

## SURVEILLANCE REPORT

Annual Epidemiological Report for 2016

# Legionnaires' disease

### Key facts

- Legionnaires' disease remains an uncommon and mainly sporadic respiratory infection with notification rates in EU/EEA countries below 4.6 per 100 000 (1.4 per 100 000 EU/EEA inhabitants overall).
- The annual notification rate increased over the 2012 to 2016 period.
- Four countries (France, Germany Italy, and Spain) accounted for 69% of all notified cases in 2016.
- Regular checks for *Legionella* bacteria and appropriate control measures in engineered water systems may prevent a significant proportion of Legionnaires' disease cases.

### Methods

This report is based on data for 2016 retrieved from The European Surveillance System (TESSy) on 1 August 2017 and reported by 28 EU Member States plus Iceland and Norway, which are part of the European Legionnaires' Disease Surveillance Network (ELDSNet). 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].

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) [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, which makes it possible to quickly investigate the clusters and take control measures at the implicated accommodation sites to prevent further infections.

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Countries were asked to report cases in accordance with the 2012 EU/EEA case definition for confirmed cases or probable cases with at least one positive laboratory test for a probable case.

Twenty-two EU/EEA countries and two non-EU/EEA countries reported TALD cases through near-real-time surveillance. TALD cases are defined as travellers having stayed at a commercial or public accommodation site in the two to 10 days before onset of disease. This definition does not include cases of LD among travellers who stayed with relatives or friends. A single TALD case was defined as a person who stayed at an accommodation site not associated with LD cases in the previous two years. A standard TALD cluster is defined as two or more cases who stayed at the same accommodation site and whose dates of onset were within two years of each other. A complex cluster is defined as a combination of cluster sites having one or more cases in common.

## Epidemiology

In 2016, 30 countries reported 7 069 cases, of which 6 560 (92.8%) were classified as confirmed. The remaining 509 (7.2%) cases were reported as probable (Table 1). As in 2015, the number of notifications per 100 000 EU/EEA inhabitants was 1.4, which remains the highest figure ever observed for the EU/EEA. Age-standardised notification rates did not differ substantially from crude rates. Of 5 404 cases with known outcome, 441 were reported to have a fatal outcome, giving a case fatality of 8.2%. Four countries (France, Germany, Italy, and Spain) accounted for 69% of all notified cases, although their combined populations only represent approximately 50% of the EU/EEA population.

**Table 1. Distribution of Legionnaires' disease cases and rates per 100 000 population by country, EU/EEA, 2012–2016**

Country	2012		2013		2014		2015		2016			
	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	Reported cases	Rate	ASR	Confirmed cases
Austria	104	1.2	100	1.2	133	1.6	160	1.9	161	1.9	1.7	158
Belgium	84	0.8	155	1.4	101	0.9	118	1.1	157	1.4	1.3	128
Bulgaria	0	0.0	1	0.0	1	0.0	1	0.0	0	0.0	0.0	0
Croatia		-	.	-	26	0.6	48	1.1	31	0.7	0.7	31
Cyprus	7	0.8	6	0.7	6	0.7	2	0.2	3	0.4	0.4	3
Czech Republic	56	0.5	67	0.6	110	1.0	120	1.1	147	1.4	1.3	138
Denmark	127	2.3	113	2.0	158	2.8	185	3.3	170	3.0	2.8	129
Estonia	3	0.2	10	0.8	8	0.6	6	0.5	14	1.1	1.0	9
Finland	10	0.2	15	0.3	10	0.2	17	0.3	15	0.3	0.3	12
France	1 298	2.0	1 262	1.9	1 348	2.0	1 389	2.1	1 218	1.8	1.8	1 179
Germany	628	0.8	808	1.0	832	1.0	867	1.1	981	1.2	1.0	781
Greece	29	0.3	38	0.3	27	0.2	29	0.3	31	0.3	0.3	31
Hungary	33	0.3	29	0.3	32	0.3	58	0.6	66	0.7	0.6	59
Iceland	2	0.6	.	-	4	1.2	1	0.3	3	0.9	1.2	2
Ireland	15	0.3	14	0.3	8	0.2	11	0.2	10	0.2	0.2	10
Italy	1 346	2.3	1 363	2.3	1 510	2.5	1 577	2.6	1 710	2.8	2.4	1 680
Latvia	48	2.3	34	1.7	38	1.9	22	1.1	24	1.2	1.1	14
Liechtenstein	.	-	.	-	.	-	.	-	.	-	.	-
Lithuania	9	0.3	1	0.0	8	0.3	7	0.2	11	0.4	0.4	11
Luxembourg	5	1.0	7	1.3	5	0.9	5	0.9	3	0.5	0.6	2
Malta	4	1.0	2	0.5	9	2.1	6	1.4	8	1.8	-	8
Netherlands	304	1.8	308	1.8	348	2.1	419	2.5	454	2.7	2.6	422
Norway	25	0.5	40	0.8	51	1.0	60	1.2	43	0.8	0.9	36
Poland	8	0.0	11	0.0	12	0.0	23	0.1	24	0.1	0.1	15
Portugal	140	1.3	94	0.9	588	5.6	145	1.4	197	1.9	1.7	195
Romania	3	0.0	1	0.0	1	0.0	3	0.0	2	0.0	0.0	2
Slovakia	4	0.1	6	0.1	14	0.3	14	0.3	14	0.3	0.2	14
Slovenia	81	3.9	77	3.7	59	2.9	106	5.1	93	4.5	4.2	92
Spain	972	2.1	815	1.7	925	2.0	1 024	2.2	951	2.0	1.9	944
Sweden	102	1.1	122	1.3	136	1.4	142	1.5	145	1.5	1.4	77
United Kingdom	401	0.6	331	0.5	370	0.6	412	0.6	383	0.6	0.6	378
<b>EU/EEA</b>	<b>5 848</b>	<b>1.2</b>	<b>5 830</b>	<b>1.2</b>	<b>6 878</b>	<b>1.3</b>	<b>6 977</b>	<b>1.4</b>	<b>7 069</b>	<b>1.4</b>	<b>1.3</b>	<b>6 560</b>

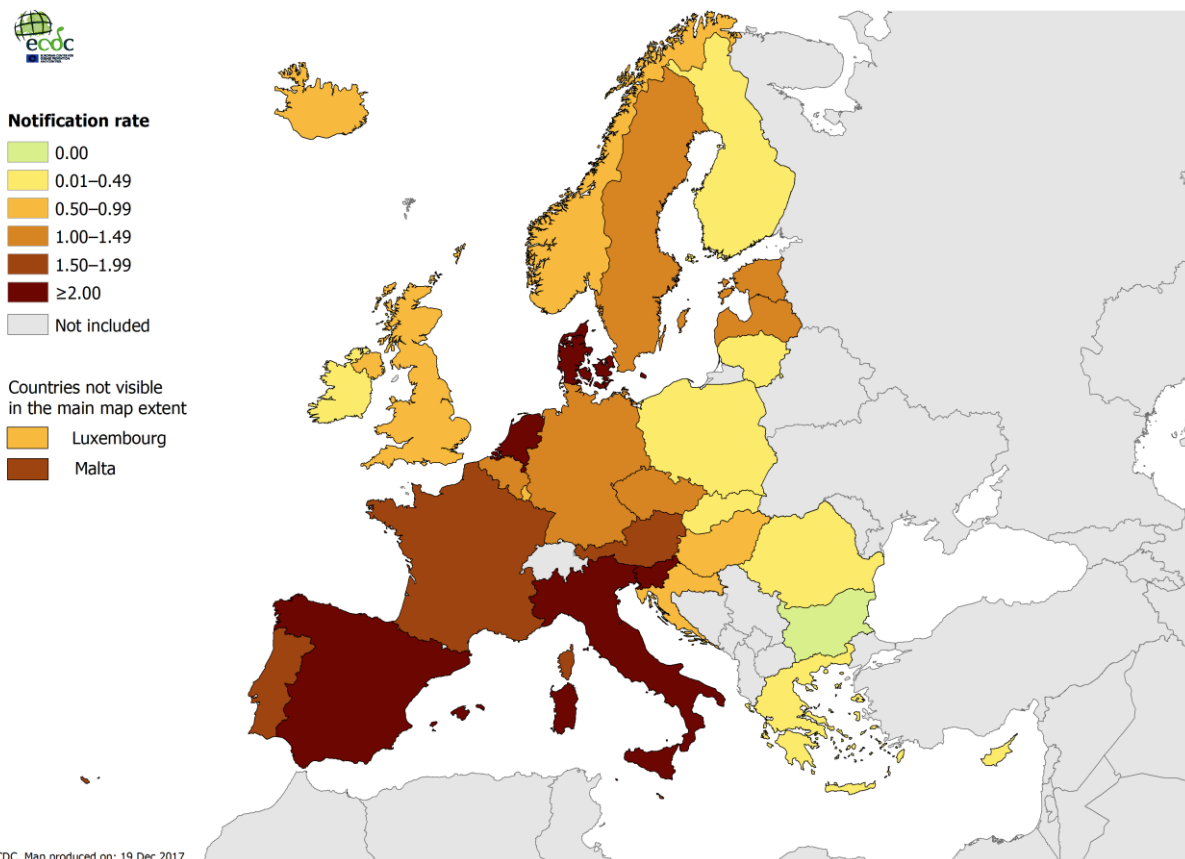
ASR: Age-standardised rate

∴: No data reported

-∴: No notification rate calculated.

Notification rates ranged from 0.2 per 100 000 inhabitants or less in Bulgaria, Ireland, Poland and Romania to 4.5 per 100 000 in Slovenia (Table 1, Figure 1).

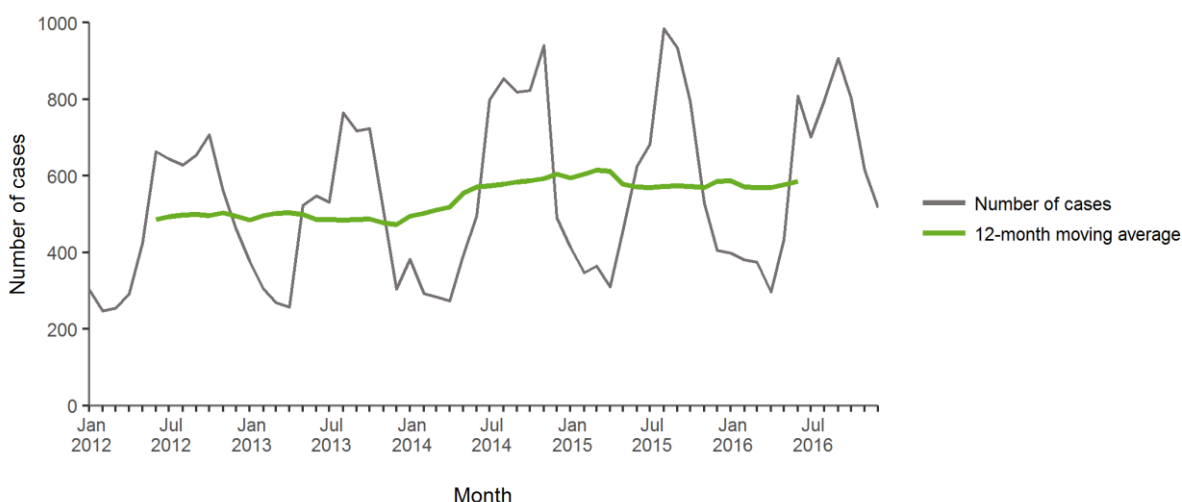
**Figure 1. Distribution of Legionnaires' disease cases per 100 000 population in the EU/EEA by country, 2016**



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 and the United Kingdom.

The number of reported cases increased over the 2012 to 2016 period (Figure 2).

**Figure 2. Distribution of Legionnaires' disease cases by month, EU/EEA, 2012 to 2016**

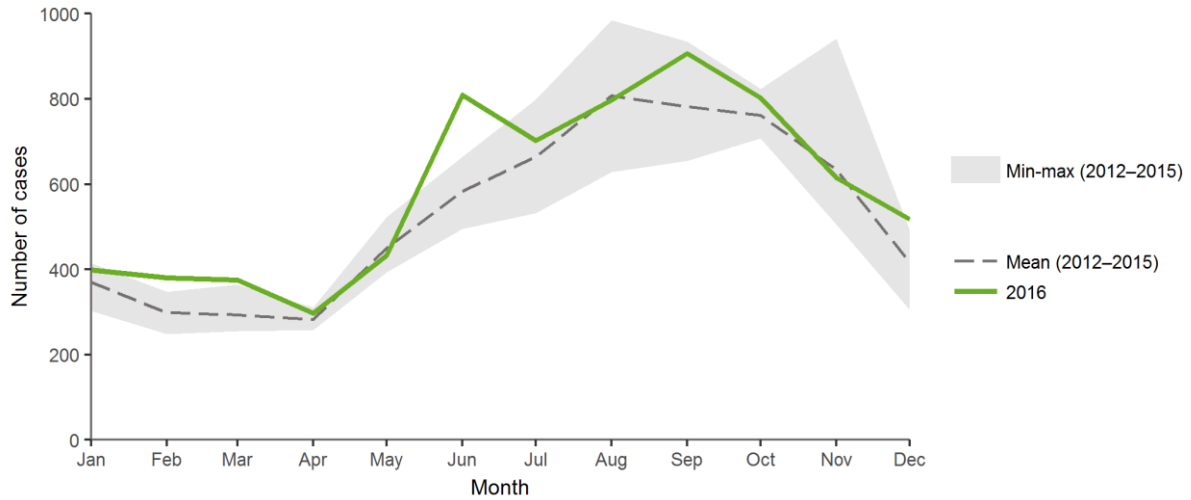


Source: Country reports from Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United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

The distribution of cases by month of reporting shows that majority of cases occurred around European summer time, similar to previous years (Figure 3). An earlier peak in June is observed than that of the 2012 to 2015 range. This increase is seen in several EU countries, but no large outbreaks were reported that may explain this. The

comparative maximum (2012 to 2015) peak in November was due to an outbreak in Portugal in 2014. Overall, 58% of cases in 2016 had a date of onset between June and October.

**Figure 3. Distribution of Legionnaires' disease cases by month, EU/EEA, 2016 and 2012 to 2015**



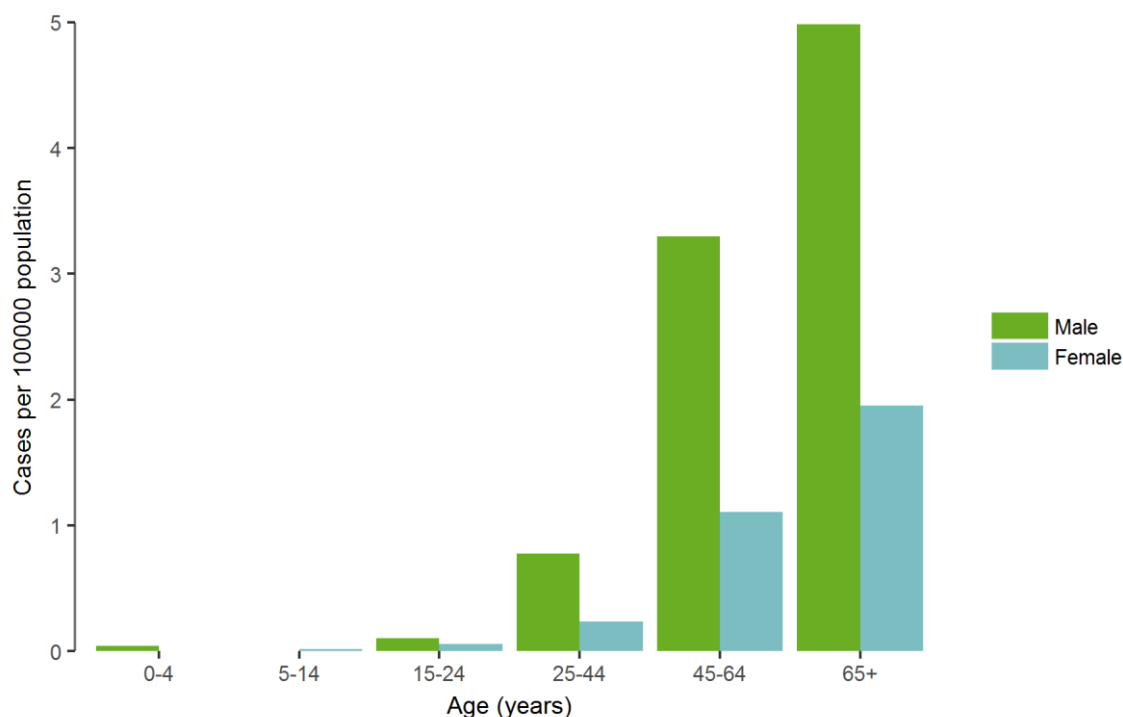
Source: Country reports from Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United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

As in previous years, most cases (71%) were community-acquired, while 20% were travel-associated, 7% were associated with healthcare facilities and 2% were associated with other settings.

In 2016, people aged 45 years and older accounted for 6 302 (89%) of 7 063 cases with known age. The notification rate increased with age, from  $\leq 0.1$  per 100 000 in those under 25 years of age to 3.3 in persons aged 65 years and above (5.0 per 100 000 in males and 2.0 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 665 of 814 (82%) culture-confirmed cases.

**Figure 4. Distribution of Legionnaires' disease cases per 100 000 population by age and gender, EU/EEA, 2016**



## Travel-associated Legionnaires' disease

For 2016, 1 082 TALD cases were reported through near-real-time surveillance: 5% fewer than in 2015, but 14% and 37% more than in 2014 and 2013 respectively. A total of 135 travel-associated clusters were detected, with 122 standard clusters in 26 countries and one ship and 13 complex clusters. In 2016, 51% of the detected clusters of TALD had initial cases reported by different countries. These clusters would probably not have been detected without the international surveillance of ELDSNet.

## Outbreaks and other threats

ECDC monitored six threats in 2016 related to Legionnaires' disease in six countries in Asia, Europe, Middle East and South America. Five were rapidly evolving clusters of TALD ( $\geq 3$  cases with onset within 3 months) involving between 3 and 5 cases each. One threat related to two rapidly evolving clusters of TALD associated with travel to Dubai, United Arab Emirates that led to the identification of an unusual increase of cases among travellers to this destination in October 2016 [5].

## Discussion

In 2016, both the number and notification rate of LD in the EU/EEA were the highest ever observed, continuing an increase observed since 2011. Contrary to 2014, no large outbreak contributed to the high number of reported cases. The main characteristics of the cases reported in 2016 were very similar to those reported in previous years. Most cases were sporadic and community-acquired and the disease mostly affected older males.

This increasing trend is probably driven by several factors, including improved surveillance, aging populations, travel patterns and climate change. Since the age-standardised notification rate also increased during the 2012 to 2016 period, demographic change would only partially explain the trend. Weather conditions such as temperature, humidity and rainfall have been associated with higher LD incidence, having an effect on 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, 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 the EU/EEA countries, likely reflecting underdiagnosis of this disease. Thus, 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 proportion 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 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 [6].

## References

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