Legionnaires' disease

- Legionnaires' disease remains an uncommon, mainly sporadic infection with low notification rates in EU and EEA countries (overall 1.0 per 100 000 inhabitants).
- Four countries (France, Italy, Spain and Germany) reported 72% of all notified cases.
- Two large outbreaks, which were monitored by ECDC, occurred in Scotland (United Kingdom) and Spain in 2012 with 48 and 42 cases, respectively.
- Regular checks for *Legionella* and appropriate control measures in man-made water systems may prevent a significant proportion of Legionnaires' disease cases.

Legionnaires' disease is a pneumonia often associated with systemic symptoms and caused by the Gram-negative bacteria, *Legionella* spp., which are found in freshwater environments worldwide[1]. Humans are infected by inhalation of aerosols containing *Legionella* bacteria, which may result in severe pneumonia with a fatal outcome. Outbreaks can originate from a common environmental water source, such as a cooling tower. Cases of Legionnaires' disease are mainly reported among persons in older age groups, especially in males.

Epidemiological situation in 2011

In 2011, 4 917 cases were reported by 29 countries with six countries (France, Italy, Spain, Germany, the Netherlands and the United Kingdom) accounting for 83% of all notified cases. The overall notification rate

Figure 2.1.5. Trend and number of cases of Legionnaires' disease reported in the EU/EEA, 2007–2011

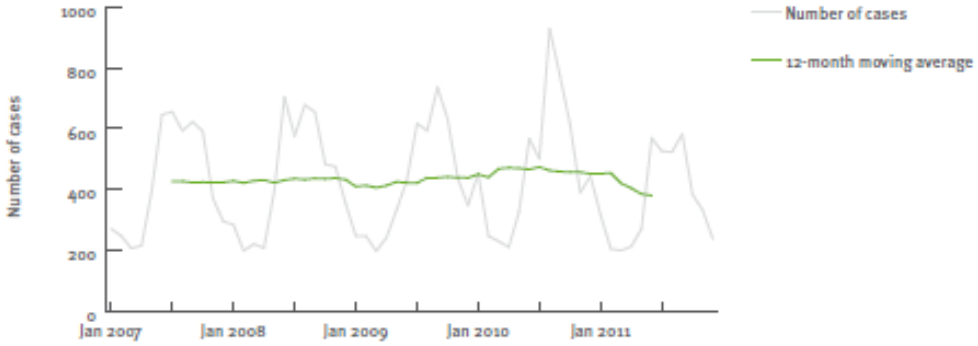
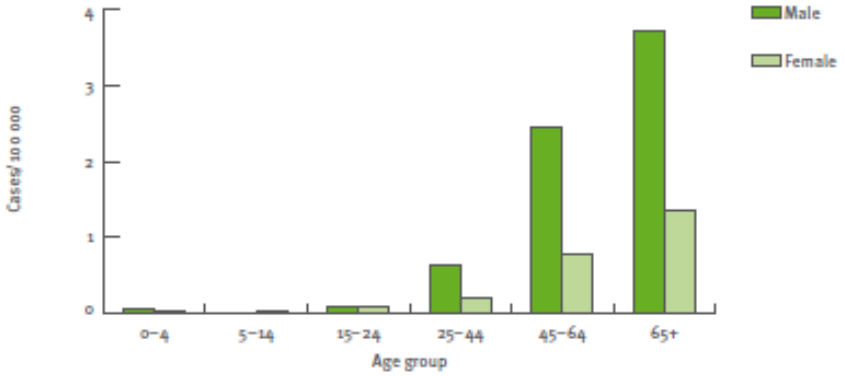


Figure 2.1.6. Rates of cases of Legionnaires' disease reported in the EU/EEA, by age and gender, 2011



Source: Country reports from Austria, Belgium, 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.

was 1.0 per 100 000 inhabitants in 2011, 22% lower than in the previous year. Very few cases were reported by eastern European countries such as Bulgaria, Poland or Romania. With the notable exception of an August peak in 2010, the average monthly number of reported cases has remained stable over the past five years (Figure 2.1.5). As in previous years[2], most cases were community-acquired (67%) while 24% were travel-associated, 7% were related to healthcare facilities and 3% to other settings. The decrease compared to 2010 was less pronounced in travel-associated cases (-9%) than in cases with other probable settings of infection. Among the six largest reporting countries, only Germany reported more community-acquired cases in 2011 (+8%). Of 3436 cases with known outcome, 306 were reported to have died, giving a case–fatality rate of 9%.

Distribution by age and gender

In 2011, people aged 65 years and older accounted for 2 072 (42%) of 4 909 cases with known age. The male-to-female ratio was 2.5:1. Notification rates increased with age, from < 0.1 per 100 000 in those under 25 years to 2.3 in persons aged 65 years and over (3.7 per 100 000 in males and 1.3 in females) (Figure 2.1.6).

Seasonality

The distribution of cases by month of onset showed a peak in summer, with 58% of all cases having a date of onset between June and October (Figure 2.1.7). In 2011, the August-September peak was not as prominent as in previous years.

Enhanced surveillance

In addition to the retrospective surveillance of Legionnaires' disease, the European Legionnaires' Disease Surveillance Network (ELDSNet) conducts daily surveillance of travel-associated cases. In 2011, 763 travel-associated cases were reported, which was 12% less than the number of cases reported in 2010[2].

A total of 82 new travel-associated clusters[I] were notified in 2011. In 37 (45%) of these clusters, the first two reported cases were from different countries, and they were therefore unlikely to have been detected without ELDSNet. Legionella was found in 60 environmental cluster investigations. Seven of the 82 accommodation sites associated with clusters had their names published on ECDC's website due to unsatisfactory or uncertain control measures.

Update from epidemic intelligence 2012

In 2012, ECDC monitored 14 threats related to Legionnaires' disease, 13 of which were travel-associated, rapidly evolving clusters[II].

The largest outbreak in 2012 was associated with a hotel in Calpe, Spain[3]. It included 42 cases with dates of onset between December 2011 and June 2012. Strong evidence suggested the spa pool to be the source of the outbreak.

In June 2012, a community outbreak occurred in the city of Edinburgh, United Kingdom[4]. It consisted of 48 confirmed and 49 suspected cases. The investigation concluded that industrial cooling towers were the likely source of infection.

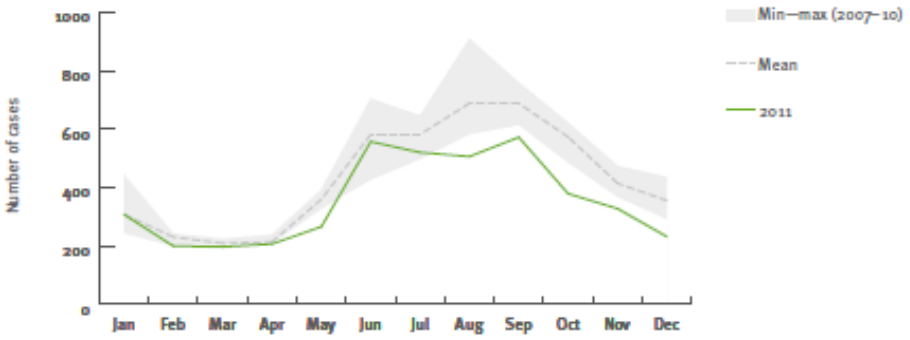
Discussion

The decrease in notifications of Legionnaires' disease observed in 2011 was mainly driven by a reduced number of community-acquired cases notified by the largest reporting countries. This may be linked to specific environmental conditions unfavourable to the growth of Legionella spp., especially during the second half of the year[5-7]. The fact, that travel-associated cases and

I A cluster is defined as two or more cases that stayed at the same public accommodation site in the two to 10 days before onset of illness where the onsets were within the same two year period.

II A rapidly evolving cluster is defined as three or more cases with dates of onset within a three-month period during the last six months.

Figure 2.1.7. Seasonal distribution: Number of confirmed cases of Legionnaires' disease by month, EU/EEA, 2007–2011



especially those with a travel history abroad decreased less, supports this hypothesis. Germany and some other countries may have seen less reduction in notifications because they are still catching up, their notification rates remaining far below what would be expected. In eastern European countries where under-ascertainment remains considerable, targeted studies on diagnostics and surveillance systems should be carried out. For example, cross-sectional prevalence studies at major university hospitals could raise awareness of the disease among local clinicians.

Despite the observed decrease in 2011, factors such as global warming, increasing use of man-made water systems, increasing travel and an ageing European population could drive an overall rise in Legionnaires' disease incidence in the future. Regular checks for presence of Legionella and appropriate control measures in man-made water systems may prevent a significant proportion of Legionnaires' disease cases[8].

In 2011, the number of travel-associated Legionnaires' disease cases notified was lower than in previous years. However, similar to previous years the near real-time surveillance at European level has once again proved useful, since 45% of the clusters were unlikely to have been detected without ELDSNet. In 2012, the network played a crucial role in monitoring two major outbreaks.

References

1. Fields BS, Benson RF, Besser RE. Legionella and Legionnaires' disease: 25 years of investigation. Clin Microbiol. Rev. 2002 Jul;15(3):506–26
2. European Centre for Disease Prevention and Control. Legionnaires' disease surveillance in Europe, 2010. Stockholm: ECDC;2012. Available from: http://www.ecdc.europa.eu/en/publications/Publications/SUR-Legionnaires-disease-surveillance-2010.pdf
3. Vanaclocha H, Guiral S, Morera V, Calatayud MA, Castellanos M, Moya V, et al. Preliminary report: outbreak of Legionnaires' disease in a hotel in Calpe, Spain, update on 22 February 2012. Euro Surveill. 2012; 17(8)
4. McCormick D, Thorn S, Milne D, Evans C, Stevenson J, Llano M, et al. Public health response to an outbreak of Legionnaires' disease in Edinburgh, United Kingdom, June 2012. Euro Surveill. 2012; 17(28)
5. Hicks LA, Rose CE Jr, Fields BS, Drees ML, Engel JP, Jenkins PR, et al. Increased rainfall is associated with increased risk for legionellosis. Epidemiol. Infect. 2007 Jul;135(5):811–7
6. Karagiannis I, Brandsema P, van der Sande M. Warm, wet weather associated with increased Legionnaires' disease incidence in the Netherlands. Epidemiol. Infect. 2009 Feb;137(2):181–7
7. Ricketts KD, Charlett A, Gelb D, Lane C, Lee JV, Joseph CA. Weather patterns and Legionnaires' disease: a meteorological study. Epidemiol. Infect. 2009 Jul;137(7):1003–12
8. Chartier Y, Lee JV, Pond K, Surman-Lee S, Bartram J. Legionella and the prevention of legionellosis. Geneva: World Health Organization; 2007. Available from: http://www.who.int/water_sanitation_health/ emerging/legionella.pdf

Table 2.1.3. Numbers and rates of Legionnaires' disease cases reported in the EU/EEA, 2007–2011

Country	2011					2010		2009		2008		2007	
	National coverage	Report type	Reported cases and rate per 100 000 population			Reported cases and rate per 100 000 population		Reported cases and rate per 100 000 population		Reported cases and rate per 100 000 population		Reported cases and rate per 100 000 population	
			Cases	Rate	Age standardised rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Austria	Y	C	101	1.20	1.14	80	0.96	92	1.10	101	1.21	107	1.29
Belgium	Y	C	79	0.72	0.70	89	0.82	80	0.74	0	0.00	77	-
Bulgaria	Y	C	0	0.00	0.00	1	0.01	3	0.04	1	0.01	0	0.00
Cyprus	Y	C	1	0.12	0.12	2	0.24	3	0.38	9	1.14	1	0.13
Czech Republic	Y	C	57	0.54	0.53	38	0.36	18	0.17	13	0.13	18	0.18
Denmark	Y	C	123	2.21	2.15	133	2.40	123	2.23	130	2.37	134	2.46
Estonia	Y	C	7	0.52	0.51	0	0.00	6	0.45	7	0.52	3	0.22
Finland	Y	C	9	0.17	0.15	24	0.45	22	0.41	16	0.30	39	0.74
France	Y	C	1170	1.80	1.79	1540	2.38	1206	1.87	1244	1.94	1428	2.24
Germany	Y	C	634	0.78	0.69	688	0.84	503	0.61	522	0.64	529	0.64
Greece	Y	C	18	0.16	0.15	9	0.08	15	0.13	29	0.26	25	0.22
Hungary	Y	C	37	0.37	0.37	60	0.60	65	0.65	25	0.25	18	0.18
Ireland	Y	C	7	0.16	0.20	11	0.25	7	0.16	11	0.25	15	0.35
Italy	Y	C	1018	1.68	1.48	1238	2.05	1207	2.01	1196	2.01	954	1.61
Latvia	Y	C	49	2.20	2.15	6	0.27	3	0.13	5	0.22	2	0.09
Lithuania	Y	C	2	0.06	0.06	1	0.03	0	0.00	0	0.00	0	0.00
Luxembourg	Y	C	6	1.17	1.18	10	1.99	5	1.01	5	1.03	5	1.05
Malta	Y	C	9	2.16	2.11	6	1.45	5	1.21	2	0.49	14	3.43
Netherlands	Y	C	311	1.87	1.82	466	2.81	251	1.52	337	2.05	325	1.99
Poland	Y	C	18	0.05	0.05	36	0.09	10	0.03	12	0.03	0	0.00
Portugal	Y	C	89	0.84	0.80	128	1.20	96	0.90	102	0.96	82	0.77
Romania	Y	C	1	0.01	0.01	1	0.01	3	0.01	4	0.02	1	0.01
Slovakia	Y	C	7	0.13	0.13	4	0.07	2	0.04	7	0.13	2	0.04
Slovenia	Y	C	44	2.15	2.05	58	2.83	66	3.25	47	2.34	32	1.59
Spain	Y	C	706	1.53	1.48	1150	2.50	1231	2.69	1234	2.73	1136	2.55
Sweden	Y	C	127	1.35	1.30	100	1.07	114	1.23	153	1.67	127	1.39
United Kingdom	Y	C	251	0.40	0.40	376	0.61	374	0.61	398	0.65	496	0.82
EU total	-	-	**4881**	**0.97**	**0.93**	**6255**	**1.25**	**5510**	**1.10**	**5610**	**1.13**	**5570**	**1.13**
Iceland	Y	C	3	0.94	1.18	2	0.63	7	2.19	2	0.63	12	3.90
Liechtenstein	-	-	-	-	-	-	-	-	-	-	-	-	-
Norway	Y	C	33	0.67	0.69	48	0.99	34	0.71	38	0.80	35	0.75
Total	-	-	**4917**	**0.97**	**0.93**	**6305**	**1.25**	**5551**	**1.10**	**5650**	**1.12**	**5617**	**1.13**

Y: yes; N: no; A: aggregated data report; C: case-based report; U: unspecified; –: no report.

Surveillance systems overview

Country	Data source	Compulsory (Cp)/ voluntary (V)/other (O)	Comprehensive (Co)/ sentinel (Se)/other (O)	Active (A)/ passive (P)	Case-based (C)/ aggregated (A)	Data reported by				National coverage	National reference laboratory data	Comparable data available	Case definition used
						Laboratories	Physicians	Hospitals	Others				
Austria	AT-Epidemiegesetz	Cp	Co	P	C	Y	Y	Y	Y	Y	-	-	EU-2008
Belgium	BE-FLA_FRA_LABNET_REFLAB	Cp	O	A	C	Y	Y	Y	-	Y	-	-	Not specified/unknown
Bulgaria	BG-NATIONAL_SURVEILLANCE	Cp	Co	P	A	Y	Y	Y	Y	Y	-	-	EU-2008
Cyprus	CY-NOTIFIED_DISEASES	Cp	Co	P	C	N	Y	N	N	Y	-	-	EU-2008
Czech Republic	CZ-EPIDAT	Cp	Co	A	C	N	Y	Y	N	Y	-	-	EU-2008
Denmark	DK-MIS	Cp	Co	P	C	N	Y	N	N	Y	-	-	Other
Estonia	EE-LEGIONELLOSIS	Cp	Co	P	C	Y	Y	Y	Y	Y	-	-	EU-2008
Finland	FI-NIDR	Cp	Co	P	C	Y	Y	N	N	Y	-	-	Not specified/unknown
France	FR-MANDATORY_INFECTIOUS_DISEASES	Cp	Co	P	C	Y	Y	Y	Y	Y	-	-	Not specified/unknown
Germany	DE-SURVNET@RKI-7.1	Cp	Co	P	C	Y	N	N	Y	Y	-	-	Other
Greece	GR-NOTIFIABLE_DISEASES	Cp	Co	P	C	Y	Y	Y	N	Y	-	-	EU-2008
Hungary	HU-EFRIR	Cp	Co	P	C	Y	Y	Y	N	Y	-	-	EU-2008
Iceland	IS-SUBJECT_TO_REGISTRATION	Cp	Co	P	C	Y	Y	Y	N	Y	-	-	EU-2008
Ireland	IE-CIDR	Cp	Co	P	C	Y	Y	Y	N	Y	-	-	EU-2008
Italy	IT-LEGIONELLOSIS	Cp	Co	P	C	N	Y	Y	N	Y	-	-	Other
Latvia	LV-BSN	Cp	Co	P	C	Y	Y	Y	N	Y	-	-	EU case definition (legacy/deprecated)
Lithuania	LT-COMMUNICABLE_DISEASES	Cp	Co	P	C	Y	Y	N	N	Y	-	-	Not specified/unknown
Luxembourg	LU-SYSTEM1	Cp	Co	P	C	Y	Y	N	N	Y	-	-	Not specified/unknown
Malta	MT-DISEASE_SURVEILLANCE	Cp	Co	P	C	Y	Y	Y	Y	Y	-	-	EU-2008
Netherlands	NL-OSIRIS	Cp	Co	P	C	Y	Y	N	N	Y	-	-	EU-2008
Norway	NO-MSIS_A	Cp	Co	P	C	Y	Y	Y	N	Y	-	-	Not specified/unknown
Poland	PL-NATIONAL_SURVEILLANCE	Cp	Co	P	C	Y	Y	Y	N	Y	-	-	Other
Portugal	PT-LEGIONELLOSIS	Cp	Co	P	C	Y	Y	N	N	Y	-	-	EU-2008
Romania	RO-RNSSy	Cp	Co	P	C	N	N	Y	N	Y	-	-	EU-2008
Slovakia	SK-EPIS	Cp	Co	A	C	Y	Y	Y	N	Y	-	-	EU-2008
Slovenia	SI-SURVIVAL	Cp	Co	P	C	Y	Y	Y	N	Y	-	-	EU-2008
Spain	ES-STATUTORY_DISEASES	Cp	Co	P	C	N	Y	Y	N	Y	-	-	EU-2008
Sweden	SE-SMINET	Cp	Co	P	C	Y	N	N	N	Y	-	-	EU-2008
United Kingdom	UK-LEGIONELLOSIS	O	Co	A	C	Y	N	Y	Y	Y	-	-	Other