

SURVEILLANCE REPORT

Annual Epidemiological Report for 2017

Legionnaires' disease

Key facts

- Legionnaires' disease remains an uncommon and mainly sporadic respiratory infection with an overall notification rate in 2017 for the EU/EEA of 1.8 per 100 000.
- There is heterogeneity in notification rates between EU/EEA countries, with the highest rate reported by Slovenia (5.8 per 100 000).
- The annual notification rate increased continuously over the 2013–2017 period from 1.2 per 100 000 in 2013 to 1.8 in 2017.
- There was a 30% increase in the number of cases in 2017 compared with 2016.
- Four countries (France, Germany, Italy, and Spain) accounted for 68% of all notified cases in 2017.
- Males aged 65 years and above were most affected (7.0 per 100 000).

Methods

This report is based on data for 2017 retrieved from The European Surveillance System (TESSy) on 13 July 2018. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

The methods used to produce this report are published online at ECDC [1] together with an overview of the national surveillance systems [2]. A subset of the data used for this report is available through ECDC's online *Surveillance atlas of infectious diseases* [3].

The surveillance data were collected through two different schemes:

- annual retrospective data collection of Legionnaires' disease (LD) cases in EU Member States, Iceland, and Norway.
- near-real-time reporting of travel-associated cases of Legionnaires' disease (TALD) through the European Legionnaires' disease surveillance network (ELDSNet) [4], including reports from countries outside the EU/EEA. This scheme aims primarily at identifying clusters of cases that may otherwise not have been detected at the national level, in order to quickly investigate them and take control measures at the implicated tourist accommodation sites to prevent further infections. A TALD cluster is the event of two cases having visited the same accommodation site within a two years period. A complex cluster is a combination of clusters, where sites have one or more cases in common [4].

For both surveillance schemes, countries were asked to report Legionnaires' disease cases in accordance with the 2012 EU/EEA case definition for confirmed cases or probable cases, i.e. at least one positive laboratory test.

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Epidemiology

In 2017, 30 countries reported 9 238 cases, of which 8 624 (93%) were classified as confirmed (Table 1). The number of notifications per 100 000 inhabitants increased to 1.8, the highest figure ever observed for the EU/EEA, increasing from 1.2 per 100 000 inhabitants in 2013. An increase of 30% in the number of reported cases in the EU/EEA was observed in 2017 compared with 2016, with an increase in the overall EU/EEA notification rate from 1.4 to 1.8 per 100 000 population.

Of 6 976 cases with known outcome, 574 (8%) were reported to have a fatal outcome. Four countries, France, Germany, Italy and Spain, accounted for 68% of all notified cases, although their combined populations only represented approximately 50% of the EU/EEA population.

Table 1. Distribution of Legionnaires' disease cases and rates per 100 000 population by country and year, EU/EEA, 2013–2017

Country	2013		2014		2015		2016		2017			
	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	ASR	Confirmed cases
Austria	100	1.2	133	1.6	160	1.9	161	1.9	219	2.5	2.3	208
Belgium	155	1.4	101	0.9	118	1.1	157	1.4	235	2.1	1.9	183
Bulgaria	1	0.0	1	0.0	1	0.0	0	0.0	2	0.0	0.0	2
Croatia	.	-	26	0.6	48	1.1	31	0.7	33	0.8	0.7	33
Cyprus	6	0.7	6	0.7	2	0.2	3	0.4	1	0.1	0.1	1
Czech Republic	67	0.6	110	1.0	120	1.1	147	1.4	217	2.1	1.9	213
Denmark	113	2.0	158	2.8	185	3.3	170	3.0	278	4.8	4.4	216
Estonia	10	0.8	8	0.6	6	0.5	14	1.1	16	1.2	1.1	10
Finland	15	0.3	10	0.2	17	0.3	15	0.3	27	0.5	0.5	25
France	1 262	1.9	1 348	2.0	1 389	2.1	1 218	1.8	1 630	2.4	2.3	1 598
Germany	808	1.0	832	1.0	867	1.1	983	1.2	1 280	1.6	1.3	1 043
Greece	38	0.3	27	0.2	29	0.3	31	0.3	43	0.4	0.3	43
Hungary	29	0.3	32	0.3	58	0.6	66	0.7	62	0.6	0.6	52
Iceland	.	-	4	1.2	1	0.3	3	0.9	3	0.9	1.0	3
Ireland	14	0.3	8	0.2	11	0.2	10	0.2	25	0.5	0.6	25
Italy	1 363	2.3	1 510	2.5	1 572	2.6	1 733	2.9	2 013	3.3	2.7	1 980
Latvia	34	1.7	38	1.9	22	1.1	24	1.2	31	1.6	1.5	24
Liechtenstein	.	-	.	-	.	-	.	-	.	-	-	.
Lithuania	1	0.0	8	0.3	7	0.2	11	0.4	14	0.5	0.5	11
Luxembourg	7	1.3	5	0.9	5	0.9	3	0.5	9	1.5	1.5	8
Malta	7	1.7	9	2.1	6	1.4	8	1.8	11	2.4	2.3	11
Netherlands	308	1.8	348	2.1	419	2.5	454	2.7	561	3.3	3.0	519
Norway	40	0.8	51	1.0	60	1.2	43	0.8	52	1.0	1.0	44
Poland	11	0.0	12	0.0	23	0.1	24	0.1	38	0.1	0.1	32
Portugal	94	0.9	588	5.6	145	1.4	197	1.9	232	2.3	1.9	228
Romania	1	0.0	1	0.0	3	0.0	2	0.0	19	0.1	0.1	15
Slovakia	6	0.1	14	0.3	14	0.3	14	0.3	14	0.3	0.3	12
Slovenia	77	3.7	59	2.9	106	5.1	93	4.5	117	5.7	5.2	117
Spain	815	1.7	925	2.0	1 024	2.2	951	2.0	1 363	2.9	2.6	1 349
Sweden	122	1.3	136	1.4	142	1.5	145	1.5	189	1.9	1.7	124
United Kingdom	331	0.5	370	0.6	412	0.6	383	0.6	504	0.8	0.7	495
EU/EEA	5 835	1.2	6 878	1.3	6 972	1.4	7 094	1.4	9 238	1.8	1.6	8 624

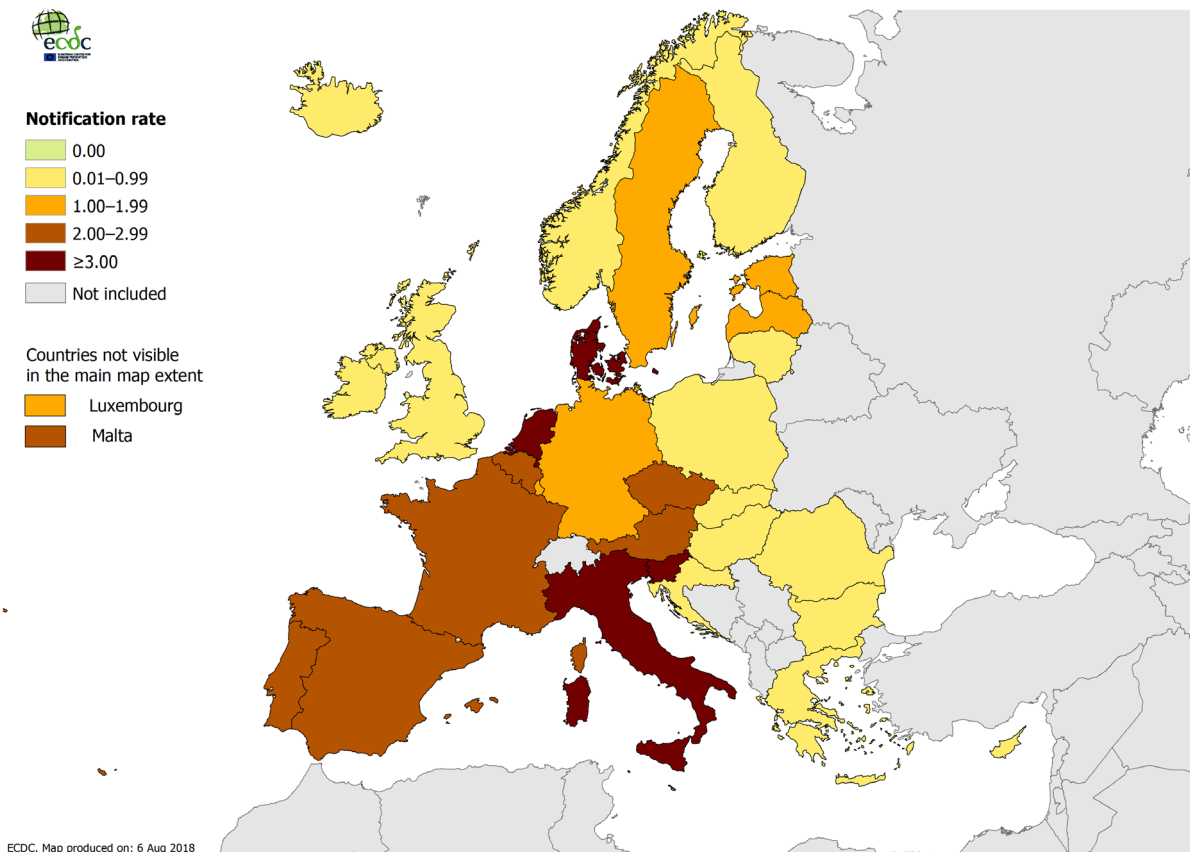
ASR: age-standardised rate

. : no data reported

- : no rate calculated.

Notification rates ranged from less than 1.0 per 100 000 inhabitants in 13 countries: Bulgaria, Croatia, Cyprus, Finland, Greece, Hungary, Iceland, Ireland, Lithuania, Poland, Romania, Slovakia and United Kingdom, to more than 3.0 per 100 000 in four countries: Denmark, Italy, the Netherlands and Slovenia (Table 1, Figure 1).

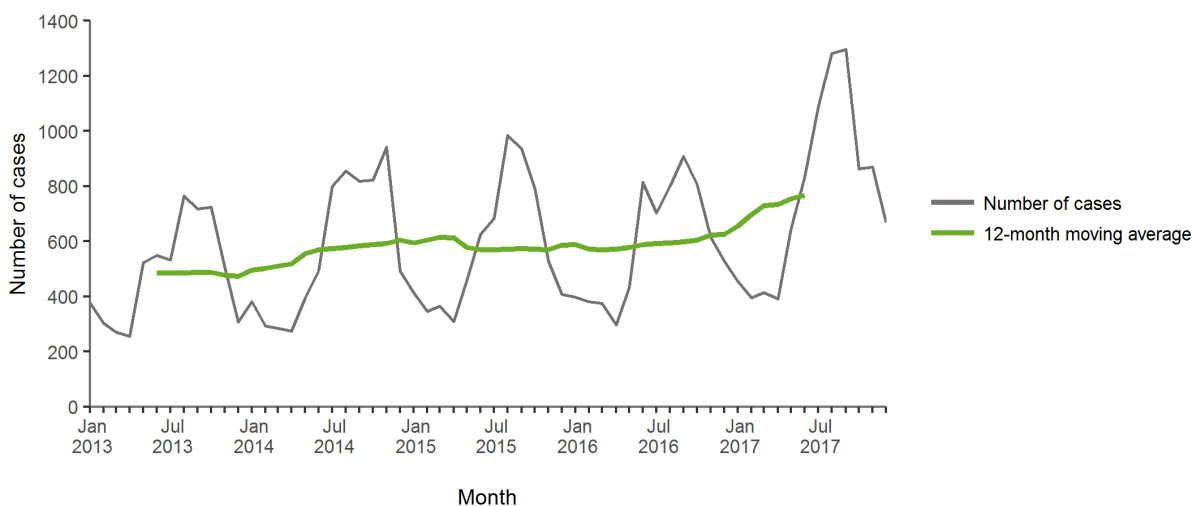
Figure 1. Distribution of Legionnaires' disease cases per 100 000 population by country, EU/EEA, 2017



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

The number of reported cases increased by 58% over the 2013–2017 period from 5 835 to 9 248 (Figure 2).

Figure 2. Distribution of Legionnaires' disease cases by month, EU/EEA, 2013–2017

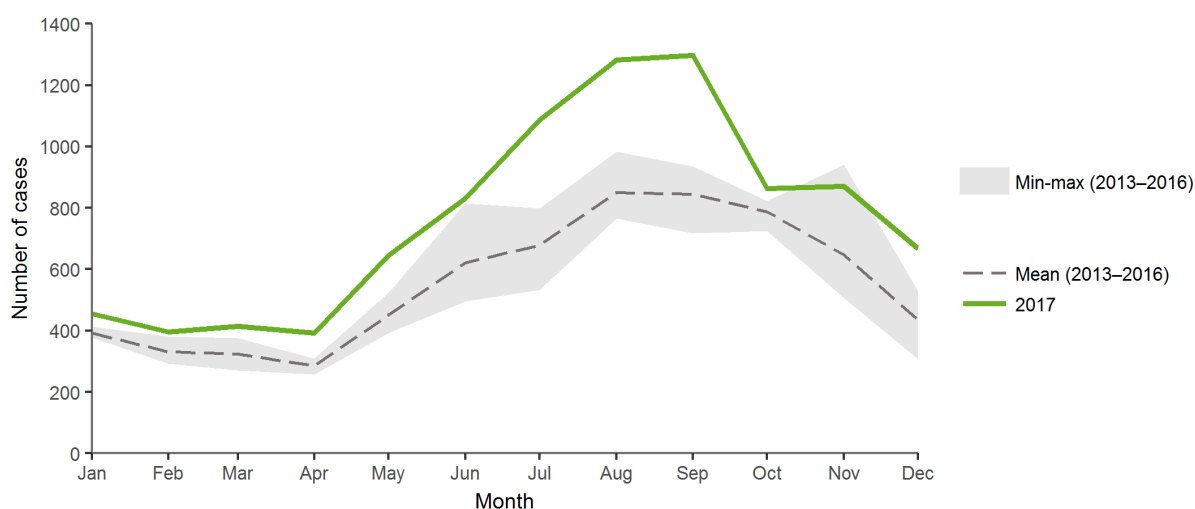


Source: Country reports from Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

The distribution of cases by month of reporting shows that the majority (58%) of cases occurred between June and October, similar to previous years (Figure 3). An increase in cases compared to the maximum in previous years (2013–2016) was observed for every month except November, where the comparison was higher due to a reported outbreak in Portugal in 2014. The peak of 1 301 cases in September 2017 was the highest monthly

number recorded to date under EU/EEA surveillance. No large outbreaks were reported by any EU/EEA country that could explain this particular seasonal increase.

Figure 3. Distribution of Legionnaires' disease cases by month, EU/EEA, 2017 and 2013–2016



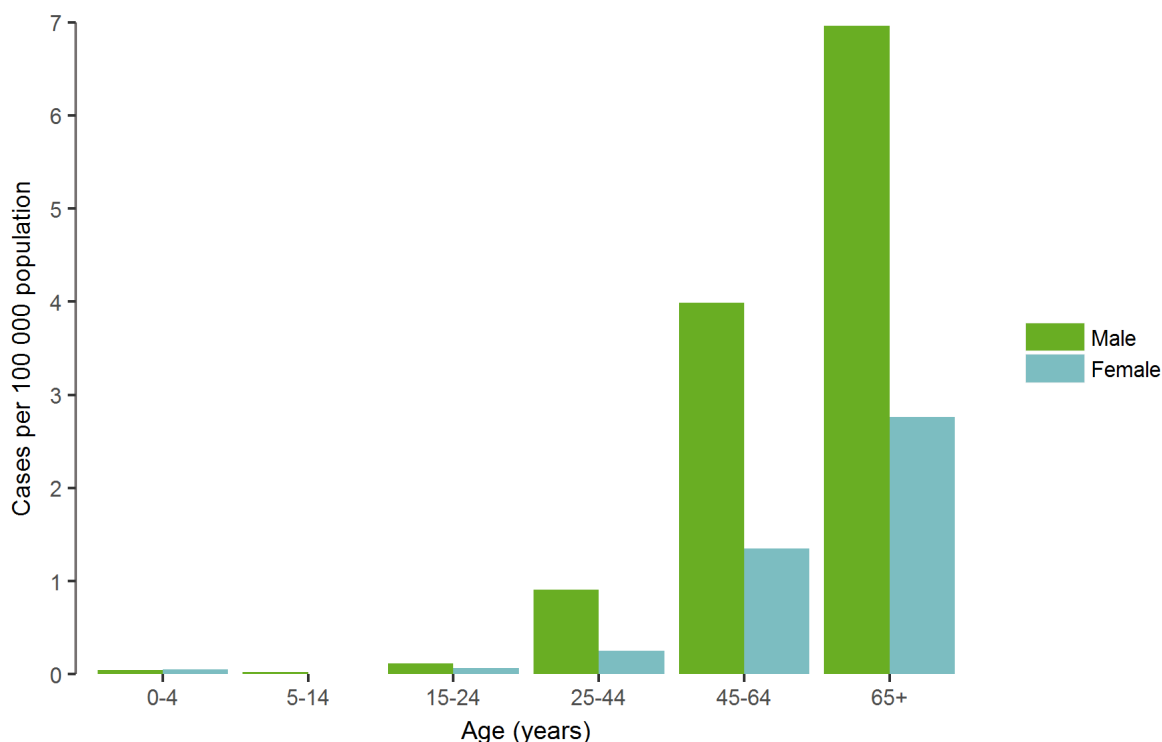
Source: Country reports Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

As in previous years, most cases were community-acquired (69%), while 21% were travel-associated, 8% were associated with healthcare facilities and 2% were associated with other settings.

In 2017, people aged 45 years and older accounted for 8 363 of 9 236 cases with known age (91%). The notification rate increased with age, from ≤ 0.1 per 100 000 in those under 25 years of age to 4.6 in persons aged 65 years and above (7.0 per 100 000 in males and 2.8 in females, Figure 4). The overall male-to-female ratio was 2.4:1.

L. pneumophila serogroup 1 was the most commonly identified pathogen, accounting for 801 of 1 014 culture-confirmed cases (79%).

Figure 4. Distribution of Legionnaires' disease cases per 100 000 population, by age and gender, EU/EEA, 2017



Travel-associated Legionnaires' disease (TALD)

For 2017, 1 487 TALD cases were reported through near-real time surveillance, 37% more than in 2016. Twenty-three EU/EEA countries and three non-EU/EEA countries reported cases. A total of 198 travel-associated clusters were detected, with 178 standard clusters in 39 countries, including 18 EU/EEA countries, and 20 complex clusters. In 2017, 57% of the detected TALD clusters had initial cases reported by different countries. These clusters would most likely not have been detected without the international surveillance of ELDSNet.

Outbreaks and other threats

Between 1 January and 31 December 2017, ECDC monitored 29 threats related to Legionnaires' disease. Twenty-four of these threats were rapidly evolving travel-associated clusters (≥ 3 cases with onset within 3 months). One threat was related to the detection by ECDC of an increase in the total number of reported travel-associated cases in the EU/EEA from late spring in 2017 compared to the same period in previous years. Another threat was a cluster of four cases on-board a cruise ship and the remaining three threats were community clusters.

In 2017, nine countries reported 28 community- or hospital-acquired outbreaks, ranging from one to seven per country. Thirteen EU/EEA countries reported no outbreaks.

Discussion

In 2017, both the number and notification rate of LD in the EU/EEA were the highest ever observed, continuing an increase observed since 2013, but being a notable increase compared with 2016. No large outbreaks contributed to the high number of reported cases. The main characteristics of the cases reported in 2017 were similar to those reported in previous years: most cases were sporadic and community-acquired and the disease mostly affected males 65 years and above.

The increasing trend is probably driven by several factors, including improved surveillance, an aging population, travel patterns and changes in climate and weather factors. Since the age-standardised notification rate also increased during the 2013–2017 period, demographic changes would only partly explain the trend. Weather conditions such as temperature, humidity and rainfall have been associated with higher LD incidence, probably through an effect on the bacterial ecology and/or an increased use of aerosol-producing devices or installations in the environment, such as cooling towers. A number of countries continue to have a notification rate below 0.5 and

several even below 0.2 cases per 100 000, which likely represents underestimation of the incidence in these countries.

Public health implications

Legionnaires' disease remains an important cause of potentially preventable morbidity and mortality in Europe and there is no indication of decreasing burden.

Though the overall incidence rate continues to rise, there is variation in incidence across EU/EEA countries, likely reflecting underdiagnosis of this disease. A priority remains to assist countries with very low notification rates in improving both the diagnosis and reporting of Legionnaires' disease.

As detection of TALD clusters through the ELDSNet surveillance scheme leads to investigations and prevention actions at accommodation sites in participating countries, the increasing number of clusters detected primarily through joint surveillance shows its value for public health.

Regular checks for the presence of *Legionella* bacteria and appropriate control measures applied to engineered water systems [5] may prevent cases of Legionnaires' disease at tourist accommodation sites and in hospitals, long-term healthcare facilities or other settings where sizeable populations at higher risk may be exposed.

References

1. European Centre for Disease Prevention and Control. Introduction to the Annual epidemiological report for 2016. In: ECDC. Annual epidemiological report for 2016. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/annual-epidemiological-reports/methods>.
2. European Centre for Disease Prevention and Control. Surveillance systems overview [Internet, downloadable spreadsheet]. Stockholm: ECDC; 2018 [cited 13 July 2018]. Available from: <https://ecdc.europa.eu/en/publications-data/surveillance-systems-overview-2017>.
3. European Centre for Disease Prevention and Control. Surveillance atlas of infectious diseases [Internet]. Stockholm: ECDC; 2018 [cited 16 November 2018]. Available from: <http://atlas.ecdc.europa.eu/>.
4. European Centre for Disease Prevention and Control. European Legionnaires' Disease Surveillance Network (ELDSNet) – Operating procedures for the surveillance of travel-associated Legionnaires' disease in the EU/EEA. Stockholm: ECDC; 2017. Available from: <http://ecdc.europa.eu/publications-data/european-legionnaires-disease-surveillance-network-eldsnet-operating-procedures>.
5. European Society of Clinical Microbiology and Infectious Diseases Study Group for Legionella Infections. European Technical Guidelines for the Prevention, Control and Investigation of Infections Caused by *Legionella* Species. Basel: ESCMID; 2017. Available from: <http://ecdc.europa.eu/publications-data/european-technical-guidelines-prevention-control-and-investigation-infections>.