Annual Epidemiological Report for 2015

Listeriosis

Key facts

- In 2015, 30 countries reported a total of 2 224 confirmed listeriosis cases in the EU/EEA.
- The EU/EEA notification rate was 0.5 cases per 100 000 population.
- The highest rates were detected in infants below one year of age and among elderly people over 64 years of age (1.6 cases per 100 000 population for both).
- The rate in 2015 remained stable compared with 2014; between 2011 and 2014, a steady increase was recorded.

Methods

This report is based on data for 2015 retrieved from The European Surveillance System (TESSy) on 12 December 2016. 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].

In 2015, 30 EU/EEA Member States reported listeriosis data; one of the reporting Member States had only partial population coverage. Twelve of the 30 Member States used the EU case definition from 2012, 11 used the one from 2008, four used another case definition, and three did not specify which case definition was used. The majority of Member States (25 of 30) conducted passive surveillance; in 23 countries, cases were reported by both laboratories and physicians and/or hospitals. Twenty-eight of the 30 Member States reported case-based data.

In addition to case-based TESSy surveillance, ECDC coordinates molecular typing-enhanced surveillance of listeriosis through isolate-based data collection. A typing-based multi-country cluster of *L. monocytogenes* is currently defined as at least two different countries reporting at least one isolate each with matching pulsotypes (both ApaI and AscI restriction enzymes), with the reports a maximum of 16 weeks apart.
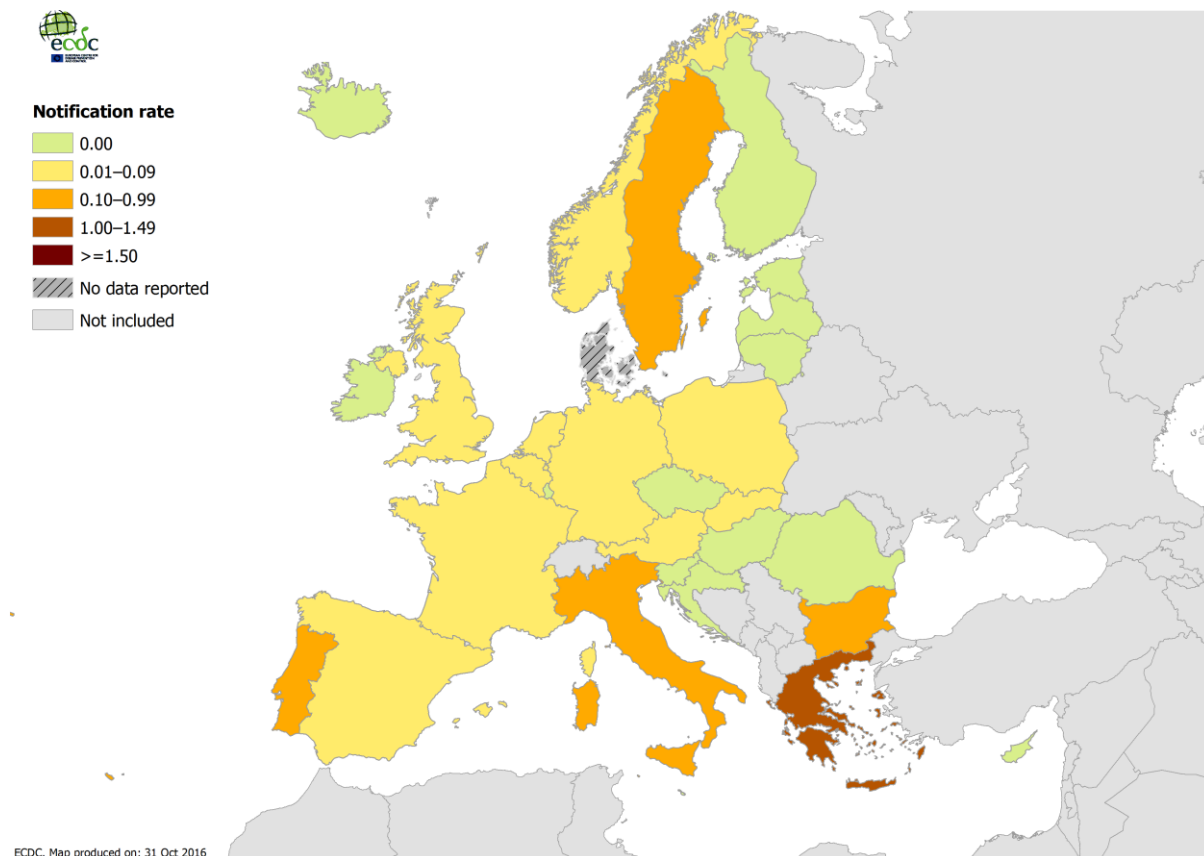

Epidemiology

In 2015, 2 224 confirmed cases of listeriosis were reported by 30 EU/EEA countries, with an overall notification rate of 0.5 cases per 100 000 population (Table 1). Germany and France had the highest numbers of reported cases (580 and 412, respectively), corresponding to 44.6% of all cases reported in the EU/EEA. The highest age-standardised incidence rates were observed in Spain (0.9/100 000), Malta (0.9/100 000), Sweden (0.8/100 000) and Estonia (0.8/100 000). Figure 1 illustrates the country-specific, age-standardised rates per 100 000 population.

Table 1. **Distribution of confirmed listeriosis cases per 100 000 population, EU/EEA, 2011−2015**

Country	2011		2012		2013		2014		2015				
	Confirmed cases		Confirmed cases		Confirmed cases		Confirmed cases		National coverage	Reported cases	Confirmed cases		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate			Number	Rate	ASR
Austria	26	0.3	36	0.4	36	0.4	49	0.6	Y	38	38	0.4	0.4
Belgium	70	-	83	0.7	66	0.6	84	0.7	Y	83	83	0.7	0.7
Bulgaria	4	0.1	10	0.1	3	0.0	10	0.1	Y	5	5	0.1	0.1
Croatia	.	.	0	0.0	0	0.0	4	0.1	Y	2	2	0.0	0.0
Cyprus	2	0.2	1	0.1	1	0.1	0	0.0	Y	0	0	0.0	0.0
Czech Republic	35	0.3	32	0.3	36	0.3	38	0.4	Y	36	36	0.3	0.3
Denmark	49	0.9	50	0.9	51	0.9	92	1.6	Y	44	44	0.8	0.7
Estonia	3	0.2	3	0.2	2	0.2	1	0.1	Y	11	11	0.8	0.8
Finland	43	0.8	61	1.1	61	1.1	65	1.2	Y	46	46	0.8	0.7
France	282	0.4	346	0.5	369	0.6	373	0.6	Y	412	412	0.6	0.6
Germany	331	0.4	414	0.5	463	0.6	598	0.7	Y	662	580	0.7	0.6
Greece	10	0.1	11	0.1	10	0.1	10	0.1	Y	31	31	0.3	0.2
Hungary	11	0.1	13	0.1	24	0.2	39	0.4	Y	38	37	0.4	0.4
Ireland	7	0.2	11	0.2	8	0.2	15	0.3	Y	19	19	0.4	0.4
Italy	129	0.2	112	0.2	143	0.2	132	0.2	Y	153	153	0.3	0.2
Latvia	7	0.3	6	0.3	5	0.2	3	0.1	Y	8	8	0.4	0.4
Lithuania	6	0.2	8	0.3	6	0.2	7	0.2	Y	5	5	0.2	0.2
Luxembourg	2	0.4	2	0.4	2	0.4	5	0.9	Y	0	0	0.0	0.0
Malta	2	0.5	1	0.2	1	0.2	1	0.2	Y	4	4	0.9	0.9
Netherlands	87	0.5	73	0.4	72	0.4	90	0.5	Y	71	71	0.4	0.4
Poland	62	0.2	54	0.1	58	0.2	87	0.2	Y	70	70	0.2	0.2
Portugal	.	.	.	.	.	.	.	.	Y	28	28	0.3	0.3
Romania	1	0.0	11	0.1	9	0.0	5	0.0	Y	12	12	0.1	0.1
Slovakia	31	0.6	11	0.2	16	0.3	29	0.5	Y	18	18	0.3	0.4
Slovenia	5	0.2	7	0.3	16	0.8	18	0.9	Y	13	13	0.6	0.6
Spain	91	0.8	109	0.9	140	1.0	161	0.8	45%	207	206	1.0	0.9
Sweden	56	0.6	72	0.8	93	1.0	125	1.3	Y	88	88	0.9	0.8
United Kingdom	164	0.3	183	0.3	192	0.3	201	0.3	Y	187	186	0.3	0.3
EU	1516	0.4	1720	0.4	1883	0.4	2242	0.5	94%	2291	2206	0.5	0.4
Iceland	2	0.6	4	1.3	1	0.3	4	1.2	Y	0	0	0.0	0.0
Liechtenstein													
Norway	21	0.4	30	0.6	21	0.4	29	0.6	Y	18	18	0.3	0.4
EU/EEA	1539	0.4	1754	0.4	1905	0.4	2275	0.5	.	2309	2224	0.5	0.4

Source: Country reports. Legend: Y = yes, N = no, C = case based, A = aggregated, · = no data reported, ASR = age-standardised rate, - = no notification rate calculated.

Figure 1. Distribution of confirmed listeriosis cases per 100 000 population, EU/EEA, 2015

Notification rate
- 0.00
- 0.01–0.09
- 0.10–0.99
- 1.00–1.49
- >=1.50
- No data reported
- Not included
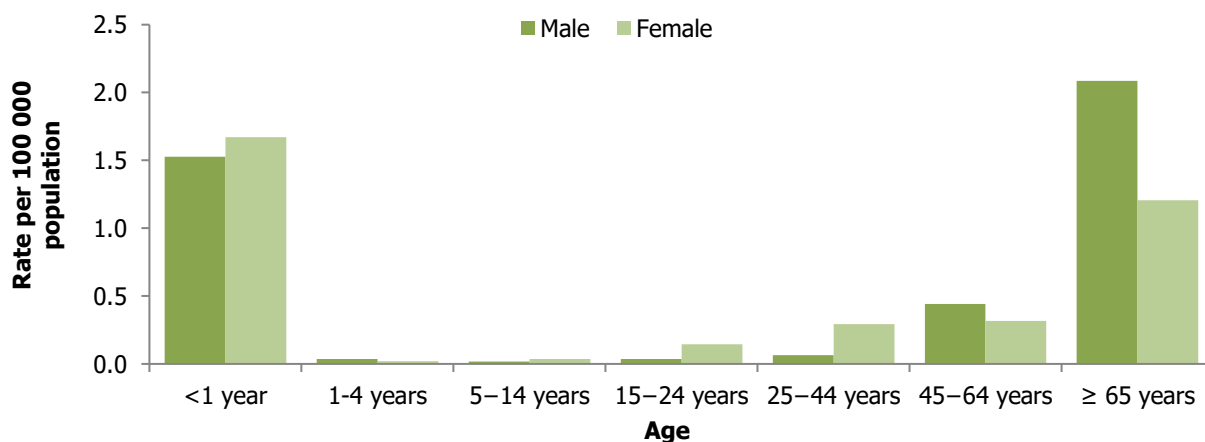
ECDC. Map produced on: 31 Oct 2016

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

Age and gender distribution

The gender distribution of confirmed listeriosis cases for which information was provided (N=2 220), was 52.1% males and 47.9% females in the EU/EEA countries, corresponding to a male-to-female ratio of 1.1:1. The most affected age groups were infants under one year of age (3.2%, 71 cases, 1.6 cases per 100 000 population) and people over 64 years of age (63.6%, 1 411 cases, 1.6 cases per 100 000 population). In addition, 458 (20.7%) cases belonged to the age group 45–64 years, 211 (9.5%) were 25–44 years old, 47 (2.1%) were in the 15–24-year age group, 13 (0.6%) were between 5 and 14 years old, and six (0.3%) were small children (1–4 years); the age was unknown for seven cases.

Figure 2. Distribution of confirmed listeriosis cases per 100 000 population, by age and gender, EU/EEA, 2015
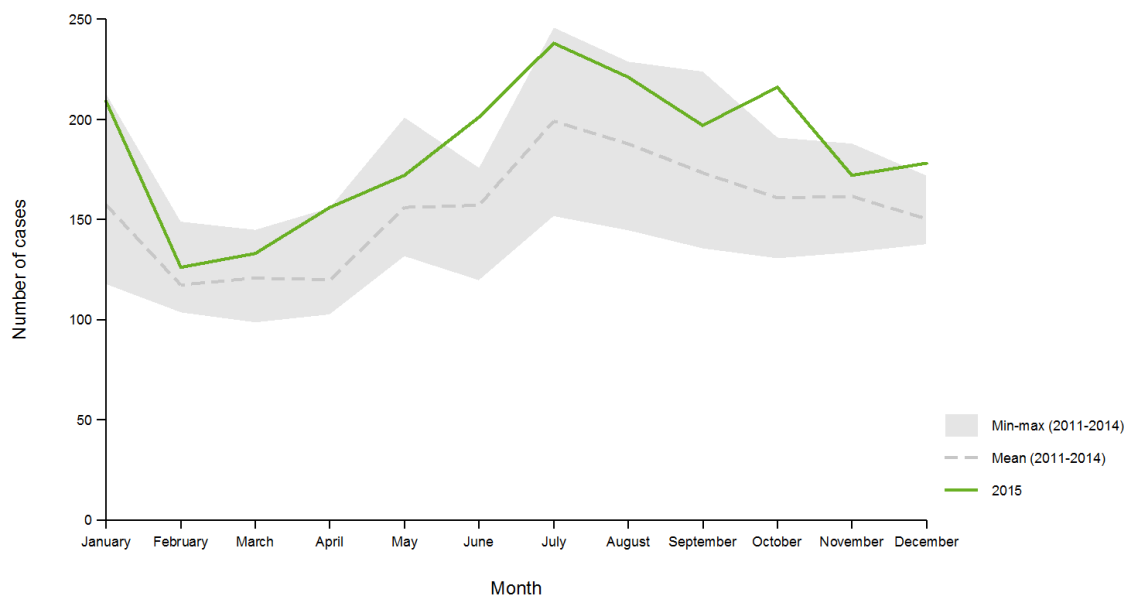

Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden,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

Seasonal distribution and trend

In 2015, cases of listeriosis showed a seasonal pattern similar to the previous years (Figure 3). The highest numbers of cases were reported in July, August and October.

Listeriosis cases at the EU/EEA level showed an increasing trend in 2011–2014. The number of cases remained stable from 2014 to 2015 (Figure 4). Twelve Member States (France, Germany, Greece, Hungary, Malta, the Netherlands, Poland, Romania, Slovakia, Slovenia, Spain and Sweden) have been showing increasing trends (p < 0.01) since 2008 [5]. Between 2008 and 2015, no decreasing trends were seen in any of the Member States.

Figure 3. **Distribution of confirmed listeriosis cases by month, EU/EEA, 2011−2015**

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

Figure 4. **Distribution of confirmed listeriosis cases by month and 12-month moving average, EU/EEA, 2011−2015**
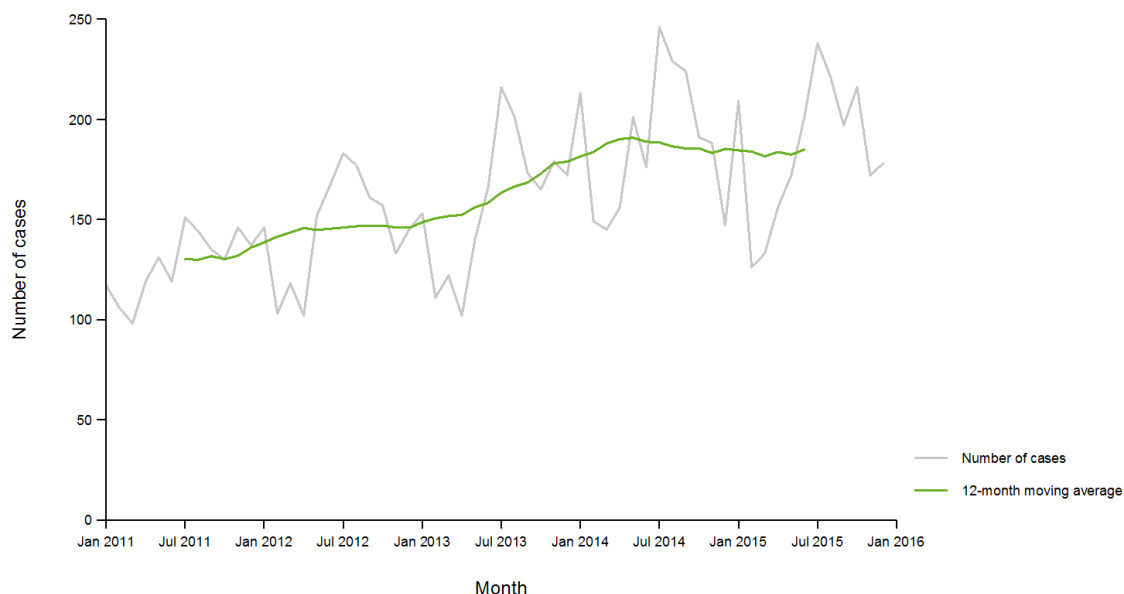
Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

Molecular typing-enhanced surveillance

In 2015, ten countries submitted *L. monocytogenes* typing data to TESSy. Six molecular typing cluster investigations were initiated in ECDC's Epidemic Intelligence information System. Five of these were small microbiological clusters and led to no further investigations, and one was associated with an outbreak in Denmark [4] that was linked to sausages and other meat products from a common source. In addition, there was one persistent pulsotype affecting eight Member States (TESSy reference types *ApaI.0142/0147* and *AscI.0026*), with a typing-based cluster from December 2012 to May 2015. Investigations of these types of persistent microbiological clusters require collaboration with the food and veterinary sector at the EU/EEA level.

Threats description for 2014

No listeriosis-related threats were reported in 2015.

Discussion

The EU/EEA surveillance of listeriosis focuses on severe, invasive forms of the disease, for which the risk groups are mainly elderly and immunocompromised persons as well as pregnant women and infants. In 2015, the majority of listeriosis cases were reported in persons over 64 years of age, especially males. Listeriosis case rates have been steadily increasing in EU/EEA in the past years. Almost all (97.4%) listeriosis cases in the EU were hospitalised in 2015; 270 cases were fatal [5]. Listeriosis can also manifest in milder forms causing gastrointestinal symptoms, but these cases are usually not surveyed at country level and are also not part of EU/EEA-level surveillance.

In 2015, a total of 14 *Listeria* outbreaks (11 due to *L. monocytogenes* and three due to unspecified *Listeria* species) were reported by nine Member States, amounting to a total of 230 cases [5]. Three of the five strong-evidence outbreaks were linked to the consumption of 'mixed foods', while the remaining two strong-evidence outbreaks were associated with the consumption of 'buffet meals' and 'pig meat and products thereof'.

More than one-fifth of the pulsotypes circulating in the EU/EEA are reported by more than one country, which indicates that targeted investigations are needed at the EU/EEA level. (Information on pulsotypes is based on pulsed-field gel electrophoresis (PFGE) types of human *L. monocytogenes* isolates submitted to TESSy as part of the molecular typing-enhanced surveillance.)

ECDC, the European Food Safety Authority and the EU reference laboratory for *L. monocytogenes* have set up a joint database for human, food, animal and environmental isolates from public heath institutes and food safety and veterinary authorities [6] and are defining processes for joint data analysis. Compared to PFGE, whole genome sequencing (WGS)-based methods have demonstrated an improved discriminatory power in listeriosis outbreak investigations [7,8], and WGS-based core genome multilocus sequence typing (cgMLST) schemes have already been defined for *L. monocytogenes* [8,9]. The PulseNet International network is working on the standardisation of WGS-based *L. monocytogenes* MLST schemes and a standardised nomenclature ensuring international data comparability [10].

Public health implications

The increasing trend in the number of listeriosis cases in the EU/EEA (with the exception of females between 25 and 44 years of age) [12] seems to be partly due to the increased population size of the elderly and other susceptible populations. This worrying development calls for more attention to the prevention and control of the disease. Raising awareness about listeriosis and potentially unsafe foods in risk groups is important, especially among the elderly, where the majority of cases occur. In addition, supranational cross-sectoral collaboration is essential to address the threat of persistent *L. monocytogenes* strains in humans.

References

1. European Centre for Disease Prevention and Control. Introduction to the Annual epidemiological report. In: ECDC. Annual epidemiological report for 2015 [internet]. Stockholm: ECDC; 2017. Available from: https://ecdc.europa.eu/en/annual-epidemiological-reports-2016/methods.

2. European Centre for Disease Prevention and Control. Surveillance systems overview [internet]. Stockholm: ECDC; 2017. Available from: https://ecdc.europa.eu/en/publications-data/surveillance-systems-overview-2015

3. European Centre for Disease Prevention and Control. Surveillance atlas of infectious diseases [internet]. Stockholm: ECDC; 2017 [Cited 30 May 2017]. Available from: https://ecdc.europa.eu/en/surveillance-atlas-infectious-diseases

4. European Centre for Disease Prevention and Control. Multi-country outbreak of *Listeria monocytogenes* PCR serogroup IVb MLST ST6 – 6 December 2017. Stockholm: ECDC; 2017. Available from: https://ecdc.europa.eu/sites/portal/files/documents/RRA-Listeria-monocytogenes-2017_0.pdf

5. European Food Safety Authority and European Centre for Disease Prevention and Control. The European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in 2015. EFSA Journal 2016; 14(12):4634. Available from: http://onlinelibrary.wiley.com/doi/10.2903/j.efsa.2016.4634/epdf.

6. Felix B, Danan C, Van Walle I, Lailler R, Texier T, Lombard B, et al. Building a molecular *Listeria monocytogenes* database to centralize and share PFGE typing data from food, environmental and animal strains throughout Europe. J Microbiol Methods. 2014;104:1-8.

7. Schmid D, Allerberger F, Huhulescu S, Pietzka A, Amar C, Kleta S, et al. Whole genome sequencing as a tool to investigate a cluster of seven cases of listeriosis in Austria and Germany, 2011–2013. Clin Microbiol Infect. 2014 May;20(5):431-6.

8. Gillesberg Lassen S, Ethelberg S, Björkman JT, Jensen T, Sørensen G, Kvistholm Jensen A, et al. Two listeria outbreaks caused by smoked fish consumption-using whole-genome sequencing for outbreak investigations. Clin Microbiol Infect. 2016 Jul;22(7):620-4.

9. Moura A, Criscuolo A, Pouseele H, Maury MM, Leclercq A, Tarr C, et al. Whole genome-based population biology and epidemiological surveillance of Listeria monocytogenes. Nat Microbiol. 2016 Oct 10;2:16185.

10. Ruppitsch W, Pietzka A, Prior K, Bletz S, Fernandez HL, Allerberger F, et al. Defining and evaluating a core genome multilocus sequence typing scheme for whole-genome sequence-based typing of *Listeria monocytogenes*. J Clin Microbiol. 2015 Sep;53(9):2869-76.

11. Nadon C, Van Walle I, Gerner-Smidt P, Campos J, Chinen I, Concepcion-Acevedo J, et al. PulseNet International: Vision for the implementation of whole genome sequencing (WGS) for global food-borne disease surveillance. Eurosurveill. 2017 Jun;22(23):30544.

12. Ricci A, Allende A, Bolton D, Chemaly M, Davies R, Salvador P, et al. *Listeria monocytogenes* contamination of ready-to-eat 1 foods and the risk for human health in the EU. doi:10.2903/j.efsa.20YY.NNNN [draft scientific opinion]. Available from: http://www.efsa.europa.eu/sites/default/files/engage/170724-0.pdf