

Listeriosis

Annual Epidemiological Report for 2020

Key facts

- In 2020, 29 EU/EEA Member States reported 1 931 confirmed listeriosis cases.
- Germany, France and Spain had the highest number of reported cases.
- The age-standardised EU/EEA notification rate was 0.37 cases per 100 000 population.
- The highest rate was detected among elderly people above 64 years of age (1.5 cases per 100 000 population).
- In 2020, a decrease in the number of confirmed listeriosis cases was seen in the EU/EEA, which was a possible outcome of the COVID-19 pandemic.

Introduction

Listeriosis is a disease caused by *Listeria monocytogenes*. The disease primarily causes problems in pregnant women, newborns, and adults with a weakened immune system. After exposure, most healthy adults do not develop any symptoms, except in the case of pregnant women. After an incubation period of about three weeks, listeriosis may lead to a self-limiting influenza-like illness in pregnant women, which may affect the uterus. In addition, listeriosis in the elderly and adults with weakened immune systems may lead to meningitis, brain infection, and severe blood infection.

Methods

This report is based on data for 2020 retrieved from The European Surveillance System (TESSy) on 5 November 2021. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

For a detailed description of the methods used to produce this report, please refer to the 'Methods' chapter in the 'Introduction to the Annual Epidemiological Report' [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].

Suggested citation: European Centre for Disease Prevention and Control. Listeriosis. In: ECDC. Annual Epidemiological Report for 2020. Stockholm: ECDC; 2023.

Stockholm, March 2023

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The notification of listeriosis cases in humans is mandatory for most EU Member States, as well as Iceland and Norway. Notification is voluntary for three Member States (Belgium, Luxembourg and the United Kingdom¹).

The surveillance systems for listeriosis have full national coverage in all Member States, except Belgium and Spain. Since 2015, the population coverage is estimated to be around 80% in Belgium. This variation in coverage over time was taken into consideration for this report when calculating the national notification rates for Belgium. No information on estimated coverage was provided by Spain, and therefore, no notification rates were calculated. For 2020, Spain did not receive data from all its autonomous regions and the case numbers may not be complete.

Nine of the 29 Member States used the 2018 EU case definition for listeriosis, nine used the 2012 case definition and six used the 2008 case definition. Four Member States used another case definition, and one did not specify which case definition was used. The majority of the Member States (26 out of 29) conducted passive surveillance; in 22 Member States, cases were reported by laboratories, physicians and/or hospitals. All Member States reported case-based data except Bulgaria, which reported aggregate data. Both reporting formats were included to calculate the number of cases, notification rates, disease trends, and distributions by age and sex.

In 2020, ECDC continued EU/EEA-wide whole genome sequencing (WGS)-enhanced surveillance of listeriosis through isolate-based data collection. The objectives of this activity are three-fold.

In the short term, the objective is to facilitate:

- early detection and delineation of multi-country listeriosis outbreaks and/or dispersed clusters to trigger outbreak investigations and contribute to food traceback and forward investigations, so that appropriate control and preventive measures can be implemented in the food chain.

In the medium term, the objectives are to facilitate:

- detection of (re-)emergence and monitoring the spread of *L. monocytogenes* strains;
- identification of persistent *L. monocytogenes* strains causing human infections in the EU/EEA and possibly originating from continuous sources;
- identification of transmission chains, new risk factors for infection, and severity of disease.

In the long term, the objective is to facilitate:

- monitoring the EU/EEA trends of listeriosis cases, by selected indicators.

For cluster detection, raw reads or assemblies were submitted by the participating Member States. Sequences were analysed at ECDC with BioNumerics version 7.6.3 (Applied Maths, Sint-Martens-Latem, Belgium). The analysis of raw reads included trimming using the default BioNumerics 7.6.3 settings; *de novo* assembly using SPAdes v.3.7.1; post-assembly optimisation by mapping reads back onto the assembly and keeping the consensus (using MismatchCorrector implemented in SPAdes v.3.7.1). The default settings of BLAST parameters for allele calling were used. Core genome multi-locus sequence typing (cgMLST) analysis was performed using assembly-based allele calling, using the Institut Pasteur scheme [4] in BioNumerics. Isolates were retained in the analysis if at least 1 574 (90%) of the 1 748 core loci were detected.

A multi-country core cluster of *L. monocytogenes* was defined as at least two different Member States reporting at least one isolate each, with maximum four differing alleles in cgMLST in single-linkage analysis. To further investigate the detected clusters, a threshold of seven core genome alleles was used to search for possible epidemiologically linked isolates.

In addition to the WGS data submitted by the Member States for listeriosis cluster detection, ECDC also collects and centrally analyses sequence data during multi-country outbreak investigations.

Epidemiology

In 2020, 1 931 confirmed cases of listeriosis were reported by 29 EU/EEA Member States. The EU/EEA notification rate was 0.43 per 100 000 population. Germany, France and Spain had the highest number of reported cases (544, 334 and 191, respectively), corresponding to 55.4% of all cases reported in the EU/EEA. The highest incidence rates were observed in Finland, Slovenia and Iceland. Figure 1 illustrates the country-specific age-standardised rates per 100 000 population.

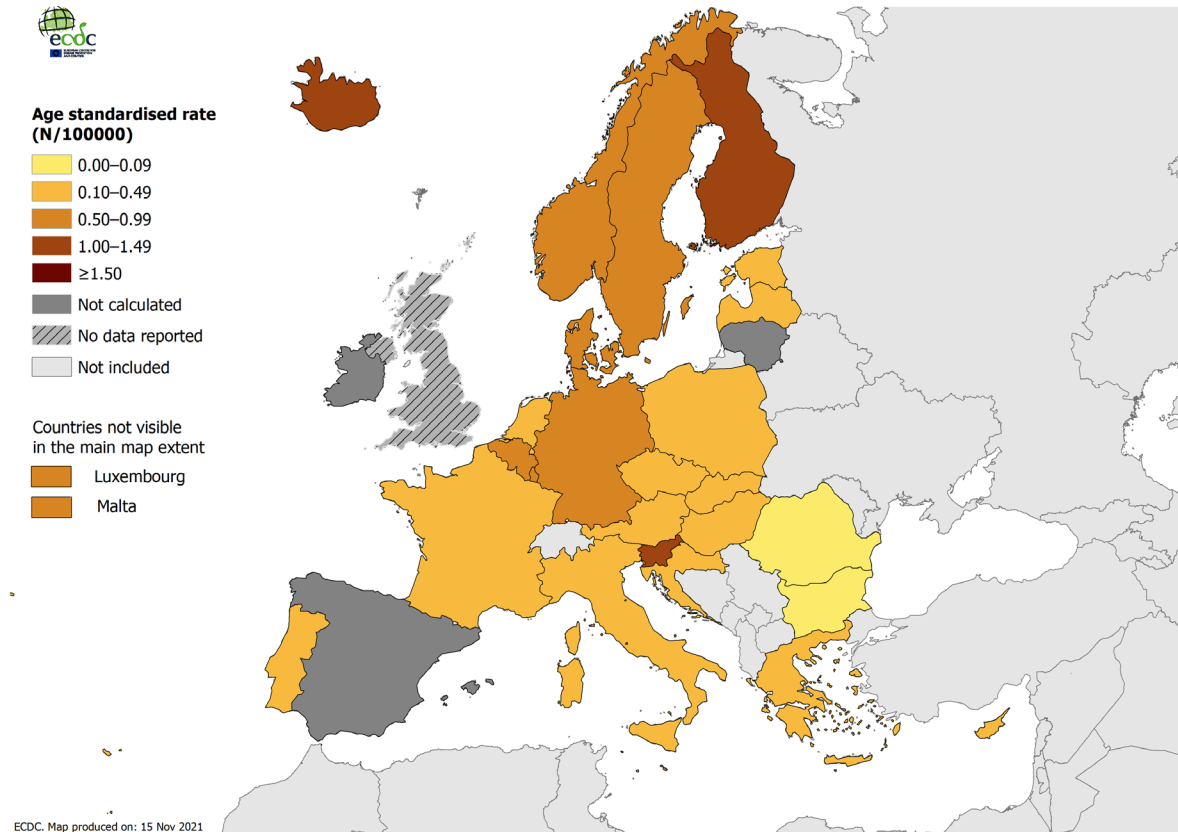
¹ The United Kingdom (UK) was a Member State of the European Union (EU) at the time of collating the data for this report. The UK withdrew from the EU on 31 January 2020.

Table 1. Distribution of confirmed listeriosis cases and rates per 100 000 population, by country and year, EU/EEA, 2016–2020

Country	2016		2017		2018		2019		2020		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	46	0.53	32	0.36	27	0.31	38	0.43	41	0.46	0.41
Belgium	103	1.14	73	0.80	74	0.81	66	0.72	54	0.59	0.55
Bulgaria	5	0.07	13	0.18	9	0.13	13	0.19	4	0.06	0.06
Croatia	4	0.10	8	0.19	4	0.10	6	0.15	5	0.12	0.11
Cyprus	0	0.00	0	0.00	1	0.12	1	0.11	2	0.23	0.24
Czechia	47	0.45	30	0.28	31	0.29	27	0.25	16	0.15	0.13
Denmark	40	0.70	58	1.01	49	0.85	61	1.05	43	0.74	0.64
Estonia	9	0.68	4	0.30	27	2.05	21	1.59	3	0.23	0.20
Finland	67	1.22	89	1.62	80	1.45	50	0.91	94	1.70	1.40
France	375	0.56	370	0.55	338	0.50	373	0.56	334	0.50	0.44
Germany	662	0.81	721	0.87	678	0.82	571	0.69	544	0.65	0.53
Greece	20	0.19	20	0.19	19	0.18	10	0.09	20	0.19	0.16
Hungary	25	0.25	36	0.37	24	0.25	39	0.40	32	0.33	0.29
Iceland	0	0.00	6	1.77	2	0.57	4	1.12	4	1.10	1.22
Ireland	13	0.28	14	0.29	21	0.43	17	0.35	6	0.12	NR
Italy	179	0.30	164	0.27	178	0.29	202	0.33	155	0.26	0.22
Latvia	6	0.30	3	0.15	15	0.78	6	0.31	8	0.42	0.37
Liechtenstein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lithuania	10	0.35	9	0.32	20	0.71	6	0.21	7	0.25	NR
Luxembourg	2	0.35	5	0.85	5	0.83	3	0.49	4	0.64	0.73
Malta	1	0.22	0	0.00	1	0.21	5	1.01	5	0.97	0.94
Netherlands	89	0.52	108	0.63	69	0.40	103	0.60	90	0.52	0.45
Norway	19	0.36	16	0.30	24	0.45	27	0.51	37	0.69	0.66
Poland	101	0.27	116	0.31	128	0.34	121	0.32	62	0.16	0.15
Portugal	31	0.30	42	0.41	64	0.62	56	0.54	47	0.46	0.37
Romania	9	0.05	10	0.05	28	0.14	17	0.09	2	0.01	0.01
Slovakia	10	0.18	12	0.22	17	0.31	18	0.33	7	0.13	0.12
Slovenia	15	0.73	13	0.63	10	0.48	20	0.96	26	1.24	1.10
Spain	362	NR	284	NR	370	NR	504	NR	191	NR	NR
Sweden	68	0.69	81	0.81	89	0.88	113	1.10	88	0.85	0.74
United Kingdom	201	0.31	160	0.24	168	0.25	154	0.23	NR	NR	NR
EU/EEA	2 519	0.47	2 497	0.47	2 570	0.47	2 652	0.46	1 931	0.43	0.37

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

Figure 1. Distribution of confirmed listeriosis cases per 100 000 population by country, EU/EEA, 2020

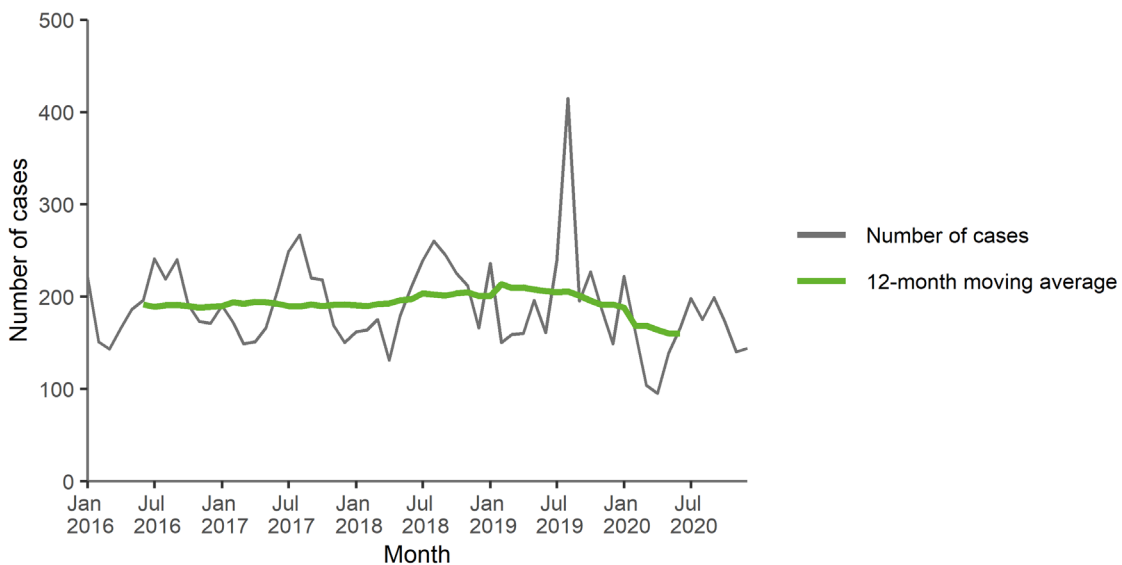


Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, and Sweden.

Listeriosis cases from Member States reporting consistently from 2016–2020 show a stable trend with a decrease in 2019–2020 (Figure 2).

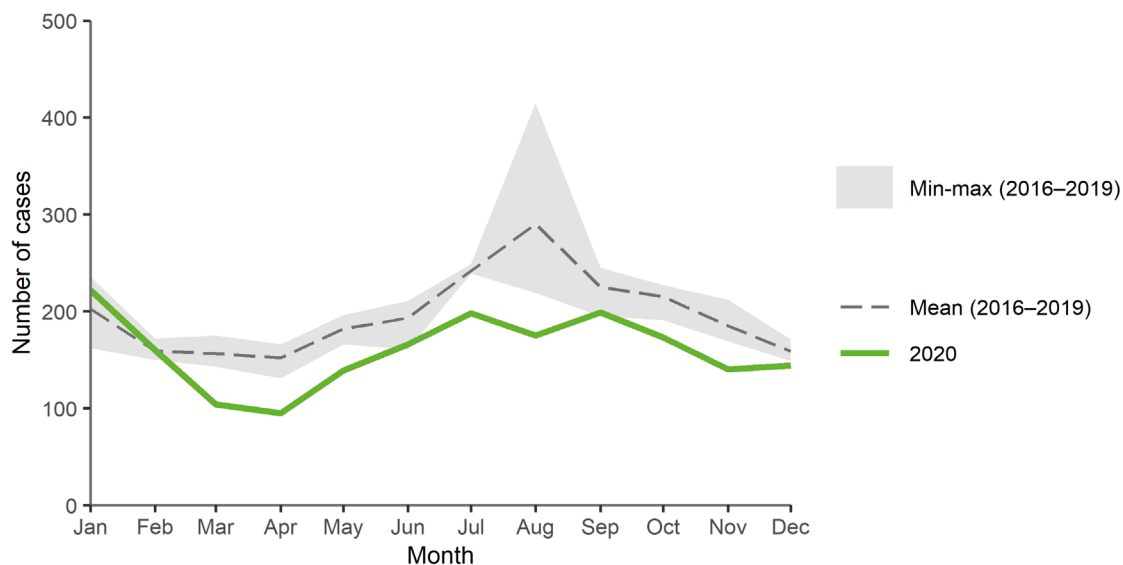
Typically, listeriosis cases peak during the summer months and less markedly during the winter. However, in 2020, the peak in winter was more pronounced.

Figure 2. Distribution of confirmed listeriosis cases by month, EU/EEA, 2016–2020



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

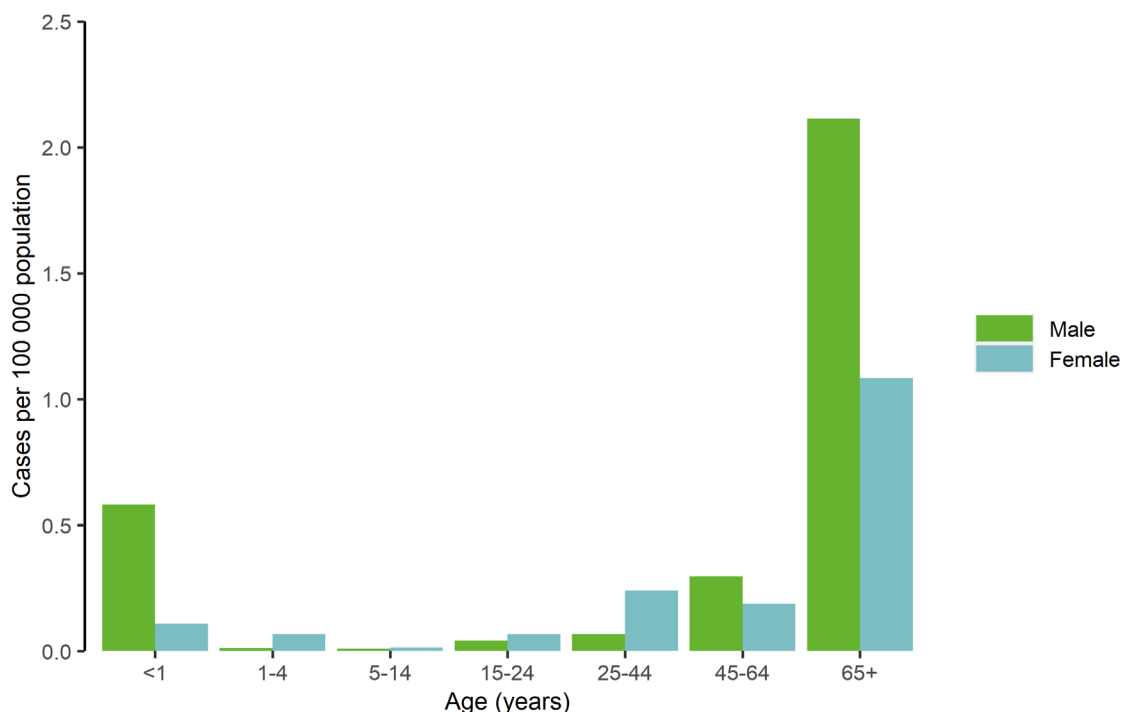
Figure 3. Distribution of confirmed listeriosis cases by month, EU/EEA, 2020 and 2016–2019



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

Out of confirmed listeriosis cases with known sex (N=1 931, i.e. all confirmed cases), 56.4% were in males and 43.6% in females, corresponding to a male-to-female ratio of 1.3:1. The most affected age group were those above 64 years of age (1 394 cases, 72.5%; notification rate: 1.5 cases per 100 000 population). Seventy-nine cases of pregnancy-associated listeriosis were reported in 2020. Of these, nine resulted in miscarriage or fatal outcome for the newborns (pregnancy outcome was reported for 33% of the pregnancy-associated cases).

Figure 4. Distribution of confirmed listeriosis cases per 100 000 population, by age and sex, EU/EEA, 2020



Whole genome sequencing (WGS)-enhanced surveillance

In 2020, seven Member States submitted *L. monocytogenes* WGS data to TESSy for 471 isolates. In addition, 13 countries submitted sequence data to contribute to ongoing multi-country outbreak investigations for 77 isolates. When analysed against older sequences, altogether 13 multi-country clusters were detected throughout the year including 40 isolates, and 86 isolates matched within pre-2020 detected clusters. There were 144 multi-country clusters detected by the end of 2020. This included 1 318 isolates with a median number of four isolates per cluster (range 2–150), and a median number of two involved countries (range 2–11). The median cluster duration (time from the oldest to newest isolate) was 2.3 years (range from five days to 14.8 years) for 108 clusters with information available on dates for the first and last isolates.

Outbreaks and other threats

In 2020, 13 urgent inquiries on listeriosis were launched in the ECDC Epidemic Intelligence Information System (EPIS) by five different EU/EEA Member States and two non-EU/EEA countries. For seven of these, no multi-country aspect was identified. For the six urgent inquiries with multi-country aspects, a probable source was found for five. One of these constituted Germany, reporting 15 different listeriosis clusters identified from 2010–2020, delineated by cgMLST (maximum 10 allelic differences), with an indication towards a connection with different salmon products.

Discussion

Listeriosis is a relatively uncommon disease, but it is one of the most severe food- and waterborne diseases under EU surveillance. It has the highest proportion of hospitalised cases of all zoonoses under EU surveillance [5]. The EU surveillance of listeriosis focuses on severe, invasive forms of the disease, for which the risk groups are mainly the elderly and immunocompromised persons, as well as pregnant women and infants. Notification of listeriosis cases in humans is compulsory in the majority of the EU/EEA Member States. Listeriosis can also manifest in milder forms causing gastrointestinal symptoms, but these cases are usually not notified at the country-level and are also not in the scope of the EU/EEA-level surveillance.

Although a decrease in the number of listeriosis cases was observed at the EU level in 2019–2020, the overall trend for listeriosis in 2016–2020 remained stable [5]. The decline in the reported cases from the previous year is a probable outcome of the COVID-19 pandemic that has largely occupied the public health resources of the EU/EEA. Hence, the surveillance capacity for other infectious diseases in some Member States might have been affected. It can also be speculated that COVID-19 control measures, such as reducing outdoor activities and increasing the level of general hygiene, could have had an effect in reducing gastrointestinal diseases [6]. The year 2020 was the second year of the EU/EEA-wide WGS-enhanced listeriosis surveillance that was started in March 2019. The COVID-19 pandemic did not affect the number of Member States reporting listeriosis data proactively or the number of isolates with sequences that were submitted. However, there was a reduction in the number of urgent inquiries launched (20 in 2019; 13 in 2020), as well as the sequence data provided by the Member States during these investigations (23 Member States provided sequences for 512 isolates in 2019, while 13 Member States provided sequences for 77 isolates in 2020).

Microbiological clusters detected from this data show that although multi-country clusters tend to be small and affect only a few Member States (skewed by the low number of Member States submitting data), they also often persist for several years, even decades. This indicates that microbiological cluster detection efforts combined with other relevant data, such as sequences from food isolates and exposure data, could help in locating sources of the pathogen and allowing the implementation of control measures to reduce the EU/EEA burden of this notably severe disease.

In 2020, *L. monocytogenes* was identified as the causative agent in nine strong-evidence and seven weak-evidence food-borne outbreaks that together caused disease in 120 people in the EU, with 83 hospitalised cases (of which 34 were in Germany) and 17 deaths, as reported to the European Food Safety Authority (EFSA) [5]. Six of the strong-evidence food-borne outbreaks were caused by 'fish and fishery products' (two in the Netherlands, two in Denmark, one in Austria, and one in Germany), two were caused by 'meat and meat products' (both in Finland), and one was caused by 'dairy products' (cheeses). As the majority of the strong-evidence food-borne outbreaks were caused by fish products, this further indicates that fish products are an important vehicle for listeriosis at the EU level. Out of the seven weak-evidence food-borne outbreaks, one was related to 'dairy products' (other than cheeses), and for six, the food vehicle was unknown.

Public health implications

Despite the stabilisation of the trend in the number of listeriosis cases in the EU/EEA from 2016–2020, the severity and increasing trend in the number of cases in the preceding years are still worrying and call for more attention to the prevention and control of the disease and the resultant outbreaks. Raising awareness of listeriosis and risky foods in risk groups is important, especially among the elderly and immunocompromised people, where the majority of cases occur, but also among pregnant women and infants. In addition, supranational cross-sectorial collaboration is essential to address the occurrence of persistent *L. monocytogenes* strains in humans.

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