Annual Report of the
National Disease Surveillance Centre 2000

"Working in partnership with other health service providers, to improve the health of the Irish population by the provision of the best possible information on disease including infectious diseases through surveillance and independent advice, epidemiological research and training."

-Mission Statement of NDSC

Health Boards in Ireland (Counties)
ERHA* - Eastern Regional Health Authority
(Dublin, Kildare, Wicklow)
MHB - Midland Health Board
(Laois, Longford, Offaly, Westmeath)
MWHB - Mid-Western Health Board
(Clare, Limerick, Tipperary N.R.)
NEHB - North Eastern Health Board
(Cavan, Louth, Meath, Monaghan)
NWHB - North Western Health Board
(Donegal, Leitrim, Sligo)
SEHB - South Eastern Health Board
(Carlow, Kilkenny, Tipperary S.R., Waterford, Wexford)
SHB - Southern Health Board
(Cork, Kerry)
WHB - Western Health Board
(Galway, Mayo, Roscommon)

*From March 1st 2000, the Eastern Regional Health Authority (ERHA) is the statutory body with responsibility for health and personal social services for the 1.3 million people who live in Dublin, Kildare and Wicklow. Three Area Health Boards (AHBs) have responsibility to deliver in their own areas, the services previously provided by the Eastern Health Board (EHB).

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Title: Annual Report of the National Disease Surveillance Centre, 2000
Published by: National Disease Surveillance Centre (NDSC), Ireland
ISSN:1649-0436

Foreword

Our second annual report contains data reflecting the enthusiasm of our professional staff under the energetic guidance of our Director. Upwards of 60 experts in various fields also advise the Board through the subcommittees listed in the Report, providing access to a wide range of expertise which is offered generously and freely.

The transfer of the notification of communicable diseases from the Department of Health and Children to the NDSC was a welcome development, although more needs to be done to ensure reliable reporting through additional staff and equipment in the health boards.

In addition to the members of the subcommittees, the members of the Board also helped through their regular and constructive contribution towards the development of the Centre.

The contents of this report are testament to the activity of the Centre, with papers ranging from AIDS or tuberculosis in Ireland, to more narrowly defined infections such as ***E. coli*** O157 or Campylobacter enteritis, to a more exotic and rare but deadly group of infections called viral haemorrhagic fevers.

The development of a monthly bulletin from the NDSC has been widely welcomed by interested professional groups, as has the access to our reports through the website.

Professor Dermot Hourihane
Chairman
National Disease Surveillance Centre

1. INTRODUCTION

This is the second Annual Report from the National Disease Surveillance Centre in Ireland. During the year 2000, the staff of the National Disease Surveillance Centre increased from ten to sixteen. On July 01 2000 the Infectious Diseases (Amendment) Regulations, 2000 (SI No.151, 2000) came into force. Under these regulations, the National Disease Surveillance Centre was assigned responsibility for the collation and analysis of the weekly infectious disease notifications reported by the Health Boards, taking over responsibility from the Department of Health and Children. In order to have more useful information on the infectious diseases notification, NDSC proposed that from July 1st 2000 the data be provided in disaggregate rather than aggregate format. Following consultation with the Health Boards this proposal was accepted and a minimum data set was agreed. Therefore, since July 2000, disaggregate data on infectious disease notification have been collated and analysed weekly by NDSC, and a report is circulated each Friday to an extensive mailing list.

In the year 2000, the National Disease Surveillance Centre also collaborated with partners in the Irish College of General Practitioners and the Virus Reference Laboratory to develop the first year of Influenza surveillance using computerised central and general practices in Ireland. The details of that surveillance programme are included in this report.

The Scientific Advisory Committee of the National Disease Surveillance Centre has continued to play an active role, and has finalised reports on Viral Hemorrhagic Fevers, Legionnaires Disease and Antimicrobial Resistance in Ireland. In the year 2000, new multi-disciplinary committees were set up on topics such as Cryptosporidiosis, Measles and management of food handlers in relation to the prevention of food-borne outbreaks. NDSC are extremely grateful to the many and multi-disciplinary participants in these committees who give voluntarily of their time to develop and make recommendations in relation to the future surveillance and prevention of infectious disease.

Dr Darina O'Flanagan
Director
National Disease Surveillance Centre

2. Management Board

Board of NDSC

Dermot Hourihane,	Professor of Histopathology, T.C.D., Consultant Histopathologist, St James's Hospital (Retired)
Mary Cafferkey,	Consultant Microbiologist, The Children's Hospital, Temple St, Dublin
John Devlin,	Deputy Chief Medical Officer, Department of Health & Children
Dora Hennessy,	Principal Officer, Department of Health & Children
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John Magner,	Programme Manager, South Eastern Health Board
Brian O Herlihy,	Director of Public Health, Eastern Regional Health Authority

3. Scientific Advisory Committee (SAC)

Edmond Smyth,	Faculty of Pathology (Chair)
Karina Butler,	Royal College of Physicians in Ireland (Paed)
Luke Clancy,	Royal College of Physicians in Ireland
Catherine Cosgrove,	Environmental Health Officers Association
Eilish Creamer,	Infection Control Nurses Association
Stephen Flint,	Univ. of Dublin School of Dental Science
Hugh Larkin,	UCD Faculty Veterinary Medicine
Nuala O Connor,	Irish College of General Practitioners
Noel Shanaghy/Tony Murray,	Academy of Medical Laboratory Science
Lelia Thornton,	Faculty of Public Health Medicine
Patrick Wall,	Food Safety Authority of Ireland

4. SUBGROUPS AND COMMITTEES

Subcommittees of SAC:

4.1 Subcommittee to Review Notifiable Diseases

Lelia Thornton, Faculty of Public Health Medicine (Chair)
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Catherine Cosgrove, Environmental Health Officers Association
Steven Dempsey, Academy of Medical Laboratory Science
Peter Harrington, Irish College of General Practitioners
Derval Igoe, National Disease Surveillance Centre
Conor Keane, Royal College of Physicians in Ireland (Path)
Jane Murphy, Infection Control Nurses Association
Darina O Flanagan, National Disease Surveillance Centre

4.2 Viral Haemorrhagic Fever Subcommittee

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Karina Butler, Royal College of Physicians in Ireland (Paed)
Liam English, Academy of Medical Laboratory Science
Hilary Humphreys, Royal College of Physicians in Ireland (Path)
Phil Jennings, Faculty of Public Health Medicine
Mary McCarthy, Infection Control Nurses Association
Darina O Flanagan, National Disease Surveillance Centre
Brendan O Hare, Consultant Anaesthetist, Crumlin, Dublin
Alan Smith, National Disease Surveillance Centre

4.3 Legionnaires' Disease Subcommittee

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Marina Burd, Infection Control Nurses Association
David Coleman, School of Dental Science, Trinity College, Dublin
Al Donnelly, Environmental Health Officers Association
Tom Donnelly, Health & Safety Authority
Rosemary Hone, Royal College of Physicians in Ireland (Path)
Alan Smith, National Disease Surveillance Centre

4.4 Subcommittee on Antimicrobial Resistance in Ireland

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Mary Cafferkey, Royal College of Physicians in Ireland (Paed)
Leonie Clark, Irish Pharmaceutical & Healthcare Association
David Coleman, School of Dental Science, Trinity College, Dublin
Martin Cormican, Royal College of Physicians in Ireland (Path)
Eilish Creamer, Infection Control Nurses Association
Lynda Fenelon, Royal College of Physicians in Ireland (Path)
Michael Gunn, Veterinary Officer, Dept of Agriculture Food and Rural Development
Conor Keane, Royal College of Physicians in Ireland (Path)
Nola Leonard, Faculty of Veterinary Medicine, UCD
Tony Murray, Academy of Medical Laboratory Science
Celine Murren, Consumers Association Ireland, Dublin
Nuala O Connor, Irish College of General Practitioners
Ann Shannon, Faculty of Public Health Medicine

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Des Fitzgerald, Architectural Adviser, Dept of Health & Children
Margaret Fitzgerald, National Disease Surveillance Centre
Wilf Higgins, Engineering Adviser, Dept. of Health & Children
Anthony Hogan, Institute of Engineers of Ireland
Shaun McCann, Royal College of Physicians in Ireland (Path)
Olive Murphy, National Disease Surveillance Centre
Eoin O Morain, Royal Institute of Architects of Ireland
Siobhan Prout, Infection Control Nurses Association

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Mary Cronin, Eastern Regional Health Authority
Dan Crowley, Cork County Council
Margaret Fitzgerald, Food Safety Authority
Barbara Foley, Food Safety Authority
Catherine Lawlor, Department of Agriculture, Food and Rural Development
Anne Moloney, Royal College of Physicians in Ireland (Path)
Dan Murphy, Health & Safety Auhority
Nuala O Connor, GP, Cork, ICGP
Margaret O Sullivan, Southern Health Board, RCPI (FPHM)
Tom Prendergast, Dublin County Council, Environmental Health Officers Association
Emer Ward, Wexford General Hospital, Infection Control Nurses Association

4.7 Subcommittee on Cryptosporidiosis

Derval Igoe, National Disease Surveillance Centre (Chair)
Bartley Cryan, Irish Society of Clinical Microbiologists
Geraldine Duffy, Teagasc
Oliver Fogarty, Dept. of Environment
Tessa Greally, Royal College of Physicians in Ireland (FPHM)
Mary Horgan, Royal College of Physicians in Ireland
Lenora Leonard, Infection Control Nurses Association
Tom McCarthy, Environmental Health Officers Association
Tony McNally, Veterinarian, Dublin Corporation
John Mulcahy, Fingal County Council
Brendan O Reilly, Academy of Medical Laboratory Science

4.8 Subcommittee on Measles

Darina O Flanagan, National Disease Surveillance Centre (Chair)
Karina Butler, Royal College of Physicians in Ireland (Paed)
Mary Cafferkey, Rotunda Hospital and The Children's Hospital, Temple Street
Mary Cronin, Royal College of Physicians in Ireland (FPHM)
Rita Doyle, Irish College of General Practitioners
Phil Jennings, Midlands Health Board

Committees:

4.9 EARSS Steering Group

Darina O Flanagan, National Disease Surveillance Centre (Chair)
Robert Cunney, Microbiologist, National Disease Surveillance Centre
Lynda Fenelon, Consultant Microbiologist, St Vincents Hospital, Dublin
Hilary Humphreys, Consultant Microbiologist, Beaumont Hospital, Dublin
Conor Keane, Consultant Microbiologist, St James's Hospital, Dublin
Olive Murphy, Consultant Microbiologist, Bon Secours Hospital, Cork
Angela Rossney, Dept. of Medical Microbiology, St James's Hospital, Dublin
Dominic Whyte, National Disease Surveillance Centre

4.10 Computerised Infectious Disease Reporting Committee 2000

Darina O Flanagan, National Disease Surveillance Centre (Chair)
John Brazil, National Disease Surveillance Centre
Rosaleen Corcoran, Director of Public Health, North Eastern Health Board
Mary Diver, Letterkenny General Hospital
Margaret Fitzgerald, National Disease Surveillance Centre
Derval Igoe, National Disease Surveillance Centre
Fiona Kenny, Consultant Microbiologist, Sligo General Hospital
Thomas Quigley, Food Safety Promotions Board
Fiona Ryan, Specialist in Public Health Medicine, Southern Health Board
Noel Ryan, Systems Analyst, Mid-Western Health Board

4.11 EPI-INSIGHT Editorial Committee

Darina O Flanagan, Managing Editor, National Disease Surveillance Centre (Chair)
Derval Igoe, National Disease Surveillance Centre
Louise Kyne, RCPI, Faculty of Paediatrics
Dermot Nolan, Irish College of General Practitioners
James O Leary, Academy of Medical Laboratory Sciences
Niamh O Sullivan, Irish Society of Clinical Microbiologists
Jackie Quinn, National Virus Reference Laboratory
Lelia Thornton, Faculty of Public Health Medicine
Dominic Whyte, Editor, National Disease Surveillance Centre

4.12 Staff of National Disease Surveillance Centre

Darina O Flanagan, Director
Gerry Boyle, Administrator
John Brazil, Information Technology Manager
Robert Cunney, Microbiologist
Margaret Fitzgerald, Surveillance Scientist
Eva Hallinan, Administrative Assistant
Derval Igoe, Specialist in Public Health Medicine
Sarah Jackson, Surveillance Assistant
Stephen Keily, IT Officer
Kirsty MacKenzie, Administrative Assistant
Niamh Mullins, Medical Officer
Olivia O Connell, Administrative Assistant
Tom O Connell, Specialist Registrar
Emer Ruane, IT Officer
Alan Smith, Medical Officer
Dominic Whyte, Surveillance Scientist

5. AIDS in Ireland, 2000

• A total of 695 cases of AIDS were diagnosed in Ireland from 1983 to 1999 and there has been a decrease in the annual incidence of AIDS since the mid-1990s.
• The majority of affected people were in the age range 25-44 years.
• Eighty percent of cases were male and males were older at diagnosis than females.
• The three commonest risk categories were injecting drug users, men who have sex with men, and heterosexuals.
• Seventy-eight percent of AIDS cases were resident in the ERHA.
• Fifty-one percent of AIDS cases in Ireland were reported to have died.
• Despite the decrease in the number of AIDS cases in Ireland, the number of new HIV infections tripled from 1994 to 1999. HIV case-based reporting was introduced in Ireland in July 2001 with the aim of ensuring the collection of accurate and complete epidemiological data on trends in the HIV epidemic in Ireland.

5.1 Introduction

Acquired Immunodeficiency Syndrome (AIDS) was first reported in the United States in June 1981.[1] It has since become a major worldwide pandemic. At the end of 2000, it was estimated that 36.1 million people were living with HIV/AIDS worldwide.[2] The features of the pandemic differ from country to country and surveillance systems have been established in order to estimate the magnitude and trends of the epidemic. AIDS surveillance was introduced in Ireland in 1985 and in 2000, NDSC took over responsibility for AIDS reporting from the Department of Health and Children (DoHC).

5.2 Methods

AIDS reporting in Ireland is a voluntary system. In the past, when an individual developed AIDS, the clinician completed an AIDS surveillance report form. The form was then sent to the Regional AIDS Co-ordinator in the relevant Health Board, who forwarded a copy to the National AIDS Co-ordinator in the Department of Health and Children (DoHC). Every six months, a summary of AIDS surveillance information was published nationally and notified to Europe for inclusion in the European Non-Aggregate AIDS Dataset (ENAADS). Late in 2000, the NDSC received the national AIDS database from the DoHC and assumed responsibility for national AIDS surveillance. The figures in the following report have not been adjusted for reporting delay, as the numbers were considered too small, especially in recent quarters. Instead, the report is based on AIDS cases diagnosed from 1983 to December 1999 and reported up to December 2000. This allows a minimum of one year after diagnosis, for AIDS cases to be reported. The figures for 2000 are reported separately. The HIV figures which had been obtained from the National Virus Reference Laboratory, were taken from a report entitled "AIDS Strategy 2000", which was produced by the National AIDS Strategy Committee.[3]

5.3 Results

There have been 695 cases of AIDS diagnosed in Ireland from 1983 to the end of 1999. Figure 5.1 looks at the number of cases of AIDS diagnosed annually and Figure 5.2 compares the number of HIV and AIDS cases diagnosed each year.

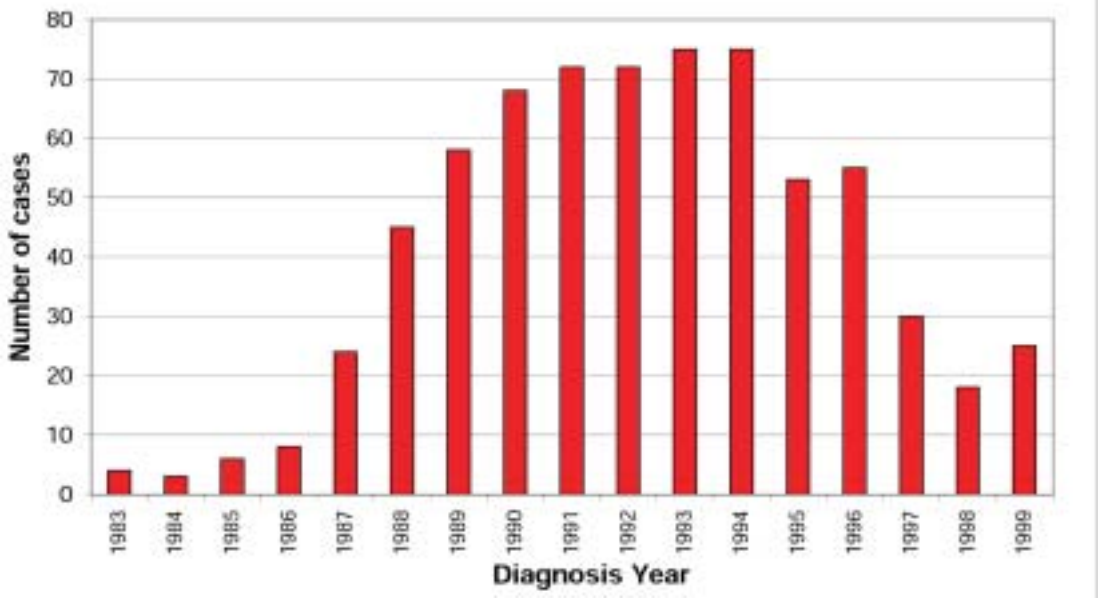

Figure 5.1: AIDS cases by year of diagnosis (1983 to 1999).

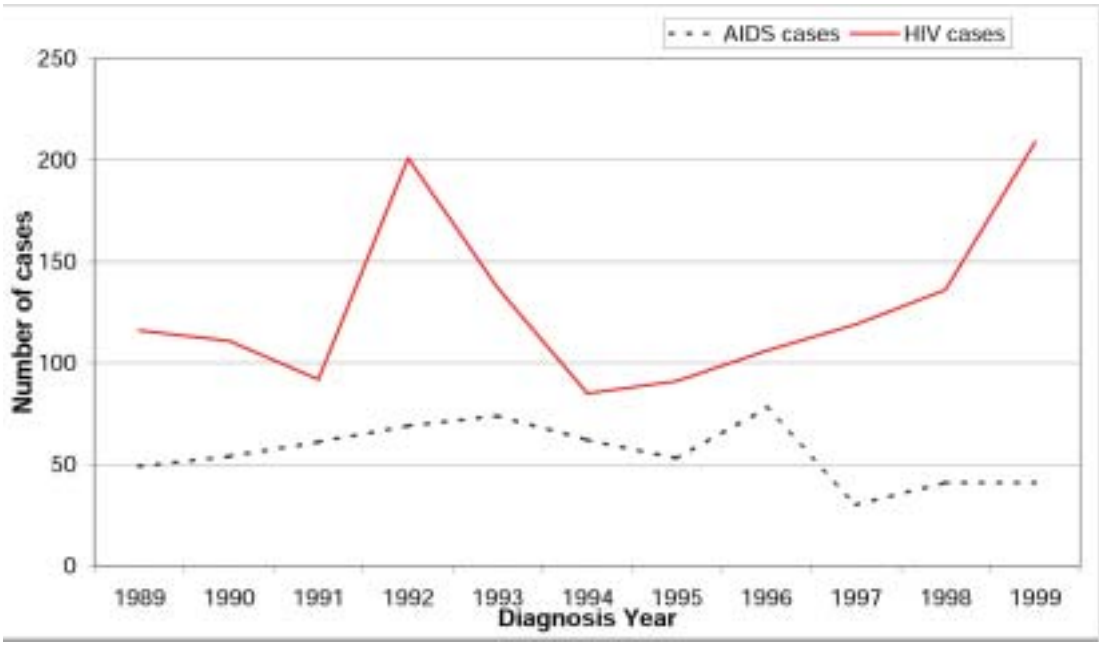

Figure 5.2: HIV and AIDS cases diagnosed in Ireland (1983 to 1999).

5.3.1 Age and sex

Over three quarters of affected people (80%) were in the age range of 25-44 years at diagnosis and the median age was 32 years. Of the 695 cases of AIDS, 80.5% were males and 19.5% were females. Figure 5.3 shows the number of AIDS cases by age group and sex.

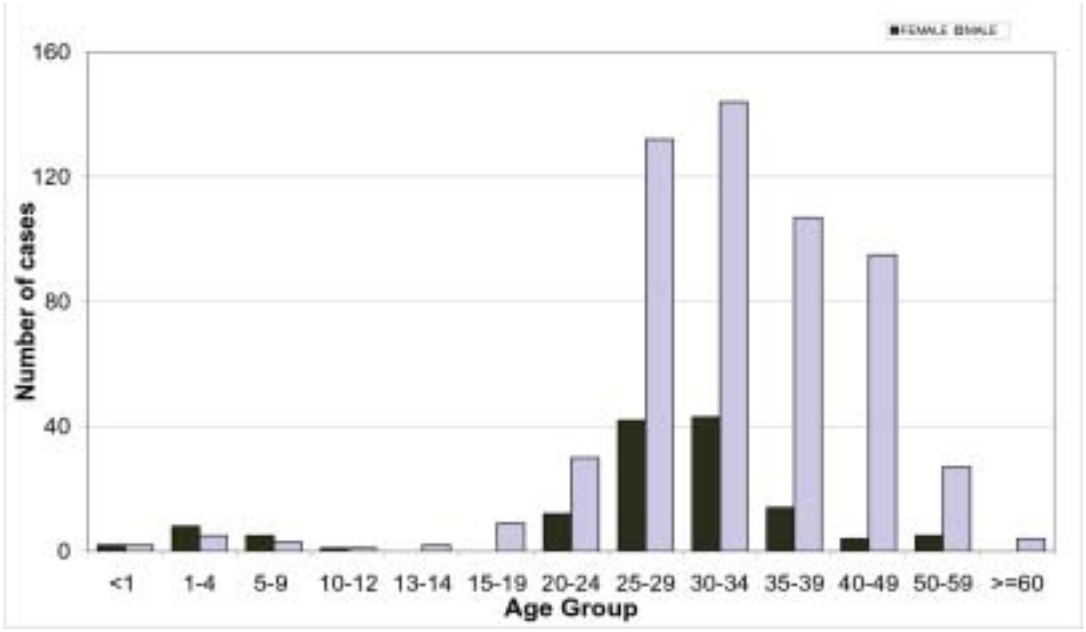

Figure 5.3: AIDS cases (1983-1999) by age group and sex.

5.3.2 Area

Seventy-eight percent of AIDS cases were resident in the ERHA area and 15% in non-ERHA areas. In the remaining 7% of cases, the area was not identified. To maintain anonymity, cases are classified as ERHA and non-ERHA and are not detailed further.

5.3.3 Probable route of transmission

Table 5.1 looks at AIDS cases in males and females by probable route of transmission and Figure 5.4 indicates the number of AIDS cases attributable to each of the three commonest transmission categories. Table 5.2 shows summary measures of age at diagnosis for the three commonest transmission categories in both males and females.

Table 5.1: AIDS cases by transmission category.

Transmission Category	Total	Male	Female
Injecting Drug User (IDU)	282	212	70
Men who have Sex with Men (MSM)	238	238	-
Heterosexual	93	48	45
Haemophiliac	33	33	-
Mother-to-Child	23	8	15
IDU+ MSM	10	10	-
Transfusion	3	2	1
Other/Undetermined	13	9	4
Total	695	560	135

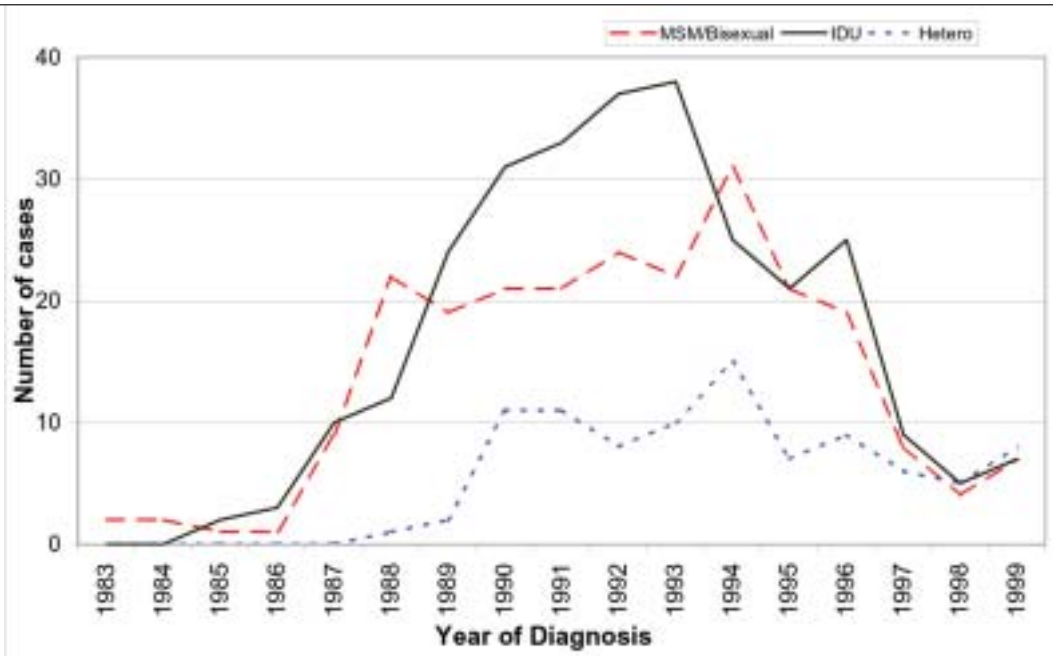

Figure 5.4: AIDS cases by year of diagnosis in the three commonest risk categories (1983 to 1999).

Table 5.2: Summary measures of age at diagnosis.

Transmission Category	Sex	Mean	Median	Minimum	Maximum
IDU	Male	30.9	31	18	48
	Female	29.5	29	22	40
Heterosexual	Male	39.1	37	22	63
	Female	33.6	33	21	58
MSM	Male	36.8	36	17	63

5.3.4 AIDS related deaths

Of the 695 cases of AIDS reported between 1983 and 1999, 357 (51%) have died. The year of death was recorded in 345 cases and is shown in Figure 5.5.

Figure 5.5: AIDS related deaths in Ireland (1985 to 1999).

5.3.5 AIDS cases diagnosed in 2000

Twelve cases diagnosed in 2000 had been reported up to the end of 2000. It is expected that a number of cases diagnosed in 2000 have not yet been reported and therefore the breakdown of cases may change. In summary:

- Nine (75%) were male.
- Six cases (50%) were among MSM.
- Six cases (50%) were in the ERHA
- Five of the cases (42%) were reported to have died.

5.4 Discussion

There were 695 cases of AIDS reported in Ireland to the end of 1999. AIDS incidence increased rapidly through the 1980's and early 1990's, peaked in 1993 and declined through the mid and late nineties. This decline is primarily attributed to the early use of highly active antiretroviral therapy (HAART), which was introduced in Ireland in early 1996.[4] This delays the progression to AIDS for persons with HIV infection. However, it is important to note that the number of cases in any given year will be subject to revision as further reports are received and particularly for recent years, are likely to be higher in later summaries. For this reason, figures for 2000 are presented separately. The incidence of AIDS in Ireland is relatively low when compared with other countries throughout Europe. The incidence rate (per million population) in Ireland in 1999 was 6.8 while the incidence rate (per million population) in the same year in various countries in Europe was; Britain: 11.9; Italy: 36.0; Spain: 77.1; Portugal: 88.3.[5]

Although the number of AIDS cases has declined over the last five years, the number of new HIV cases has been steadily increasing and has tripled since 1994. It is clear that monitoring trends in the AIDS epidemic does not reliably reflect trends in HIV infection and does not accurately represent the need for prevention and care services. It is essential to have reliable information about the incidence and future directions of HIV infection and the types of behaviour that increase the risk of HIV transmission. In order to collect this information and following a recommendation of the National AIDS Strategy Committee, HIV case based reporting was introduced in Ireland in July 2001. The new system collects information on individual HIV positive cases and continues to report on all cases of AIDS. A new joint HIV/AIDS surveillance form has been designed and replaces the current AIDS surveillance report form. The aim of this new system is to provide reliable information about the incidence, demographics and future trends of HIV infection. This is essential for the design and implementation of appropriate and effective prevention and care strategies.

The majority of people affected with AIDS were in the age range 25-44 years. Approximately 80% of AIDS cases in Ireland were male. However, the percentage of AIDS cases in females has risen over the five years and in particular, the proportion of AIDS cases in females associated with heterosexual behaviour has increased. This trend has also been seen worldwide.[6]

There was a difference in age distribution between the sexes. Females were younger at AIDS diagnosis then males with a difference in median age of four years. This trend has been seen elsewhere and it has been suggested that women may be at risk for infection at an earlier age due to infection by older sexual partners.[6] IDUs are younger at AIDS diagnosis than both MSM and heterosexuals with a median age of 30 compared to 34 and 36 respectively. This information may be useful when planning AIDS/HIV prevention programs. There is a disproportionately high number of AIDS cases in the ERHA. While approximately one third of the Irish population live

in the ERHA, over three quarters of cases of AIDS occur in this area. In particular, almost all AIDS cases (98%) among injecting drug users occur in the ERHA area. This highlights specific challenges to be faced in this area.

The three major groups affected by AIDS are clearly, IDUs, MSM and heterosexuals. All other categories account for approximately 12% of the total number of AIDS cases. The number of AIDS cases in all transmission categories has declined since the mid 1990's and this can be primarily attributed to increased use of HAART, which has delayed disease progression.[4] However, the decline in the number of cases among MSM and IDUs has been higher than among persons exposed through heterosexual contact. It is important to note that the rate of AIDS in IDUs is much higher than the rate in the general population. It has previously been estimated that Dublin has between 3,000 and 15,000 drug users.[7] Taking the upper estimate of 15,000, the rate of AIDS in injecting drug users in 1999 was 466 per million population compared to an overall rate of 6.8 per million population. Worldwide, sexual intercourse between men and women is reported to account for 80% of AIDS cases.[2] In Ireland, however, heterosexual exposure accounts for only 13% of AIDS cases reported to date. It would be extremely useful to further categorise this group into subcategories of heterosexual transmission. With the introduction of HIV case based reporting in July 2001, this information will be available for new HIV diagnoses.

Fifty one percent of AIDS cases are reported to have died. Since 1995, the annual number of deaths among persons with AIDS has decreased. The mortality rate of AIDS in Ireland has dropped from 13.8 deaths per million population in 1995 to 4.7 deaths per million population in 1999. This decrease in AIDS related deaths reflects the improved survival among persons with AIDS due to improvements in medical care and the effect of HAART.[4] The use of antimicrobial prophylaxis to delay or prevent the development of a number of opportunistic infections may also extend survival.[8]

5.5 References

1. Pneumocystis Pneumonia- Los Angeles. ***MMWR*** 1981; **30**: 250-252

2. The Global HIV and AIDS epidemic, 2000. ***MMWR*** 2001; **50**: 434-9

3. National AIDS Strategy Committee. AIDS Strategy 2000. Department of Health and Children

4. Murphy EL, Collier AC, Kalish La, Assmann SF, Para MF, Flanigan TP, Kumar PN, Mintz L, Wallach FR and GJ Nemo. Highly active Antiretroviral therapy decreases mortality and morbidity in patients with advanced HIV disease. ***Ann Intern Med*** 2001; **135** (1): 17-26

5. European Centre for the Epidemiological Monitoring of AIDS, HIV/AIDS surveillance in the European Union, 4th quarterly report, InVS, Saint Maurice, France, 1999.

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7. Cullen W, Bury G, Barry J and F O'Kelly. Drug users attending general practice in Eastern Regional Health Authority (ERHA) area. ***IMJ*** 2000; **93** (7).

8. Powderly WG. Prophylaxis for opportunistic infections in an era of effective antiretroviral therapy. ***Clin Infect Dis*** 2000; **31** (2): 597-601

5.6 Acknowledgements

NDSC would like to thank, Dr John Devlin, National AIDS Co-ordinator, the regional AIDS co-ordinators, the Surveillance Sub-Committee of the National AIDS Strategy Committee (NASC), the consultants in infectious diseases/genito-urinary medicine, the National Virus Reference Laboratory and Dr Francoise Hamers and Dr Angela Downs, EuroHIV, Institut de Veille Sanitaire, France.

6. HEPATITIS B INFECTION IN 2000

• One hundred and eighty-seven cases of hepatitis B were reported to the National Disease Surveillance Centre in 2000.
• In 2000, the highest rate of hepatitis B infection occurred in the Eastern Regional Health Authority area and the Southern Health Board.
• It is evident that there is a need for enhanced surveillance of hepatitis B in Ireland to differentiate acute cases from chronic cases and to examine the risk factors for hepatitis B.

6.1 Introduction

Hepatitis B virus (HBV) is the most serious type of hepatitis and is a common cause of morbidity and mortality worldwide. Chronic HBV infection, with persistence of hepatitis B surface antigen (HbsAg) is associated with the development of chronic liver disease, including cirrhosis or primary hepatocellular carcinoma in later life. Clinically suspected viral hepatitis B is a notifiable disease in Ireland and is notified weekly to the National Disease Surveillance Centre (NDSC). In a recent study, the prevalence of HBV exposure in the Irish population has been estimated at 0.51%.[1] Ireland is therefore characterised as a low prevalence country for HBV infection.

6.2 Methods

Since July 2000, HBV cases are reported weekly to the NDSC via the weekly infectious disease notification system. Prior to this date, weekly notifications were collated by the Department of Health & Children.

6.3 Results

One hundred and eighty-seven cases of HBV were reported to the NDSC in 2000. Figure 6.1 shows the number of cases that were reported between 1990 to 2000. Table 6.1 outlines the number of cases and the crude rate of HBV reported in each health board.

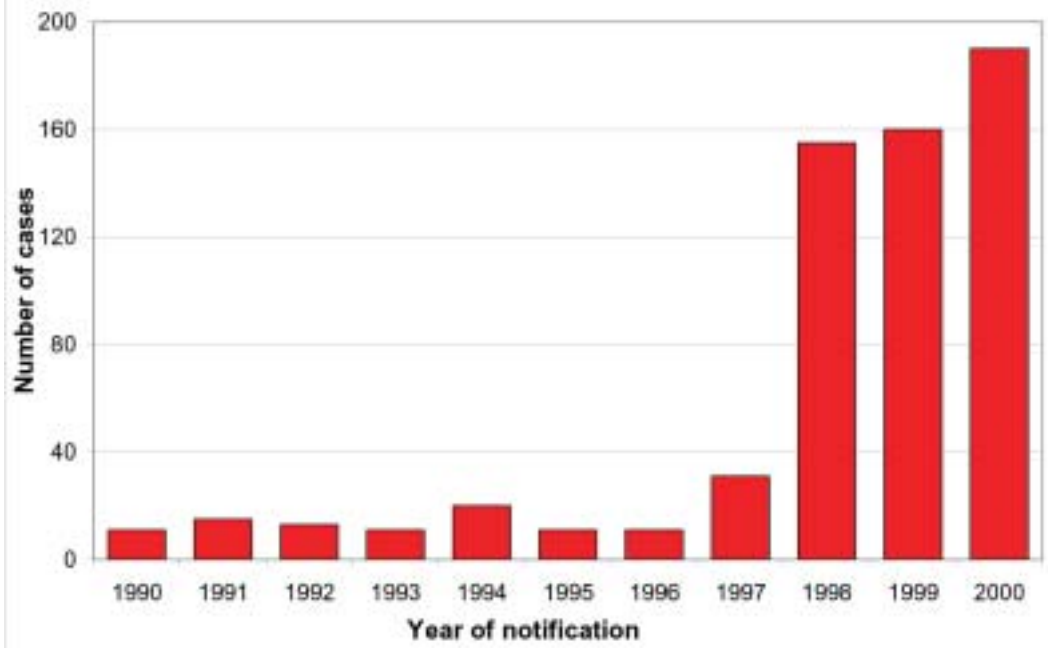

Figure 6.1: HBV cases in Ireland (1990-2000).

Table 6.1: Cases, CIR and ASIR (/100,000) of HBV cases reported in Ireland in 2000 by health board.

Health Board	Cases	CIR	Cases*	ASIR*
ERHA	115	8.9	47	3.3
MHB	0	0	0	0
MWHB	7	2.2	5	1.6
NEHB	2	0.7	2	0.7
NWHB	0	0	0	0
SEHB	10	2.5	6	1.6
SHB	47	8.6	25	4.7
WHB	6	1.7	6	1.9
Total (Ireland)	187	5.2	91	2.5

CIR = Crude Incidence Rate, ASIR = Age Standardised Incidence Rate, *Data from July-September 2000

Since July 2000, disaggregate data has been collected on HBV by NDSC. Table 6.2 lists the age and sex of HBV cases reported from July to December 2000. Seventy percent of cases were in the 20-35 year age group. There were equal numbers of males and females. The age standardised rates for HBV by health board from July to December, 2000 are also shown in Table 6.1.

Table 6.2: Cases of HBV reported in Ireland from July to December 2000 by age group and sex.

Age Group (Yrs)	Female	Male	Not Known	Total
<1	2	1	0	3
1-4	2	0	0	2
10-14	0	1	0	1
15-19	3	3	0	6
20-24	13	3	3	19
25-29	9	11	1	21
30-34	10	11	2	23
35-39	3	5	1	9
40-44	0	3	0	3
45-49	0	2	0	2
50-54	0	1	0	1
60-64	0	1	0	1
Total	42	42	7	91

6.4 Discussion

Since 1996, there has been an increase in the number of notifications each year and in particular, between 1997 and 1998, there was a five-fold increase. This increase may reflect the introduction of new screening programs for HBV in certain areas. In 2000, the highest rate of HBV infection occurred in the Eastern Regional Health Authority (ERHA) area and the Southern Health Board (SHB). At present there is limited information on the epidemiology of HBV infection in Ireland and there is no information on the risk groups affected by hepatitis B. Many of those identified as hepatitis B positive may be chronic carriers rather than newly infected persons. It is evident that there is a need for enhanced surveillance of hepatitis B in order to differentiate acute cases from chronic cases of hepatitis B and in order to examine the risk factors for hepatitis B.

6.5 References

1. O'Connell T, Thornton L, O'Flanagan D, Staines A, O'Connell J, Dooley S and G McCormack. Prevalence of hepatitis B anti-core antibody in the Republic of Ireland. ***Epidemiol Infect*** 2000; **125**: 701-704.

6.6 Acknowledgement

NDSC would like to thank the Community Care Areas and Departments of Public Health for the provision of this data.

7. Influenza in Ireland, 2000/2001

• This is the first year of influenza surveillance using computerised sentinel general practices in Ireland.
• Influenza activity was generally mild throughout the 2000/2001 influenza season.
• Peak incidence occurred during week 8 and coincided with an increase in influenza B.
• Further expansion and improvements in the present system are now being planned for the forthcoming season.

7.1 Introduction

Influenza is one of the oldest and most common diseases known to man. The viral agent responsible for influenza was first reported in 1933. Cases of influenza occur every winter, but the level of impact on morbidity, mortality and health services, varies depending on the circulating strain of virus and the level of pre-existing immunity in the community.[1,2]

There are three types of influenza virus, A, B and C. Influenza C rarely causes human illness. The clinical course of influenza B changes little from year to year and is usually milder than influenza A. Influenza A is the most important clinically, as it varies considerably and is responsible for epidemics and pandemics.[3]

Influenza virus has two surface glycoproteins, haemagglutinin (H) and neuraminidase (N). Minor changes in the surface glycoproteins are known as antigenic drift. Antigenic drift occurs between each influenza season (October to May in the Northern Hemisphere). These minor changes necessitate annual reformulation of the influenza vaccine, which is based on the current circulating strains. The content of the trivalent vaccine is decided by the WHO and recommendations are made every February for the forthcoming season.[4] Major changes in the surface glycoproteins occur infrequently and are known as antigenic shift. These result in the emergence of a novel virus that may be capable of causing an influenza pandemic. The Spanish Flu Pandemic of 1918 is acknowledged as the most devastating, resulting in an estimated 20-40 million deaths worldwide. It is almost inevitable that another pandemic will occur but the exact timing or severity cannot be predicted.[3]

Surveillance is essential during a pandemic or interpandemic period to allow planning of control measures such as vaccinations. A national surveillance system must be able to: (1) Detect increased influenza activity in the community (2) Report on influenza activity accurately and in a timely fashion (3) Confirm that influenza virus is indeed circulating.[3,5] This is the first year of influenza surveillance using computerised sentinel general practices in Ireland. The National Disease Surveillance Centre (NDSC) has worked in collaboration with the National Virus Reference Laboratory (NVRL) and the Irish College of General Practitioners (ICGP).

7.2 Materials and Methods

7.2.1 Clinical Data

Twenty computerised general practices using the software package Health One™ were recruited to report electronically, on a weekly basis, the number of patients per week with influenza-like illness (ILI). In total, the 20 practices had 32 general practitioners (GPs), with an estimated total practice population size of just less than 57,000. Selection of practices was based on enthusiasm for the project and competence at using the software package. There was at least one sentinel practice per health board.

ILI is defined as the sudden onset of symptoms with a temperature of 38°C or more, with

two or more of the following: headache, sore throat, dry cough and myalgia. Patients were those attending for the first time with these symptoms.

The surveillance period ran from October 2000 to May 2001, week 40 to week 20 in the calendar year with the week running Monday to Sunday. Practices filed a report with the ICGP electronically by 12 noon on Tuesday of every week. Only data received by 12 noon on Wednesday was included in the weekly influenza surveillance report produced by NDSC. Practices who failed to make a return were emailed or phoned as a reminder. Data received were anonymous. Information recorded included the general practitioner identifier number and patient data (date of birth, sex and date seen). If there were no cases of ILI, zero reporting was required.

7.2.2 Virological data

Sentinel GPs were asked to send a combined nasopharyngeal and throat swab on two patients per week where a clinical diagnosis of ILI was made. Instructions were given on storage of the transport medium and collection of nasopharyngeal swabs. All materials necessary for swabbing, including easily identifiable laboratory forms and stamped addressed envelopes complying with An Post regulations, were supplied by the NVRL prior to commencement of the surveillance season. Swabs were sent to the NVRL for testing using cell culture and PCR techniques. The NVRL supplied results on a weekly basis on the number of swabs received from each of the practices. The date of swab receipt, sex, date of birth, and positive or negative results by PCR and/or cell culture by type and subtype were all reported.

7.3 Results

7.3.1 Influenza activity in Ireland

GP consultations for ILI were reported on a weekly basis per 100,000 population from week 40, 2000 to week 20, 2001 (Figure 7.1). Peak incidence occurred during week 8 and coincided with an increase in influenza B. The consultation rate for week 8 was 121 per 100,000 population. A second smaller peak occurred during week 11, with a consultation rate of 109 per 100,000. From week 13, the GP consultation rate decreased steadily until week 20, when the consultation rate reached zero. The peak age specific consultation rate* was in the 15 to 44 year age group (Figure 7.2). Fifty-one percent of GP consultations for ILI were male and forty-nine percent were female.

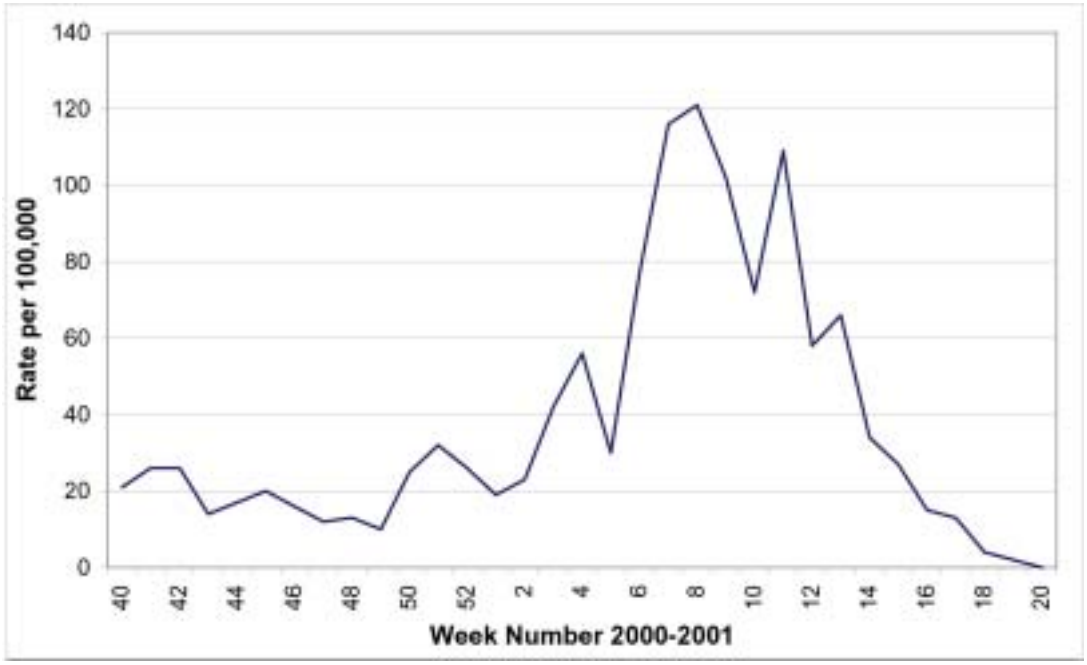

Figure 7.1: GP consultation rate for ILI per 100,000 population by report week.

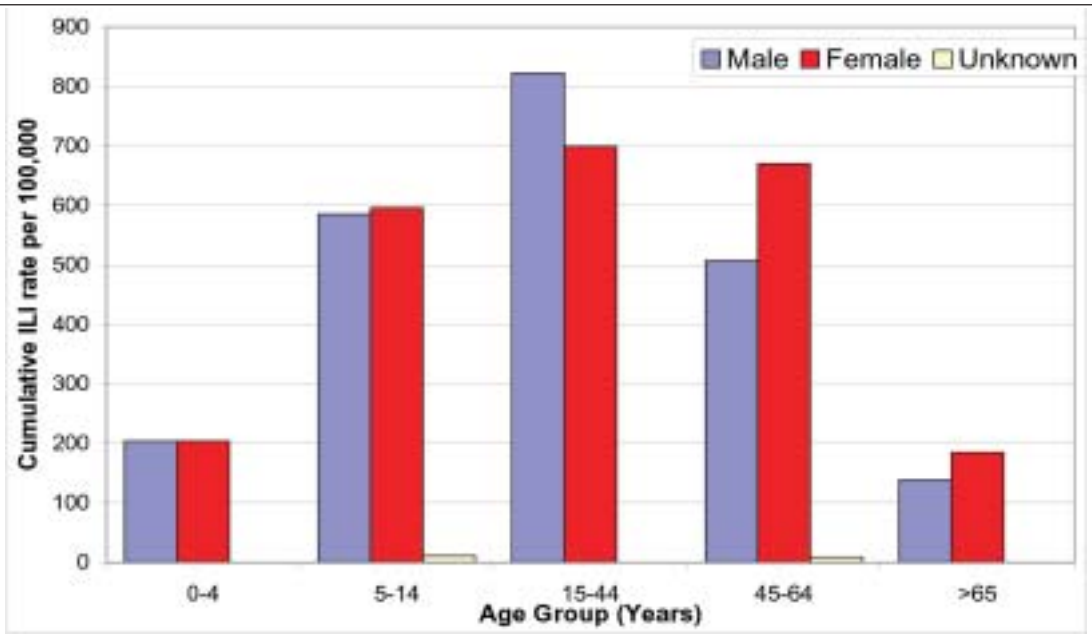

Figure 7.2: Age-specific ILI rate per 100,000 population.*

****The denominator used in the age specific consultation rate is from the 1996 census data; this assumes that the age distribution of the sentinel general practices is similar to the national age distribution; this has not been validated.***

7.3.2 Virological data

The NVRL received 329 swabs from sentinel GPs over the 2000/2001 influenza season (Figure 7.3 in Appendix). Of the 329 swabs received, 140 (42.6%) were positive for influenza virus. The highest number of positive samples occurred during the period of peak clinical activity. Influenza A accounted for 39.3% (55) of positive swabs; 35% (49) were influenza A (H1N1), 2.9% (4) were influenza A (H3N2), and 1.4% (2) were unsubtyped influenza A. Influenza B accounted for 60.7% (85) of the positive swabs. Influenza A was the predominant strain from week 40, 2000 until week 6, 2001, after which influenza B predominated until week 15, 2000. No swabs were positive for influenza virus after week 15. The highest number of positive swabs was in the 15 to 44 year age group. Of the 140 positive swabs, 52.1% (73) were male, 47.1% (66) were female, and 0.7% (1) was of unknown sex.

The NVRL referred four influenza A (H1N1) virus isolates to the World Health Organisation Laboratory in London for antigenic characterisation. Three samples were identified as being antigenically similar to the current vaccine strain A/New Caledonia 20/99. The other isolate was closely related to an older H1N1 strain, A/Bayern/07/95. Although A/Bayern -like viruses are antigenically distinct from the A/New Caledonia-like viruses, the A/New Caledonia/20/99 vaccine strain produces high titres of antibody that cross-react with A/Bayern/07/95-like viruses. Both of these H1 isolates were identified in other European countries as well as in the United States this season.

7.4 Discussion

Influenza activity in Ireland was generally mild throughout the 2000/2001 influenza season, as was reflected worldwide. Overall, this season was not as intense in comparison to the 1999/2000 season. In the United States, influenza A (H1N1) predominated throughout the season. This was the first season that influenza A (H3N2) did not predominate in the United States since the 1995/1996 influenza season. Influenza activity peaked during late January

and early February.[6] In Canada influenza B predominated this season.[7] In Europe, influenza A (H1N1) activity was reported until the end of February, after which influenza B became the predominant circulating strain, as in most European countries. Influenza C was reported from France (for the first time since 1981) during week 9, 2001. Sporadic reports of influenza A (H3N2) from Spain occurred during week 10, 2001.[8] In England, Scotland and Wales levels of influenza activity and other respiratory illness remained low this season. GP consultations for influenza and flu-like illness peaked in February, but remained at the lower end of the range for normal seasonal activity before quickly declining. Influenza activity was initially associated with influenza A (H1N1), as with most of Europe. Influenza B became the predominant circulating strain as the season progressed.[9] In Hong Kong, influenza A (H5N1) was recently detected in poultry markets, resulting in the slaughter of over one million poultry. No human cases of H5N1 virus have been detected during this outbreak.[10]

During the 2000/2001 influenza season Ireland became a provisional member of the European Influenza Surveillance Scheme (EISS).[8] This is a network of 14 countries reporting electronically on clinical and virological influenza data on a weekly basis. EISS posts a summary report of all 14 countries on their website weekly. Different countries use different definitions of influenza/ influenza-like illness so that direct comparisons are not possible. Also some countries use number of consultations due to ILI out of total consultations rather than over the practice population.

Influenza activity can be measured not only by GP consultation rates, but also through school and work absenteeism, hospital admission rates, sales of "over the counter" medications and deaths. Steps have already been taken to observe school absenteeism, hospital admission rates and levels of illness in nursing homes in each of the health boards. Further expansion and improvements in the present system are now being planned for the forthcoming season, including an increase in the number of sentinel GPs. Influenza surveillance is essential in order to minimise the impact of this fatal infection especially in high-risk patients, the elderly and the very young. Monitoring of ILI activity in the community over a number of seasons may help to predict the potential impact of influenza on the health services.

7.5 Acknowledgements

NDSC would like to thank our partners in influenza surveillance: Dermot Nolan and Paul McCormick (ICGP); Suzie Coughlan, Peter Quinn and Seamus Dooley (NVRL); and the regional Departments of Public Health. Special thanks are due to the sentinel GPs who provided data throughout the 2000/2001 influenza season.

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10. Outbreak of chicken flu rattles Hong Kong. ***Nature*** 2001; **416**:(6844):261

8. TUBERCULOSIS IN IRELAND IN 1999

• There were 469 new cases of TB in 1999, giving a crude incidence rate of 12.9 per 100,000 population.
• Sixty-five patients were born outside Ireland (13.8%).
• Fifty-one percent of cases were aged over 45 years.
• There were 242 isolates of *M. tuberculosis* and 11 isolates of *M. bovis*.
• There were two MDR-TB cases.
• Nine deaths were attributable to TB in 1999.

8.1 Introduction

In Ireland the incidence of tuberculosis has declined over the last 50 years from 6,795 new cases in 1952, giving an incidence of 230/100,000 to 469 new cases in 1999, an incidence of 12.9/100,000. 1999 is the second successive year in which there has been an increase in the crude number of notified cases of tuberculosis (TB) in Ireland. 1999 saw a 10.2% increase in notifications compared to 1998. This increase is a timely reminder that tuberculosis is a disease that hasn't gone away and that every effort to combat the disease needs to be maintained if not enhanced.

8.2 Materials and Methods

The case definitions used were those recommended by the Working Party on Tuberculosis.[1] Specifically, a **definite case** of tuberculosis was defined as one in which infection due to ***Mycobacterium tuberculosis***, ***M. bovis*** or ***M. africanum*** was confirmed by culture. An **other than definite case** was defined as one, in the absence of confirmation by culture, in which there were signs and symptoms compatible with tuberculosis and the clinician took the decision to treat the patient with a full curative course of anti-tuberculous drugs.

8.3 Results

Total number of cases: Four hundred and sixty nine cases (469) of TB, 284 males (61%) and 185 (39%) were notified in 1999. This is a notification rate of 12.9/100,000, a 10.2% increase on 1998 (11.7/100,000) and the second successive year that has seen an overall increase in case notifications since 1991 (Table 8.1).

Table 8.1: Notified cases of tuberculosis in Ireland 1991-1999

Year	Number	Crude incidence rate per 100,000	3 year moving average
1991	640	18.2	
1992	604	17.1	621
1993	598	16.9	581
1994	524	14.5	526
1995	458	12.6	468
1996	434	12.0	438
1997	416	11.5	426
1998	424	11.7	430
1999	469	12.9	

8.3.1 Geographical distribution of cases

The WHB (17.9/100,000) and the MWHB (17.1/100,000) had the highest age standardised rates of TB in Ireland in 1999 although these were not statistically significant when compared to the 1999 national figure (12.9/100,000), (Figure 8.1).

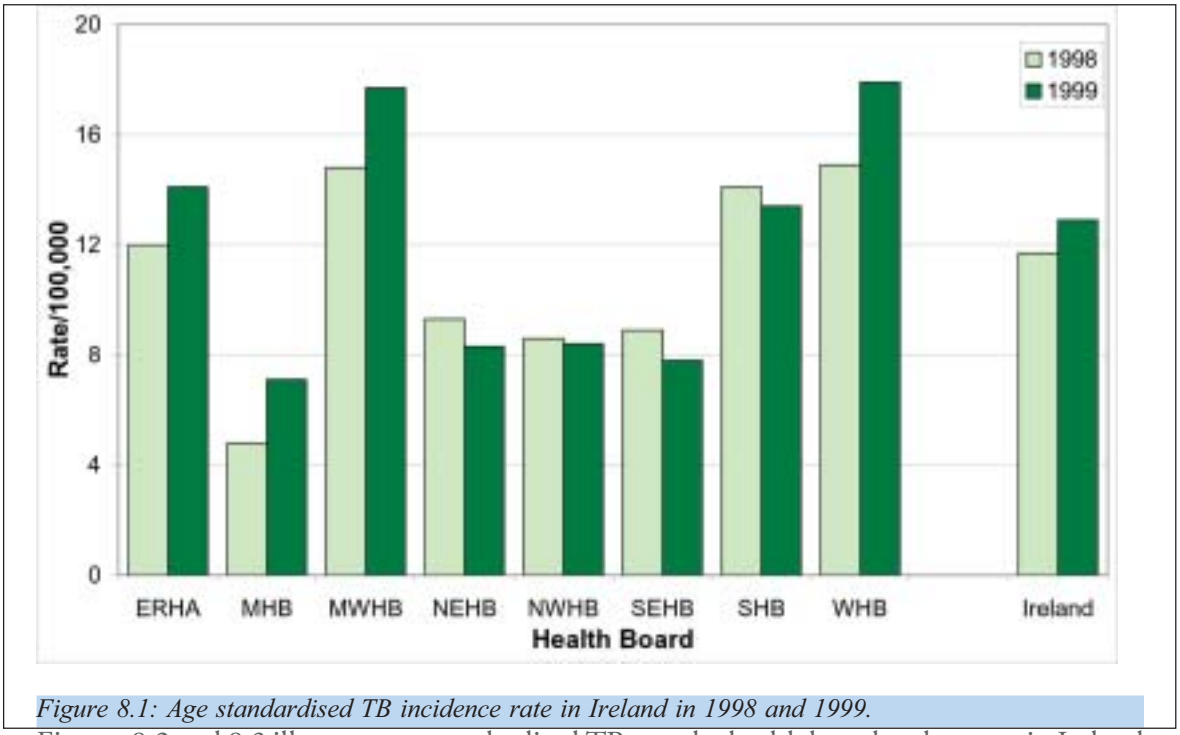


Figure 8.1: Age standardised TB incidence rate in Ireland in 1998 and 1999.

Figures 8.2 and 8.3 illustrate age standardised TB rates by health board and county in Ireland in 1999.

Figure 8.4 illustrates the 1998 age standardised county rate in 1998.

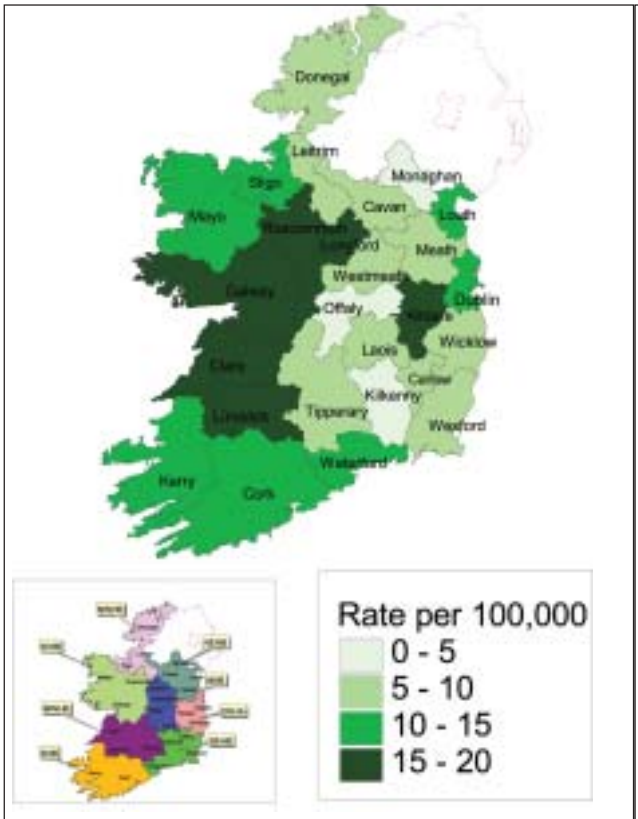


Figure 8.2: Age standardised county TB rate per 100,000 population in 1999.

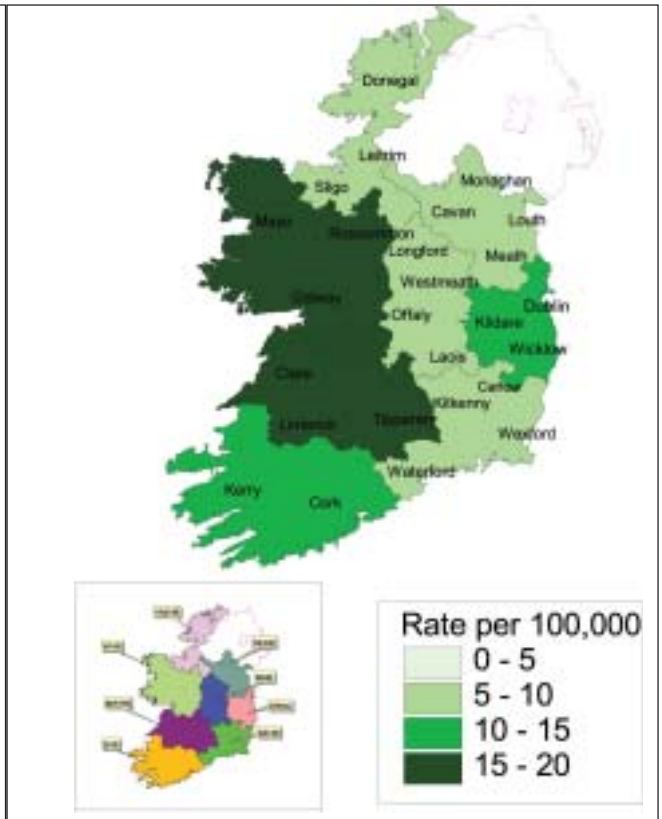
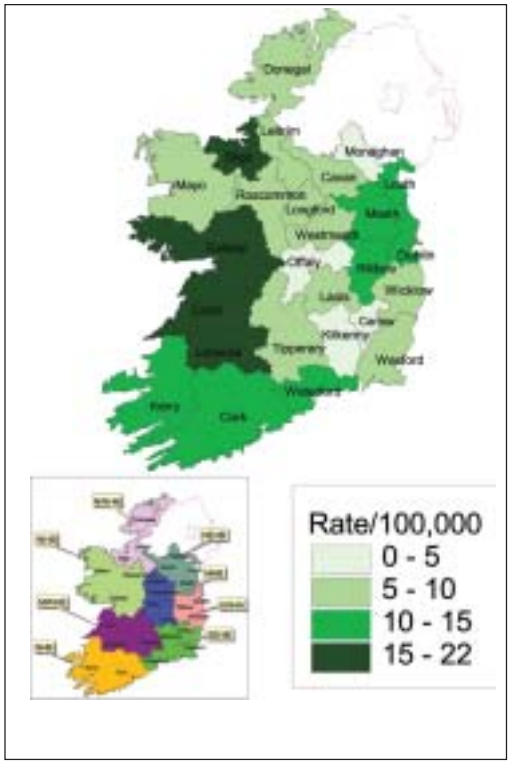


Figure 8.3: Age standardised health board TB rate per 100,000 population in 1999.

Figures 8.4: Age standardised county TB rate per 100,000 population in 1998.



8.3.2 Age and sex

The age and sex specific rate per 100,000 population in Ireland in 1999 are illustrated in Figure 8.5.Two hundred and forty cases (51.2%) were aged over 45 years with just over a quarter of all cases occurring in the over 65 age group (25.4%).The highest rate was observed in those over 65 years.

There were 284 males (61%) and 185 females (39%), which gave a sex ratio of 1.5

8.3.3 Geographic origin of TB cases

There were 65 patients born outside Ireland (13.8%): 28 from Europe, 23 from Asia, 13 from Africa and 1 from Oceania. The non-national population did not differ from the Irish population in terms of sex, disease category, sputum or culture status but they were however younger ($p<0.0001$).

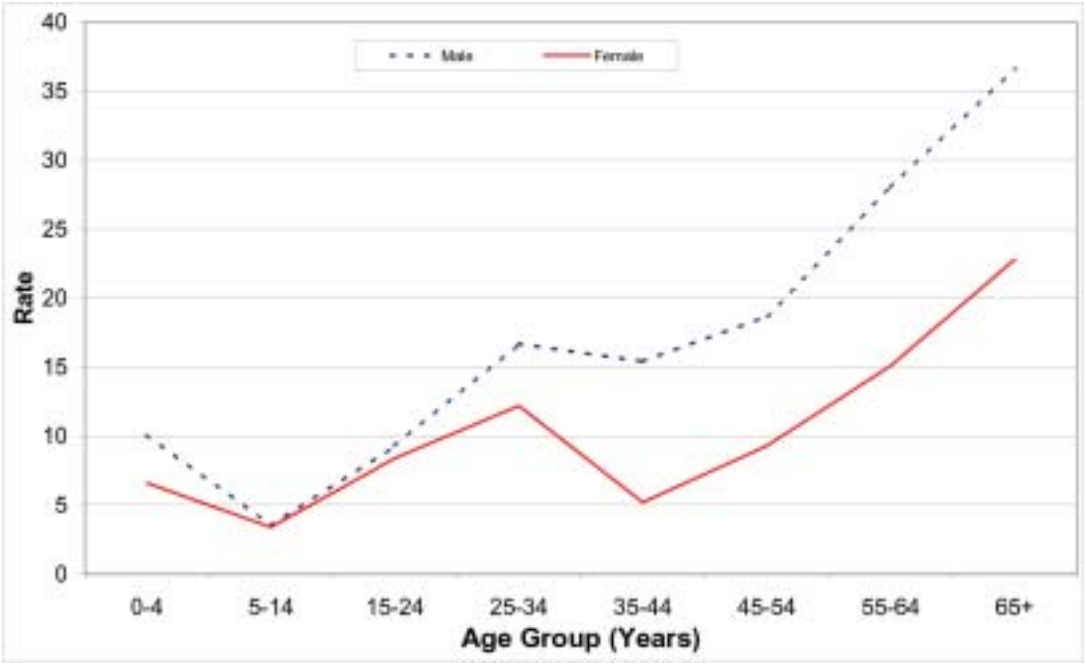


Figure 8.5: Age and sex specific rates of notified cases of TB per 100,000 population.

8.3.4 Diagnostic Category

Of the 469 TB notifications, 260 (55.4%) were definite cases, i.e. culture confirmed (7.2 per 100,000) and 209 (44.6%) were other than definite cases (5.8 per 100,000).

Of the 469 TB notifications 306 were pulmonary TB (65.2%), 110 cases were extrapulmonary TB (23.5%), 22 cases were pulmonary+extrapulmonary TB (4.7%) and 27 cases were primary TB. The diagnostic breakdown in each health board is shown in Table 8.2. The distribution of TB disease by age group is illustrated in Figure 8.6.

For international comparisons, WHO requires all cases with a pulmonary component be classified as pulmonary cases. Of the 328 TB cases with a pulmonary disease component, 202 cases (61.5%) were definite, i.e. culture confirmed (5.6 per 100,000). There were 124 cases (38%) of sputum smear positive pulmonary cases (3.4 per 100,000).

Table 8.2: Diagnostic categories of TB by health board in 1999.

Health Board	P	E	P+E	Pri	Total*
ERHA	124	36	11	9	180
MHB	13	0	2	0	15
MWHB	27	24	0	3	54
NEHB	14	8	3	0	25
NWHB	12	4	1	2	19
SEHB	23	7	1	0	31
SHB	43	23	4	4	74
WHB	50	8	0	9	67
Total	306	110	22	27	465

4 cases could not be allocated to a diagnostic category at time of report
P-Pulmonary, E-Extrapulmonary, Pri-Primary

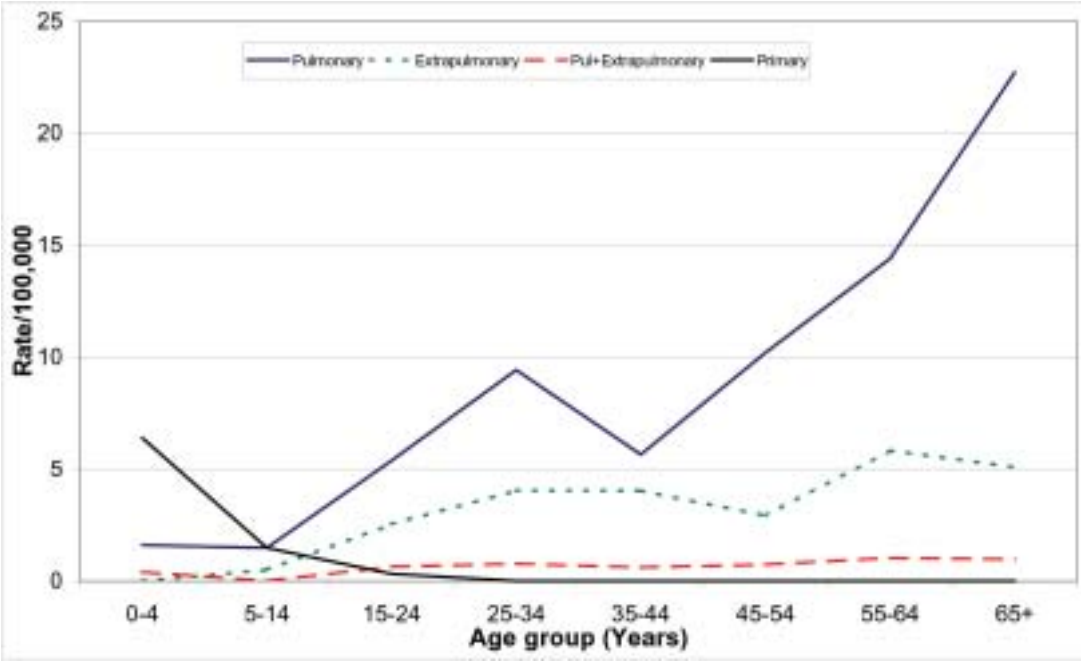


Figure 8.6: Distribution of TB disease by age group.

8.3.5 Isolates and Resistance

Of the 260 definite, culture confirmed cases 95.7% of isolates were ***M. tuberculosis*** (n=242) and 4.3% were ***M. bovis*** (n=11). Seven isolates were not available.

Resistance was documented in 6 cases out of a total of 242 ***M.tuberculosis*** isolates (2.5%). Mono-resistance to isoniazid was recorded in 4 cases. There were two MDR-TB cases, defined as resistance to at least isoniazid and rifampicin, notified and treated in 1999.

8.3.6 HIV

Six patients had HIV in association with TB. Five cases were pulmonary TB, the sixth pulmonary+extrapulmonary TB. Five were culture positive for ***M.tuberculosis***, fully sensitive to standard TB chemotherapy.

8.3.7 Outcome

Seventy five patients (16.9%) had a documented "treatment completed" outcome. Five patients (1%) had a recorded "lost to follow-up" outcome.

There were 34 deaths (7.2%) amongst the 469 notified cases of TB in Ireland in 1999. In nine cases (1.9%)TB was the recorded cause of death giving a crude death rate of 0.2/100,000

A summary profile of the epidemiology of TB in Ireland for 1999 is shown in Table 8.3.

Table 8.3: Summary Profile of the epidemiology of TB in Ireland 1998-9.

	1998	1999
Total number of cases	424	469
Notification rate	11.7	12.9
Foreign born TB patients	35	65
Culture positive cases	241	260
M.tuberculosis	234	242
M.bovis	6	11
Smear positive pulmonary cases	121	124
Cases resistant to isoniazid alone	2	4
Cases resistant to rifampicin alone	0	0
Cases resistant to ethambutol alone	0	0
Cases resistant to streptomycin alone	2	0
Multi drug resistant cases	0	2
Deaths attributable to TB	6	9

8.4 Discussion

In Ireland there was a 10.2% increase in the notification rate in 1999 compared to 1998. This has also been reflected in the 3 year moving average, which for the first time in the 1990s has seen a reversal of the steady downward trend in the number of TB cases seen.

In 1999, 13.8% of all TB cases were born outside Ireland. Although this has risen from 8.3% in 1998[2], when compared to several other European countries, e.g. Norway, Sweden, Denmark and Switzerland, where more than 50% of tuberculosis cases are in patients of foreign origin[3], it means we still have one of the lowest proportion of TB cases in foreign born patients in the EU.

There were two cases of multi-drug resistant TB (MDR-TB) in 1999. With a further two cases of MDR-TB provisionally reported for 2000 through the National TB Surveillance System (NTBSS 2000) it is an issue that needs to be kept under surveillance, something that can be greatly facilitated with the establishment of a National TB Reference Laboratory.

This is the second successive year, which has seen an increase in the crude number of notified cases. Although the increase is small, it is a reminder that tuberculosis in Ireland hasn't gone away and that tuberculosis treatment and contact tracing services need to be maintained and preferably enhanced.

8.5 References

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9. Infectious Disease Notifications, 2000

• On 1st July 2000, responsibility for the collation and analysis of the weekly Infectious Disease Notifications was transferred from the Department of Health and Children to NDSC (S.I. No. 151, 2000).
• Since July 2000, the health boards provide NDSC with disaggregate data on each notification.
• There was a measles outbreak in Ireland in 2000, 1603 cases were reported compared to 147 cases in 1999.
• The level of activity for acute viral meningitis was high in 2000, 98 cases were reported compared to 27 in 1999.

9.1 Introduction

The 1947 Health Act entitles the Minister of Health and Children to specify by regulation the diseases that are infectious and covered by legislation. This list of notifiable infectious diseases was first specified in the 1948 Health Regulations. The principal current regulations are contained in the 1981 Infectious Disease Regulations, which have been revised in 1985, 1988 and 1996.

On July 1st 2000 the Infectious Diseases (Amendment) Regulations, 2000 (S.I. No. 151, 2000) came into force. Under these regulations, the National Disease Surveillance Centre (NDSC) was assigned responsibility for the collation and analysis of the weekly infectious disease notifications reported by the health boards, taking over responsibility from the Department of Health and Children.

In order to have more useful information on the infectious disease notifications, NDSC proposed that from 1st of July 2000 the data be provided in disaggregate rather than aggregate format. Following consultations with the health boards this proposal was accepted and a minimum dataset was agreed. Therefore, since July 2000, disaggregate data on infectious disease notifications has been collated and analysed weekly by NDSC and a report is circulated each Friday to an extensive mailing list.

9.2 Materials and Methods

Since 1st July 2000, the health boards have provided NDSC with disaggregate data on each infectious disease notified. The agreed dataset includes the following variables: identification number, community care area, county of residence, date of onset, date of notification/week number, date of birth, age, sex, disease and organism (if available). The health boards make returns to NDSC either on paper or disk by the Wednesday of each week with respect to infectious diseases notified between the Sunday and Saturday of the previous week. Zero notifications are also reported to NDSC. As an interim measure from July to December 2000,

the disaggregate data was inputted and analysed at NDSC using an Epi-Info database. Data prior to July 2000 from the Department of Health and Children's system was collated in a MS Excel database.
Following year-end the 2000 infectious disease data were reconciled with the health boards databases/records.

9.3 Results

The numbers of infectious diseases notified by health board in 2000 are presented in Table 9.1. For comparative purposes the national figures for 1999 are also included in this table. The numbers of infectious diseases reported by age and sex are presented in Tables 9.2 and 9.3, respectively. Since the collection of disaggregate data at national level did not commence until 1st July 2000, the age and sex are not known in some cases. Annual figures on the infectious diseases reported since 1982 are presented in Table 9.4 (see Appendix). Enhanced surveillance systems are in operation for some of these diseases listed on Table 9.1 and detailed articles on these appear elsewhere in this report. When the 2000 and the 1999 figures are compared two diseases in particular warrant further mention, namely, measles and acute viral meningitis.

9.4 Measles

Measles is an acute viral infectious disease that occurs throughout the world and ranks as one of the leading causes of childhood mortality. It is a human disease with no known animal reservoir. It is usually a disease of childhood and is most common in the non-immunised 1-4 years age group. However, one can catch measles at any age. Measles transmission is primarily person-to-person via large respiratory droplets and is highly communicable, with >90% secondary attack rates among susceptible persons. Complications due to measles are quire common and include severe cough, breathing difficulties, ear infections, pneumonia and conjunctivitis. More serious problems involve the central nervous system, but are rarer; these include acute encephalitis and sub-acute sclerosing pan-encephalitis.

A measles outbreak occurred in Ireland in 2000. In total 1603 cases were reported, the highest seen since 1993,when 4328 cases were reported. One hundred and forty seven cases were reported in 1999. The 2000 outbreak was predominantly in the ERHA with 78% of cases occurring there (Table 9.1). The incidence rate was highest in ERHA at 96.7 per 100,000, followed by SEHB (26.8/100,000) and MHB (22.4/100,000). The national incidence rate was 44.2 per 100,000. The outbreak peaked in the second week of April (Week 15), 119 cases were reported nationally (Figure 9.1). From the end of March until the end of May (Week 13-21) over 60 cases were notified each week. It was the third week in October before the numbers of cases reported each week dropped to 1999 levels again. The measles virus associated with the outbreak in Ireland was the D2 genotype - a genotype most frequently detected in the southern and eastern parts of the African continent.[1] Three deaths occurred due to measles in 2000 (two children died from pneumonia and one child died from post infectious encephalitis). The control measures implemented by the outbreak control team were outlined in the July 2000 edition of Epi-Insight.[2]

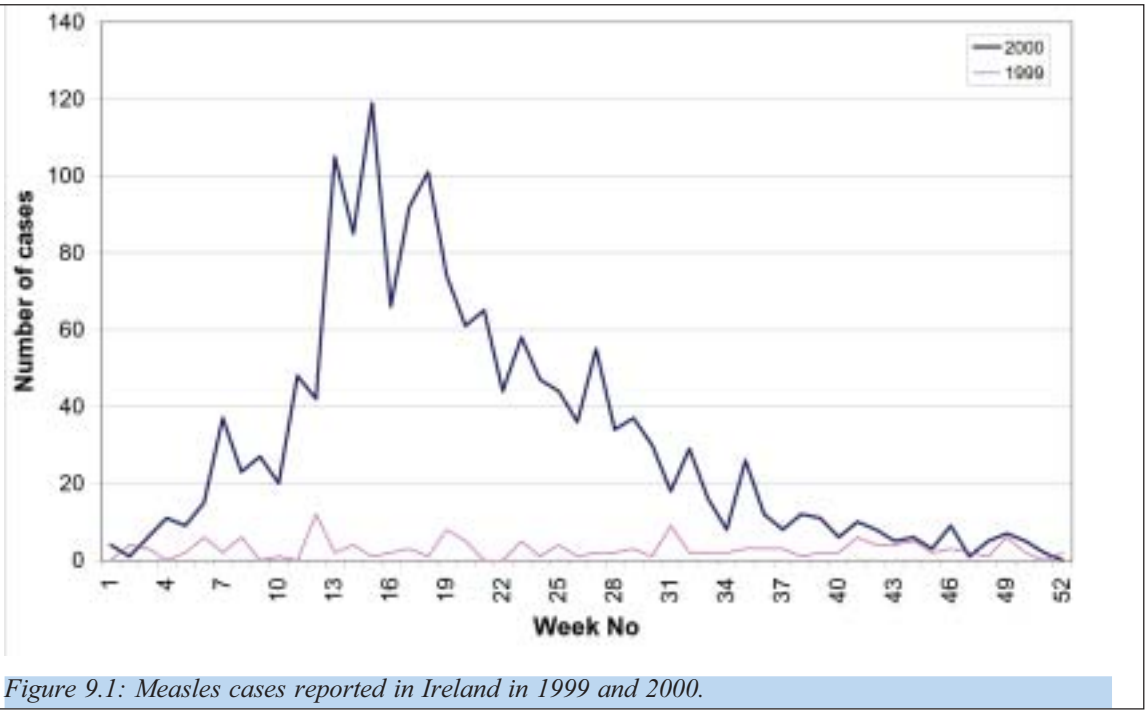

Figure 9.1: Measles cases reported in Ireland in 1999 and 2000.

A highly effective vaccine, MMR, can prevent measles in over 90% of immunised children, following a single dose of the vaccine (given at 15 months). With the second dose of the vaccine (given at 4-5 years), over 99% of immunised children are protected from measles infection. However, for MMR vaccine to be effective in eliminating measles in this country MMR uptake rates have to be 95% or over. Unfortunately in Ireland these uptake rates (<80%) fall far short of the national target. Based on these facts it is not surprising that the measles outbreak in 2000 commenced in Dublin's inner city where there were pockets of very low uptake and in some areas this was less than 70%.

In the USA, for example, reported cases of measles have declined rapidly since 1993. This decline was due primarily to intensive efforts to vaccinate pre-school children following a resurgence of cases in 1989-1991. Measles vaccination levels in 2 year-old children increased from 70% in 1990 to 92% in 1998. Similar intensive efforts are required in Ireland if we want to minimise the chances of an outbreak occurring similar to the one in 2000. Furthermore, if Ireland is to keep pace with the other European countries in the effort to eliminate indigenous transmission of measles virus by 2007, then innovative immunisation and surveillance strategies need to be implemented.

9.5 Acute viral meningitis

Acute viral (aseptic) meningitis is serious but rarely fatal in persons with normal immune systems. About 90% of cases of viral meningitis are caused by enteroviruses such as coxsackieviruses and echoviruses. Personal hygiene (e.g. hand washing thoroughly and often) is the most effective method in avoiding the acquisition and transmission of enterovirus infection.

In 2000, 98 cases of acute viral meningitis were reported in Ireland compared to 27 in 1999. From Week 25 (mid June) onwards cases were consistently reported each week ranging from 1 to 10 cases, compared to the previous 24 weeks when on 16 of those weeks zero cases were reported (Figure 9.2). The incidence rate ranged from 5.7 per 100,000 in NWHB to 1.3 per 100,000 in MWHB, with a national incidence rate of 2.7 per 100,000. In parallel with the

increased notifications of acute viral meningitis in 2000 there was an increase in the number of isolates of echovirus type 13 seen by the National Virus Reference Laboratory, increasing from 13 isolates in 1999 to 44 isolates in 2000. Most of these isolates were from patients less than 15 years of age with symptoms of viral meningitis.

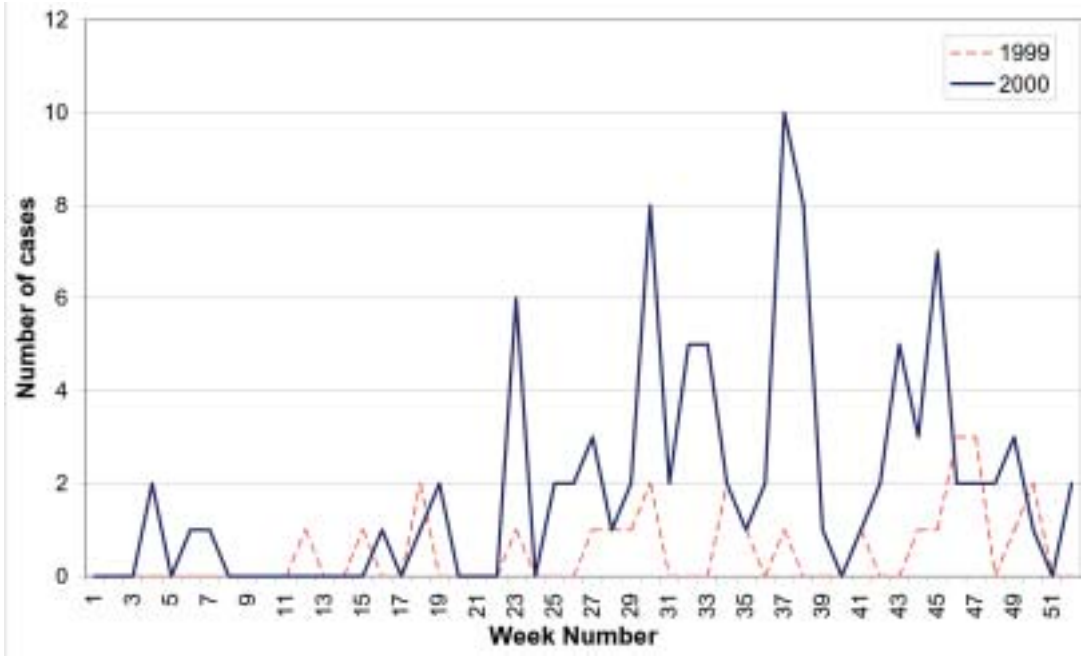

Figure 9.2: Acute viral meningitis cases reported in Ireland in 1999 and 2000.

A similar situation arose in the England and Wales in the summer of 2000; the Public Health Laboratory Service (PHLS) reported that an increase in the number of notifications of viral meningitis was reflected in an increase in laboratory confirmed echovirus type 13 infections.[3] Viral meningitis often peaks in the summer months, but the scale of the increase can vary from year to year - in 2000, the level of activity was relatively high both in Ireland and the UK.

9.6 Future Developments re Infectious Disease Notifications

From early 2001 NDSC plans to use an MS Access database for managing the weekly infectious disease notifications. This will allow for the incorporation of the historical Department of Health and Children aggregate notification data with the disaggregate data currently being collected within the one system. This system will also enable data provided electronically on disk by some health boards to be automatically imported into the database. A variety of reporting options will also be available on the system. Summary reports will also be made available on the NDSC website.

9.7 References

1. Global distribution of measles genotypes. WER 2001; 76 (33): 249-251. Available at <http://www.who.int/wer>

2. Cronin, M. Measles Outbreak, Dublin 2000. ***EPI-INSIGHT***. 2000; **1**(2), 2-3.
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3. Anon. Increase in cases of viral meningitis. CDR Weekly. [Serial online]2000 [cited 2000]; 10(31), 279 and 280. Available at <http://www.phls.co.uk/puplications/CDR00/cdr3100.pdf>

9.8 Acknowledgements

NDSC would like to thank the General Practitioners, clinicians, microbiologists, Community Care Areas and Departments of Public Health without whose dedication and commitment collation and analysis of the weekly infectious disease notifications would not be possible.

Table 9.1: Number of notifiable infectious dieases reported by health board in 2000, and the total number reported in 1999 in Ireland.

Disease	ERHA	MHB	MWHB	NEHB	NWHB	SEHB	SHB	WHB	Total 2000	Total 1999
Acute Anterior Poliomyelitis	0	0	0	0	0	0	0	0	0	0
Acute Encephalitis	0	0	0	0	1	0	0	0	1	1
Acute Viral Meningitis	33	8	4	12	12	11	13	5	98	27
Anthrax	0	0	0	0	0	0	0	0	0	0
Bacillary Dysentery (Shigellosis)	19	1	2	1	0	3	3	1	30	116
Bacterial Meningitis (including meningococcal septicaemia)*	224	37	39	56	23	81	93	33	586	587
Brucellosis	2	0	5	3	0	0	5	0	15	19
Cholera	1	0	0	0	0	0	0	0	1	0
Creutzfeldt Jakob Disease	1	0	0	0	1	0	0	0	2	1
Creutzfeldt Jakob Disease (variant)	0	0	0	0	0	0	0	0	0	1
Diphtheria	0	0	0	0	0	0	0	0	0	0
Food Poisoning (bacterial other than salmonella)	590	47	40	43	111	355	298	70	1554	1673
Gastroenteritis when contracted by children under 2 yrs)	1017	42	138	167	123	361	487	461	2796	2917
Infectious Mononucleosis	72	4	32	14	2	1	25	1	151	198
Infectious Parotitis (Mumps)	26	1	0	0	15	2	8	0	52	38
Influenzal Pneumonia	9	0	4	0	0	0	7	0	20	15
Legionnaires Disease	7	0	1	0	0	0	1	0	9	2
Leptospirosis	2	1	1	0	0	2	0	1	7	6
Malaria	13	1	2	0	0	0	3	0	19	17
Measles	1253	46	22	39	27	105	86	25	1603	147
Ornithosis	0	0	0	0	0	0	0	0	0	1
Plague	0	0	0	0	0	0	0	0	0	0
Rabies	0	0	0	0	0	0	0	0	0	0
Rubella	51	6	15	1	2	10	6	6	97	62
Salmonellosis (other than typhoid or paratyphoid)	212	46	29	107	48	49	76	73	640	962
Smallpox	0	0	0	0	0	0	0	0	0	0
Tetanus			1		0	0	0	0	1	1
Tuberculosis**	na	na	na	na	na	na	na	na	na	469
Typhoid & Paratyphoid	0	0	0	0	0	0	1	0	1	0
Typhus	0	0	0	0	0	0	0	0	0	0
Viral Haemorrhagic Disease	0	0	0	0	0	0	0	0	0	0
Viral Hepatitis Type A	167	2	20	35	1	77	5	2	309	323
Viral Hepatitis Type B	115	0	7	2	0	10	47	6	187	160
Viral Hepatitis Unspecified	47	2	0	2	1	10	2	0	65	125
Whooping Cough	68	5	4	13	4	11	41	6	152	179
Yellow Fever	0	0	0	0	0	0	0	0	0	1

* As reported through Enhanced Surveillance System for Bacterial Meningitis. These figures include 2 imported cases reported by SHB

** Final figures for Tuberculosis not yet available, will be obtained from National TB Surveillance System

Table 9.2: Number of notifiable diseases reported by age group in 2000.

	Age Group (Years)											
Disease	**0 - 4**	**5 - 9**	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 34**	**35 - 44**	**45 - 54**	**55 - 64**	**65+**	**Unknown**	**Total**
Acute Encephalitis	0	0	0	0	0	0	0	0	0	0	1	1
Acute Viral Meningitis	17	17	22	9	5	5	1	0	0	0	22	98
Bacillary Dysentery (Shigellosis)	4	1	0	0	0	7	1	2	1	0	14	30
Bacterial Meningitis (including meningococcal septicaemia)*	301	66	57	84	23	15	12	8	7	12	1	586
Brucellosis	0	0	1	0	0	0	0	4	0	0	10	15
Cholera	0	0	0	0	0	1	0	0	0	0	0	1
Creutzfeldt Jakob Disease	0	0	0	0	0	0	0	0	2	0	0	2
Food Poisoning (bacterial other than salmonella)	212	36	33	37	53	90	75	23	34	46	915	1554
Gastroenteritis (when contracted by children under 2 years of age)	785	0	0	0	0	0	0	0	0	0	2011	2796
Infectious Mononucleosis	6	6	12	27	11	3	0	0	0	0	86	151
Infectious Parotitis (Mumps)	4	4	2	3	2	6	1	0	0	0	30	52
Influenzal Pneumonia	0	0	0	1	0	0	0	0	0	0	19	20
Legionnaires Disease	0	0	0	0	0	1	0	2	0	3	3	9
Leptospirosis	0	0	0	0	0	1	0	2	2	2	0	7
Malaria	3	2	0	0	2	3	3	0	0	0	6	19
Measles	282	57	10	4	4	3	0	0	0	0	1243	1603
Rubella	20	2	2	0	2	3	0	0	0	0	68	97
Salmonellosis (other than typhoid or paratyphoid)	61	26	18	17	30	45	45	22	17	27	332	640
Tetanus	0	0	0	1	0	0	0	0	0	0	0	1
Tuberculosis	**	**	**	**	**	**	**	**	**	**	**	**
Typhoid & Paratyphoid	0	1	0	0	0	0	0	0	0	0	0	1
Viral Hepatitis Type A	18	35	30	18	10	24	7	2	3	6	156	309
Viral Hepatitis Type B	3	0	3	6	19	44	12	3	1	0	96	187
Viral Hepatitis Unspecified	0	1	0	3	5	9	2	1	0	2	42	65
Whooping Cough	56	25	1	0	0	1	0	0	0	0	69	152

* As reported through Enhanced Surveillance System for Bacterial Meningitis. These figures include 2 imported cases; one aged 0-4 and the other 20-24 years

** Final figures for Tuberculosis not yet available, will be obtained from National TB Surveillance System

Table 9.3: Number of notifiable infectious diseases in Ireland in 2000 by sex.

Disease	Male	Female	Not Known	Total
Acute Encephalitis	0	0	1	1
Acute Viral Meningitis	49	25	24	98
Bacillary Dysentery (Shigellosis) (including meningococcal septicaemia)*	5	8	17	30
Bacterial Meningitis	337	247	2	586
Brucellosis	4	1	10	15
Cholera	0	1	0	1
Creutzfeldt Jakob Disease	0	2	0	2
Food Poisoning (bacterial other than salmonella)	346	286	922	1554
Gastroenteritis (contracted by children under 2 years)	387	339	2070	2796
Infectious Mononucleosis	33	29	89	151
Infectious Parotitis (Mumps)	9	12	31	52
Influenzal Pneumonia	1	0	19	20
Legionnaires Disease	5	1	3	9
Leptospirosis	7	0	0	7
Malaria	7	2	10	19
Measles	189	174	1240	1603
Rubella	11	18	68	97
Salmonellosis (other than typhoid or paratyphoid)	140	166	334	640
Tetanus	1	0	0	1
Tuberculosis	**	**	**	**
Typhoid & Paratyphoid	1	0	0	1
Viral Hepatitis Type A	64	76	169	309
Viral Hepatitis Type B	42	42	103	187
Viral Hepatitis Unspecified	16	7	42	65
Whooping Cough	30	49	73	152

* As reported through Enhanced Surveillance System for Bacterial Meningitis. These figures include 2 imported cases, one male and one female

** Final figures for Tuberculosis not yet available, will be obtained from National TB Surveillance System

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.

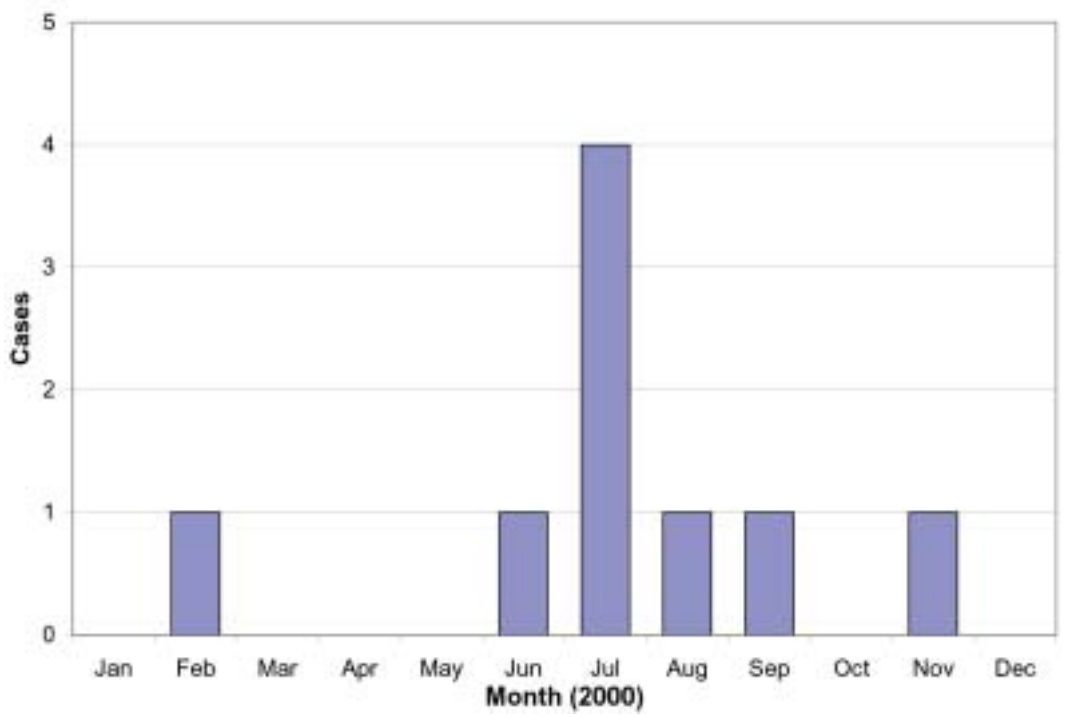

Figure 10.1: Monthly distribution of legionella cases in Ireland, 2000.

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 countries[3] (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

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11. Bacterial Meningitis in Ireland, 2000

• In 2000, 586 cases of bacterial meningitis (including 2 imported cases) notified in Ireland.
• The incidence of invasive meningococcal disease continues to be high, 14.15 per 100,000 cases notified (n=513, excluding two imported cases).
• Incidence rates for Group B and Group C disease: 7.06 and 3.83 per 100,000.
• Seventy-one cases of bacterial meningitis other than IMD notified.
• Thirty deaths due to bacterial meningitis, 25 due to IMD.

11.1 Introduction

In Ireland, acute bacterial meningitis is an important cause of morbidity and mortality especially in young children. Invasive meningococcal disease (IMD) is the leading cause of bacterial meningitis accounting for approximately 90% of the cases, followed by pneumococcal meningitis (4%). The incidence of invasive ***Haemophilus influenzae*** type b (Hib) disease has fallen dramatically since the introduction of the Hib vaccine in 1992. The fatality rate for IMD ranges between 3-6%, whereas for pneumococcal meningitis it tends to be higher at over 10%.

11.2 Materials and Methods

The Enhanced Surveillance of Bacterial Meningitis (including meningococcal septicaemia) commenced in Ireland in 1997. The system operates as follows: the Community Care Areas (CCA) notify the relevant Department of Public Health and NDSC simultaneously of any suspected case of bacterial meningitis by completing Part 1 of the Enhanced Form. Follow-up information on each case notified is collected by the Department if Public Health/CCA and notified to NDSC (Part 2 of the form). At NDSC data are inputted to an MS Access database. The NDSC database is reconciled monthly with the Meningococcal Reference Laboratory (MRL) database and quarterly with the Department of Public Health databases. Data analysis was performed using MS Access, MS Excel and Epi Info. Population data was taken from 1996 census.

For surveillance purposes the diagnosis of IMD is classified as **Definite**, **Presumed** and **Possible** as outlined in the Department of Health and Children's Working Group report.[1] Briefly, the case definitions are as follows:

Definite: A case where ***Neisseria meningitidis*** is detected by culture or PCR in a normally sterile site (CSF, blood, synovial fluid etc.).

Presumed: A case where the convalescent serology test is positive or Gram-negative diplococci detected in CSF or skin-scrapings or ***N. meningitidis*** isolated from an eye, throat or nasal swab together with either characteristic purpuric rash or clinical or laboratory features of bacterial meningitis (CSF pleocytosis).

Possible: A case with evidence of acute sepsis with or without meningitis, together with characteristic purpuric rash or a case with clinical evidence of sepsis without purpuric rash and in whom ***N. meningitidis*** is isolated from an eye, throat or nasal swab.

11.3 Results

11.3.1 Bacterial Meningitis

In 2000, 586 cases of bacterial meningitis were notified in Ireland through the Enhanced Surveillance system for Bacterial Meningitis (including two imported cases). Invasive meningococcal disease (IMD) accounted for 88% of these cases (515 cases, including two imported cases). Subsequent analysis will exclude the imported cases of IMD. The remaining bacterial meningitis cases were due to ***Streptococcus pneumoniae*** (n=25), ***Haemophilus influenzae*** (n=6), ***Streptococcus pyogenes*** (n=3), ***Escherichia coli*** (n=2), ***Mycobacterium tuberculosis*** (n=2), ***Listeria monocytogenes*** (n=1), ***Staphylococcus aureus*** (n=1) and other bacterial meningitis – no organism isolated (n=31).

11.3.2 Invasive Meningococcal Disease

In 2000, there were 513 cases (excluding the two imported cases) of IMD notified in Ireland, giving a rate 14.15 per 100,000. The 2000 rate is 4% less than the rate notified in 1999 (14.70/100,000), but is 14.5% higher than the rate notified for both 1997 and 1998 (12.35/100,000) (Figure 11. 1). The male:female ratio was 1.4:1.0. Three hundred and eighty were classified as definite, 58 as presumed and 75 as possible cases. The breakdown by serogroup was as follows: 256 Group B, 139 Group C, four Group Y, three Group W135 and six non-groupable (NG). Group B IMD accounted for 63% of the serogrouped cases. The incidence of Group B IMD dropped by 12% in 2000 when compared to 1999. There was an incidence rate of 7.06 per 100,000 (256 cases, excluding two imported cases) in 2000 as opposed to 8.00 per 100,000 (290 cases) in 1999. However, the 2000 rate was still higher than those notified in 1997 and 1998, which were 5.02 and 6.15 per 100,000, respectively (Figure 11.1). The incidence of Group C disease remained largely unchanged in 2000 (3.83/100,000 – 139 cases) compared to previous years (Figure 11.1). It accounted for 34% of the serogrouped cases.

11.3.3 Age-standardised incidence rates of IMD

In 2000, the crude incidence rates (CIR) and age standardised incidence rates (ASIR) varied by health board (Table 11.1). These differences were only statistically significant for the WHB, the ASIR rate was significantly lower than the national rate.

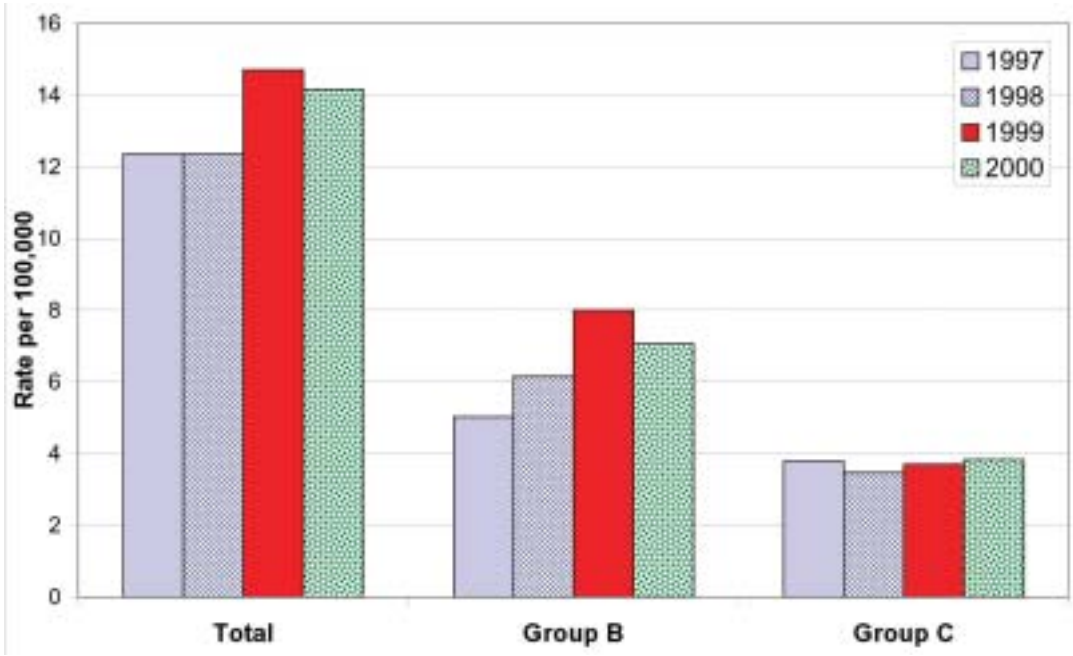

Figure 11.1: Incidence of invasive meningococcal disease in Ireland, 1997-2000.

Table 11.1: Numbers, crude incidence rates (CIR) and age standardised incidence rates with 95% confidence intervals (CI) of IMD by health board in Ireland, 2000 (incidence rates expressed per 100,000 population).

Health Board	Number	CIR [95% CI]	ASIR [95% CI]
ERHA	192	14.8 [12.7-16.9]	14.9 [12.8-17.0]
MHB	33	16.1 [10.6-21.5]	15.5 [10.2-20.8]
MWHB	31	9.8 [6.3-13.2]	9.7 [6.3-13.2]
NEHB	50	16.3 [11.8-20.9]	15.8 [11.4-20.2]
NWHB	20	9.5 [5.3-13.6]	9.5 [5.3-13.6]
SEHB	71	18.1 [13.9-22.4]	17.9 [13.7-22.1]
SHB	84	15.4 [12.1-18.7]	15.6 [12.3-18.9]
WHB	32	9.1 [5.9-12.2]	9.2 [6.0-12.4]

For Group B disease the SHB (3.4/100,000, 95% CI=1.8-4.9/100,000) and WHB (3.8/100,000; 95% CI=1.7-5.8) ASIR were significantly lower than the national rate (7.1/100,000; 95% CI=6.2-7.9) (Figure 11.2). For Group C disease the WHB ASIR (1.4/100,000; 95% CI=0.17-2.6) was significantly lower than the national rate (3.8/100,000; 95% CI=3.2-4.5) (Figure 11.2).

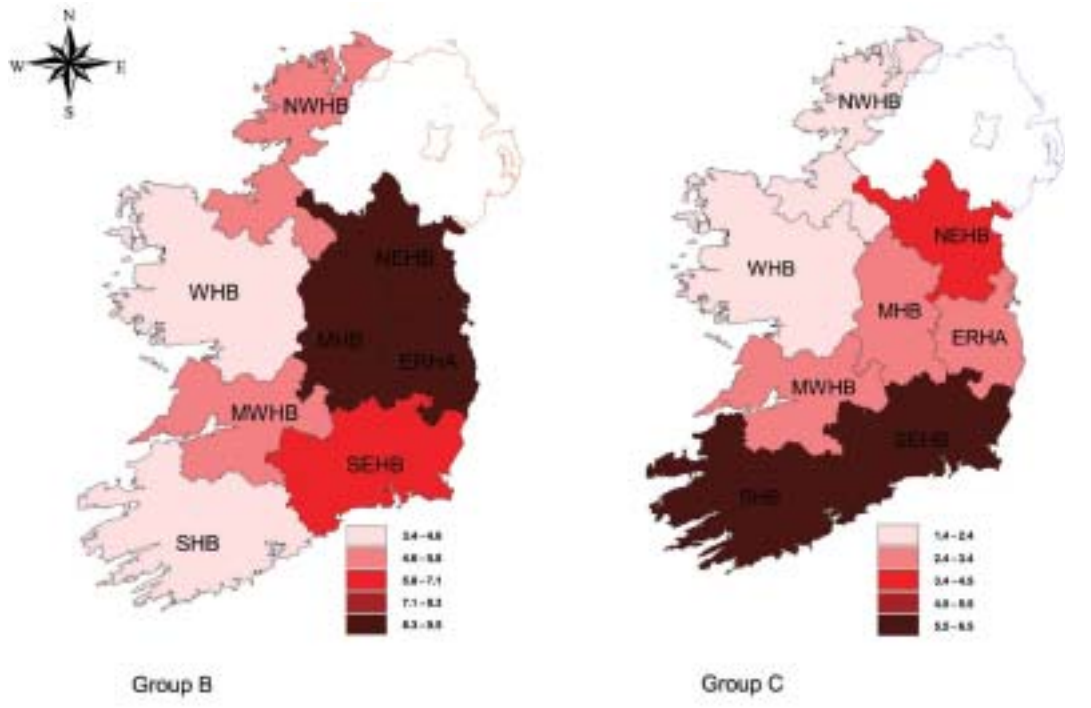

Figure 11.2: Age standardised incidence rates of Group B and Group C IMD by health board in 2000.

11.3.4 Age-specific incidence of IMD

The highest age specific incidence rates of IMD in 2000 occurred in infants less than one year (212.9/100,000) and in children 1-4 years of age (82.3/100,000). For Group B IMD the age specific incidence rate was 114.6 and 48.6 per 100, 000 for less than 1 year and 1-4 year olds, respectively, while the incidence rates of Group C IMD were 40.9 and 18.4 per 100,000 for these age groups (Figure 11.3). In children over 4 years of age the incidence rate of meningococcal disease declined, however slight increases were observed in 15-19 years age group for Group B (8.5/100,000) and Group C (9.13/100,000) IMD (Figure 11.3).

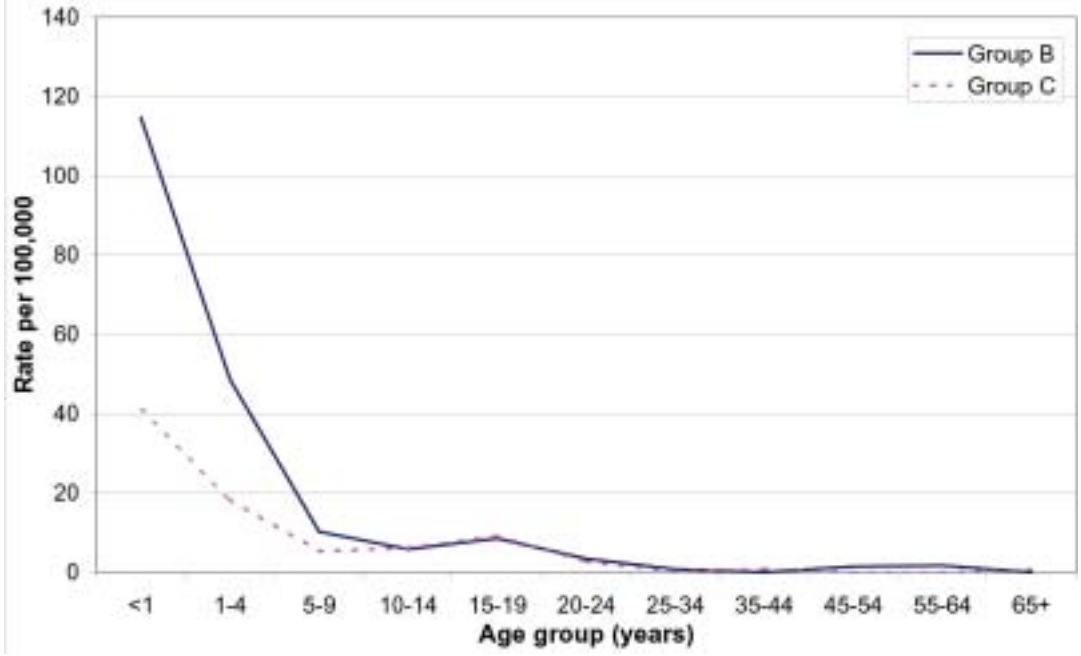

Figure 11.3: Age-specific incidence of Group B and C IMD in Ireland in 2000.

11.3.5 Bacterial meningitis other than meningococcal disease

Seventy-one cases (1.96/100,000) of bacterial meningitis other than meningococcal disease were notified in 2000. The incidence rate was highest in the less than one-year old age group, 36.84 per 100,000 (Table 11.2). Pneumococcal meningitis and bacterial meningitis (organism unknown) accounted for the majority of these cases (Table 11.2).

Table 11.2: Bacterial meningitis other than IMD in Ireland in 2000.

	Age group (years)							Total	IR
Organism	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25+**		
E. coli	2	0	0	0	0	0	0	2	0.06
Group B Streptococcus	0	0	0	0	0	0	3	3	0.08
H. influenzae type b	3	3	0	0	0	0	0	6	0.17
L. monocytogenes	0	0	0	0	0	0	1	1	0.03
M. tuberculosis*	0	0	0	0	0	0	2	2*	0.06
S. pneumoniae	11	4	1	0	1	0	8	25	0.69
S. aureus	0	1	0	0	0	0	0	1	0.03
Other (No organism isolated)	2	3	4	1	7	3	1	31	0.85
Total number of cases	18	11	5	1	8	3	25	71	1.96
IR	36.8	45.46	1.77	0.31	2.36	1.02	1.17	1.96	

* Includes one possible case IR-Incidence rate per 100,000

11.3.6 Deaths due to bacterial meningitis

There were 30 deaths due to bacterial meningitis in 2000 compared to 18 deaths in 1999. Twenty-five deaths were due to IMD, four due to pneumococcal meningitis and one as a result of ***Listeria monocytogenes*** meningitis. The numbers of deaths by age group are presented in Table 11.3. The case fatality rate (CFR) for pneumococcal meningitis was higher (16%) than that for IMD (4.9%). Group B IMD (5.1%, 13 deaths) had a lower case fatality rate than Group C IMD (7.9%, 11 deaths). There was one death due to Group Y IMD.

Although the incidence of Group B and Group C IMD is highest in very young, the CFR was higher in some of the older age groups (Table 11.3). The Group B CFR was highest in

the 20-24 age group (20%), followed by the <1 year olds (8.9%) and then the 15-19 year olds (6.9%), (Table 11.3). The Group C CFR was highest in the 15-19 and 20-24 year olds, 16.1% and 12.5%, respectively (Table 11.3).

Table 11.3: Deaths due to Group B and C IMD by age group in Ireland in 2000.

Age Group (Years)	Group B			Group C		
	Deaths	Cases	CFR (%)	Deaths	Cases	CFR (%)
<1	5	56	8.9	1	20	5.0
1-4	3	98	3.1	2	37	5.4
5-9	0	29	0.0	0	15	0.0
10-14	1	19	5.3	2	20	10.0
15-19	2	29	6.9	5	31	16.1
20-24	2	10	20.0	1	8	12.5
25+	0	15	0.0	0	8	0.0
Total	13	256	5.1	11	139	7.9

CFR=case fatality rate

11.4 Discussion

The incidence of IMD continues to be high in Ireland (14.15 per 100,000 for 2000) when compared with other countries (Malta: 8.12/100,000,[2] Scotland: 6/100,000,[2] Denmark: 3/100,000,[3] USA: 0.8/100,000[4]). New Zealand reported a similar rate as Ireland for 2000 (13.3/111,000).[5] New Zealand is now in its tenth year of an IMD epidemic. However, unlike the Irish situation, the high incidence of IMD in New Zealand can largely be attributed to a particular Group B subtype.

The incidence of Group B disease tends to be higher in the eastern-northeastern region of the country (ERHA, MHB and NEHB) these rates were not regarded as significantly higher than the national rate. In the case of Group C disease rates are highest in the south of the country (SEHB and SHB), but not significantly higher; and lowest in the health boards along the western-northwestern seaboard (NWHB and WHB[significantly lower]).

Overall, the incidence of Group B IMD in Ireland dropped by 12% in 2000 when compared with the previous year, whereas the incidence of Group C IMD remained largely unchanged. Now that the meningococcal Group C conjugate vaccine has been introduced since October 2000, it will be interesting to monitor the impact this vaccine will have on the epidemiology of IMD in Ireland over the coming years.

There was an outbreak of IMD due to serogroup W135 type 2a, subtype P1.2, 5 among pilgrims returning from the Hajj in Saudi Arabia or their close contacts in 2000. The three W135 cases notified in Ireland were not the Hajj strain and the cases had no associations with the Hajj.

Deaths due to IMD increased from 17 in 1999 to 25 in 2000. Between 1999 and 2000 there was a shift in the ratio of Group B:C deaths, 2.4:1 (1999) and 1.2:1 (2000), with five of the 11 Group C deaths in 2000 occurring in the 15-19 year old age group.

Although in comparison with IMD, the incidence of ***S. pneumoniae*** meningitis is low in Ireland (0.69/100,000), the CFR tends to be higher (16%). Efforts to develop effective pneumococcal vaccines have been ongoing. A 23-valent-polysaccharide vaccine (Pneumovax II) has been available in Ireland since 1985. The vaccine is recommended for use in persons 65 years and over. It should also be given to those over two years of age as outlined in the

Immunisation Guidelines for Ireland.[6] A conjugate pneumococcal vaccine will be licensed for use in Ireland in 2001 and unlike the polysaccharide vaccine will be effective in children less than two years of age. The Royal College of Physicians Immunisation Advisory Committee will develop recommendations in relation to this new pneumococcal conjugate vaccine in 2001.

11.5 Acknowledgements

We wish to thank all those that have contributed to the surveillance of meningococcal disease in Ireland: the Departments of Public Health, Medical Officers in the Community Care Areas, the Meningococcal Reference Laboratory and the Microbiology Laboratories.

11.6 References

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6. Immunisation Guidelines for Ireland – National Immunisation Committee of the Royal College of Physicians of Ireland, 1999.

12. VTEC O157 in Ireland, 2000

• VTEC O157 is an emerging pathogen and a serious global public health concern. In 2000, HUS occurred in 12% of cases and there was one death.
• VTEC is transmitted in three ways: through contaminated food or water, direct person-to-person spread, and direct contact with infected farm animals.
• VTEC O157 should be made a notifiable disease and surveillance of non-O157 VTEC should be enhanced

12.1 Introduction

Verocytotoxin producing ***Escherichia coli*** (VTEC) of which ***E. coli*** O157:H7 is the most common member is a serious global public health concern. VTEC produce toxins that can lead to symptoms of non-bloody diarrhoea, haemorrhagic colitis, haemolytic uraemic syndrome (HUS) and thrombotic thrombocytopenic purpura (TTP). In Ireland, there is no statutory requirement to notify ***E. coli*** O157:H7. In addition, there is no national reference laboratory facility for confirmation of verocytotoxin production, or definitive typing of VTEC, and samples are sent to the Public Health Laboratory Service (PHLS), Colindale for this purpose. This presents many challenges in management of clinical cases, and in national collation of information on ***E. coli*** O157:H7. In practice, clinical microbiologists report suspect cases, pending confirmation of verocytotoxin production, to public health colleagues so that appropriate public health action can be taken.

12.2 Methods

In 1999, the National Disease Surveillance Centre, in co-operation with Directors of Public Health in each health board region, established an epidemiological surveillance system for VTEC O157:H7. Since 1999, clinical microbiologists, specialists in public health medicine and area medical officers have participated in a system whereby a standard dataset of information is collected on each case identified and reported to the National Disease Surveillance Centre. This information includes socio-demographic data, clinical data, possible risk factors and information on links between cases. An initial notification to NDSC is made on the date of notification of the case to the health board, and follow-up information is returned when available. Due to the current arrangements for definitive typing, there can be a considerable delay between initial notification to NDSC and complete information on each case. Several participants in the system also notify other non-O157:H7 verocytotoxin-producing ***E coli***.

The case definitions that have been used in this system are as follows:

Suspected: A case of post-diarrhoeal HUS or TTP.

Probable: A case with isolation of ***E. coli*** O157 from a clinical specimen (asymptomatic or symptomatic), pending confirmation of H7 or Shiga toxin, or a clinically compatible case that is epidemiologically linked to a confirmed or probable case.

Confirmed A case that has isolation of ***E. coli*** O157:H7 from a specimen or isolation of Shiga toxin-producing ***E. coli*** O157:NM(non motile) from a clinical specimen.

Probable cases that were subsequently confirmed as not H7 or Shiga toxin producing were removed from the database. A travel-associated case was defined as one where there had been international travel within two weeks prior to onset of illness.

12.3 Results

In 2000, 41 cases of VTEC O157 were notified to NDSC. Six of these cases occurred in non-Irish residents, and therefore were not included in the estimation of population-based rates. These six cases are included in the descriptive epidemiology. The incidence of VTEC O157 in Ireland is shown in Table 12.1.

Table 12.1: Number of cases of VTEC O157 and crude incidence rate (95% CI) in Ireland, 1996-2000.

Year	No. of reported cases	Crude incidence rate /100,000 population	[95% CI]
1996	8	0.2	[0.1-0.4]
1997	31	0.8	[0.5-1.2]
1998	76	2.1	[1.6-2.6]
1999	51	1.4	[1.0-1.8]
2000	35 (41)*	1.0	[0.6-1.3]

* 41 cases notified, but 6 occurred in non Irish residents. CI = Confidence Interval

There has been some regional variation in the numbers of cases reported (Table 12.2).

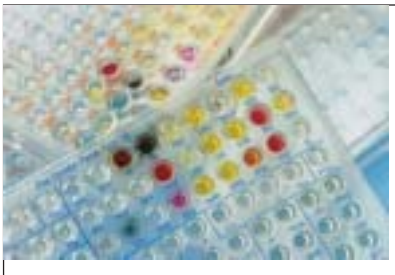
Table 12.2: Crude incidence rate (CIR) and age standardised incidence rate (ASIR) with 95% confidence intervals by health board, Ireland, 1999-2000 expressed per 100,000 population.

	2000				1999		
Health Board	CIR	[95% CI]	ASIR	[95% CI]	CIR	ASIR	[95% CI]
ERHA	0.5	[0.1-0.9]	0.5	[0.1-0.9]	0.7	0.7	[0.2-1.1]
MHB	3.4	[0.9-5.9]	3.3	[0.8-5.7]	4.4	5.6	[2.5-9.1]
MWHB	0.6	[0.2-1.5]	0.6	[0.2-1.5]	3.8	3.9	[1.7-6.0]
NWHB	0.5	[0.4-1.4]	0.4	[0.4-1.1]	0.9	1.0	[0.4-2.3]
SEHB	1.5	[0.3-2.8]	1.5	[0.3-2.7]	1.5	1.5	[0.3-2.7]
SHB	0.4	[0.1-0.9]	0.4	[0.1-0.8]	1.6	1.7	[0.6-2.7]
WHB	2.8	[1.1-4.6]	2.9	[1.1-4.7]	0.6	0.5	[0.2-1.2]
NEHB	0		0		0	0	
Total			1.0	[0.6-1.3]		1.4	[1.0-1.8]

In 2000 and in 1999, the crude incidence rates and age standardised incidence rates varied by health board, but these differences were not statistically significant.
Twenty two (54%) cases occurred in females and 19 (46%) occurred in males. Most cases occurred in young children in the 1-4 year age group (Table 12.3). Looking at the age specific incidence rate in cases in Irish residents, the age group at highest risk was the 0-4 year olds. (Figure 12.1)

Table 12.3: Cases of VTEC O157 by age group, 2000.

Age group (Years)	Number of cases	Percent
< 1	1	2
1-4	15	37
5-9	4	10
10-14	1	2
15-24	3	7
25-44	6	15
45-64	6	15
65 +	5	12
Total	41	100



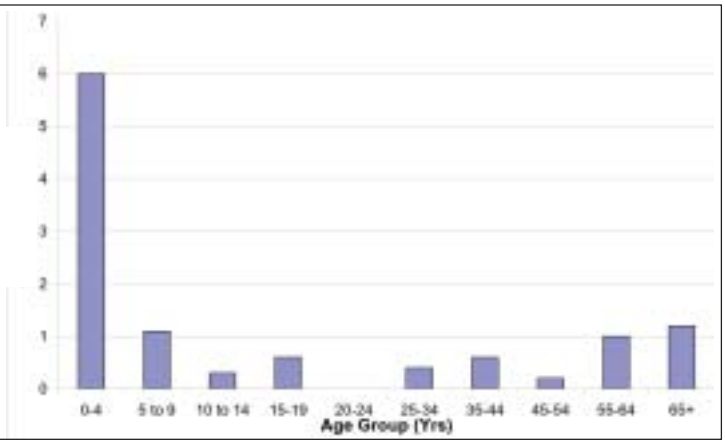


Figure 12.1: Age specific incidence rate of VTEC O157 in Irish residents, Ireland 2000.

12.3.1 Seasonality of VTEC O157

There were two peaks in occurrence of cases, in March and in September, (Figure 12.2).

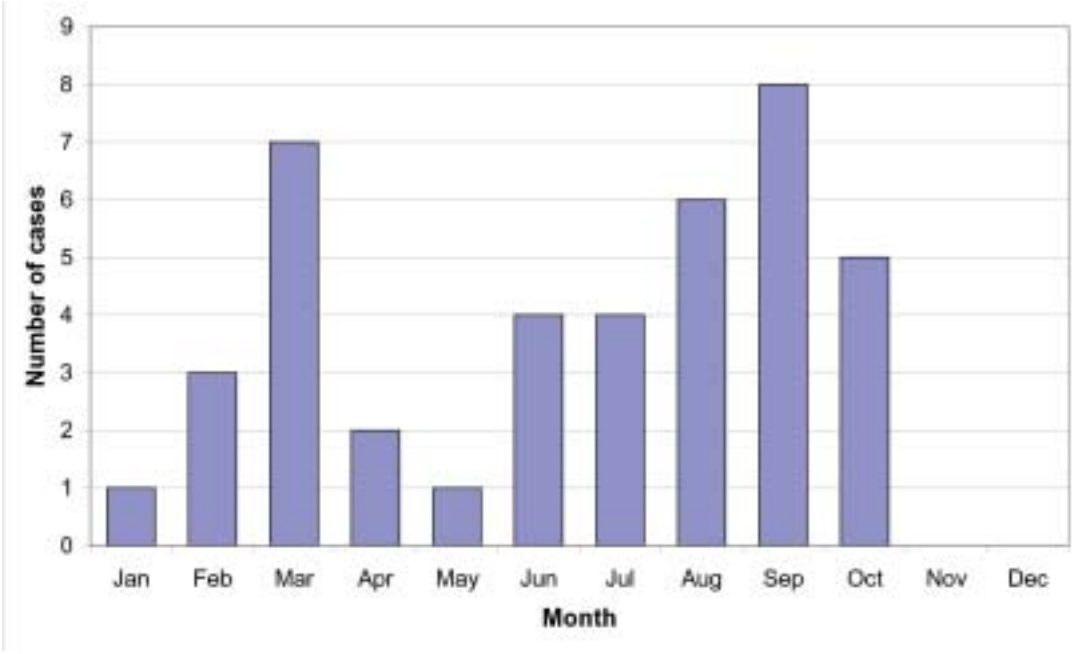


Figure 12.2: Cases of E. coli *O157:H7 by month of onset of symptoms (or of diagnosis, if asymptomatic), Ireland, 2000.*

Eight (19.5%) cases were travel associated, and 33 (80.5%) were not travel associated (Table 12.4). The countries visited within 14 days of onset of illness were UK (3), Spain (3), and Canada (2).

12.3.2 Clinical features

In total, 40 cases (98%) had symptoms, and only one case was asymptomatic. Reported symptoms included bloody diarrhoea in 26 (64%) cases, and haemolytic uraemic syndrome in 5 cases (12%). The five cases of HUS occurred in persons ranging in age from 2 to 17 years. Three were female and two were male. All these cases reported bloody diarrhoea. Four of the cases with HUS recovered from their illness. One person died from HUS in 2000. This case occurred in a male in the 5 to 9 year age group, and was associated with travel to Spain. The phage type in this case was PT4.

12.3.3 Microbiological investigation

One case of HUS was identified on serology alone. This case was included as a case, as there were typical clinical features, and the case developed HUS. Following investigation of a travel associated case in Spain in a 17-year-old female; VTEC O157 was isolated from frozen hamburger samples taken from a restaurant where she had eaten. Diagnosis of VTEC in this case had been made using serology only, and no isolate was available for genetic testing and investigation of a possible link. No other food or water sample was linked microbiologically to a case of VTEC in 2000.

Limited information was available nationally on test results from water sampling. In five cases, there was documented contamination of the water supply with coliforms and with ***E coli***. In no case was ***E coli*** O157 detected in water.

Phage typing of strains showed that PT32 was the predominant type found. The pattern of phage types found in travel-associated cases was different to non-travel associated cases.

Table 12.4: Phage type, association with international travel and countries visited within 14 days of onset of illness, for cases of E. coli *O157:H7, Ireland, 2000.*

Phage type	Not travel associated	Travel associated	Countries	Total
14	0	2	Canada (2)	2
2	1	0		1
21	1	0		1
21/28	0	2	UK (2)	2
31	1	0		1
32	24	2	Spain (1) UK (1)	26
38	1	0		1
39	1	0		1
4	0	2	Spain (2)	2
8	1	0		1
Not available	3	0		3

Table 12.5: Phage types of cases of E. coli *O157:H7 in Irish residents by health board, Ireland, 2000.*

	Phage type								
Health Board	32	4	21	31	2	38	39	8	Not available
ERHA	3	2	0	0	1	0	0	0	1
MHB	6	0	0	0	0	0	0	0	1
MWHB	2	0	0	0	0	0	0	0	0
NWHB	0	0	0	0	0	0	0	1	0
SEHB	5	0	0	0	0	0	1	0	0
SHB	2	0	0	0	0	0	0	0	0
WHB	6	0	1	1	0	1	0	0	1
Total	24	2	1	1	1	1	1	1	3

The range of phage types detected was more diverse than that found in Ireland in 1999, where only two different phage types were detected, PT32 in 66.7% and PT21/28 in 33.3% (Table 12.5).

12.3.4 Epidemiological investigation

On active investigation of many of the cases identified in 2000, further previously undiagnosed cases of VTEC were identified. Of 35 cases with this information, eight cases (23%) occurred in association with other cases, and 27 cases (77%) were sporadic. Three family outbreaks of VTEC O157 were detected. There was no generalised outbreak of ***E. coli*** O157:H7 detected in 2000. As a result no food item was linked epidemiologically to VTEC. Of 27 cases where consumption patterns of unpasteurised cheese and/or milk were known, three cases (3/27) reported this exposure. Fifteen cases (50%) reported exposure to farm animals (n=30). Information on the source of the water supply was available in 31 cases. Of these, the water supply was public in 14 (45.2%) cases, well water in ten (32.2%), and from a group water scheme in seven (22.6%) cases.

Information on whether the case attended a crèche, or was an in-patient in a nursing home, hospital or in another institutionalised setting, was also gathered. Of 33 cases where information was available, three attended a crèche. Two patients were in-patients in hospital with other conditions when VTEC O157 was detected. Following investigation, no further cases were detected in these hospitals. Twenty-seven cases were not in a high-risk category.

12.3.5 Non-O157 VTEC

All cases of non-O157 VTEC reported to NDSC occurred in the Eastern Regional Health Authority (ERHA). In summer 2000, a case of HUS in a child with a history of diarrhoea was notified to the Department of Public Health in the ERHA. Stool samples were negative for ***E. coli*** O157 and other non-O157 VTEC. However, five siblings and cousins of the case with HUS provided specimens identified as ***E. coli*** O26, verocytotoxin positive.

12.4 Discussion

Each case of VTEC identified is investigated thoroughly, and family and other at risk contacts are screened as recommended according to PHLS guidelines.[1] This means that cases with mild symptoms, which would otherwise not come to medical attention, are identified, and are reported. By systematically collating information on each case identified, the epidemiology of VTEC in Ireland is emerging. It is clear that young children are most at risk of disease, and given the potential for rapid spread in crèches, prompt action is taken when a case is identified, as well as efforts at primary prevention, through education of parents and staff about the need for very good hygiene practices, and not attending the crèche if a child has diarrhoea.

The three main routes of infection with VTEC O157 are via contaminated food or water, person-to-person spread and through direct contact with farm animals. This descriptive epidemiology is identifying significant exposures to farm animals. Those who visit farms should be made aware of the risks and all those who are in contact with farm animals should have access to adequate hand washing facilities for use after being in contact with them.

Proper cooking of meat will kill the organism, and as good weather approaches and the barbeque season begins, the important message is to cook meat until the juices run clear, and the meat is brown throughout.

The majority of cases of VTEC in 2000 occurred in persons whose source of water was not from a public water supply. In five cases notified to NDSC, water quality around the time of identification of illness in the index case was not adequate. It is important that the public has access to a clean water source, as contaminated water has been implicated as the source of large outbreaks of VTEC internationally.[2]

The lack of a national reference laboratory for confirmation of toxin production and definitive typing of VTEC in Ireland is a cause for concern. Ireland should be in a position to rapidly investigate any possible case of this serious and potentially fatal illness, rather than have to refer outside the country. **In this regard, the ERHA Public Health Laboratory has just opened a containment level 3 laboratory for diagnosis of VTEC infection and confirmation of toxin status. This facility is available to the ERHA, the NEHB and other health boards who wish to avail of the service.**

The emergence of outbreaks of non-O157 VTEC in Ireland highlights the importance of improving national surveillance of non-O157 VTEC. As was seen in 2000, non-O157 VTEC can be associated with serious illness.

12.5 Acknowledgements

We would like to acknowledge the cooperation of microbiologists, medical laboratory scientists, SAMOs, AMOs, SPHMs, PEHOs and EHOs for participating in the enhanced surveillance system.

12.6 References

1. PHLS Advisory Committee on Gastrointestinal Infections. Guidelines for the control of infection with Verocytotoxin producing ***Escherichia coli*** (VTEC). ***Communicable Disease and Public Health*** 2000 **3**(1); 14-23.
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13. CAMPYLOBACTER ENTERITIS IN IRELAND, 1999

• In 1999, there were over 2000 laboratory confirmed cases of campylobacter enteritis in Ireland.
• A crude incidence rate of 57.5/100,000 persons in Ireland compared with 51 in Northern Ireland, 105 in England and Wales and 116 in Scotland.
• The largest burden of illness in Ireland falls on the 0-5 and 25-35 year old age groups.
• Campylobacter enteritis was found in males predominantly in several age groups.
• Campylobacter enteritis peaks in the summer months but appears to be a growing problem in recent years.

13.1 Introduction

There has been increasing concern internationally at the level of illness caused by ***Campylobacter spp.*** Commonly, ***Campylobacter jejuni*** (***C.jejuni***) or ***Campylobacter coli*** (***C.coli***) infection is a zoonosis and manifests as a severe enteritis. A review of the epidemiology of laboratory-confirmed campylobacter enteritis in Ireland was carried out in 2000. This review provides important information to supplement further investigations in this field by the National Disease Surveillance Centre (NDSC), the Food Safety Authority of Ireland (FSAI) and other partners in infectious disease surveillance and control.

13.2 Methods

In March 2000, NDSC asked laboratories and/or public health doctors for disaggregate information on all laboratory-confirmed cases of campylobacter enteritis diagnosed in 1999. A minimum dataset was requested; data on an identifier, date of birth, gender, address and date of onset/isolation/reporting. In regions where laboratory surveillance systems were in place, this information was requested from their database. Duplicates were removed where detected. Data were assigned a health board where necessary and a county where address was supplied. Direct methods of standardisation were applied using the Irish population as the standard population. Population data were taken from the 1996 census.

13.3 Results

Information on campylobacter was obtained from all Health Boards. Information on age was missing in 12% of cases and information on gender was incomplete in 0.7% of cases. Data on age was not available on many cases in two health board areas (North Eastern [58%] and Mid-Western [32%]).

In total, 2085 cases of laboratory-confirmed campylobacter enteritis were reported in 1999 in Ireland. This represents a crude incidence rate of 57.5 cases per 100,000 persons.

Males accounted for 56% of cases, females 44%, where gender was given. The male:female ratio was 1.28:1.

Campylobacter infection has a well characterised seasonal distribution and this is evident when the trend over time is examined. Table 13.1 shows the cases as they occurred in each health board by month. The number of cases seen by week in 1999 is shown in Figure 13.1.

Table 13.1: Cases by month (1999) and crude incidence rate (CIR) for each health board.

Health Board	E	M	MW	NE	NW	SE	S	W	Total
January	38	8	3	5	6	9	34	19	122
February	35	3	13	8	6	8	42	20	135
March	48	8	5	10	9	21	44	43	188
April	41	6	8	8	8	24	29	38	162
May	80	8	28	8	13	33	68	42	280
June	69	17	15	9	17	37	58	52	274
July	68	5	8	4	13	29	50	50	227
August	39	7	15	8	16	17	53	35	190
September	47	8	7	7	8	6	41	29	153
October	33	6	0	5	8	17	34	17	120
November	66	4	0	2	6	7	32	19	136
December	27	3	1	0	8	11	22	26	98
Total	591	83	103	74	118	219	507	390	2085
CIR	45.6	40.4	32.5	24.2	56	55.9	92.7	110.7	57.5

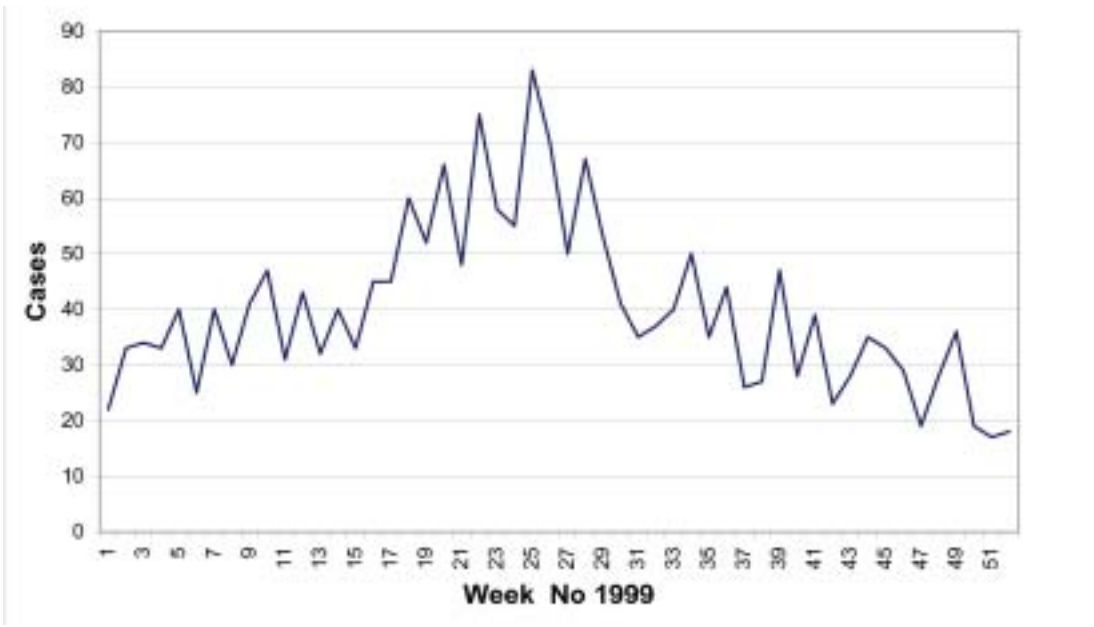

Figure 13.1: Cases of campylobacter infection by week (1999) in Ireland.

Very often the burden of illness from a pathogen can be distorted by age structure when comparing different areas and countries. To overcome this, age standardised rates were calculated to allow comparisons between areas to be made without the confounding effects of age. When age standardised rates for each health board are examined (Figure 13.2), the trend was similar to that seen with the crude rates.

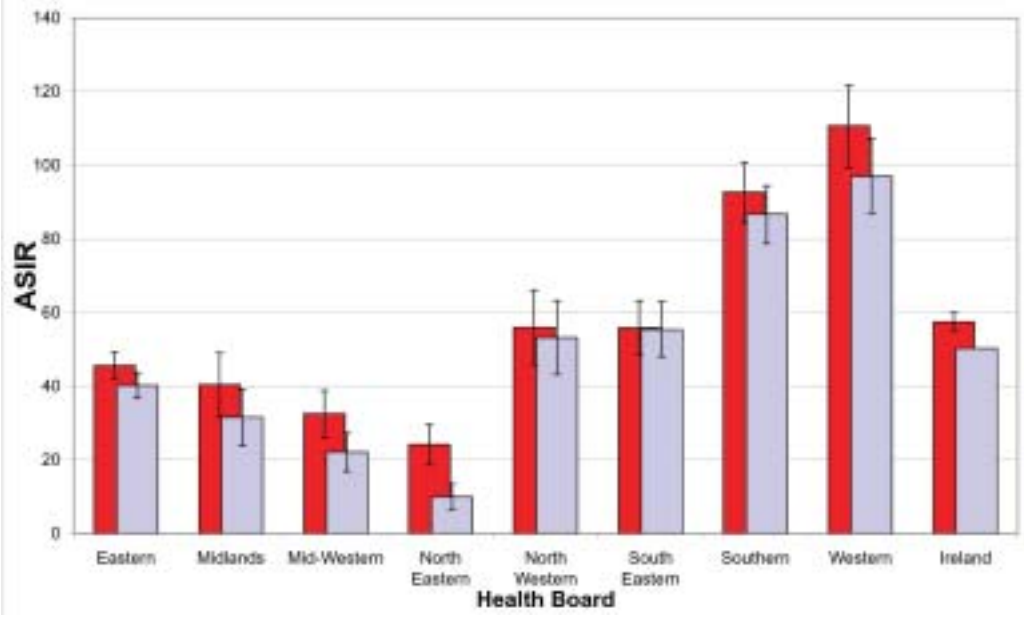

Figure 13.2: Age standardised rates for campylobacter enteritis by health board (blue) in Ireland in 1999, compared to crude incidence rates (red) (95% confidence intervals included).

Figure 13.3 shows the age specific incidence rate in each age group for Ireland. This demonstrates that there was a large burden of illness in children less than five years of age. There was a second peak in the 25-35 year old age group. This is a well-recognised feature of the illness in many countries also.

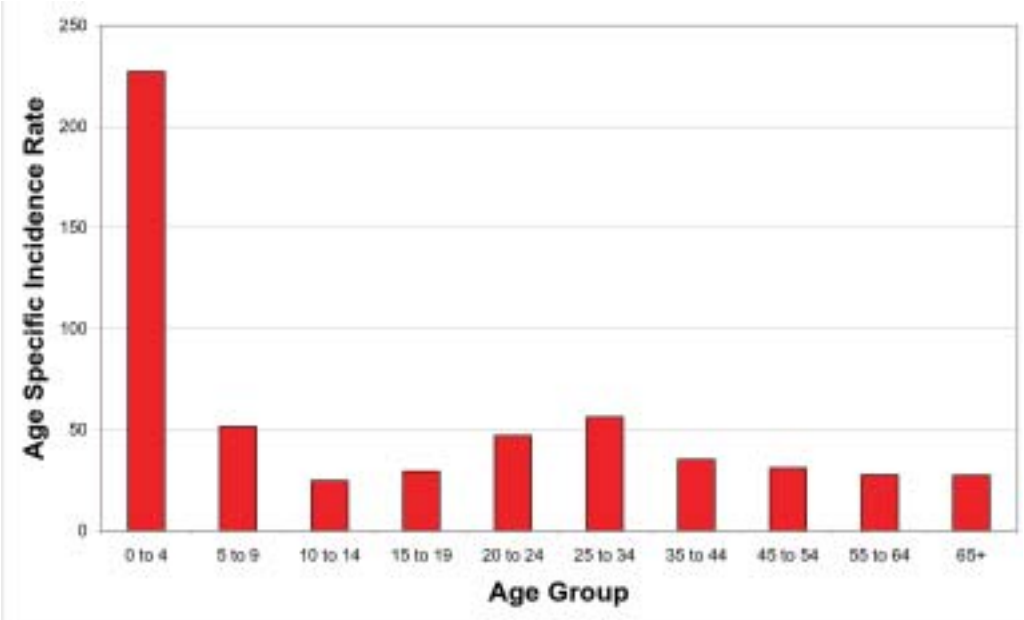

Figure 13.3: Age specific incidence rates (per 100,000) for campylobacter enteritis in Ireland in 1999.

Another interesting aspect of campylobacter enteritis was the variation in the gender distribution. There was a clear predominance in males in several age groups, it was equal in middle age groups and greater in females in the older groups. This is illustrated in Figure 13.4 where this data has been adjusted for each age group.

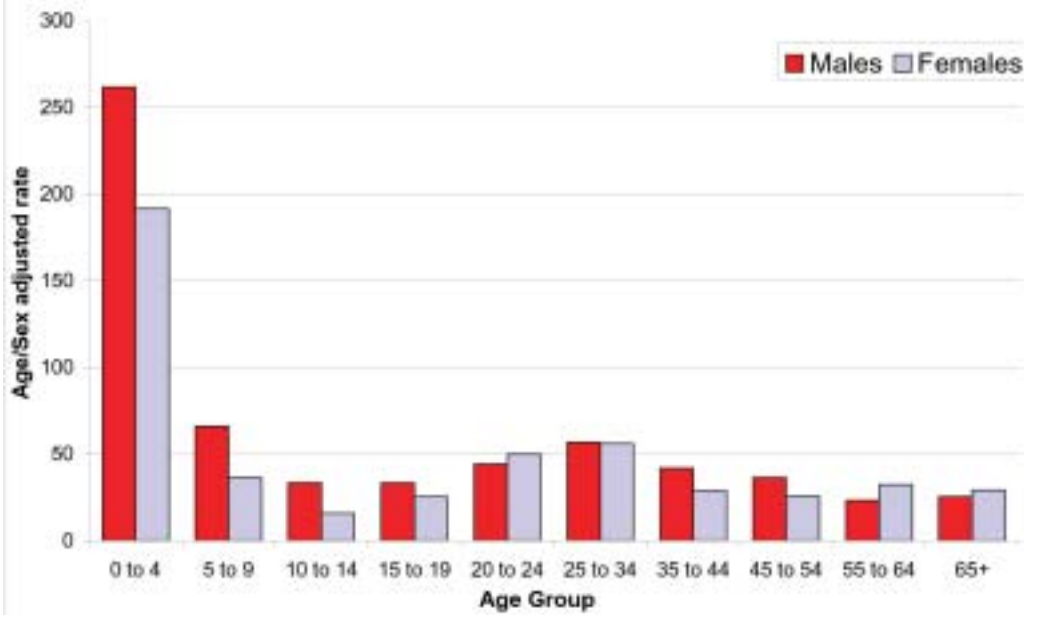

Figure 13.4: Age-sex adjusted incidence according to age group for campylobacter enteritis.

13.4 Discussion

The crude incidence rate of 57.5 cases per 100,000 persons, makes campylobacter the single biggest cause of bacterial food-poisoning in Ireland. This compares with a rate of 51/100,000 in Northern Ireland, 104.9 in England and Wales and 116 in Scotland. The similarity in rates between the North and South of Ireland contrasts with the higher rates abroad. It must be reiterated that these are laboratory confirmed cases and the real burden of illness is higher.

Risk factors for campylobacter include ingestion of poultry and meats, poultry and meat handling (cross contamination), contact with some pets and occupational exposure. Outbreaks have been documented in some countries associated with water and raw milk. Pasteurisation kills the organism. Campylobacter infection is a serious illness but the symptoms are not so distinct as to allow differentiation from other causes. The stool often contains blood, pus or mucus. Symptoms include severe, crampy abdominal pain (mimicking appendicitis) and diarrhoea but vomiting is rare. It can cause bacteraemia and has been associated with subsequent development of Guillain-Barré, Syndrome.

To reduce the burden of illness we must focus on prevention rather than cure. Further work is needed in Ireland to identify risk factors for those most affected (those under five years of age) and to examine the reasons for the observed regional variation in incidence. The unusual gender distribution of the illness remains unexplained. NDSC/FSAI will continue working with our partners in surveillance to elicit more answers to these questions. A multidisciplinary working group was established by the FSAI in July to assess the extent of the risk to humans and the food industry from campylobacter and to develop effective prevention strategies.

There can be significant morbidity associated with campylobacter infection. It is a preventable zoonosis and good quality surveillance is key to enabling an appropriate and timely response to this and other microorganisms causing food poisoning.

13.5 Acknowledgements

NDSC thanks all those who provided information for the report on campylobacter enteritis in Ireland in 1999 and also the FSAI, INFOSCAN and LSS for their assistance. Many medical microbiologists, public health doctors and medical laboratory scientists made special efforts to obtain their data for this period to allow NDSC compile an accurate and relatively complete database of laboratory-confirmed cases of campylobacter enteritis.

14. Salmonella in Ireland, 2000

• Salmonella is a bacterial pathogen that is a common cause of sporadic cases and outbreaks of foodborne illness in Ireland.
• The number of reported cases of salmonellosis in 2000 decreased, as evident from the weekly clinical notification data reports.
• 665 clinical isolates of *Salmonella enterica* were referred to the Interim National Salmonella Reference Laboratory (INSRL) in 2000 for serotyping, phage typing and antimicrobial sensitivity analyses.
• *S.* Typhimurium and *S.* Enteritidis were the predominant serotypes detected in 2000, followed by S. Bredeney, *S.* Kentucky, and *S.* Dublin.
• The predominant *S.* Typhimurium phage type isolated by INSRL was DT104 (81%), and the predominant S. Enteritidis phage type detected was PT4 (70%).
*** High levels of antimicrobial resistance were found among *S.* Typhimurium isolates, particularly S. Typhimurium DT104.**

14.1 Introduction

Salmonella is a bacterial pathogen that is a common cause of foodborne illness in Ireland and worldwide. There are over 2,300 known serotypes of salmonella. However in recent times ***S. enterica*** serotype Enteritidis and ***S. enterica*** serotype Typhimurium have accounted for the majority of cases of human salmonellosis. ***S. enterica*** infections present as an acute self-limiting gastrointestinal illness, characterised by diarrhoea, abdominal cramps, fever, vomiting, and occasionally bloody diarrhoea. In vulnerable populations, such as the immunocompromised and the elderly, the illness may pose a more serious health risk. *S.* Typhi and *S.* Paratyphi can cause enteric fever, a severe systemic life threatening condition, but this is very rare in Ireland and mainly associated with travel.
Salmonella has been identified as the causative organism in many outbreaks in Ireland [1] and prevention, surveillance and control of infection is a public health priority. As salmonella is a zoonotic agent, control measures must focus on the animal reservoir as well as on humans. On a European level, control of salmonella infections and other zoonoses is being targeted as a major priority in a new EU food safety policy [2] launched by the EU Health and Consumer Protection Commissioner, Mr David Byrne in August 2001.

14.2 Materials and Methods

The Interim National Salmonella Reference Laboratory (INSRL) was established in 2000 in the Department of Medical Microbiology, University College Hospital, Galway. This laboratory accepts ***S. enterica*** isolates from all clinical and food laboratories for serotyping, phage typing and antimicrobial sensitivity testing.
This report reviews data available from the Interim National Salmonella Reference Laboratory (INSRL) and weekly clinical notifications for the year 2000. These data enable us to provide an overview of the epidemiology and burden of disease caused by salmonella infections in Ireland today, and highlight in particular, the high levels of antimicrobial resistance among ***S. enterica*** isolates, particularly S. Typhimurium.

14.3 Results

14.3.1 INSRL data: Demographic information
There were 665 clinical isolates of ***S. enterica*** referred to INSRL in 2000. The male: female ratio was 1:1. The age groups and sex of those affected are shown in Table 14.1.

Table 14.1: Age group of clinical isolates of S. enterica *(n=665) referred to INSRL, 2000.*

Age group (yrs)	No. of isolates (%)	Male	Female	Unknown
0-4	110 (17)	60	47	3
5-14	67 (10)	34	33	0
15-24	81 (12)	43	38	0
25-34	97 (15)	47	50	0
35-44	69 (10)	29	38	2
45-54	42 (6)	14	28	0
55-64	47 (7)	16	29	2
65+	47 (7)	20	26	1
Not known (NK)	105 (16)	52	45	8
Total	665	315	334	16

There was a marked seasonality in the human cases reported in 2000, with peaks in March and August (Figure 14.1).

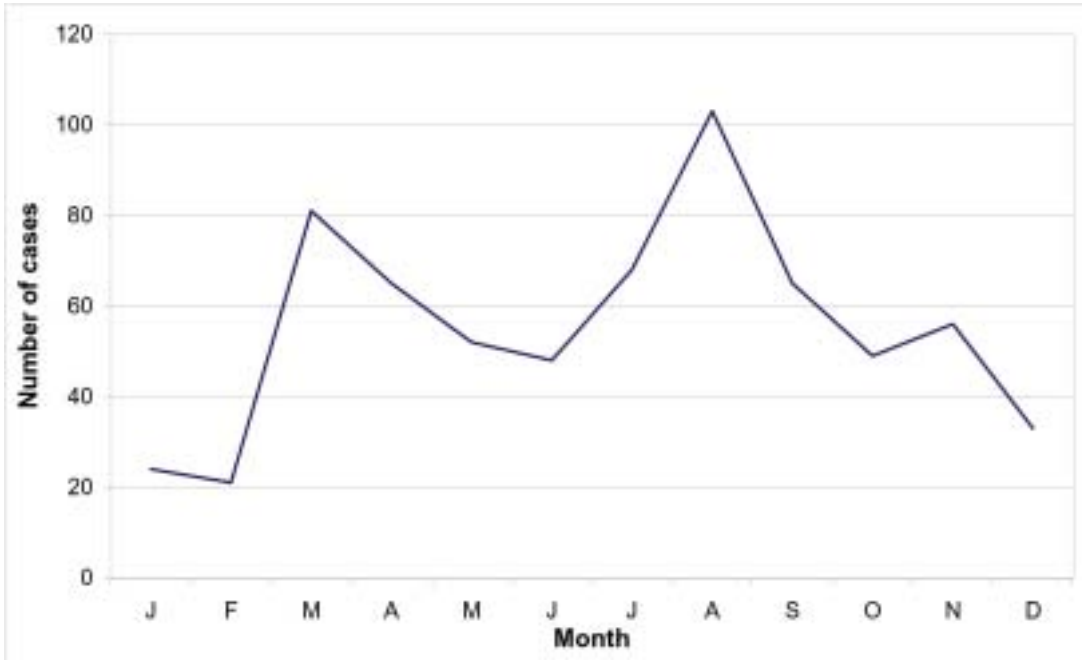

Figure 14.1: Isolates of Salmonella enterica *referred to INSRL by month, 2000.*

Note: month refers to the date the isolate was received in the reference laboratory

The breakdown of salmonella serotypes by health board is shown in Table 14.2. The total figures and crude incidence rates (CIR) are also presented.
It should be noted however that health board location refers to the location of the clinical laboratory that the isolate was sent to, and may not correspond with the geographic location of the cases.

Table 14.2: Serotypes of Salmonella enterica *by health board, 2000.*

	Health Board								
Serotype	**ERHA**	**MHB**	**MWHB**	**NEHB**	**NWHB**	**SEHB**	**SHB**	**WHB**	**Total**
Agona	1	0	0	0	1	0	1	3	6
Alachua	2	0	0	0	0	0	0	0	2
Anatum	1	0	0	0	0	0	1	0	2
Blockley	2	0	0	0	0	0	1	0	3
Bovis-morbificans	1	0	0	0	0	0	0	0	1
Braenderup	1	0	0	0	0	0	0	0	1
Brandenburg	0	0	0	0	0	0	1	0	1
Bredeney	7	2	0	3	3	3	4	2	24
Coeln	0	0	0	0	0	0	1	0	1
Corvallis	1	0	0	0	0	0	0	0	1
Dublin	1	2	1	2	1	1	0	2	10
Enteritidis	108	12	7	12	13	10	55	22	239
Give	2	0	0	0	0	0	0	0	2
Grumpensis	0	0	1	0	0	0	0	0	1
Hadar	6	0	1	1	1	0	0	2	11
Haifa	2	0	0	0	0	0	0	0	2
Heidelburg	0	1	0	1	0	1	0	0	3
Infantis	4	1	0	0	0	2	0	0	7
Java	0	0	0	0	0	1	0	0	1
Kentucky	9	0	0	5	0	0	1	0	15
LaRochelle	0	0	0	0	1	0	0	0	1
Litchfield	0	0	0	2	0	0	0	0	2
Livingstone	1	0	0	0	0	0	0	0	1
Manhattan	0	0	1	0	0	0	0	0	1
Mapo	1	0	0	0	0	0	0	0	1
Mbandaka	2	0	1	0	0	0	0	0	3
Mississippi	0	1	0	0	0	0	0	0	1
Montevideo	1	0	0	0	0	0	0	0	1
Othmarschen	1	0	0	0	0	1	0	0	2
Poona	1	0	0	0	0	0	0	0	1
Saintpaul	1	0	0	0	0	0	0	0	1
Schwarzengrund	5	3	0	0	0	0	1	1	10
Singapore	1	0	0	0	0	0	0	0	1
Stanley	1	0	0	1	0	0	0	0	2
Takoradi	0	0	0	0	0	0	0	1	1
Thompson	1	0	0	0	0	0	0	0	1
Typhimurium	90	19	26	41	18	24	31	35	284
Unnamed	4	0	0	0	0	1	0	0	5
Virchow	5	0	0	0	0	1	2	1	9
TOTAL	263	41	38	68	38	45	99	69	661
CIR	20.3	19.9	12.0	22.2	18.0	11.5	18.1	19.6	18.2
CIR=Crude incidence rate / 100,000 population									

14.3.2 Serotyping, phage typing and antibiotic susceptibility results

At present ***S.*** Typhimurium and ***S.*** Enteritidis are the dominant serotypes associated with human salmonellosis in Ireland (Table 14.3). The next most commonly isolated serotypes were ***S.*** Bredeney, ***S.*** Kentucky, and ***S.*** Dublin as shown in Table 14.3. There were no isolates of ***S.*** Typhi or ***S.*** Paratyphi detected in 2000. The number of reported cases of ***S.*** Enteritidis appears to be on the increase, however it should be noted that the ascertainment process has varied from 1998 to 2000.

Table 14.3: Serotypes of S. enterica *referred to INSRL.*

Serotype	No. of cases (%)		
	1998	1999	2000
S. Typhimurium	578 (80)	200 (42)	286 (43)
S. Enteritidis	60 (8)	155 (33)	239 (36)
S. Bredeney	15 (2)	55 (12)	24 (4)
S. Kentucky	14 (2)	12 (3)	15 (3)
All other serotypes	54 (7)	52 (11)	101 (15)
Total	721	474	665

The predominant ***S.*** Typhimurium phage type isolated by INSRL in 2000 was DT104 (81%), and the predominant ***S.*** Enteritidis phage type detected was PT4 (70%).

14.3.3 Antimicrobial resistance

The antimicrobial susceptibilities of the most commonly isolated serotypes in 2000 are presented in Table 14.4. High levels of resistance were found among ***S.*** Typhimurium isolates, particularly ***S.*** Typhimurium DT1O4. Many of these isolates were found to be resistant to at least five antimicrobial agents, viz. ampicillin, chloramphenicol, streptomycin, sulphonamide and tetracycline (ACSSuT).

Table 14.4: Antimicrobial susceptibilities of human Salmonella enterica *serotypes in Ireland in 2000.*

		% resistance						
Serotype	N	Amp	Chl	Strep	Sulph	Tet	Trim	Nal
S.Typhimurium	286	83	73	78	90	83	16	2
S.Enteritidis	239	8	0	1	2	3	0.5	15
S.Bredeney	24	0	0	0	8	0	8	0
S.Kentucky	15	7	0	13	80	13	67	13
S.Dublin	12	0	0	8	0	0	0	0
S.Hadar	11	73	0	82	0	91	0	73
S.Schwarzengrund	10	0	0	0	10	0	10	0
S.Virchow	9	22	0	0	11	0	0	56

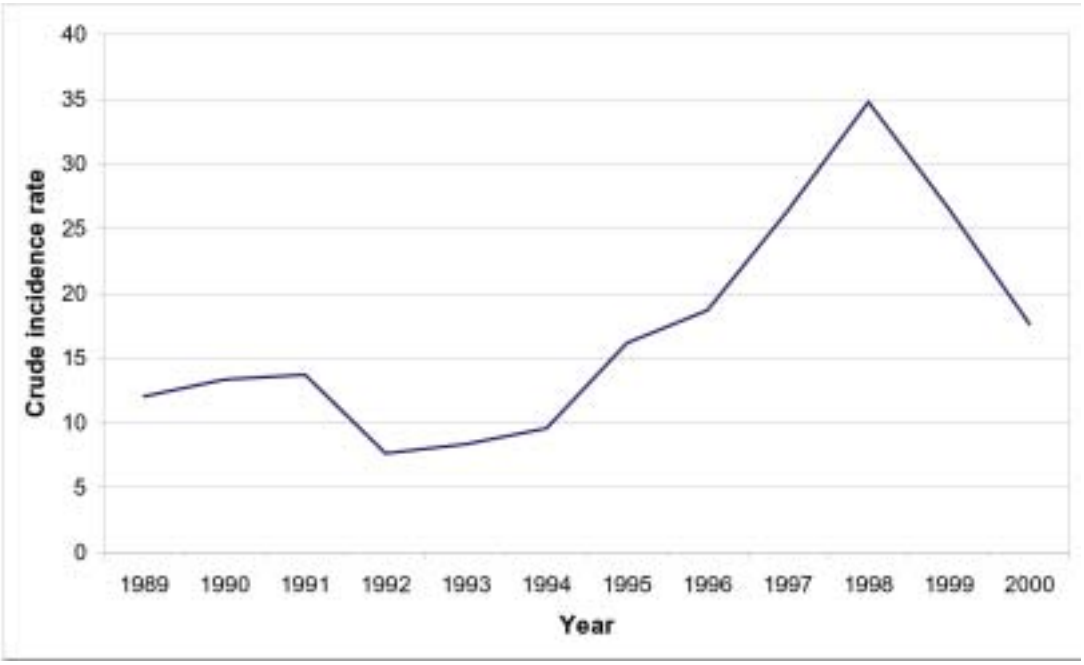

Figure 14.2: Crude incidence rate of salmonellosis in Ireland per 100,000 population, 1989-2000 (source: DoHC and NDSC).

14.3.4 Clinical notification data

Salmonellosis is a notifiable disease. Medical practitioners are legally obliged to report all suspected cases. Information on trends in salmonellosis notifications shows that the crude incidence rate of salmonellosis rose in the 1990s to peak in 1998, and has been decreasing since then (Figure 14.2). The total number of notifications in 2000 was 640, compared to 960 in 1999. The crude incidence rate for 2000 was 17.6/ 100,000 population. To date in 2001, (weeks 1-30, week ending 28/7/01), the number of notifications was 215 as compared with 372 in the same period in 2000, illustrating the continuing downward trend.

14.4 Discussion

The importance of Salmonella as a foodborne pathogen in Ireland is clearly highlighted by the data presented in this report.

The incidence of salmonellosis however is decreasing, as evident from the clinical notification data (Figure 14.2). This finding was mirrored in the UK[3] and Europe in 2000. This reduction may be attributed to the salmonella control programmes for ***S.*** Enteritidis and ***S.*** Typhimurium currently in place. Since 1999, eggs produced under the Egg Quality Assurance Scheme set up by An Bord Bia and the Irish Egg Association, with assistance from FSAI, are subject to enhanced salmonella controls in addition to the regulatory requirements. A national salmonella control programme in pig herds was developed in 2000, with FSAI, the Dept. of Agriculture, Food and Rural Development (DAFRD), food producers and processors. In this programme, pig herds are monitored and categorised according to the level of salmonella contamination present.

As time goes on, we will be able to monitor salmonella trends more accurately by examining the laboratory data generated by INSRL from the isolates submitted. It is hoped eventually with the advent of CIDR (Computerised Infectious Disease Reporting) that we will be able to merge these clinical and laboratory data. ***S.*** Typhimurium remains the predominant serotype detected in Ireland, with an increase being seen in 2000 in the number of ***S.*** Enteritidis isolates that were detected. The predominant serotype in England & Wales and Northern Ireland for the past number of years has been ***S.*** Enteritidis.[3]

A very interesting finding from analysis of the 2000 INSRL data set, is the scale of the problem of antimicrobial resistance (AMR) amongst salmonella isolates. This is a worldwide problem and has been highlighted previously[4], however the data presented are extremely significant in relation to ***S.*** Typhimurium DT104. Multi-drug resistant ***S.*** Typhimurium DT104 is now the most common variety of salmonella isolated in Ireland. Other strains such as S. Hadar also showed a significant level of resistance. It is extremely important to be able to link human, animal and food data in order to track the spread of AMR. Recent data from the U.S suggests that the use of antimicrobial agents in livestock may contribute to the problem of increased resistance in strains that cause human disease.[5]

The spread of AMR is a global issue that needs a strategic coordinated response to combat the problem. To this end, a subgroup of the Scientific Advisory Committee of NDSC recently launched the report 'SARI' (Strategy for the control of Antimicrobial Resistance in Ireland).[6]

The DAFRD, FSAI and NDSC together aim to produce a "Zoonosis Report" for Ireland this year, presenting data collected on zoonotic agents in 2000 from clinical, food and animal isolates. This is seen as a priority at EU level as was highlighted by the report put forward by the Commission earlier this month.[2] A regulation is being proposed on the control of

foodborne zoonotic agents. Salmonella is identified as the priority target, especially in poultry products and eggs. The aim is to cut the 166,000 annual cases of the illness in the EU by bringing in new controls that will affect producers of breeding poultry, laying hens, broilers, turkeys and breeding pigs. A fixed timetable has been put in place to meet these targets. To achieve these reductions, Member States will need to adopt national control programmes and encourage the private sector to collaborate.

It is evident from this report that there is very valuable information derived from analysis of the data collected by INSRL. Ongoing participation of laboratories in this system and the assistance of public health and environmental health in investigation of cases/ outbreaks at health board level, will enable the epidemiology of salmonella infections in Ireland to be elucidated even further. Prevention of salmonella infections requires a strategic approach involving a wide range of professionals, to help to reduce the burden of illness caused by this pathogen.

14.5 Acknowledgements

We would like to sincerely thank Prof Martin Cormican and all of his staff in the National Salmonella Reference Laboratory, UCHG for providing the data for this report, and also the clinical and food microbiology laboratories that send salmonella isolates to INSRL for analysis. In addition, we wish to acknowledge the Community Care Areas and Departments of Public Health for providing the clinical notification data.

14.6 References

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5. Tollefson L. & Miller M.A. Antibiotic use in food animals: controlling the human health impact. ***J AOAC Int*** 2000; **83**:245-254.
6. Available at: <http://www.ndsc.ie> (SARI. pdf).

15. Antimicrobial Resistance in Ireland, 2000

• The threat from antimicrobial resistance needs to be curbed through local, regional, national and international integrated strategies.
• In 2000, there were 645 reports of patients with *S. aureus* bacteraemia, of which 40% were resistant to methicillin (MRSA).
• In 2000, there were 205 reports of patients with *S. pneumoniae* bacteraemia/meningitis, of which 13% were penicillin non-susceptible (PNSP) Three percent were considered to be high-level resistant.
• In comparison to other European countries Ireland has a relatively high level of MRSA and PNSP.
• There is a clear north/south European divide in terms of antimicrobial resistance rates.

15.1 Introduction

In 2000, seven laboratories joined in the existing twelve laboratories in the European Antimicrobial Surveillance System (EARSS) project. Four in January and three more in July/October. Nineteen laboratories participated in the ***Streptococcus pneumoniae*** (***S. pneumoniae***) component of EARSS and eighteen in the ***Staphylococcus aureus*** (***S. aureus***) component. Population coverage estimated to be 65-75%. Participant laboratories consist of an equal mix of large tertiary care facilities and smaller general hospitals. The number of isolates received from each centre in 2000 was comparable to 1999, where data was available.

Data were received at the National Disease Surveillance Centre (NDSC) - the national coordinating centre for EARSS in Ireland. Information on the reporting forms was entered into the WHONET 5 database. Duplicates were removed. Laboratories were then advised of their individual returns for the quarter. The EARSS referral centre in St James's Hospital, Dublin performed further testing on all methicillin resistant ***S. aureus*** (MRSA); complete antibiograms and oxacillin and vancomycin E-test. At the EARSS referral centre in Beaumont Hospital, Dublin (Royal College of Surgeons of Ireland) further testing of ***S.pneumoniae*** involved penicillin, ciprofloxacin and cefotaxime E-test being performed. The databases at NDSC and at the referral centres were correlated to maximise consistency. Participant laboratory susceptibility test results and E-test results from referral centres were input to the database and the data were transmitted to the international centre in RIVM, The Netherlands.

15.2 Methods and Materials

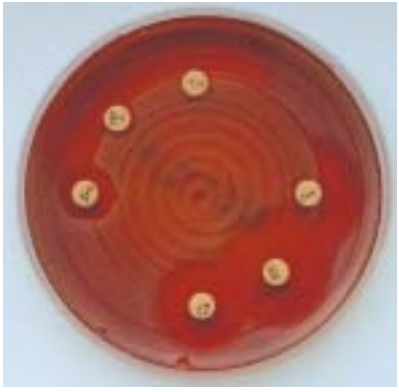
15.2.1 Resistance Definitions

S. aureus

Oxacillin sensitive- MIC ≤ 2mg/L (MSSA)
Oxacillin resistant- MIC ≥ 4mg/L (MRSA)

S. pneumoniae

Penicillin susceptible - MIC ≤ 0.06mg/L (PSSP)
Penicillin intermediate - MIC=0.1 to 1.0mg/L ("PNSP")
Penicillin resistant - MIC ≥ 2mg/L ("PNSP")



15.2.2 EARSS Case Definitions
(1) Resistance data on the first isolate only of each strain from the blood of each patient with ***S. aureus*** infection, confirmed by a coagulase test.

(2) Resistance data on the first isolate only, of each strain from the blood or CSF of each patient with a community acquired ***S. pneumoniae*** infection, confirmed by optochin test.

15.3 Results

15.3.1 Reports of ***S. aureus*** bacteraemia
In 2000, 645 isolates were received, (Range 121-201 for the 4 quarters).
The total proportion of ***S. aureus*** resistant to methicillin/oxacillin was 38.8% [1999: 39.15]
The 95% Confidence Intervals: 35 to 42.5% [1999: 34.9% to 43.3%]

The trend in resistance rates and reports of ***S. aureus*** bacteraemia received is illustrated in Figure 15.1. There is a consistent MRSA level across the two years.

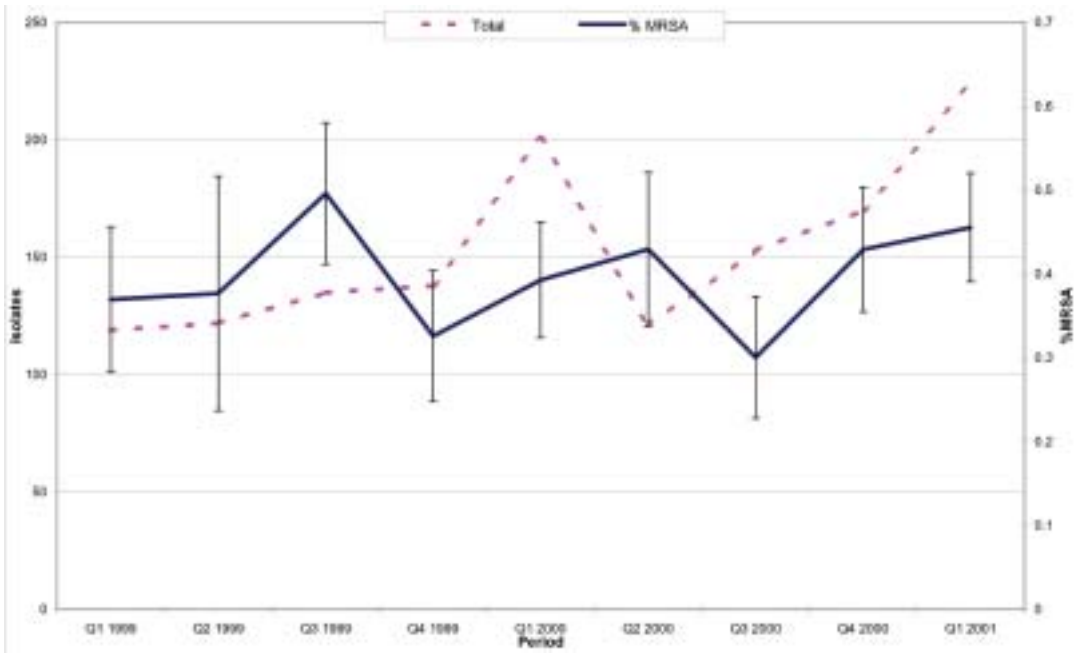


Figure 15.1: Trends in reported S. aureus *bacteraemia/%MRSA by quarter 1999-2000 with 95% CI.*

15.3.2 Antibiotic Resistance Patterns (based on participant returns) for ***S. aureus***
A summary table of the proportion resistant, sample size and confidence interval is shown in Table 15.1. This is an indication as to the reliability of the results given the sample used.

Table 15.1: Breakdown of resistance in S. aureus *to selected antimicrobials for 2000.*

Antibiotic	n	Resistant	% Resistant	Upper 95% CI	Lower 95% CI
Oxacillin/Methicillin	645	250	38.8%	42.5%	35.0%
Erythromycin	509	212	41.7%	45.9%	37.4%
Ciprofloxacin	364	166	45.6%	50.7%	40.5%
Gentamicin	575	109	19.0%	22.2%	15.8%
Vancomycin	520	0	0.0%	0.0%	0.0%

The distribution of the isolates occurring through the year is illustrated in Figure 15.2.

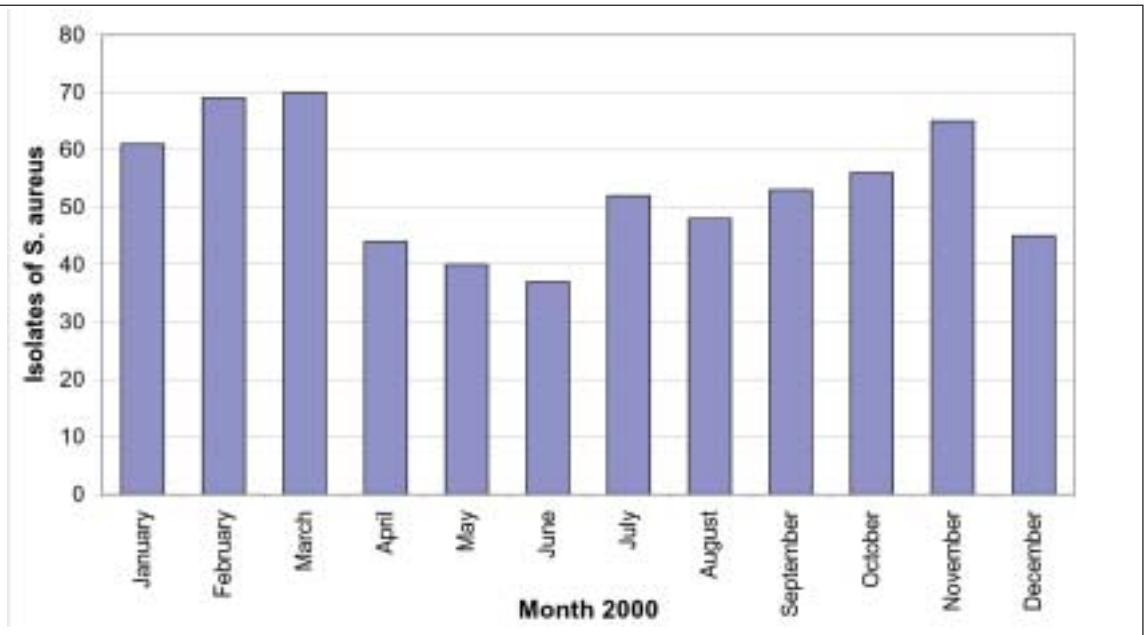


Figure 15.2: Monthly distribution of S. aureus *in EARSS 2000.*

In addition to examining the dataset as submitted from participants as a whole, we examined the characteristics of the methicillin sensitive ***S. aureus*** separately. We can look at this data (which is incomplete) in light of the full dataset on MRSA from the Reference Laboratory (Table 15.2).

15.3.3 Precentage Resistance in methicillin sensitive ***S. aureus***

Table 15.2: Resistance in methicillin sensitive S. aureus *to selected antimicrobials for 2000.*

Antibiotic	n	Susceptible	Resistant	% Resistant
Ciprofloxacin	202	192	10	5.0
Erythromycin	304	280	24	7.9
Fusidic Acid	53	48	5	9.4
Gentamicin	344	340	4	1.2
Tetracycline	121	118	3	2.5
Teicoplanin	40	40	0	0.0

15.3.4 MRSA Referral Laboratory Data

The results of the antibiograms performed at the EARSS Referral Laboratory in St. James's Hospital are shown in Table 15.3.

Table 15.3: Antibiogram analysis of MRSA from SJH for 2000 (n=242).

Antibiotic	% Resistant	% Moderate	% Susceptible
Chloramphenicol	0.0	0.0	100.0
Ciprofloxacin	96.7	0.0	3.3
Erythromycin	90.5	0.0	9.5
Fusidic Acid	2.1	5.4	92.6
Gentamicin	43.8	0.4	55.8
Lincomycin	43.8	0.0	56.2
Mupirocin	1.2	39.3	59.5
Rifampicin	1.2	0.0	98.8
Tetracycline	0.4	0.0	99.6
Trimethoprim	12.0	0.8	87.2
Vancomycin	0.0	0.0	100.0

The results in Table 15.3 are based on standardised testing of all MRSA isolates sent to the EARSS referral laboratory. Minimum inhibitory concentrations were carried out on oxacillin and vancomycin using the E-test method.
The oxacillin E-test results for 2000 are shown in Figure 15.3.

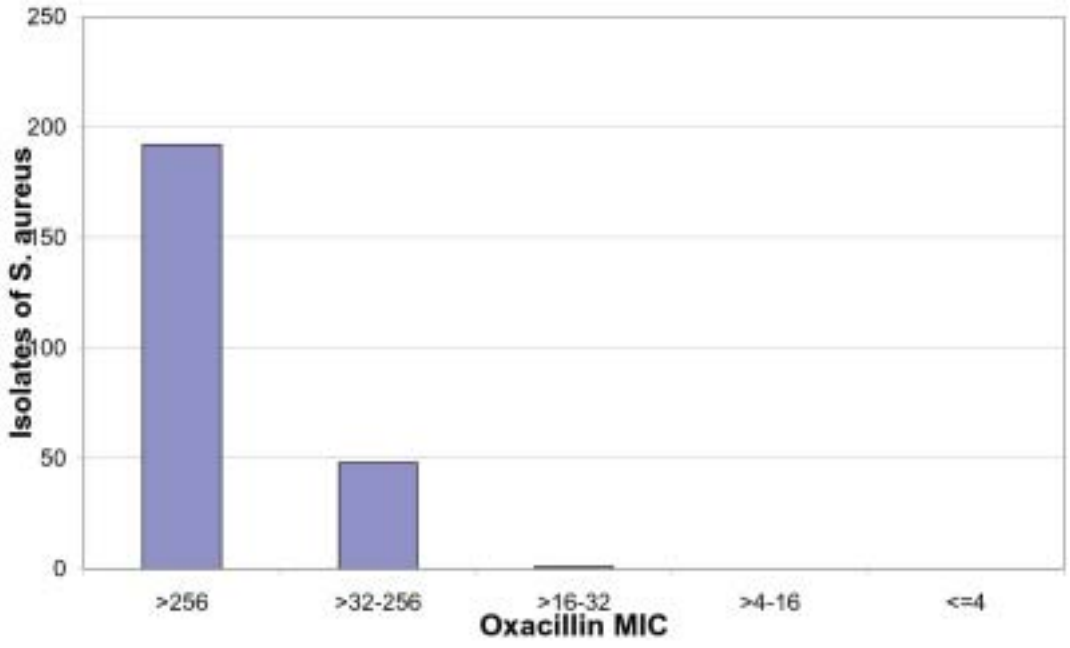


Figure 15.3: Distribution of MRSA oxacillin E-test in 2000.

All isolates of MRSA had vancomycin E-test of <4mg/L.

15.3.5 International Comparative Analysis (***S. aureus***)
Cumulative data from RIVM for 1999/2000 data show substantial geographic variation in resistance throughout the countries participating in the project (Figure 15.4).

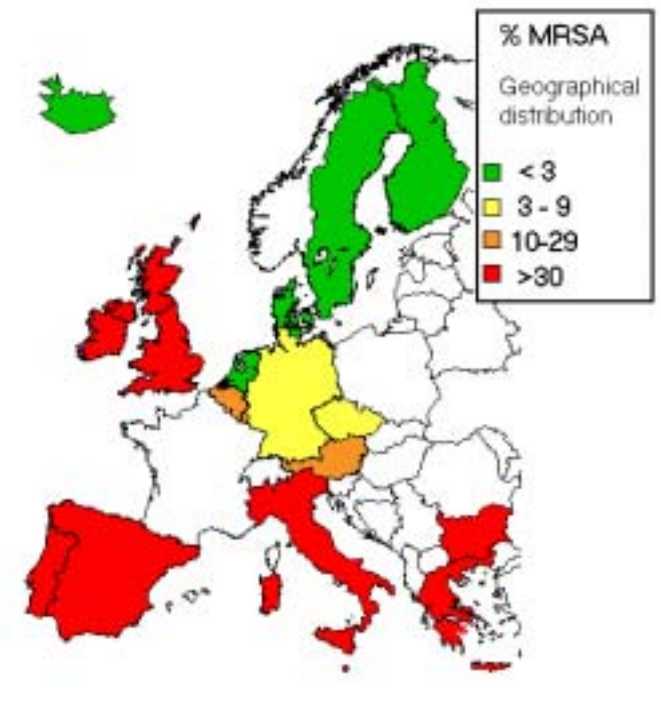


Figure 15.4: Map illustrating the distribution of MRSA in EARSS countries 1998-2000.(White=No data)

15.3.6 Reports of ***S. pneumoniae*** bacteraemia/meningitis
In 2000, 205 isolates were received, (Range 38-66 for the four quarters).
The total proportion of ***S. pneumoniae*** resistant to penicillin/oxacillin was 12.7% The 95% Confidence Interval was 8.1 to 17.2%, [1999: 18.2%, 95% CI 12.2 - 24.2%]

The trend in resistance rates and reports of ***S. pneumoniae*** bacteraemia received is illustrated in Figure 15.5. There is a drop in PNSP level after an initial high PNSP rate, across the two years. It has increased recently, but several factors, including the addition of more laboratories can account for this.

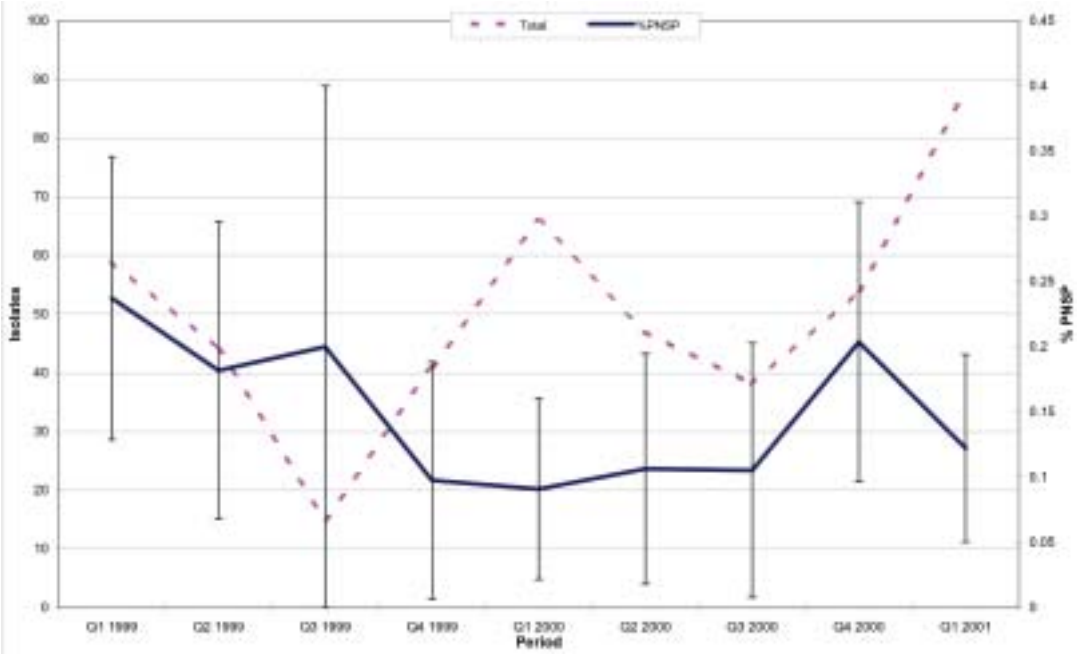


Figure 15.5: Trends in reported S. pneumoniae *bacteraemia/%PNSP by quarter 1999-2000 with 95% CI..*

15.3.7 Antibiotic Resistance Patterns (based on participant returns) for ***S. pneumoniae***
A summary table of the proportion resistant, sample size and confidence interval is shown in Table 15.4.

Table 15.4: Breakdown of resistance in S. pneumoniae *to selected antimicrobials for 2000.*

% Resistant	n	Resistant	% Resistant	Upper 95% CI	Lower 95% CI
Oxacillin/Penicillin	205	26	12.7%	17.2%	8.1%
Erythromycin	153	19	12.4%	17.6%	7.2%
Tetracycline	96	5	5.2%	9.7%	0.8%
Cefotaxime	86	0	0.0%	0.0%	0.0%
Vancomycin	94	0	0.0%	0.0%	0.0%

The distribution of the samples received through 2000 is illustrated in Figure 15.6. It follows the expected pattern of pneumococcal infection in humans, high in winter months and lower in summer months, though not as marked as in 1999.

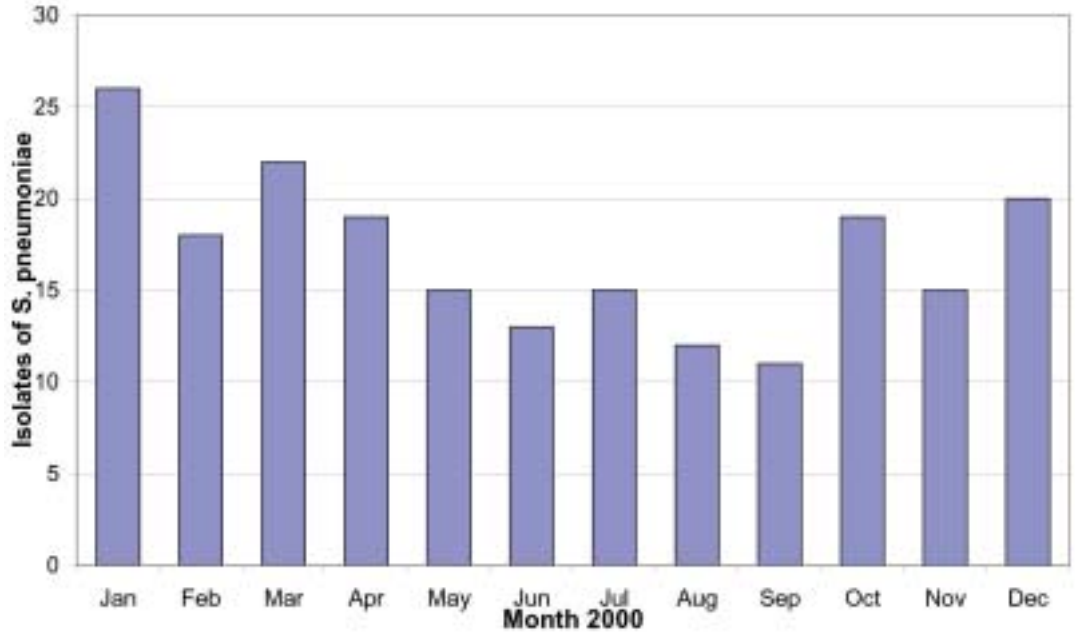


Figure 15.6: Monthly distribution of S. pneumoniae *in EARSS 2000.*

15.3.8 Referral Laboratory Data

Analysis of ***S. pneumoniae*** at RCSI/Beaumont revealed penicillin E-test data shown in Figure 15.7.

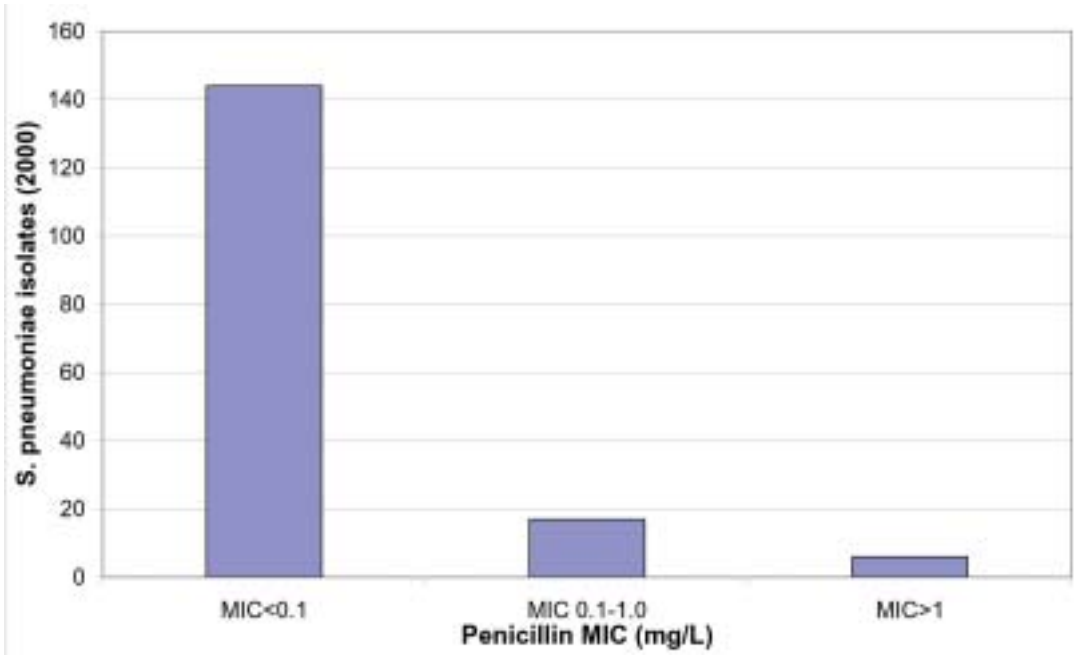


Figure 15.7: Distribution of S. pneumoniae *penicillin E-test in 2000.*

According to the definitions specified already and data on 167 isolates submitted to the EARSS Referral Centre in Beaumont Hospital, "high-level" resistance was detected in six isolates during the year and intermediate resistance was detected in 17. High-level resistance was seen in 3.6% and intermediate resistance was seen in 10.2%. On the basis of isolates submitted to Beaumont - the proportion of PNSP in samples submitted in 2000 was 13.8%. Based on the BSAC breakpoint data published on March 2000, all 148 isolates tested were

ciprofloxacin intermediate (intermediate=MIC<4mg/L). Similarly, based on these criteria, there were no isolates resistant to cefotaxime (resistant=MIC>2mg/L).

15.3.9 International Comparative Analysis (***S.pneumoniae***)
Cumulative data from RIVM for 1999-2000 shows the variation in resistance rates in ***S. pneumoniae*** in Europe (Figure 15.8).

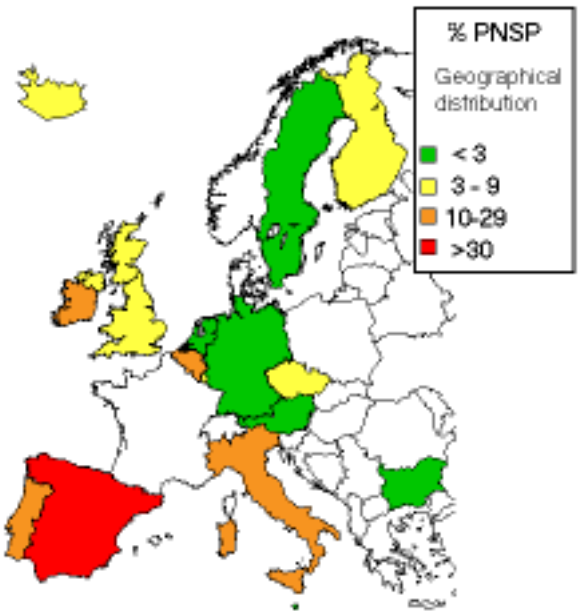


Figure 15.8: Map illustrating the distribution of PNSP in EARSS countries 1998-2000 (White = No data).

15.4 The Future

In 2001, the EARSS project will expand in several European countries to include three additional pathogens - ***Enterococcus faecium***, ***Enterococcus faecalis*** and ***Escherichia coli***.
To enhance this expansion and facilitate electronic communication, priority is being given to the use of WHONET 5 software to assist data collection. Laboratories can have the choice of populating a local WHONET 5 database or use WHONET5/Baclink to translate a file download from the laboratory information management system (LIMS) for EARSS and local data analysis. This has been done successfully with two centres. While this provides for the timely collection of EARSS data - it must also consider the need to accommodate the isolates that are sent to the EARSS Referral laboratories.
A new dynamic interactive website is available to allow aggregate EARSS data to be interrogated for each country and can generate tables, graphs and maps from these data.
The EARSS project has proved itself to be an essential source of reliable data on ***S. aureus*** bacteraemia and ***S. pneumoniae*** bacteraemia and CSF infection. It can serve as a tool to monitor antimicrobial resistance in these two important pathogens in a systematic and ongoing fashion. The consistency of the surveillance system can be useful in examining the impact of interventions to control antimicrobial resistance in Ireland, complementing the Strategy for control of Antimicrobial Resistance in Ireland.

15.5 Acknowledgement:

Significant time and resources were given by consultant microbiologists and medical scientists to check the quality of the data received during the year. NDSC would like to thank all participants for their patience and co-operation in this project and RIVM for their feedback.

16. IMMUNISATION UPTAKE IN IRELAND, 2000

• In 2000, the national immunisation uptake rates at 24 months did not reach the national target of 95%.
• MMR uptake at 24 months increased from 77% in 1999 to 79% in 2000.
• The most notable increase in MMR was in Quarter 3 (80%) and Quarter 4 (83%).
• Immunisation programmes in Ireland need strengthening.

16.1 Introduction

Vaccines are one of the greatest achievements of biomedical science and public health. Vaccines are responsible for the control of many infectious diseases that were once common in Ireland. Under the Primary Childhood Immunisation Programme in Ireland ten diseases are targeted, namely, diphtheria (D), tetanus (T), pertussis (aP, acellular pertussis vaccine), polio (OPV, oral polio vaccine), ***Haemophilus influenzae*** type b infection (Hib), meningococcal Group C disease (MenC, since October 2000), measles, mumps, rubella (MMR) and tuberculosis (BCG vaccine, not implemented nationwide). The current immunisation schedule recommends that children should be administered one dose of BCG at birth or by one month of age, one dose each of DTaP, OPV, Hib and MenC at two, four and six months of age (i.e. total of three doses of each vaccine) and one dose MMR vaccine at 15 months.[1] Booster doses of DTaP, OPV and MMR should be given at 4-5 years of age.

The burden of disease and death in Ireland has been dramatically reduced by vaccination. However, the bacteria and viruses that cause vaccine preventable disease and death still exist and can infect those not protected by vaccines. Therefore, to effectively control and/or eradicate vaccine preventable diseases it is essential that 95% of children have completed the primary immunisation schedule by 2 years of age, (i.e. three doses of D, T, aP, Hib, OPV and one dose of MMR).

16.2 Materials & Methods

Each health board is responsible for maintaining an immunisation register. In 2000, the health boards provided uptake data for Quarter 1 and 2, 2000 on those that have completed the primary immunisation schedule by 24 months of age to the Department of Health and Children (DoHC). The DoHC forwarded this information to the National Disease Surveillance Centre (NDSC). Since Quarter 3, 2000, the health boards provide NDSC quarterly uptake data on children 12 and 24 months of age, in a format agreed by NDSC and the health boards. Data on the number eligible for immunisation in each cohort, the number who completed the primary immunisation schedule and the percentage immunised are provided.

NDSC collates and analyses these data on an MS Excel spreadsheet to determine national uptake levels. The annual rates presented in this report were calculated from the quarterly reports submitted by the health boards.

16.3 Results

Immunisation uptake rates in children reaching their second birthday in 2000 are presented in this report. MenC uptake rates are not available since the campaign only commenced in October 2000. Apart from MMR the national immunisation uptake rates at 24 months in 2000 did not change greatly from the levels reported in 1999 (Figure 16.1). D_3 and T_3 were down 0.3% to 85.9%, P_3 was up 0.2% to 82.1%, Hib_3 was down 0.1% to 85.4% and OPV_3 was down 0.3% to 85.7%. (Note: subscript refers to the number of doses, eg. D_3 indicates three doses of vaccine containing diphtheria antigen)

The annual immunisation uptake rates by health board in children 24 months of age in 1999 and 2000 are presented in Table 16.1. The national target of 95% uptake was not reached for any of the vaccines either nationally or by the health boards.

At national level the most remarkable difference between 1999 and 2000 was the increase of MMR_1 uptake in 2000 by 2% to 78.9% (Figure 16.1). In 2000, MMR_1 uptake increased by 3-5% in MHB, MWHB, SEHB and SHB (Table 16.1). The increase in MMR_1 uptake was seen nationally in Quarter 3, 2000, increasing from 77% in Quarter 2 to 80% in Quarter 3 and increasing further in Quarter 4 to 83% (Figure 16.2).

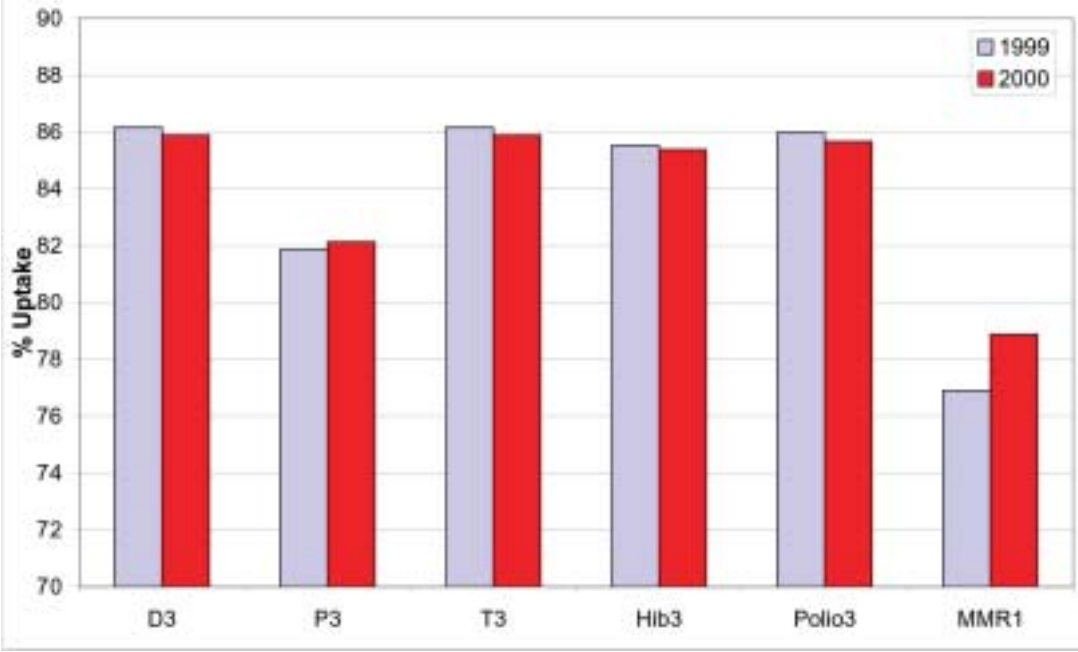


Figure 16.1: Annual immunisation uptake rates (%) at 24 months for Ireland in 1999 and 2000 (Note scale ranges from 70-90% on this figure).

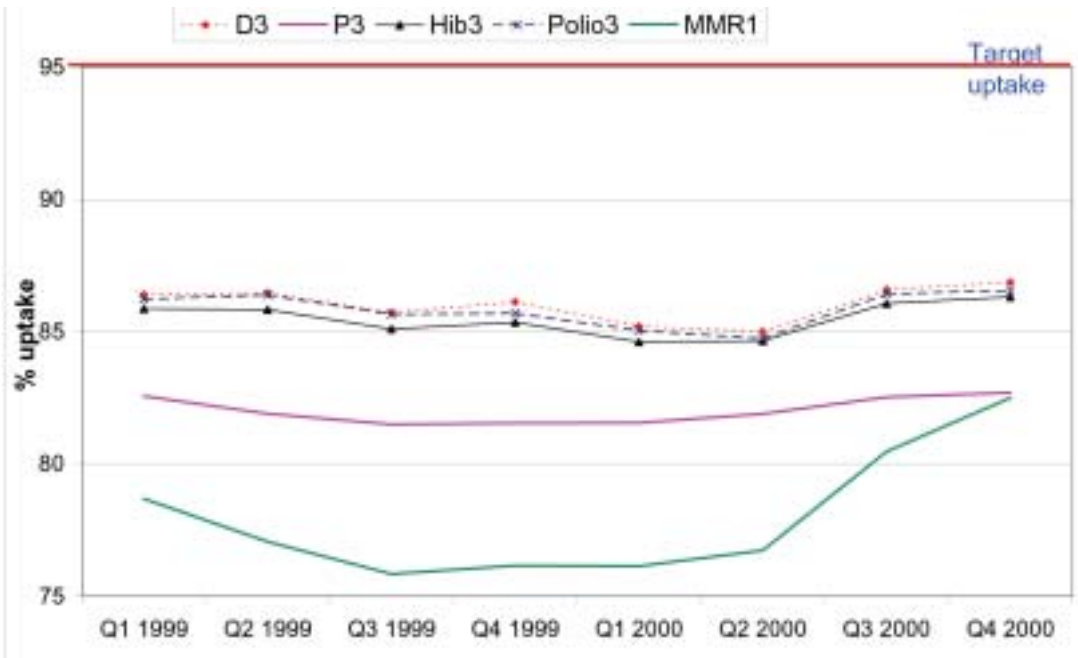


Figure 16.2: Quarterly national immunisation uptake rates at 24 months for D_3, P_3, Hib_3, OPV_3 and MMR_1 (Note T_3 rate not shown since identical to D_3).

Table 16.1: Annual immunisation uptake rates at 24 months by health board in 1999 and 2000

	% Uptake at 24 months in 1999						% Uptake at 24 months in 2000					
Health Board	D_3	P_3	T_3	Hib_3	$Polio_3$	MMR_1	D_3	P_3	T_3	Hib_3	$Polio_3$	MMR_1
ERHA	84.8	81.1	84.8	84.0	84.7	76.6	84.6	81.5	84.6	83.9	84.4	77.3
MHB	82.0	77.7	82.0	81.4	82.0	70.1	81.8	77.5	81.8	81.4	81.6	75.0
MWHB	80.6	78.1	80.6	79.9	80.4	72.9	80.7	77.6	80.7	80.3	80.2	76.9
NEHB	91.8	**	91.8	91.8	91.8	78.3	92.9	**	92.9	92.8	92.8	80.1
NWHB	87.0	83.3	87.0	86.7	86.8	74.6	84.0	**	84.0	83.5	83.7	73.6
SEHB	89.0	84.8	89.0	88.7	88.8	86.6	89.6	85.4	89.6	89.3	89.5	89.7
SHB	85.8	81.5	85.8	85.2	85.7	72.5	84.9	81.0	84.9	84.4	84.6	76.8
WHB	91.7	88.2	91.7	90.2	90.5	82.5	91.1	86.8	91.1	90.6	91.0	83.1
Ireland	86.2	81.9	86.2	85.5	86.0	76.9	85.9	82.1	85.9	85.4	85.7	78.9

** P_3 uptake could not be accurately calculated as DTaP/DT uptake was reported as a combined value

Note: subscript = number of doses e.g. D_3 indicates 3 doses of vaccine containing diphtheria antigen

16.4 Discussion

Childhood vaccinations have a major impact on the reduction and elimination of many causes of morbidity and mortality among children. Monitoring immunisation uptake is necessary to characterise under vaccinated populations and to evaluate the effectiveness of efforts to increase uptake.

In 2000, immunisation uptake rates at 24 months in Ireland fell far short of the 95% target. National uptake rates for the vaccines other than MMR_1 ranged from 82-86%, at least 9% below the target rate. In the case of MMR_1 the rate was even lower at 78.9% - 16% below the national target. MMR_1 uptake rates increased somewhat in 2000 when compared to 1999, this increase was essentially seen in Quarter 3 and the upward trend continued in Quarter 4. A measles outbreak occurred in Ireland in 2000, over 1600 cases were reported. This outbreak peaked in April. The improved MMR_1 uptake rates seen in the second half of 2000 can in all probability be attributed to parents having their children vaccinated in response to concerns about the outbreak and the control measures implemented to curb the spread of measles.

The low immunisation uptake rates in Ireland are a major cause for concern. Unless the target 95% rate is reached and maintained outbreaks like the measles one seen in 2000 will continue to occur. Immunisation uptake rates in Ireland compare badly with other countries. In the UK, the quarterly uptake rates in 2000 for all the antigens apart from MMR were consistently 94-95%, while MMR rates were 88%.[2] In the USA, uptake rates remain at or near record high levels. In 1999 for example, national immunisation uptake for three doses of any diphtheria and tetanus toxoids and pertussis vaccine was 96%; for three doses of poliovirus vaccine, 90% and for one dose of MMR, 92%.[3] National immunisation uptake rates for routinely recommended childhood vaccines have increased substantially in the USA since 1993 when the Childhood Immunisation Initiative was implemented by the federal government. Immunisation programmes in Ireland need strengthening. A review initiated by the health boards and recent recommendations by the Oireachtas Joint Committee on Health and Children are important advances in this regard.

16.5 References

1. Immunisation Guidelines for Ireland. 1999. National Immunisation Advisory Committee of the Royal College of Physicians of Ireland.
2. COVER Programme. Available at <http://www.phls.co.uk>
3. National, State, and Urban Area Vaccination Coverage Levels among children aged 19-35 months United States, 1999. ***MMWR Weekly*** 2000, **49**(26); 585-9 Available at <http://www.cdc.gov>

16.6 Acknowledgements

The authors would like to thank the Health Boards for providing these data. Special thanks to the Specialists in Public Health Medicine and the Systems Analysts for their assistance.

17. PUBLICATIONS

The National Disease Surveillance Centre (NDSC) collects and collates data from a wide variety of sources in Ireland. The efforts and time of data providers in community care, public health, microbiology, environmental health, central statistics and other government organisations is fully acknowledged by NDSC. The publication and dissemination of information based on these data are crucial functions in NDSC. Feedback of information is essential to "increasing awareness and it reinforces the importance of participating in a meaningful public health activity. This feedback must be "timely, informative, interesting and relevant to practice.[1]

In 2000, NDSC prepared several periodic reports on meningococcal disease, clinical notifications, influenza, tuberculosis, immunisation uptake, antimicrobial resistance (European Antimicrobial Resistance Surveillance System) and gastroenteric pathogens such as campylobacter and verocytotoxigenic ***E. coli***.

A full report on the "Epidemiology of Tuberculosis in Ireland in 1999" was compiled in 2000 for publication (ISSN 1649-1106).

A landmark document – "A Strategy for the Control of Antimicrobial Resistance in Ireland - SARI" was prepared by a Subcommittee of the Scientific Advisory Committee in NDSC (ISBN 0-9540177-0-6). It was launched by the Minister for Health and Children in June 2001.

Several consultation documents have been prepared by subcommittees:
"The Management of Legionnaires' Disease in Ireland.
"The Management of Viral Haemorrhagic Fevers (VHF) in Ireland.
"National Guidelines for the Prevention of Nosocomial Invasive Aspergillosis during Construction/Renovation Activities.
"A Review of Infectious Disease Notification Legislation in Ireland

In June 2000, the first issue of ***EPI-INSIGHT*** was distributed to over 600 recipients, 300 by post and 320 by electronic mail (ISSN 1393-9548). The readership is national and international. It is also an important conduit of information between Ireland and our partners in Europe. The multi-disciplinary editorial committee from public health, microbiology, paediatrics, virology, medical laboratory science and general practice, has made this monthly bulletin a positive asset to infectious disease control and prevention in Ireland.

Almost all of these documents are readily accessible via the NDSC website: www.ndsc.ie

1. Centers for Disease Control and Prevention. Principles of Epidemiology. 2nd Edition US Department of Hleath and Human Services

18. INFORMATION & COMMUNICATIONS TECHNOLOGY

Year 2000 saw very significant expansion in the range of activities and the number of staff in NDSC. These developments were underpinned by similar expansion and development of information systems in NDSC, both with regards to the Information and Communications Technology (ICT) infrastructure within NDSC, and with regards to communications with information partners at local, regional, national and international levels.

18.1 Hardware and Software

There was extensive growth in the range of activities to be supported in NDSC and this was accompanied by expansion of the ICT infrastructure. This included new and upgraded hardware, including the installation of a dedicated network server with tape backup, and additional PCs, printers, CD writers, and a flatbed scanner. There were significant upgrades to network and applications software, including the installation of Windows 2000 Advanced Server, and of Office 2000 Professional (including Word, Excel, PowerPoint and Access) on each workstation.

18.2 Connectivity

There was significant enhancement of Internet connectivity to each workstation on the NDSC local area network (LAN). The installation of additional ISDN lines, an ISDN router, and a firewall replaced dial-up access via analogue modems to the Internet. This enabled the provision of seamless secure access to the Internet via the NDSC LAN. An email server was installed to facilitate the use and management of email both within NDSC and with external partners. The telephone system was replaced with a more scaleable solution to accommodate the anticipated installation of an NDSC wide area network carrying both voice and data.

18.3 IT Support

The increased extent and complexity of the ICT systems within NDSC significantly increased the need for IT support. The extent of the support required was established and a number of service providers were invited to tender. After evaluating the proposals received, Bull Cara were selected to provide helpdesk support. The continued expansion of NDSC activities, requiring increased ICT support, together with increasing commitments to the national Computerised Infectious Disease Reporting (CIDR) system, required this Bull Cara helpdesk support to be augmented by the provision of on-site support later in the year. This was further enhanced by the recruitment by NDSC of an IT Officer at the end of the year.

18.4 Clinical Infectious Disease Notification Database - WANDA

NDSC took over responsibility for the collection of and reporting on clinical infectious disease notifications from the Department of Health and Children on July 1st 2000. A functional specification was drawn up for a system to record the disaggregate data supplied by the Health Boards, and to produce weekly aggregate and ad hoc reports. A number of suppliers were invited to submit proposals for this work, these were evaluated, and RDM

were selected as the software house to develop this Access database. After acceptance testing by NDSC, historic clinical infectious disease data was migrated from the database in the Department of Health and Children into the new NDSC database, known as WANDA (Weekly Analysis of Notifiable DAta). The weekly reports from this system are distributed via email and are available from the NDSC website.

18.5 NDSC website

NDSC established its web presence in the spring of 2000 and has proved to be an extremely efficient method of distributing NDSC publications such as bulletins, reports, and guidelines. The site averages over 100 hits per day with the majority now originating from Ireland. The main pages on interest are the publications and the Epi-Insight (monthly NDSC bulletin) pages which account for almost 75% of site accesses.

NDSC specified and selected a managed website application from Terminal4 to enable easier maintenance and updating of its growing website in a devolved but managed fashion. This application is being run in-house as an NDSC intranet web server prior to use on the public web site.

18.6 Computerised Infectious Disease Reporting (CIDR)

NDSC is leading an initiative to provide a national computerised infectious disease reporting system. This is a national project of strategic importance to NDSC and to the process of infectious disease surveillance and management at local, regional and national level in Ireland. Business / IT consultants were invited to propose how they could assist NDSC in the identification of NDSC information needs and the information needs of public health and microbiology laboratories. After evaluating the responses to this invitation, Astron Consulting were selected in April 2000 to assist NDSC to identify user needs, to determine the current status of infectious disease data management in Ireland, and to assess the suitability for implementation in Ireland of systems from overseas. Astron concluded that there were no systems available from overseas that could be adopted or adapted for use in Ireland and reluctantly recommended the building and development of a new system.

Astron also delivered draft documents detailing user requirements, data requirements, and a draft request for proposal. Astron presented their final report to the Board of NDSC in November who accepted Astron's recommendation on the necessity to develop a new system.

18.7 IT Training

NDSC staff have undertaken training courses at a variety levels from basic to advanced in Office 2000 applications (Word, Excel and Access) to enhance their data handling and report formatting skills. Continued training in applications used in NDSC will be provided to enhance the skills of NDSC staff. Similarly training in software / hardware / network support is anticipated.

18.8 Information Legislation

As required by the Data Protection Act 1988, NDSC registered in 2000 with the Data Protection Commissioner. Similarly, although NDSC is not yet formally listed as falling within the remit of the Freedom of Information Act 1997, NDSC is facilitated administratively by the Eastern Regional Health Authority (ERHA) which does. Consequently NDSC is operating on the basis that it is

subject to the provisions of this Act and has assigned the responsibilities associated with the Act to its Freedom of Information officer.

18.9 Information interfaces with local, regional, national and international partners

18.9.1 GP-IT Messaging sub-group

NDSC has been asked by the General Practice Information Technology (GP-IT) group to contribute to the GP-IT Messaging sub-group to help to define a minimum data set for each message type and establish a framework for moving towards EDI as a standard, to make recommendations relating to the use and mapping of general practice and hospital coding systems, and to address the issue of data protection, security and confidentiality in electronic data interchange (EDI).

18.9.2 European Basic Surveillance Network Project

The project "Basic Network for Surveillance of Infectious Diseases in the European Union." is approved by the European Commission and the project commenced on July 1, 2000. The aim of the project is to transfer selected surveillance data from the national databases within the European Union into a common database where the data will be made available to all participating Institutes. Previous work has been done within the project "Preparing standards for surveillance of infectious diseases on the European Union level" which was initiated to create common case definitions and minimal data sets for infectious disease surveillance across the Union. These standards are to be used for the diseases included in the Basic Surveillance Project. NDSC is representing Ireland in this initiative and has been asked to contribute on an ongoing basis to the work of this group.

Planning for the continued expansion of NDSC activities and increased staff numbers

The continuing development of NDSC and its expansion, both in terms of the range of activities and in the numbers of staff, will continue to pose a challenge in terms of the way information and communications technologies can be used to support this. Planning for these and other changes, internal and external to NDSC, will continue to constitute a significant ongoing task to ensure that NDSC utilises ICT for maximum benefit in a cost-effective manner.

19. COMPUTERISED INFECTIOUS DISEASE REPORTING

Why do we need CIDR?

We need quality information to prevent and control infectious disease. This information needs to be timely, accurate, and to include both clinical and laboratory notifications of infectious disease. The system needs to be efficient, requiring no more multiple entry of information, no islands of information and no multiple non-integratable databases.

What are the potential benefits of CIDR?

The system will transmit laboratory information electronically in a secure manner to public health and other CIDR partners, following authorisation and allow the review of epidemiological information by the laboratory. This will allow comparisons within region, and with national information.

CIDR will provide timely information for public health action. It will provide automated secure linkage of laboratory and clinical information, following authorisation. There will only be one surveillance system to maintain, not many as at present. It will allow the effectiveness of prevention and control programmes to be evaluated locally and regionally, and enable comparison of local information with neighbouring and national information. It will provide information to plan prevention and control programmes

Accurate information on infectious diseases nationally will be available, and will be used to describe the national burden of disease and to provide information to influence national policies related to Infectious Disease and Vaccine-Preventable Disease.

How will CIDR work?

There will be one data repository for all notifications, including both laboratory and clinical notifications. This information will be case-based - keyed on individual patients. Appropriate security and confidentiality mechanisms will be in place to protect the data and ensure it is used in an appropriate and ethical manner. CIDR will collect data from laboratories, clinicians and other parties and provide on-line access to information for partners in a timely fashion - as required by all partners.

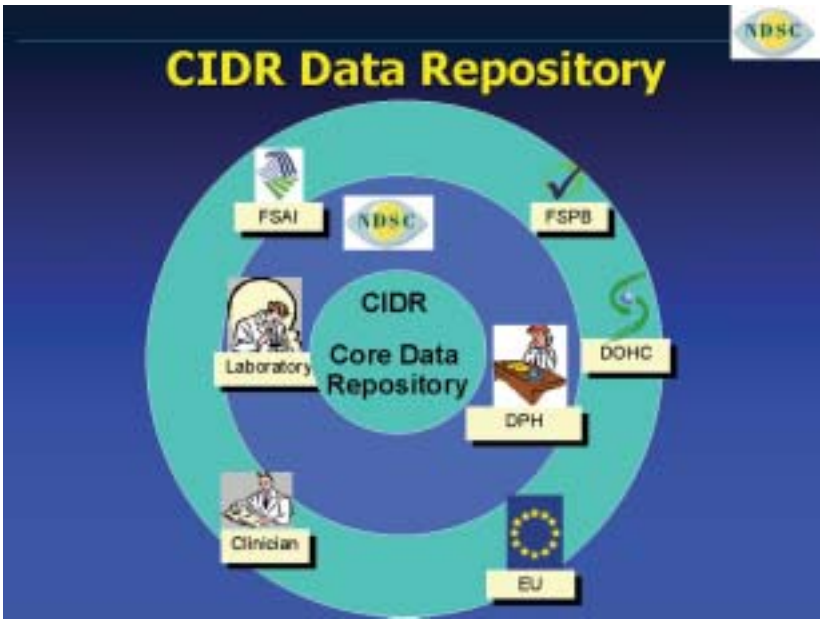


Figure 19.1.

There will be in-built functions for improving data quality. For example where no instances are found, zero reports will be filed. CIDR will allow manual data entry, inquiry and update of all notifications. Only data providers will be able to change / delete his/her data and all entries and changes to reports will be logged. CIDR will facilitate extraction of data to analysis tools by non-IT users and incorporate the flexibility to accept additional data for a disease or new diseases. It will also possess the flexibility to accept new report types and facilitate electronic capture from LIMS, incorporating standard codes within CIDR for data elements. The use of CIDR will be supported by case definitions and trigger alarms on a platform of enterprise strength construction adhering to open IT standards.

Why not adopt a system from overseas?

Following extensive consultation (assisted by external consultants, Astron Consulting) with partners and the identification of their needs, a number of systems from overseas (including UK, US and Canada) were examined. No existing system met the functional specifications and our consultants recommended the development of a new system.

How are data flows managed in CIDR?

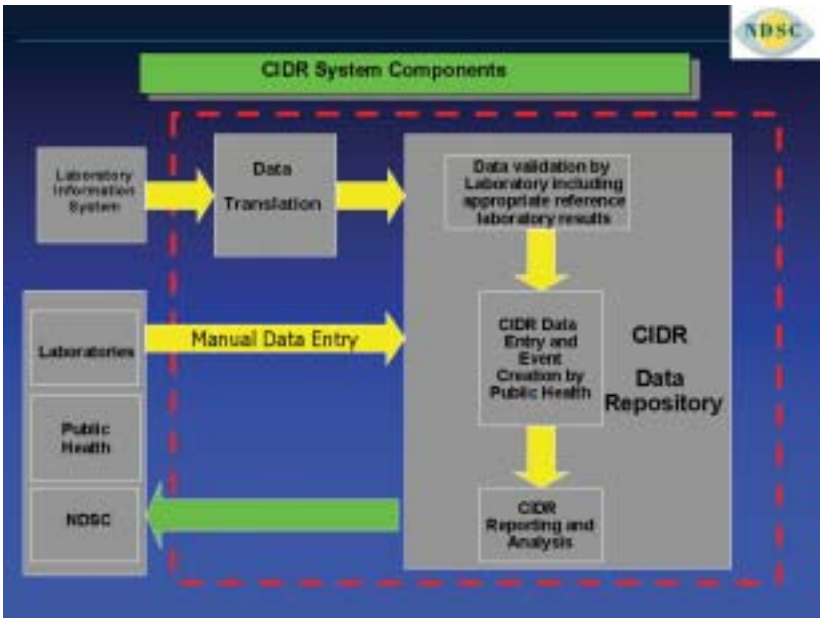


Figure 19.2.

The components of CIDR are illustrated in Figure 19.2. Laboratories will upload data into the CIDR database, either manually or via an electronic link from their laboratory information system. This information will be translated into the CIDR data structure and the integrity of the information validated by the laboratory.
This information is then passed to public health professionals who determine if this needs to be linked to existing records (whether clinical or laboratory notifications) or whether a new 'event' needs to be created. When a new 'event' is created, this information becomes available in disaggregate or aggregate form, with or without personal identifiers, as determined by business rules detailing justification of purpose.

How is an 'Event' created in CIDR?

Figure 19.3 illustrates how 'event' creation occurs and how additional information relating to an 'event' can be linked to this by partners.

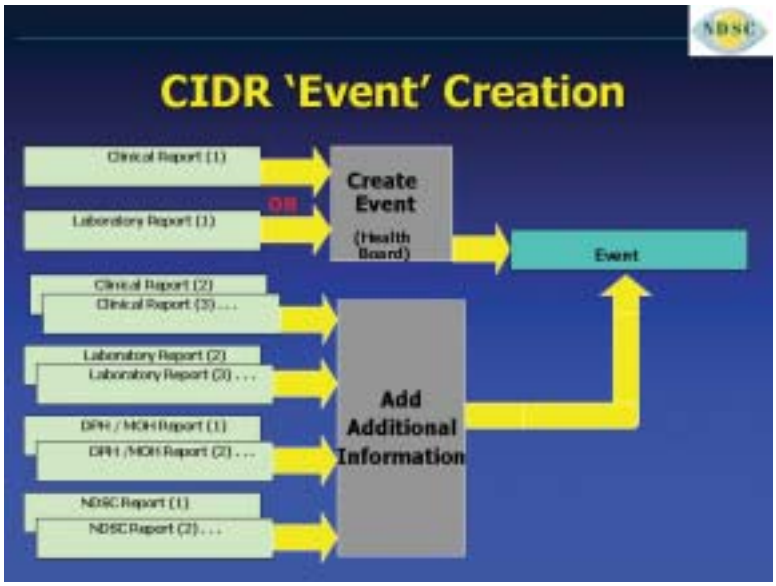


Figure 19.3.

An initial report from either a clinician or a laboratory will be recorded in the system. Additional information relating to that 'event' i.e. a particular episode of infectious disease will be linked to the original record as it becomes available. For example, an initial 'event' may be created on foot of a report of salmonellosis with additional epidemiological and laboratory information subsequently liked to the original record.

How will CIDR feedback information?

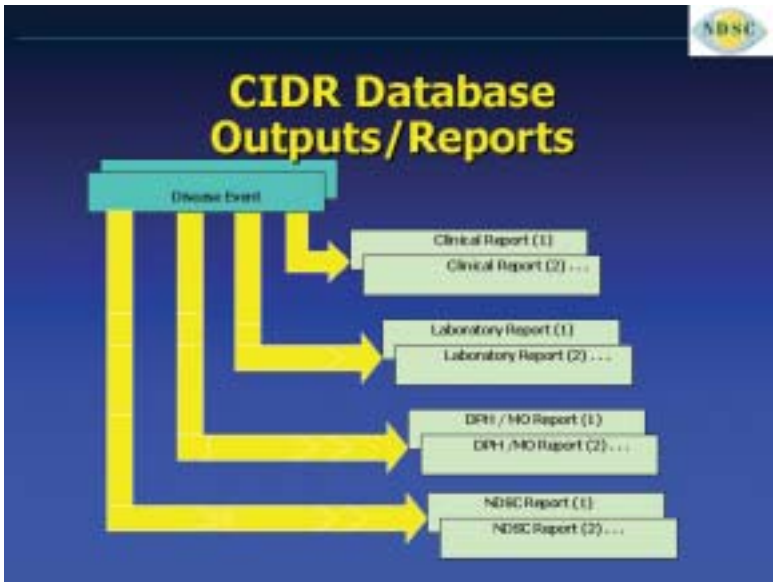


Figure 19.4.

It is essential that CIDR is able to deliver information where and when it is needed and to those partners with a need to know. The format of reports will reflect existing needs and the business rules agreed for the operation of the CIDR system. For example all partners providing information should be able to review this for accuracy and completeness. Access to personally-identifiable data, to disaggregate or locale-specific information will need to be controlled on the basis of the agreed business rules. These reports will enable each of the partners in CIDR to carry out their responsibilities. They will allow laboratories to view their information in an epidemiological manner and to compare this with trends in adjacent areas and

nationally. They will allow public health professionals to identify and control instances of infectious disease within their area. NDSC will obtain reports to describe the national burden of disease and to provide information to influence national policies related to Infectious Disease and Vaccine-Preventable Disease.

How will CIDR be delivered?

The process of delivering CIDR is complex. As well as defining the hardware and software required to support the dataflows needed, a parallel process of defining the business rules for the appropriate and ethical sharing of this information is necessary. This complexity is reflected in the organisation of the project illustrated in Figure 19.5.

Figure 19.5.

A CIDR Development Committee was established in September 1999 to assist and continue to advise NDSC and other CIDR partners on the development and introduction of a national system for electronic surveillance. Members of this committee act as advocates and promote CIDR within their own organisation / profession. The CIDR Project Team has been dedicated on a fulltime basis to deliver CIDR and external consultants engaged to assist in the this process. A CIDR Project Board will manage the project, and ensure it achieves business objectives within the budget, resources and timescales allocated. This Board will ensure co-operation and ownership of the project within the wider organisations and that resources are made available as required, throughout the life of the project. They will also ensure human resource issues resulting from the project are managed properly. A National Supervisory Committee has been established to act as a national forum to facilitate the Health Boards, the Food Safety Authority of Ireland (FSAI), the Food Safety Promotion Board (FSPB), the Department of Health and Children (DoHC) and NDSC develop business rules for participation in CIDR. This committee will also ensure that there is co-ordination at national level to allow for efficient and effective working of CIDR. Regional and agency business rules committees are assisting in the development of these business rules and provide a framework for the regional management of CIDR.

When will CIDR be delivered?

It is expected that the core system will be built in 2002. Pilot Health Board(s) / site(s) will be selected for a limited period (3-6 months) to identify all the resource implications for interaction with the system before national rollout.

Electronic Laboratory Reporting (ELR) will be implemented initially on a pilot basis and rolled out nationally as quickly as possible.

APPENDIX

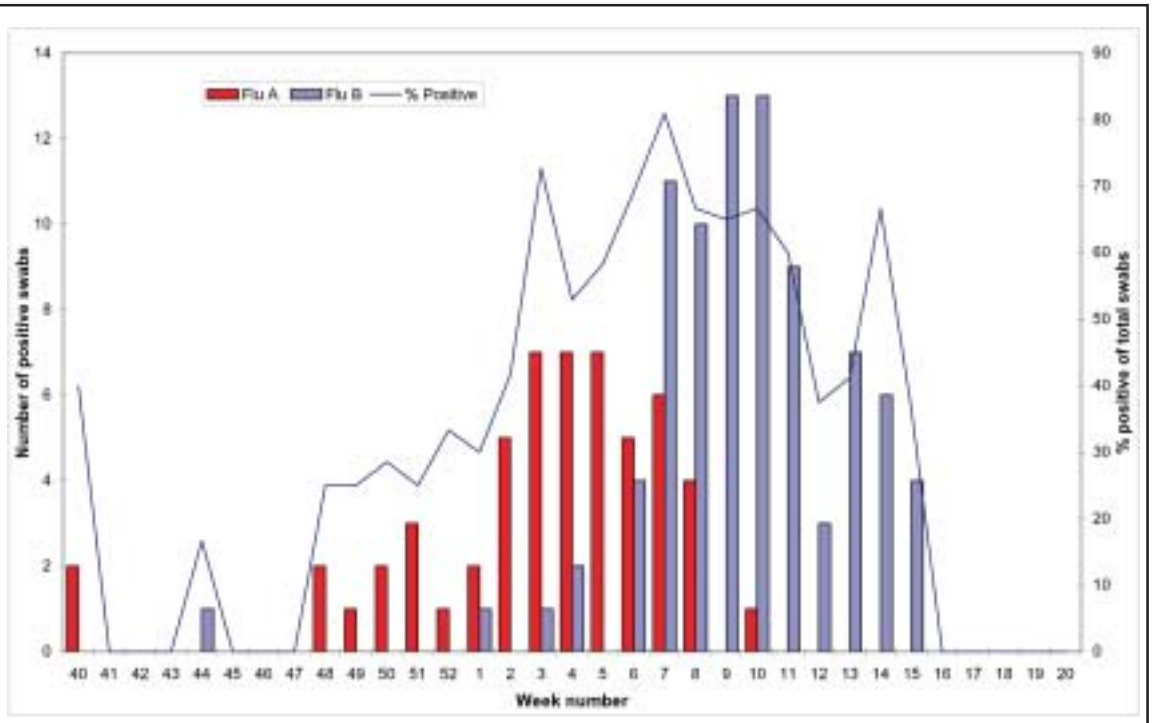


Figure 7.3: Number of positive swabs by flu type and % positive of total swabs by week.

Table 9.4: Infectious Diseases Notified in Ireland ~ 1982-2000

Infectious Disease	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Acute Anterior Poliomyelitis	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acute Encephalitis	4	7	10	4	7	1	0	0	0	0	1	2	1	0	7	3	0	1	1
Acute Viral Meningitis	54	191	163	120	161	81	101	52	300	86	104	39	90	74	77	32	32	27	98
Anthrax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bacillary Dysentery (Shigellosis)	143	212	273	146	347	68	422	143	277	736	283	219	203	97	59	41	120	116	30
Bacterial Meningitis (including meningococcal septicaemia)*	124	141	192	100	147	111	128	115	131	155	225	203	241	382	410	508	491	587	586
Brucellosis	159	126	126	115	53	38	22	20	15	27	26	28	14	6	10	7	15	19	15
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Creutzfeldt Jakob Disease**	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	3	6	1	2
vCreutzfeldt Jakob Disease**	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	0	0	1	0
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Food Poisoning (bacterial other than salmonella)	68	83	164	98	195	88	43	64	157	83	46	97	62	100	276	448	1235	1673	1554
Gastroenteritis (when contracted by a child under 2 years)	2404	2987	3242	3317	3815	3900	3241	3410	3758	4132	3410	3832	3043	3234	2997	2968	3483	2917	2796
Infectious Mononucleosis	55	196	233	214	145	186	286	211	208	188	208	206	183	156	216	212	217	198	151
Infectious Parotitis (Mumps)	NA	NA	NA	NA	NA	NA	271	709	48	53	43	44	33	27	422	285	57	38	52
Influenzal Pneumonia	6	76	93	37	153	53	73	42	94	139	48	55	6	31	54	29	4	15	20
Legionnaires Disease	2	2	1	0	0	0	4	2	1	0	2	0	1	1	2	6	2	2	9
Leptospirosis	4	14	8	5	4	6	3	5	5	4	9	5	2	1	6	8	12	6	7
Malaria	33	17	12	32	41	28	30	23	12	11	15	9	12	9	14	8	17	17	19
Measles	1897	6180	5725	9903	451	201	936	1248	556	135	179	4328	1233	235	228	185	204	147	1603
Ornithosis	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Plague	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rubella	166	2395	2060	668	799	444	1156	440	258	206	155	179	206	100	602	113	83	62	97
Salmonellosis (other than typhoid or paratyphoid)	175	205	287	142	265	249	271	427	473	484	270	295	338	571	678	958	1261	962	640
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1	1	1
Tuberculosis***	975	924	837	804	602	581	575	638	613	640	604	598	524	458	434	416	424	469	NA
Typhoid & Paratyphoid	2	4	3	1	1	0	2	0	0	4	3	1	1	4	4	0	3	0	1
Typhus	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Viral Haemorrhagic Disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Viral Hepatitis Type A	184	237	255	201	126	212	261	564	538	205	430	369	94	133	313	422	218	323	309
Viral Hepatitis Type B	26	54	33	57	55	63	32	20	11	15	13	11	20	11	11	31	155	160	187
Viral Hepatitis Unspecified	1066	1192	1022	731	544	381	253	371	398	152	240	190	60	66	67	122	147	125	65
Whooping Cough	1073	1728	3061	3689	1482	1717	1170	2217	803	843	860	869	353	436	261	459	252	179	152
Yellow Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0

Note: 1982-1999, data collated by DoHC, *Since 1997, figures taken from Enhanced Surveillance System for Bacterial Meningitis, ** CJD and vCJD not notifiable (NN) in Ireland, prior to 1997

***TB figures taken from the Enhanced TB Surveillance System. TB figure for 2000 not yet finalised