

Characteristics of the most important outbreaks of legionnaire's disease in France from 1998 to 2007

P2-02

C. Campese¹, S. Jarraud², D. Che¹
1/ French Institute for Public Health Surveillance, Saint-Maurice, France; 2/ National Reference Centre for Legionella, Lyon, France

Background

- In France, the notification of Legionnaire's disease (LD) cases is mandatory since 1987
- Following a study in 1995 showing under-reporting (estimated sensitivity $\approx 10\%$), the surveillance system was strengthened in 1997 [1]
- The incidence rate was 2.3 per 100 000 population in 2007
- Between 1998 and 2007, 9935 cases were notified but few outbreaks occurred
- Our study describes the characteristics of these outbreaks

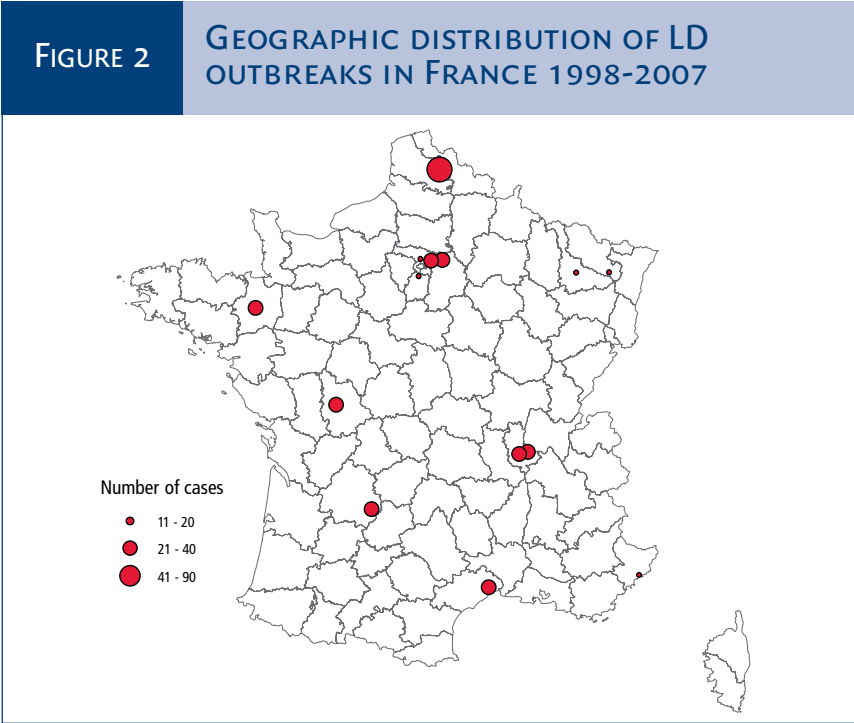
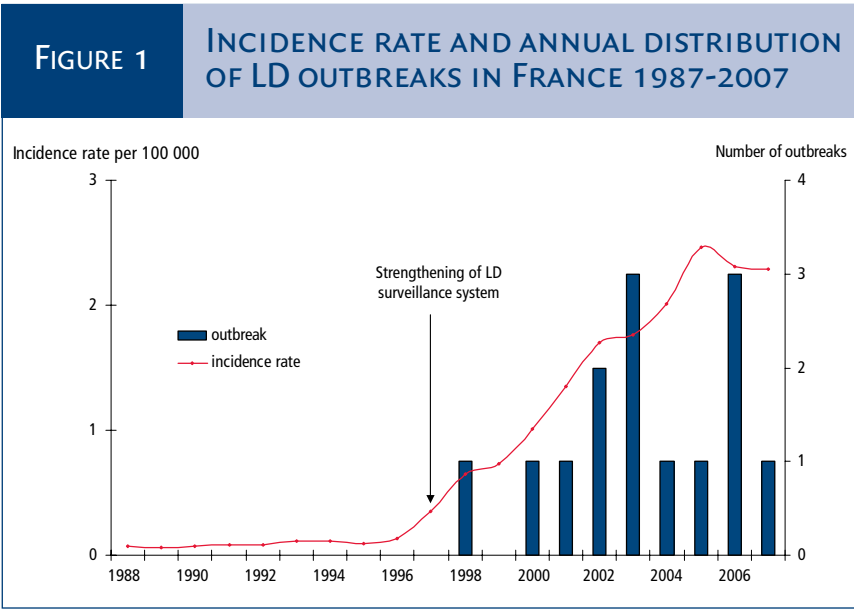
Methods

- Case definitions
 - patient who presented with pneumonia and one of the following laboratory results
 - a confirmed case
 - isolation of *Legionella*
 - or/and detection of *Legionella pneumophila* antigen in urine
 - or/and a fourfold rise in antibody titre to *Legionella*
 - a presumptive case
 - a single high titre in antibody to *Legionella*
 - patient who presented with pneumonia, who shared the same exposure as a confirmed case but with no laboratory confirmation of LD
 - a possible case
- An outbreak was defined as the occurrence of more than 10 cases of LD linked in terms of time and place
- Laboratory methods
 - Sub-typing using pulsed-field gel electrophoresis (PFGE)
 - Comparison of human and environmental strains
- The characteristics of the outbreak cases were compared to those of cases notified in France during the same period (1998-2007) = national data

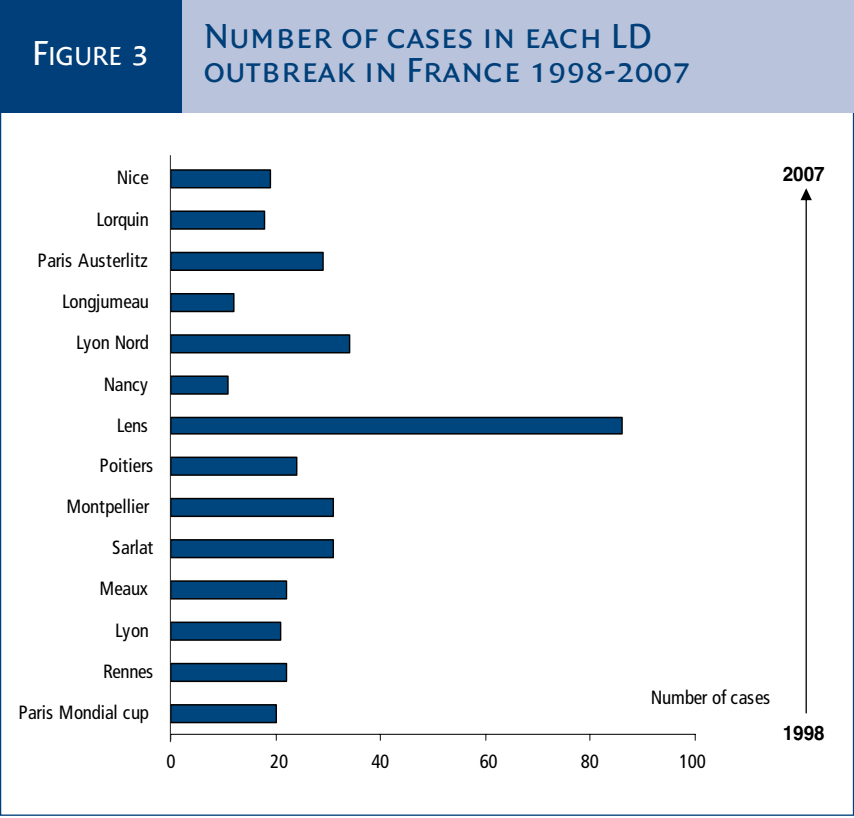
Results

DESCRIPTION OF OUTBREAKS

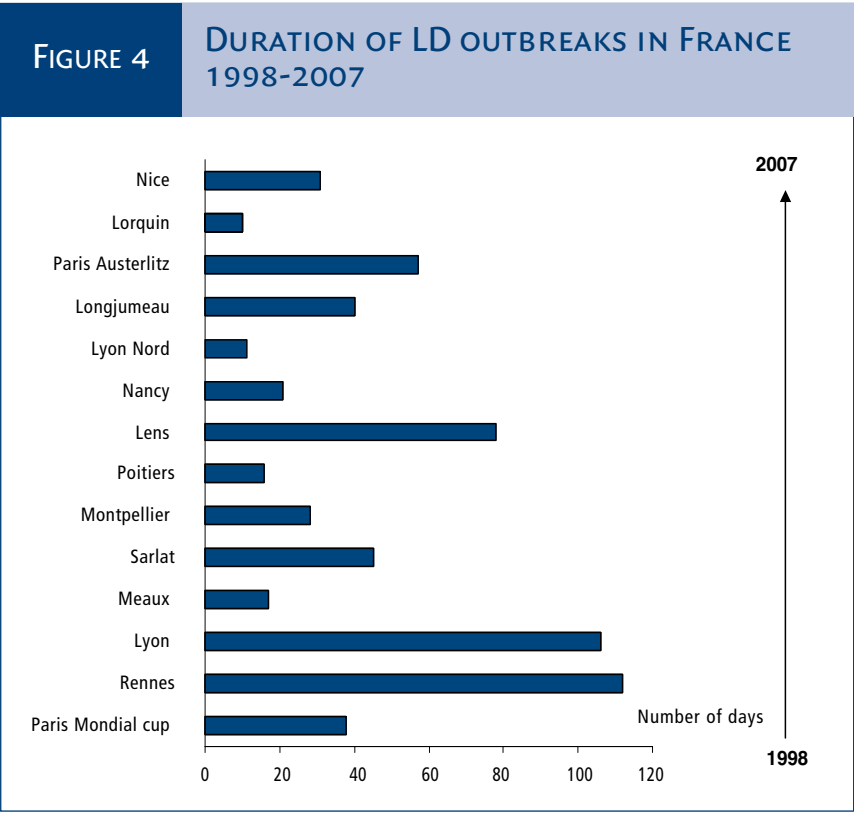
- Between 1998 and 2007, 14 outbreaks were identified, corresponding to 380 (3.8%) notified cases
- Detection of outbreak:
 - 12 by the French local authorities
 - 1 by the Ewgli network [2]
 - 1 by the National reference centre for *Legionella* [3]
- Fourteen cases from 3 outbreaks were reported by Ewgli
- At least one outbreak occurred every year, except in 1999
- 3 outbreaks occurred in 2003 and in 2006



- The median number of cases in outbreaks was 22 [range 11-86]
 - 11 to 19 cases: 4 outbreaks
 - 20 to 39 cases: 9 outbreaks
 - more than 39 cases: 1 outbreaks (Lens)



- Duration of outbreaks
 - less than 20 days: 4
 - 20 to 49 days: 6
 - more than 50 days: 4



- Twelve (86%) took place between the months of May and September

- Laboratory results
 - For all 14 outbreaks, at least one clinical isolate was available for analysis
 - epidemic strains were identified in 9 outbreaks
 - endemic strains (Paris, Lorraine, Mondial, Biarritz) were identified in 5 outbreaks
 - In 13 of the 14 outbreaks, human and environmental strains were available and genomic profiles were compared
 - In 8/13 (62%) outbreaks, strains shared the same genomic profile, indicating the probable common source of contamination

- Identification of the source of contamination
 - 8 outbreaks: a cooling tower was identified: Paris 98 [2] - Rennes [3] - Meaux [4] - Sarlat [5] - Poitiers [6] - Lens [7] - Longjumeau [8] - Paris Austerlitz [9]
 - 5 outbreaks: cooling towers were suspected: Lyon 2001 [10] - Montpellier [11] - Lyon 2005 [12] - Nancy [13] - Nice [14]
 - 1 outbreak: a spa was suspected: Lorquin [15]

DESCRIPTION OF CASES INVOLVED IN OUTBREAKS

- Among the 380 cases of LD
 - 361 (95%) confirmed cases
 - 5 (1%) presumptive cases
 - 14 (4%) possible cases were included in 2 outbreaks [5;15]

TABLE	COMPARISON OF CASES INVOLVED IN OUTBREAKS TO NATIONAL DATA OF LD IN FRANCE 1998-2007		
	Outbreak cases	National data	p
Total of cases	380	9935	
Diagnosed by urinary antigen	332 (87%)	8242 (83%)	ns
Isolate available	82 (22%)	1771 (18%)	ns
Sex ratio M/F	2.5	2.9	
Median age (years)	63	61	
Presence of risk factors	276/362 (76%)	6717 (68%)	< 0.001
Case fatality rate	48/380 (13%)	1120/8205 (14%)	ns

- In outbreaks
 - M/F sex ratio was 2.5 [range 1.2 to 19.0]
 - median age was 63 years [range 51 to 81]
 - 19/380 (5%) cases were not hospitalized, particularly 21% in Lyon-outbreak in 2005
 - no patients died in 4 outbreaks (Poitiers, Lyon 2005, Lorquin, Nice)

Discussion

- Less than 4% of notified cases were related to outbreaks
- Only one outbreak had more than 40 cases
- Clinical strains were available for all outbreaks
- In 5 outbreaks, endemic strains were identified
- In 13/14 outbreaks, cooling tower(s) was identified or suspected as the source of contamination
- Characteristics of outbreak cases are mainly similar to those of all notified LD cases
- 5% of cases were not hospitalized and in 4 outbreaks no patients died. This could be the result of a more rapid cases detection during outbreak
- Despite the increased number of cases notified, the number of outbreak cases remained stable over the period
- Extensive media coverage of outbreaks may have improved the sensitivity of the surveillance system
- Following these outbreaks, new legislations were introduced: <http://www.sante.gouv.fr/>
 - surveillance and control of cooling towers in hospitals (2003)
 - surveillance and control of all cooling towers (2004)
 - investigation and surveillance guideline (2005)
 - organisation of the response to outbreaks (2006)

Conclusion

- The reinforced surveillance system for LD has enabled more rapid detection and investigation of outbreaks by improving sensitivity
- The availability of clinical isolates contributed to the identification of the outbreak sources
- Cooling towers were the most probable source of the majority of outbreaks, which emphasizes the need to still strengthen regulations in order to better control the dispersion of *Legionella* from these sources

References

- Repeat capture-recapture studies as part of the evaluation of surveillance of Legionnaires' disease in France. Nardone A, Decludt B, Jarraud S and al. *Epidemiol Infect*: 2003; 131:647-54.
- Epidemic cluster of legionnaires disease in Paris, June 1998. Decludt B, Guillotin L, Van gastel B and al. *Euro Surveill* 1999 Nov;4(11):115-8.
- Cas groupés communautaires de légionellose, Rennes, France, 2000. *Bull Epidemiol Hebd* 2002; 30-31:152.
- Cas groupés de légionellose liés au centre hospitalier de Meaux, 2002. Salvio C, Demachy MC, Fiace A and al. *Bull Epidemiol Hebd* 2003; 34:163.
- Cas groupés de légionellose liés au centre hospitalier de Sarlat, 2002. Campese C, Charon M, De Caze A and al. *Bull Epidemiol Hebd* 2003; 34:164.
- Cas groupés de légionellose, Poitiers, France, 2003. Gilles C, Rivière D and al. *19th Annual Meeting of European Working group for Legionella Infections, 15-18 May 2004 Chamonix Mont Blanc*.
- A community-wide outbreak of Legionnaires' disease linked to industrial cooling towers – how far can contaminated aerosols spread? Tran Minh NN, Hef D, Jarraud S and al. *J Infect Dis* 2006; 193(1):102-11.
- Les légionelloses survenues en France en 2006. Campese C, Maine C, Che D. *Bull Epidemiol Hebd*, 2007; 43:365-7.
- Outbreak of a community-acquired legionnaires' disease, July-September 2006, Paris, France. Sejour-Salamanca D, Henry S, Che D, on behalf of the investigation team. *Euro Surveill*, 2006 28 Sept; 11(9).
- Cas groupés communautaires de légionellose dans l'agglomération lyonnaise. Fabres B, Rey S, Quenelle V, Campese C, Decludt B. *Bull Epidemiol Hebd* 2002; 30-31:153-4.
- Cas groupés de légionellose, Montpellier, France, 2003. Franke F, Allié MP, Claudet J and al. *Bull Epidemiol Hebd*, 2004; 36-37: 176-7.
- An outbreak of legionnaires disease in Lyon, France, April-May 2005: preliminary results. Schmitt M, Bitar D. *Euro Surveill*. 2005 May 26; 10(5):E050526.2.
- Les légionelloses survenues en France en 2004. Campese C, Jarraud S, Bitar D, Maine C, Che D. *Bull Epidemiol Hebd*, 2005; 26:129-32.
- Investigation des cas de légionellose déclarés dans les Alpes-Maritimes au cours des mois d'octobre, novembre et décembre 2005. Institut de veille sanitaire, mars 2007.
- Outbreak of legionellosis suspected to be related to a whirlpool spa display, September 2006, Lorquin, France. Alsibai S, Bilo de Bernardi P, Janin C, Che D, Lee JV. *Euro Surveill*, 2006 12 Oct; 11(10).

LEGIONELLES
Centre National de Référence

INVS
FRENCH INSTITUTE
FOR PUBLIC HEALTH
SURVEILLANCE