

10. LEGIONNAIRES' DISEASE

- **Nine cases of Legionnaires' Disease were notified in 2000.**
- **Five of the nine cases were travel associated.**
- **Seven occurred in the summer months.**
- **All nine cases were *Legionella pneumophila* serogroup 1.**
- **Two deaths were attributable to Legionnaires' Disease.**
- **The low rate in Ireland would suggest significant under-diagnosis and under-reporting of Legionnaires' Disease.**

10.1 Introduction

Legionnaires' disease is a notifiable disease in Ireland as defined by the Infectious Disease Regulations 1981. It is caused by *Legionella pneumophila*, a Gram negative aerobic non spore forming bacillus. *Legionella* is a ubiquitous organism that lives as an intracellular parasite of amoebae in aquatic environments.^{1,2} Legionella bacteria can be found naturally in environmental water sources such as rivers, lakes and reservoirs, usually in low numbers. Water temperatures in the range 20°C to 45°C favour growth of the organism. The organisms do not appear to multiply below 20°C and will not survive above 60°C. The presence of sediment, sludge, scale and other material within the system, together with biofilms, are also thought to play an important role in the harbouring and provision of favourable conditions in which Legionella may grow.

Potential sources of *Legionella* are shown in the box below:

- Hot and cold water systems
- Cooling towers and evaporative condensers
- Respiratory and other therapy equipment
- Spa pools/jacuzzis/natural pools/thermal springs
- Fountains/sprinklers
- Humidifiers for food display cabinets
- Water cooling machine tools
- Vehicle washes



Legionnaires' disease is a multi-system illness which can have widespread clinical symptoms, though the principle manifestation of the disease is pneumonia.

10.2 Materials and Methods

Definitions

Participants in the European Working Group for Legionella Infections (EWGLI), which includes Ireland, use the following case definitions:

Confirmed case of Legionnaires' disease

An acute lower respiratory infection with focal signs of pneumonia on clinical examination and/or radiological evidence of pneumonia and one or more of the following:

Culture - isolation of any legionella organism from respiratory secretion, lung tissue or blood.

Seroconversion - a fourfold or greater rise in specific serum antibody titre to *L. pneumophila* serogroup 1 by the indirect immunofluorescent antibody test or by microagglutination.

Antigen detection - the detection of specific legionella antigen in urine using validated reagents.

Presumptive case of Legionnaires' disease

An acute lower respiratory infection with focal signs of pneumonia on clinical examination and/or radiological evidence of pneumonia and one or more of the following:

Serology - A fourfold or greater rise in specific serum antibody titre to *L. pneumophila* other serogroups or other Legionella species or by the indirect immunofluorescent antibody test or by microagglutination.

Serology - a single high titre using reagents to *L. pneumophila* serogroup 1 or other Legionella species and serogroups

Antigen detection - the detection of specific Legionella antigen in respiratory secretion or direct fluorescent antibody (DFA) staining of the organism in respiratory secretion or lung tissue using evaluated monoclonal reagents

Travel associated cases

A case is defined as travel associated if the patient spent one or more nights away from their home in accommodation used for commercial or leisure purposes, e.g. hotels, holiday apartments, ships, campsites etc. in the 10 days before the onset of illness. The onset of symptoms for Legionnaires' disease must be within ten days of the last date of travel. Travel associated cases may involve travel within Ireland or with travel abroad. A case must meet the clinical, microbiological and travel history criteria for it to be notified to EWGLI surveillance scheme.

Notification

An enhanced surveillance form is completed by public health doctors on each case that is notified to Departments of Public Health. This form is then faxed to the National Disease Surveillance Centre (NDSC) where details are entered onto an MS Access database. If the case fulfils the definition for a travel acquired case, NDSC forwards on details of the case to EWGLI.

10.3 Results

10.3.1 Cases

In 2000 there were nine cases of Legionnaires disease notified, 6 male and 3 female. The median age was 50 years (range 19-80 years). Eight cases were Irish nationals. The ninth case occurred in an American tourist.

10.3.2 Seasonal distribution

Using date of case notification the majority of cases (78%) occurred during June-September 2000 (Figure 10.1).

10.3.3 Microbiology

All nine cases were *L. pneumophila* serogroup 1. Four cases were positive on urinary antigen detection alone. One case was positive on urinary antigen detection and on serology (4 fold rise in titre). Three cases were positive on serology alone (4 fold rise in titre x2, single high titre x1). One case was positive on culture (post mortem).

10.3.4 EWGLI

Five cases were travel associated cases and were notified to EWGLI. These cases were associated with travel to Mexico, Spain, France and the USA.

10.3.5 Outcome

There were two deaths, in cases aged 50 and 64 years.

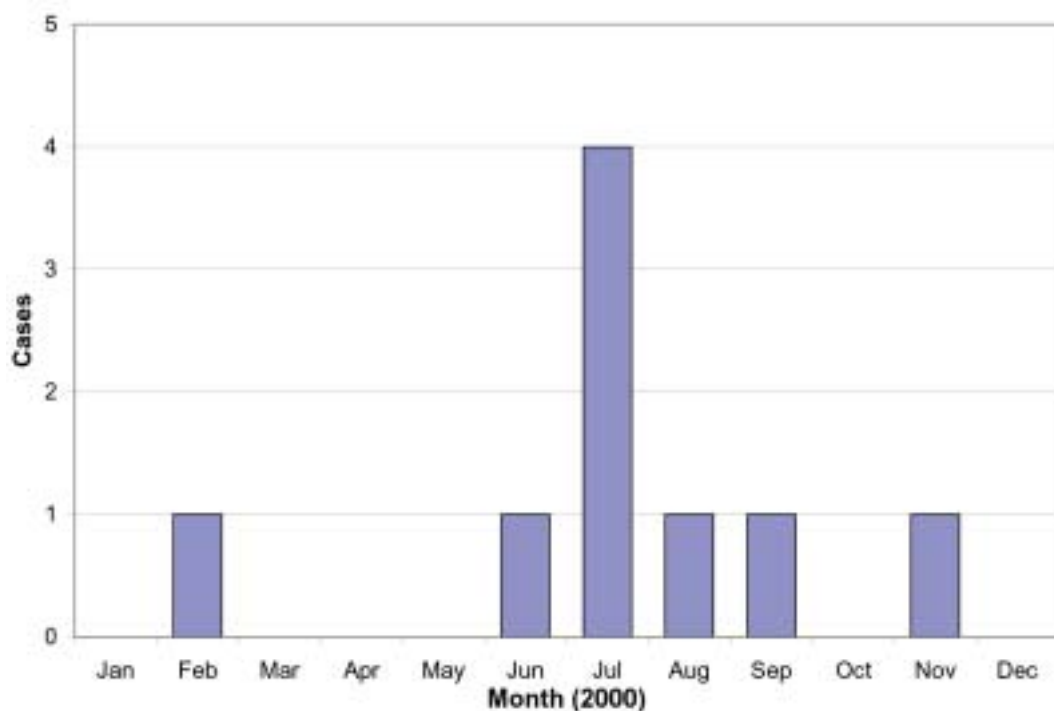


Figure 10.1: Monthly distribution of legionella cases in Ireland, 2000.

10.4 Discussion

Legionnaires Disease would appear to be a rare disease in Ireland based on the number of notifications made to the Department of Health and Children and NDSC over the last ten years (Table 10.1). However, when compared with other European countries³ (Table 10.2), Ireland is conspicuous by its low rate particularly so in comparison with Northern Ireland, Scotland, England and Wales with whom we share similar ecological factors such as climate, geography and water quality. This would tend to suggest that a major degree of under diagnosis and under reporting of Legionnaires' disease currently exists in Ireland.

Table 10.1: Number of Legionnaires' disease cases notified 1990-2000.

Year	Cases Notified	Rate per million population
1990	1	0.3
1991	0	-
1992	2	0.6
1993	0	-
1994	1	0.3
1995	1	0.3
1996	2	0.6
1997	6	1.7
1998	2	0.6
1999	2	0.6
2000	9	2.5
1991 population: 3,525,719		1996 population: 3,626,087

Table 10.2: Rate of Legionnaires' disease in European countries in 1999.

Country	Rate per million population
Belgium	19.5
Denmark	16.9
The Netherlands	16.7
Switzerland	10.7
Sweden	9.7
Malta	7.9
Spain	7.7
France	7.6
Scotland	6.8
Austria	5.1
Italy	4.1
England & Wales	3.7
Northern Ireland	2.9
Norway	2.2
Finland	1.7
Ireland	0.6

Recognised risk factors for Legionnaires' disease include being of an older age group (>50 years), male, cigarette smoker, and having a chronic underlying disease with or without an associated immunodeficiency.⁴ The risk of acquiring Legionella infection is principally related to individual susceptibility of the person exposed and the degree of intensity of exposure, represented by the quantity of Legionella present and the length of exposure.

Participation in EWGLI ensures standardises methods of diagnosis, recording and reporting of disease and permits direct comparisons from other participating countries. Outbreaks or clusters of cases of Legionnaires' disease in travellers can be quickly identified through this European network allowing rapid alerts to be communicated to all participating countries, WHO and other relevant bodies.

Raising awareness amongst clinicians and encouraging notification of cases can contribute to effective surveillance, which is needed for swift identification of cases and possible sources of infection, which in turn can lead to the formulation of effective and appropriately targeted health intervention strategies.

10.5 Useful Documents

Copies of The Control of legionella bacteria in water systems: Approved Code of Practice and Guidance, ISBN 0 7176 1772 6, price £8.00, ref. L8, are available from HSE Books, PO Box 1999, Sudbury, Suffolk, CO10 2WA, tel: 01787-881165 or fax: 01787-313995. This document can also be ordered online at <<http://www.hsebooks.co.uk>>

10.6 References

1. Rowbotham TJ. Isolation of *Legionella pneumophila* from clinical specimens via amoebae and the interaction of those and other isolates with amoebae. *J Clin Pathol* 1983; **36**: 978-86
2. Fields BS, Sanden GN, Barbaree JM et al. Intracellular multiplication of *Legionella pneumophila* in amoebae isolated from hospital hot water tanks. *Curr Microbiol* 1989; **18**: 131-7
3. EWGLI (2000). Legionnaires' disease, Europe, 1999. *Eurosurveillance Weekly*, **4**: 001102 (<http://www.eurosurv.org>)
4. Edelstein PH. Legionnaires' disease. *Clin Infect Dis* 1993; **16**: 741-9