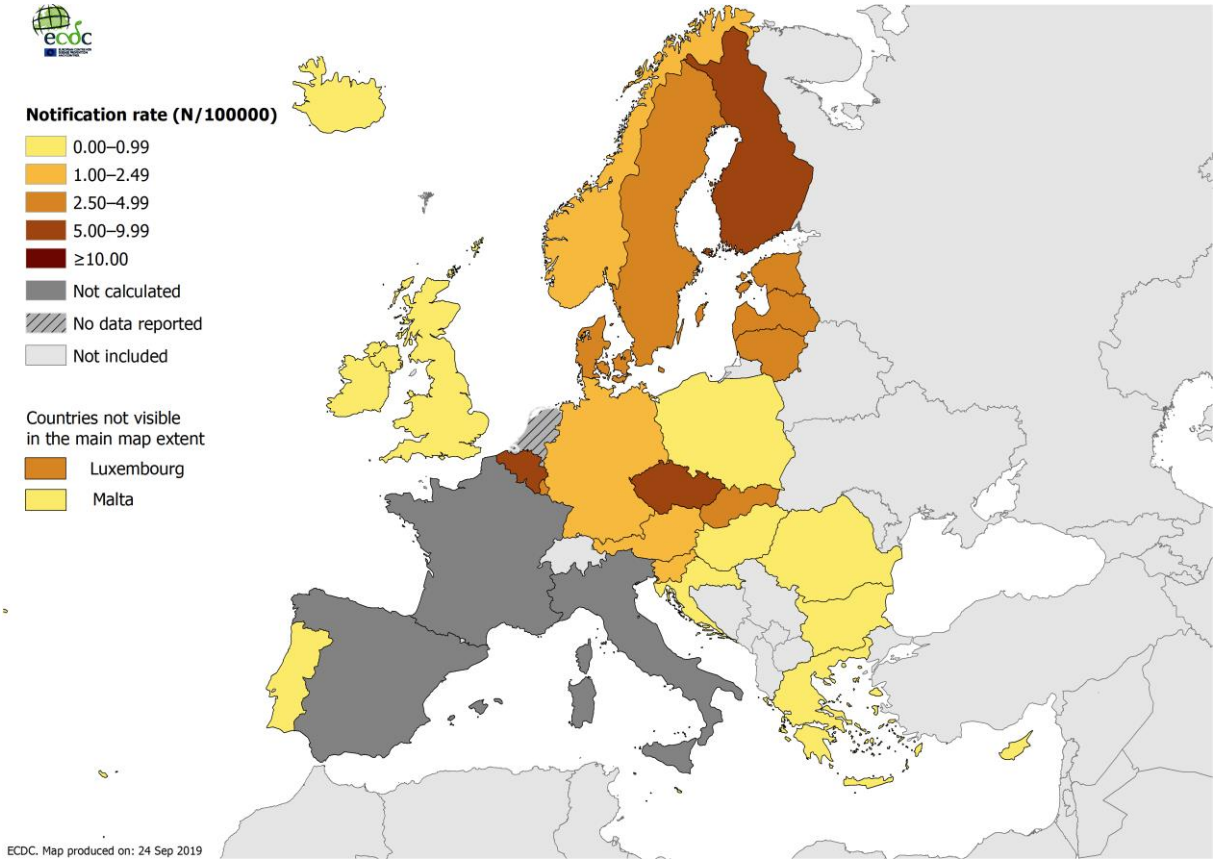
Thirty percent of 1 873 yersiniosis cases with known information were hospitalised. Three of 3 862 cases with known outcome were reported to have died, giving a case fatality of 0.08%.

Table 1. Distribution of confirmed yersiniosis cases and rates per 100 000 population by country and year, EU/EEA, 2014–2018

Country	2014		2015		2016		2017		2018			
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Confirmed cases	Rate	ASR	Reported cases
Austria	107	1.3	118	1.4	86	1.0	95	1.1	136	1.5	1.6	136
Belgium	309	-	350	3.1	355	3.1	317	2.8	790	6.9	6.8	790
Bulgaria	20	0.3	12	0.2	10	0.1	17	0.2	9	0.1	0.1	9
Croatia	20	0.5	16	0.4	22	0.5	29	0.7	20	0.5	0.5	20
Cyprus	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Czech Republic	557	5.3	678	6.4	608	5.8	611	5.8	622	5.9	6.2	644
Denmark	250	4.4	273	4.8	278	4.9	206	3.6	282	4.9	5.0	282
Estonia	62	4.7	53	4.0	45	3.4	43	3.3	63	4.8	5.0	63
Finland	579	10.6	582	10.6	407	7.4	423	7.7	529	9.6	10.1	529
France	574	-	624	-	735	-	738	-	929	-	-	929
Germany	2470	3.1	2741	3.4	2763	3.4	2580	3.1	1877	2.3	2.6	1877
Greece	-	-	-	-	-	-	-	-	21	0.2	-	21
Hungary	43	0.4	41	0.4	70	0.7	30	0.3	36	0.4	0.4	37
Iceland	3	0.9	1	0.3	1	0.3	0	0.0	2	0.6	0.6	2
Ireland	5	0.1	13	0.3	3	0.1	6	0.1	8	0.2	0.2	8
Italy	18	-	7	-	9	-	8	-	14	-	-	14
Latvia	28	1.4	64	3.2	47	2.4	47	2.4	68	3.5	3.6	68
Liechtenstein	.	.	.	.	.	.	.	.	.	.	.	.
Lithuania	197	6.7	165	5.6	155	5.4	174	6.1	139	4.9	5.1	139
Luxembourg	19	3.5	15	2.7	12	2.1	15	2.5	16	2.7	2.7	16
Malta	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	0
Netherlands	.	.	.	.	.	.	.	.	.	.	.	.
Norway	211	4.1	76	1.5	57	1.1	67	1.3	105	2.0	2.0	105
Poland	212	0.6	172	0.5	167	0.4	191	0.5	170	0.4	0.5	170
Portugal	-	-	24	0.2	14	0.1	35	0.3	30	0.3	0.4	30
Romania	32	0.2	25	0.1	40	0.2	36	0.2	22	0.1	0.1	22
Slovakia	172	3.2	224	4.1	200	3.7	242	4.5	259	4.8	4.9	268
Slovenia	19	0.9	10	0.5	31	1.5	18	0.9	32	1.5	1.6	32
Spain	436	-	432	-	514	-	585	-	549	-	-	549
Sweden	248	2.6	245	2.5	230	2.3	236	2.4	278	2.7	2.8	280
United Kingdom	58	0.1	44	0.1	87	0.1	142	0.2	198	0.3	0.3	198
EU/EEA	**6649**	**1.8**	**7005**	**1.9**	**6946**	**1.8**	**6891**	**1.8**	**7204**	**1.7**	**1.9**	**7238**

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

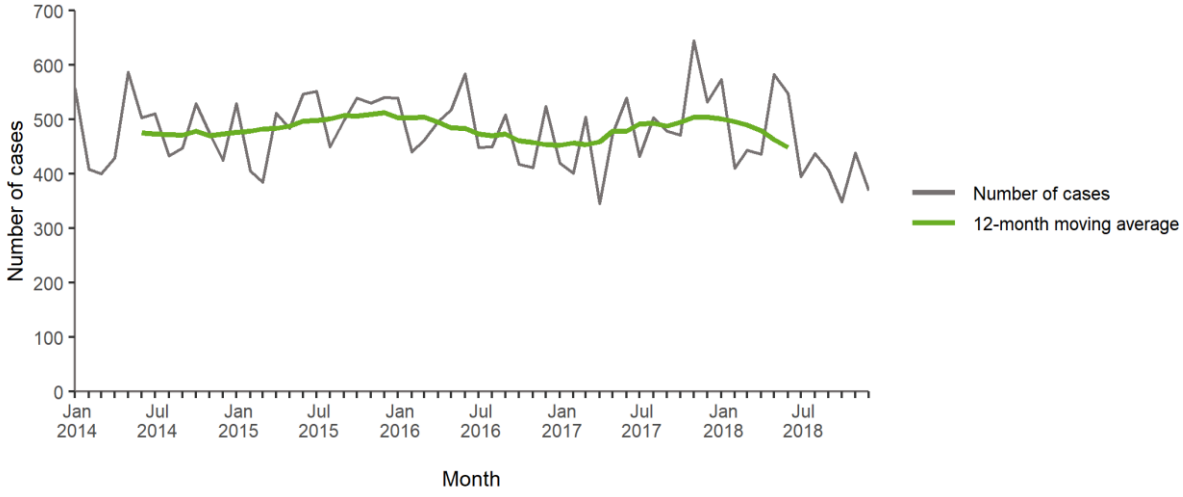
Figure 1. Distribution of confirmed yersiniosis cases per 100 000 population by country, EU/EEA, 2018



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

From 2014 to 2018, the yersiniosis trend in the EU/EEA remained stable (Table 1, Figure 2).

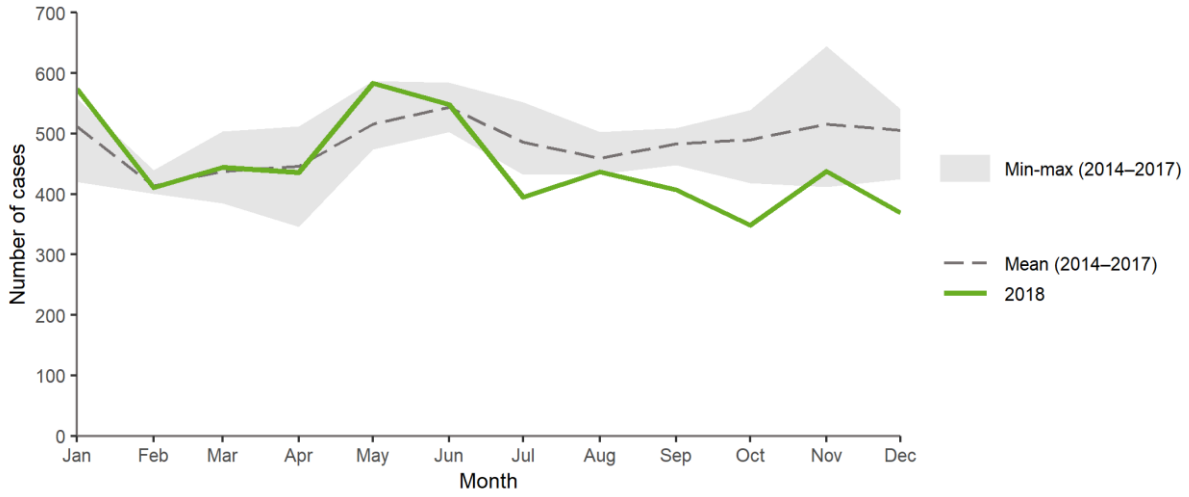
Figure 2. Distribution of confirmed yersiniosis cases by month, EU/EEA, 2014–2018



Source: Country reports from Austria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Germany, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

As in previous years, cases of yersiniosis did not show a clear seasonal pattern in 2018. The highest number of cases were reported in May and June (Figure 3).

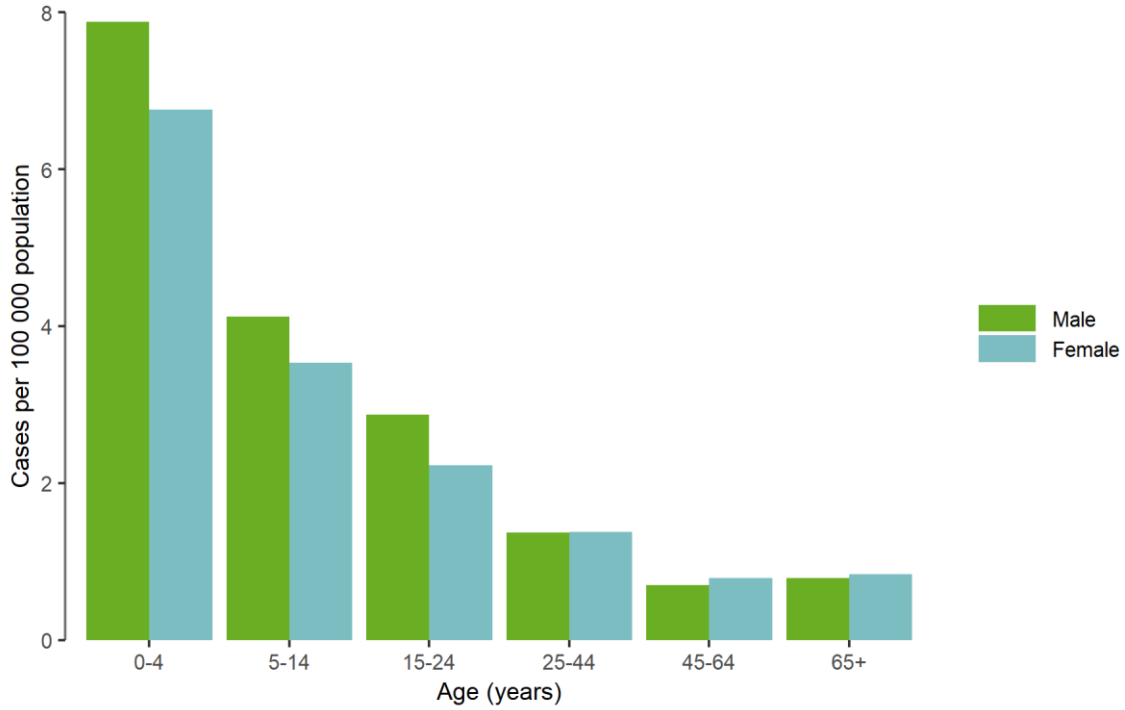
Figure 3. Distribution of confirmed yersiniosis cases by month, EU/EEA, 2018 and 2014–2017



Source: Country reports from Austria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Germany, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, Norway, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

Among the 7 151 confirmed yersiniosis cases for which gender was reported, 52% were male and 48% were female, with a male-to-female ratio of 1.1:1. The highest notification rate per 100 000 population was detected in the age group 0–4-years; 7.9 for males and 6.8 for females. This age group accounted for 1 689 (23%) of the 7 204 cases with information on age. The notification rate decreased with age and was lowest in males 45–64 years of age (0.7 per 100 000 population) and in females ≥ 45 years of age (0.8 per 100 000 population) (Figure 4).

Figure 4. Distribution of confirmed yersiniosis cases per 100 000 population, by age and gender, EU/EEA, 2018



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 2018. The first one was launched by

Finland and involved 55 cases with bioserotype 4/O3 between November 2017 and January 2018. Sweden had seen an increase of serotype O3 during the same time period, but it was not known if the cases in the two countries shared any common exposure or whether the isolates were genetically related. The second urgent inquiry was launched by Norway on 19 cases of serotype O9, but no multi-country dimension was found.

Discussion

In 2018, yersiniosis was the fourth most commonly reported zoonosis in the EU [3]. Among the two pathogenic species that are notified at the EU/EEA level, *Y. enterocolitica* caused the majority (99%) of human infections. Nine countries reported a total of 74 *Y. pseudotuberculosis* cases in 2018. The overall trend of reported yersiniosis cases remained stable from 2014 to 2018. 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 4 years of age who accounted for almost one-quarter of all confirmed cases in 2018.

The main reservoir for *Y. enterocolitica* is domestic pigs, and the pathogenic *Y. enterocolitica* bioserotypes that are 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). All *Y. pseudotuberculosis* serotypes are considered pathogenic to humans. *Y. pseudotuberculosis* is a rare cause of human food-borne infections but typically causes outbreaks. The major vehicle of these outbreaks has been contaminated vegetables, particularly root vegetables with a long cold storage [4, 5].

In recent years, also *Y. enterocolitica* outbreaks from vegetables have been reported [6], suggesting that other sources than pork may play a role. In 2018, all 12 yersiniosis outbreaks reported to the European Food Safety Authority (EFSA) within the annual zoonoses data reporting were due to *Y. enterocolitica*. These outbreaks involved 58 cases in eight countries, accounting for 0.2% of all reported food- and waterborne outbreaks at the EU level. These outbreaks were relatively small (mean 4.8 cases/outbreak) [7]. One of these outbreaks was reported as a 'strong-evidence outbreak' with 'ham manufactured by the restaurant' as the incriminated vehicle of infection.

Biotype information, which is crucial for evaluating the pathogenicity of *Y. enterocolitica* isolates, was provided only for 20% of the reported *Y. enterocolitica* cases in 2018. Phenotyping methods are laborious. Interpreting biotyping reactions can be subjective, and misidentification is common. As for the majority of food- and waterborne pathogens, whole genome sequencing (WGS) is increasingly used also to subtype pathogenic *Yersinia* isolates in outbreak investigations [6,8,9]. Benefits of WGS include the possibility to perform highly discriminatory analyses as well as retrieving results for various genetic analyses from the same raw data. Multiple-locus variable-number of tandem-repeats analysis (MLVA) and core single nucleotide polymorphisms (SNP) analysis have demonstrated an acceptable discriminatory power for *Y. enterocolitica*, and both methods were able to cluster epidemiologically associated isolates [10]. The use of WGS for typing of *Yersinia* isolates will facilitate monitoring animal-to-human transmission of these pathogens and improve public health surveillance of the pathogenic lineages.

Public health implications

Pigs are the most important source of *Y. enterocolitica* infections, and many cases are considered 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. Pork should be consumed only after adequate cooking, especially when given to young children. Proper kitchen hygiene is required to avoid cross-contamination. Outbreaks of *Y. pseudotuberculosis* have frequently been linked to raw vegetables and ready-to-eat vegetable products such as grated carrots and lettuce. Good agricultural and hygiene practices in food storage and processing can decrease the risk of contamination of these products and prevent further infections.

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