

CLUSTERS OF TRAVEL ASSOCIATED LEGIONNAIRES' DISEASE IN FRANCE, SEPTEMBER 2001 - AUGUST 2003

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Clusters of travel associated legionnaires' disease warrant urgent attention, and are detected by the French national surveillance system and the European network EWGLINET.

Between September 2001 and August 2003, 37 clusters were identified in French tourist accommodation: 27 hotels and 10 campsites. The number of clinical cases per cluster was as follows: 30 clusters of 2 cases (81%), 6 clusters of 3 cases (16%) and 4 consisting of just one case (3%) a total of 82 cases. The local health authorities performed environmental investigations for 36 of the 37 clusters. Among the 36 clusters investigated, water samples were collected for 35. At 16 (46%) sites, *Legionella pneumophila* was found at a level of more than 10³ cfu/litre. In all of the accommodation where risk assessment was found to be inadequate control measures were implemented immediately. Six hotels were closed immediately following cluster alerts.

Comparison of clinical and environmental isolates by pulsed field gel electrophoresis (PFGE) was possible in 3 clusters and identical genomic profiles of the isolates were found in all. During this two year period of surveillance, we found that on many sites there has been a risk of exposure to *Legionella*. This reinforces the importance of the European surveillance network and the timely notifications of all the cases to EWGLINET.

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Introduction

Every year, it is estimated that 77 million tourists visit France. Most of them (90%) come from other European countries, mainly from the United Kingdom (20%), Germany (19%) and the Netherlands (16%). Clusters of travel associated legionnaires' disease are a matter of concern and many outbreaks have been already published (1-3). In 1997, national surveillance of legionnaires' disease was heightened in France and in 2002, 1021 cases were notified to the French national surveillance scheme with an incidence of 1.7 cases per 100 000 population (4). In 1998, the French ministry of health published national recommendations on the prevention of exposure to *Legionella* in public places and accommodation (5,6).

In July 2002, the European Guidelines for control and prevention of travel associated Legionnaires' disease were adopted at the voluntary level by most European surveillance of travel associated legionnaires' disease scheme (EWGLINET) participant countries (1). It should be noted that France started following them as from July 2001, one year before their final approval. This paper describes

investigated clusters linked to travel in France during a two year period from September 2001 to August 2003 are described.

Methods

EWGLINET and the definitions and procedures for responding to cases of travel associated legionnaires' diseases are described elsewhere (7,8). The French national institute of public health surveillance (Institut de Veille Sanitaire) notifies the coordinating centre in London of all the French cases of legionellosis in patients who had been travelling during the incubation period in France or in other countries, and receives notifications of foreign cases travelling in France.

When a cluster is detected by the French national surveillance system or through EWGLINET, the local health authorities are immediately informed and an environmental investigation is conducted. A preliminary report stating whether control measures are in progress and if the hotel remains open or not should be sent to the co-ordinating centre within two weeks (Form A) from the cluster alert, while a full report (Form B) should be sent within six weeks from the cluster alert. Local health authorities are responsible for filling these forms, which are available in French, to notify surveillance networks of the conclusion of their investigation.

Results

Between September 2001 and August 2003, EWGLINET and the French national surveillance system identified 37 clusters located at various French tourist accommodation sites. Thirteen clusters occurred between September 2001 and August 2002 and 24 between September 2002 and August 2003. These clusters occurred in 27 hotels and 10 campsites.

The number of clinical cases per cluster was as follows: 30 clusters of 2 cases (81%), 6 clusters of 3 cases (16%) and 4 consisting of a single case (3%) giving a total of 82 cases. The mean age of the cases was 60 years (range 27-96 years). Most of the cases were male (80%) and the sex ratio male/female was 4.

According to the European case definition (4), 75 (91%) cases were confirmed and 7 (9%) were probable. Diagnosis was by detection of urinary antigen for 67 cases (82%), by culture for 6 (7.3%), and by a four fold rise in specific serum antibody titre for 2 (2.4%). Five patients had a single high titre and 2 were diagnosed by PCR.

The mean length of patients' stay at the accommodation sites was 5 days (range 1-27 days). Most of the accommodation sites were located in southern France (FIGURE). Twenty four of the patients who stayed at cluster sites also stayed at other sites in France, whilst 4 also stayed at sites in other European countries.

French citizens were involved in 9 (24.3%) clusters together with other European citizens whereas in 16 (43.2%) clusters, patients were exclusively French. In 12 (32.5%) other clusters, only other European citizens were affected.

The mean time interval between the first and second case was 94 days (range 0-626 days) and in 13 (35%) clusters, the interval was

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less than one month. In 13 (35%) clusters, the second case occurred more than 6 months after the first case notified was notified.

For 36 of the 37 clusters, the local health authorities performed environmental investigations. One campsite was closed during the winter season at the date of notification and no investigation was conducted.

The investigations were carried out between 0 and 10 days (mean 5 days) after the EWGLINET notification, but for 11 clusters, investigation took place prior to the EWGLINET notification. For these clusters, as all patients were French, the French surveillance network was warned before EWGLINET was.

Among the 36 clusters investigated, water samples were collected in 35. As one campsite was closed when an investigation was requested, only a risk assessment was carried out.

In 16 (46%) sites, *Legionella pneumophila* was found at a level more than 10^3 cfu/litre and in 6 (17%) *Legionella pneumophila* was present at a level between 10^2 and 10^3 cfu/litre at the time of investigation. In 13 (43%) sites, no *Legionella pneumophila* was found. In 26 (72%) sites, the assessment identified the low temperature of the hot water system and closed off water pipes among the risks present.

In all accommodation sites with inadequate risk assessments, control measures were implemented immediately, and 6 hotels were closed immediately after the cluster alert.

Form B was sent to the EWGLINET coordinating centre punctually in 35 out of 36 cluster investigations. The name of one campsite was published on EWGLINET website but then removed when satisfactory measures were taken by the owner.

Comparison of clinical and environmental isolates by pulsed field gel electrophoresis (PFGE) at the Centre National de Référence (CNR) des *Legionella* (national reference centre for legionellae) was possible for 3 clusters and identical genomic profile of the isolates were found in all.

Four accommodation sites had previously been linked with clusters in 2001, 2002 or 2003. At that time, all the control measures have been taken and controlled by the local health authorities and the form B has been returned with satisfactory conclusion.

Discussion

Through the network, we detected clusters with small numbers of cases but we could assume that control measures have prevented a number of new cases. Good collaboration has meant that numbers of clusters detected have nearly doubled in the two year period. It is not surprising that most of the clusters were located in the south of France, a popular destination for holidays.

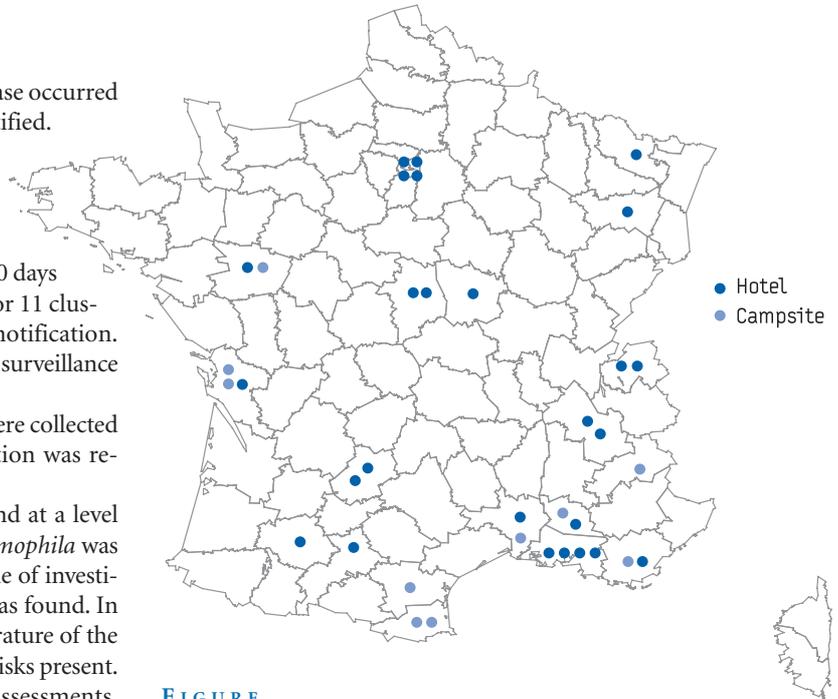
The high number of French citizens involved in the clusters can be explained by the fact that there are more French people than foreigners who travel in France. In fact, data on tourist origins in France shows that 63% are French and 37% foreigners (9).

The improvement of our surveillance system in the recent years has also allowed a rapid detection of clusters.

The previous case definition of a cluster was 2 cases during a six month period. Using this definition, we would have missed 35% of the clusters.

The risk assessments showed that most of the sites were at risk for *Legionella* contamination and infection. In nearly half of the sites, contamination with *Legionella* was more than 10^3 cfu/l which is the level where action is required to be taken (7). Despite the low proportion of human cultures obtained, in all the clusters where comparison of clinical and environmental isolates was possible, we had confirmation of the source of infection. However, our data shows that 29% of tourists stay in two or more hotels during the incubation period, highlighting the problem of interpreting association between cases and possible multiple sources of infection.

It is worrying that 4 sites were previously linked with clusters



FIGURE

Localization of the clusters, France, September 2001 - August 2003

and the subsequently had an extra case. It may be important to implement regular tests at these sites known to be particularly at risk during a determined period.

Appropriate surveillance and timely notification is necessary for interruption of *Legionella* transmission from ongoing outbreak sources and for implementation of preventive measures. The European EWGLINET is a unique, sensitive network (6). It has been very efficient in determining numbers of published European outbreaks (1-3).

This reinforces the importance of the European surveillance network and the timely notifications of all the cases to EWGLINET, particularly national cases travelling inside their own country as these could potentially be linked to other European cases.

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