National Disease Surveillance Centre Annual Report 2002

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Foreword

This is my fourth foreword to the NDSC annual report. As in previous years, it reflects the commitment, vision and professionalism of our Director, Dr Darina O'Flanagan and all the staff at NDSC.

NDSC continued to make an important contribution to public health in Ireland in 2002 through a range of activities including the provision of expert advice, epidemiological investigation, scientific research, data collection and through participation in health promotion and training.

The wide range of valuable work carried out at NDSC was enhanced during the year by the recruitment of additional, highly qualified and committed staff across a number of disciplines.

Furthermore, the move to our new Gardiner Street headquarters in April 2002, allowed for greater cohesion and communication amongst the various professional strands of the centre. The fact that the transfer to the new premises went so smoothly and without disruption to any of the services provided by NDSC is a credit to all involved.

The next couple of years will provide an exciting challenge for the health services in Ireland. NDSC is in a position to confidently take part and contribute to the change process and to continue our invaluable work in improving the health of the Irish population.

It remains for me to thank the present Board members, our Director, and all the staff whose efforts have contributed to the ongoing success of NDSC.

Professor Dermot Hourihane
Chairman
Board of the National Disease Surveillance Centre

Introduction

This is the fourth annual report from the National Disease Surveillance Centre.

This report highlights achievements in recent years in the field of communicable disease control.

It is particularly gratifying to see the 90% reduction in cases of group C meningococcal disease since the introduction of men C vaccine in October 2000. While the benefits of an immunisation programme are often more apparent immediately after its introduction, the success of the programme has meant that one hundred and twenty five fewer families suffered the trauma of childhood meningococcal disease in 2002.

The continuing rise in the notification of sexually transmitted diseases and increases in reports of HIV infections are a matter for concern. The rising incidence of sexually transmitted diseases is consistent with an increase in unsafe sex and mirrors the situation in many other European countries. Tragically, we are once again seeing infants born with congenital syphilis.

New and emerging diseases continue to demand our attention but it is important that we remember the dangers associated with those infectious diseases that we have not yet managed to confine to history.

Work continues on major projects like the Strategy for the control of Antimicrobial Resistance in Ireland (SARI) and the Computerised Infectious Disease Reporting (CIDR) system. These projects will make a major contribution to the control of infectious diseases in Ireland.

Once again the scientific advisory committee has worked hard and many of the subcommittees have completed guidelines which are available on the NDSC website. The work of all who have contributed to these sub-committees is gratefully acknowledged, as is the work of all staff at NDSC.

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Bacterial Meningitis, 2002

KEY POINTS

In 2002,

- **297 cases of bacterial meningitis were notified in Ireland.**
- **253 of the cases (including 3 imported) were due to meningococcal disease.**
- **Excluding imported cases meningococcal disease notifications declined by 51% compared with 2000 and by 23% compared with 2001.**
- **Serogroup C meningococcal disease notifications declined by 90% when compared with 2000 highlighting the impact meningococcal serogroup C conjugate vaccine has had in Ireland.**
- **There were 12 deaths due to bacterial meningitis including eight due to meningococcal disease.**

Introduction

Bacterial meningitis is still a significant cause of childhood morbidity and mortality in Ireland. The majority of cases of bacterial meningitis are due to invasive meningococcal disease (IMD), a serious life-threatening illness caused by *Neisseria meningitidis*.

However, the introduction of the meningococcal serogroup C conjugate (MenC) vaccine in Ireland (October 2000) as part of the primary childhood immunisation schedule and in the catch-up programme for everyone up to and including 22 years of age, has reduced the burden of serogroup C meningococcal disease significantly.

Material and Methods

Enhanced surveillance of bacterial meningitis (including meningococcal septicaemia) commenced in Ireland in 1997. The Community Care Areas (CCAs) simultaneously notify the Departments of Public Health and NDSC of each suspected case of bacterial meningitis. Follow-up information on each case notified is collected by the Department of Public Health/CCA and forwarded to NDSC. At NDSC data are entered into a MS Access database. The Irish Meningococcal and Meningitis Reference Laboratory (IMMRL) at the Children's Hospital, Temple Street, Dublin, perform active surveillance on laboratory confirmed cases of IMD. The NDSC database is reconciled monthly with the IMMRL database and quarterly with the Departments of Public Health databases. A final data validation is performed with the Departments of Public Health and IMMRL following year-end.

Data analysis was performed using MS Access and MS Excel.

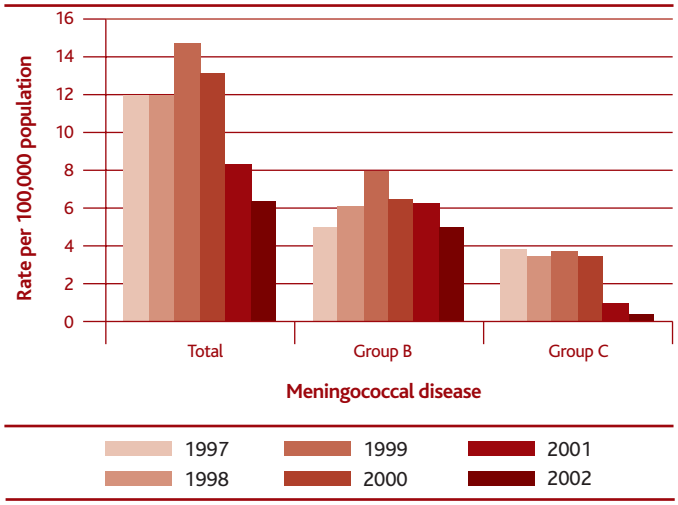

Figure 1. Crude incidence rates for meningococcal disease in Ireland, 1997-2002

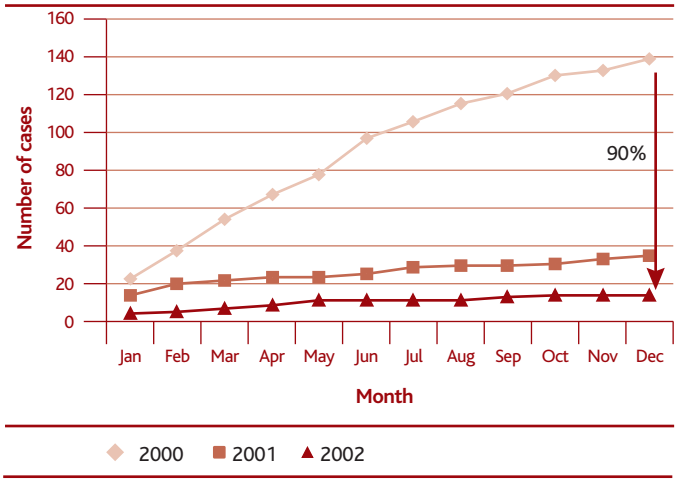

Figure 2. Cumulative number of cases of serogroup C disease in 2000, 2001 and 2002

Of note when analysing the years 2000-2002, the population data were taken from the 2002 census, while denominator data for the years 1997-1999 were taken from the 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] A summary of 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 are detected in CSF or skin-scrapings or *N. meningitidis* is isolated from an eye, throat or nasal swab together with either the 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 the characteristic purpuric rash or a case with clinical evidence of sepsis without a purpuric rash and in whom *N. meningitidis* is isolated from an eye, throat or nasal swab.

Results

Bacterial Meningitis

Two hundred and ninety seven cases of bacterial meningitis (including 3 imported cases) were notified in Ireland in 2002. Invasive meningococcal disease (IMD) accounted for 85% of the bacterial meningitis notifications (253 cases including 3 imported cases). *Streptococcus pneumoniae* accounted for 5% (n=15) of the bacterial meningitis cases notified, while *Haemophilus influenzae* type b accounted for 1% of the cases (n=3).

Invasive Meningococcal Disease

Imported cases of IMD

An imported case is defined as a case where the onset of illness occurs within two days of arrival in the country or where the infection is known to have been acquired abroad. In 2002, three imported cases of IMD were notified in Ireland. These were serogroup B cases with one notified by each of the following health boards, NEHB, SEHB and WHB. These imported IMD cases will be excluded from subsequent analysis in this report.

Total IMD

Excluding the three imported cases, 250 cases of IMD were notified in Ireland in 2002, which is equivalent to a rate of 6.4/100,000. IMD notifications declined by 51% in 2002 compared with 2000 (13.1/100,000; 513 cases; excluding 2 imported cases) and by 23% compared with 2001 (8.3/100,000; 326 cases, excluding 4 imported cases) (Figure 1). The incidence rate in 2002 is the lowest recorded since the enhanced surveillance system for bacterial meningitis (including meningococcal septicaemia) commenced in 1997 (Figure 1). Two hundred and eight IMD (83.2%) were classified as definite, 17 (6.8%) as presumed and 25 (10%) as possible cases. Eighty seven percent (n=218) of cases were laboratory confirmed by the IMMRL. Of the 218 cases confirmed by

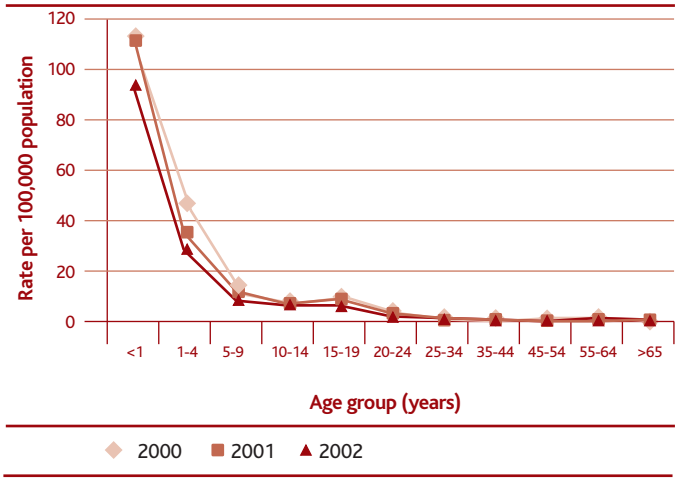

Figure 3a. Age specific incidence rates for serogroup B disease 2000-2002

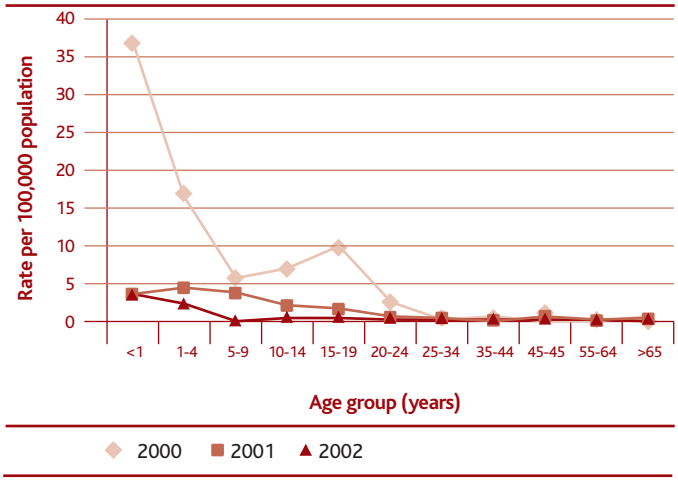

Figure 3b. Age specific incidence rates for serogroup C disease, 2000-2002

IMMRL, 59.6% (130 cases) were by PCR, 35.8% (78 cases) by culture and 4.6% (10 cases) by convalescent serology.

IMD by serogroup

Of the 250 cases of IMD notified, the breakdown by serogroup was as follows: 196 serogroup B, 14 serogroup C, 6 serogroup W135 (none were Hajj related), 2 serogroup Y, 1 non-groupable (NG) and 31 had no organism detected. Serogroup B IMD accounted for 90% of cases with a serogroup result. The incidence of serogroup B IMD dropped by 19% in 2002 (5.0/100,0000, 196 cases) when compared with 2001 (6.2/100,000; 242 cases) and by 23.4% when compared with 2000 (6.5/100,000; 256 cases) (Figure 1). Furthermore, the incidence rate for serogroup B IMD in 2002 was lower than those reported for 1997 and 1998, 5.0 and 6.2 per 100,000, respectively (Figure 1).

Serogroup C IMD accounted for just 6.4% of the serogrouped cases in 2002 compared to 34% of these cases in 2000. The incidence of serogroup C IMD declined by 59% in 2002 (0.4/100,000; 14 cases) compared with the previous year (0.9/100,000; 34 cases) and by a dramatic 90% compared with 2000 (3.6/100,000; 139 cases) (Figure 2).

IMD by age and sex

The male:female ratio was 1:0.9, with males accounting for 51.6% (n=129) of the cases. Fifty eight percent (n=146) of IMD cases were in those under 5 years of age, while 90% (n=225) of the cases were under 25 years of age. The highest age specific incidence rates were in the under 1 year olds (119.3/100,000) and 1-4 year olds (36.3/100,0000). The age specific incidence rates for serogroup B IMD in 2002 were similar to those seen in 2001, with the highest rates in the under1 year olds (93.6/100,000) and 1-4 year olds (28.2/100,000) (Figure 3a). In 2002, the age specific incidence rate for serogroup C IMD was highest in the less than 1 year olds (3.7/100,000) followed by the 1-4 year olds (2.2/100,0000). Compared with 2000, the age specific incidence rates for serogroup C IMD in 2002 declined in all the age groups under 25 years of age (Figure 3b).

IMD by health board

In 2002, as in previous years the crude incidence rates (CIR) and age standardised incidence rates (ASIR) for IMD varied by health board (Table 1a). When compared to the national rates none of these differences were statistically significant. However, the rates in the WHB for IMD were less that the national rate and this was close to significance. The ASIR of serogroup B and C IMD by health board in 2000, 2001 and 2002 are presented in Figures 4 and 5, respectively. For both serogroup B and C, no statistical differences were noted between the national incidence rates and the health board rates.

In 2000, the highest incidence rates for serogroup C were in the south of the country with the SEHB and SHB reporting ASIR of greater than 5.0/100,000. In 2001, the incidence rates declined in all health boards, with no health board reporting ASIR of greater than 1.2/100,000 (Figure 4). This decline continued in 2002 with no health board reporting ASIR of greater than 0.9/100,000 while in the NWHB, SHB and WHB no serogroup C cases occurred.

Impact of MenC vaccine on serogroup C IMD

Serogroup C IMD declined by 92% in the age group targeted by the campaign (now aged under 25 years), dropping from

Table 1. Numbers, crude incidence rates (CIR) and age standardised incidence rates (ASIR) with 95% confidence intervals (CI) of total IMD (Table 1a), serogroup B (Table 1b) and serogroup C (Table 1c) by health board, in 2002.

Table 1a

Health Board	Number	CIR [95% CI]	ASIR [95% CI]
ERHA	89	6.4 [5.0-7.7]	6.5 [5.2-7.9]
MHB	18	8.0 [4.3-11.7]	7.6 [4.1-11.1]
MWHB	27	8.0 [5.0-10.9]	8.0 [5.0-11.0]
NEHB	24	7.0 [4.2-9.7]	6.4 [3.8-8.9]
NWHB	14	6.3 [3.0-9.6]	6.5 [3.1-9.9]
SEHB	23	5.4 [3.5-7.8]	5.3 [3.1-7.4]
SHB	41	7.1 [4.9-9.2]	7.2 [5.0-9.5]
WHB	14	3.7 [1.8-5.6]	3.7 [1.7-5.6]
IRELAND	**250**	**6.4 [5.6-7.2]**	**–**

Table 1b

Health Board	Number	CIR [95% CI]	ASIR [95% CI]
ERHA	71	5.1 [3.9-6.2]	5.2 [4.0-6.4]
MHB	15	6.7 [3.3-10.0]	6.3 [3.1-9.4]
MWHB	19	5.6 [3.1-8.1]	5.6 [3.1-8.1]
NEHB	22	6.4 [6.7-9.0]	5.8 [3.4-8.2]
NWHB	10	4.5 [1.7-7.3]	4.6 [1.7-7.4]
SEHB	13	3.1 [1.4-4.7]	3.0 [1.7-4.6]
SHB	32	5.5 [3.6-7.4]	5.7 [3.7-7.6]
WHB	14	3.7 [1.6-5.3]	3.7 [1.7-5.6]
Ireland	**196**	**5.0 [4.3-5.7]**	**–**

Table 1c

Health Board	Number	CIR [95% CI]	ASIR [95% CI]
ERHA	9	0.6 [0.2-1.1]	0.6 [0.2-1.1]
MHB	2	0.9 [0.3-2.1]	0.9 [-0.4-2.2]
MWHB	1	0.3 [-0.3-0.9]	0.3 [-0.3-0.9]
NEHB	1	0.3 [-0.3-0.9]	0.3 [-0.3-0.8]
NWHB	0	0.00	0.00
SEHB	1	0.2 [-0.2-0.7]	0.2 [-0.2-0.7]
SHB	0	0.00	0.00
WHB	0	0.00	0.00
Ireland	**14**	**0.36 [0.2-0.6]**	**–**

131 cases in 2000 to 10 cases in 2002 (Table 2). Seventy one percent (10/14) of the serogroup C cases occurred in the target age group (now aged under 25 years) and four of these cases had received the MenC vaccine. However, only one of these can be classified as a true vaccine failure. This case received one dose four days after turning one year of age and became ill at 23 months of age. The other three cases were partial vaccine failures. Two of these received one dose of the vaccine at 11 months of age (with one receiving it just nine days prior to their first birthday). They became ill at 26 and 19 months of age, respectively. The third case received two doses of vaccine at four and six months of age and had onset of illness at 20 months of age.

Bacterial meningitis other than IMD

Forty four cases (1.1/100,000) of bacterial meningitis other than IMD were notified in 2002 (Table 3). The breakdown by aetiological agent of these meningitis cases was as follows; 15 *Streptococcus pneumoniae*, two serogroup B streptococci (GBS), three *Haemophilus influenzae* type b (Hib), three *Mycobacterium tuberculosis,* one *Staphlococcus aureus* and 20 organism unknown. The incidence rate of bacterial meningitis other than IMD was highest in the under 1 year olds, 31.2 per 100,1000 (Table 4). *Streptococcus pneumoniae* and bacterial meningitis (organism unknown) accounted for the majority of these cases. In relation to the Hib cases, one case developed the illness at 15 months of age and had not received the vaccine. The two other cases had each received three doses of the vaccine and were therefore regarded as true vaccine failures. One received the Hib vaccine at the correct schedule and developed illness at 31 months of age. The other received the vaccine in the UK as per the schedule there i.e. at two, three and four months of age, and developed illness at 4 years.

Deaths due to bacterial meningitis

There were 12 deaths due to bacterial meningitis in 2002, compared to 30 in 2000 and 15 in 2001. In 2001, these included 12 deaths due to meningococcal disease (8 group B, 3 group C, 1 group W135), two pneumococcal meningitis deaths and one due to bacterial meningitis (organism unknown). Eight of the deaths in 2002 were due to IMD (all group serogroup B), one each due to pneumococcal meningitis, *Staphlococcus aureus* meningitis, Group B streptococcus meningitis and bacterial meningitis (organism unknown). The case fatality rate (CFR) for IMD in 2002 was 3.2% (Table 4). The CFR for serogroup B IMD was 4.1% and was highest in the under 1 year olds at 7.8% (Table 4). All of the eight serogroup B deaths occurred in those under 5 years of age. There were no serogroup C deaths in 2002 whereas in 1999 and 2000 there were five and 11 deaths, respectively, thereby highlighting the positive impact that the MenC vaccine has had in reducing not only morbidity but also mortality due to group C disease in Ireland.

Discussion

The lowest incidence of IMD since the enhanced surveillance system commenced in Ireland in 1997 was in 2002, with rates falling from between 12 and 15 per 100,000 in the years previous to 2001 to 6.4 per 100,000 in 2002. One of the main reasons for the decline in IMD was due to the introduction of the MenC vaccine in October 2000, with the incidence rate in 2002 declining by an impressive 90% since 2000. This reduction in Group C meningococcal disease has

Table 2. Number of cases of Group C disease notified in 2000 and 2002

Age group (years)	2000	2002	% Reduction
<1	20	2	90
1-4	37	5	86
5-9	15	0	100
10-14	20	1	95
15-19	31	1	97
19-24	8	1	88
25+	8	4	50
Total	**139**	**14**	**90**

Table 3. Bacterial meningitis other than IMD in Ireland in 2002

Organism	Age group (years)						CIR
	<1	1-4	5-14	15-24	>25	Total	
Group B streptococcus	*2*	*0*	*0*	*0*	*0*	*2*	*0.05*
H. influenzae b	*0*	*3*	*0*	*0*	*0*	*3*	*0.08*
M. tuberculosis	*0*	*0*	*0*	*2*	*1*	*3*	*0.08*
S. pneumoniae	*8*	*3*	*0*	*1*	*3*	*15*	*0.38*
S. aureus	*0*	*0*	*0*	*0*	*1*	*1*	*0.03*
Organism unknown	*7*	*1*	*5*	*4*	*3*	*20*	*0.51*
Total	**17**	**7**	**5**	**7**	**8**	**64**	**1.12**
ASIR	**31.2**	**3.14**	**0.90**	**1.09**	**0.33**	**1.12**	

CIR = Crude incidence rate per 100,000 ASIR = age -specific incidence rate per 100,000

been observed in all age groups in 2002 when compared with the same period in 2000. The most dramatic reductions were seen in the age groups targeted by the MenC vaccine, ranging from a 100% reduction in 5-9 year olds to 86% reduction in the 1-4 years. The incidence of serogroup C IMD reduced in all health boards/health authorities in 2002. Mortality due to serogroup C disease also declined in 2002 with no deaths occurring.

The incidence rate of serogroup B disease also declined in 2002 (by 23% compared with 2000), but not to the same magnitude as serogroup C disease. In 2002, all health boards except NEHB showed a decline in the incidence of serogroup B disease. Five of the eight health boards have similar incidence rates (4.5-6.0/100,000).

The six serogroup W135 cases notified in Ireland in 2002 were not Hajj related and no serogroup W135 2a; P1.2, 5 have been reported in Ireland to date. This serogroup W135 2a; P1.2, 5 was the serogroup associated in 2000 with returning pilgrims and their contacts following the Hajj pilgrimage to Mecca in Saudia Arabia.

In comparison to IMD, the incidence of pneumococcal meningitis remains low in Ireland (0.4/100,000) and there were one associated death in 2002, which occurred in an infant.

Although group C disease has declined since the introduction of the MenC vaccine, group B disease is still very common in Ireland. Since there is no suitable vaccine yet to combat group B disease, parents and healthcare professionals should be ever vigilant and alert to the signs and symptoms of the disease.

Table 4. Deaths due to total and serogroup B IMD by age group in Ireland, in 2002

Age group (years)	Total IMD			Serogroup B		
	Deaths	Cases	CFR (%)	Deaths	Cases	CFR (%)
<1	4	65	6.2	4	51	7.8
1-4	4	81	4.9	4	63	6.4
5-9	0	24	0.0	0	21	0.0
10-14	0	22	0.0	0	18	0.0
15-19	0	23	0.0	0	20	0.0
20-24	0	10	0.0	0	6	0.0
≥25	0	25	0.0	0	17	0.0
Total	**8**	**250**	**3.2**	**8**	**196**	**4.1**

CFR = case fatality rate

Acknowledgements

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Tuberculosis in Ireland, 2001

Key Points

- **There were 381 new cases of TB in 2001, giving a crude incidence rate of 9.7/100,000 population.**
- **Sixty three cases (16.5%) were born outside Ireland.**
- **Although the highest rate was observed in the 65+ age group, there was a 30% decrease in this age group in 2001, compared to 2000.**
- **There were 204 isolates of *M. tuberculosis*, seven were *M. bovis* and one was *M. africanum*.**
- **There were two multi-drug resistant *M. tuberculosis* cases.**
- **Five deaths were attributed to TB.**
- **Outcome data were reported in 60% of TB cases only.**

Introduction

Since 1998, all information concerning TB notifications in Ireland has been reported by each of the health boards to the National Disease Surveillance Centre (NDSC) for analysis. Beginning on January 1st 2000, this information has included enhanced surveillance data based on the minimum dataset reported to EuroTB, the European agency that collates national TB data within Europe and contributes that data to the WHO global TB control programme. The resulting National Tuberculosis Surveillance System (NTBSS) was set up following consultation between NDSC, the eight health boards and the National Tuberculosis (TB) Advisory Group.

Materials and Methods

For each individual case of tuberculosis notified in 2001, an enhanced notification form was completed by public health doctors, using the available clinical, microbiological, histological and epidemiological data. These forms were then collated in the regional Departments of Public Health. In all but one health board, data were also entered onto an Epi Info 6 database locally and an anonymised version of each database was submitted to NDSC on a quarterly basis. A single health board submitted anonymised facsimiles of enhanced TB forms directly to NDSC. All cases were then collated at a national level on a single Epi Info database for detailed analysis. Reports summarising results were produced on a quarterly basis by NDSC. Information on all cases was updated in late 2002 / early 2003 by each health board to include outcome data.

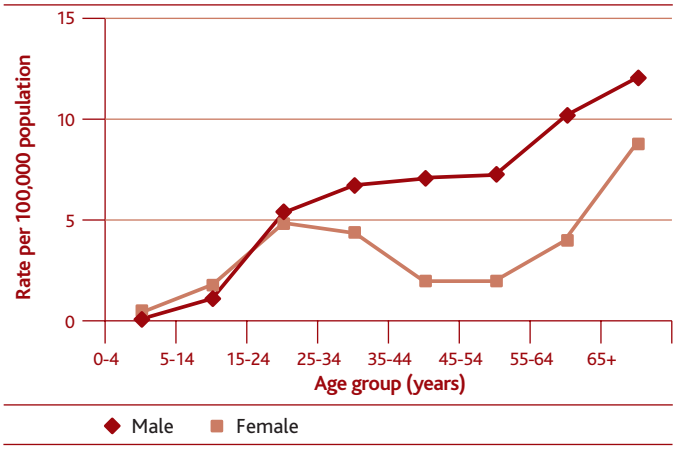

Figure 1: Age- and sex-specific TB incidence rates in Ireland, 2001

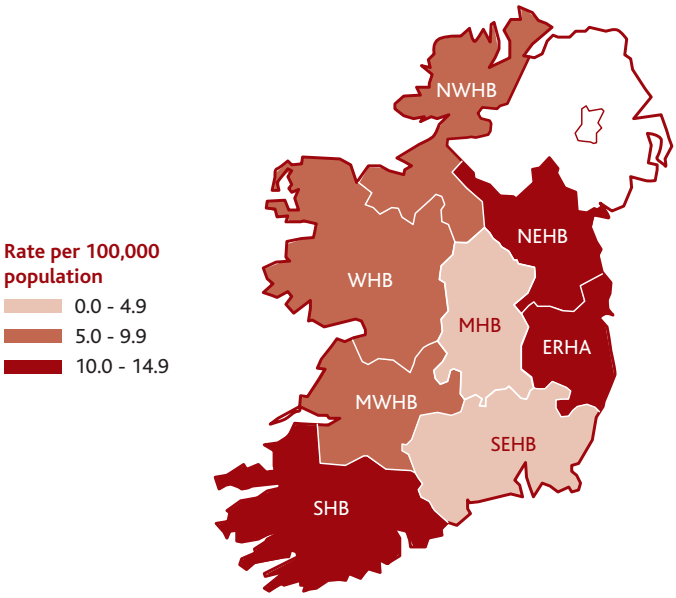

Figure 2: Age standardised incidence rates in Ireland by health board, 2001

Population figures, used as the denominator, were taken from the 2002 census of population. The 95% confidence intervals were used to compare rates between groups of interest. Direct methods of standardisation were used to allow comparison of rates between geographical areas using the Irish population as the standard population.

As in previous years, the case definitions used were as recommended by the National Tuberculosis (TB) Working Group.[1]

- **A notified case** of TB refers to clinically active disease due to infection with organisms of the *Mycobacterium tuberculosis* complex (*M. tuberculosis, M. bovis, M. africanum*). Active disease is presumed if the patient is commenced on a full curative course of anti-tuberculosis chemotherapy. Persons placed on chemoprophylaxis for preventive treatment or infected by mycobacterium other than *M. tuberculosis* complex are not included as cases.

- **Pulmonary TB** is defined as a laboratory-confirmed case – either a positive smear, histology or culture of a respiratory sample – with or without radiological abnormalities consistent with active pulmonary TB or a case where the physician takes the decision that the patient's clinical symptoms and/or radiological signs are compatible with pulmonary TB.

- **Extrapulmonary TB** is defined as a patient with a smear, culture or histological specimen, from an extrapulmonary site, that is positive for *M. tuberculosis* complex or a case with clinical signs of active extrapulmonary disease in conjunction with a decision taken by the attending physician to treat the patient with a full curative course of anti-tuberculosis chemotherapy.

Results

Three hundred and eighty one cases of TB were notified in 2001, giving a notification rate of 9.7/100,000 population. This represents a 3.5% decrease on the corresponding figure in 2000 (395 cases: 10.1/100,000) (table 1) and is the lowest annual number of cases reported in Ireland to date.

The highest age standardised TB incidence rates were reported in the Eastern Regional Health Authority and the Southern Health Board, both at 12.4 per 100,000 population (table 2). The Midland Health Board had the lowest rate at 3.1/100,000. In addition, the rates in the MHB, SEHB and NWHB were significantly lower than the national age standardised incidence rate (9.7 per 100,000).

Age and sex distribution of cases

Two hundred and forty one cases were male (63.3%) and 139 were female (36.5%). The gender of one case was not recorded. The average age of those diagnosed with TB was 45.6 years with a range from one to 93 years and the highest rate was observed in those over 65 years (at 20.6/100,000 population). Almost a quarter of cases occurred in those aged 65 and over (n=91). This is a 30% decrease when compared with TB data from 2000 (n=130). The age- and sex-specific incidence rates per 100,000 population in Ireland, in 2001 are illustrated in figure 1.

Table 1. Notified TB cases in Ireland, 1991 – 2001, with 3-year moving average, 1992 - 2000

Year	Number	Crude rate per 100,000	3 year moving average
1991	640	18.2	
1992	604	17.1	612
1993	598	16.9	581
1994	524	14.5	526
1995	458	12.6	469
1996	434	12.0	436
1997	416	11.5	423
1998	424	11.7	433
1999	469	12.9	439
2000	395	10.1	410
2001	381	9.7	

Table 2: Total and age standardised incidence rates [95% confidence interval (CI)] for TB in Ireland by health board, 2001

Health Board	TB cases	Age standardised incidence rate	95% CI
ERHA	173	12.4	10.4–14.2
MHB	7	3.1	0.8-5.3
MWHB	24	6.9	4.2-9.7
NEHB	38	11.3	7.7-14.9
NWHB	13	5.4	2.5-8.4
SEHB	20	4.7	2.7-7.0
SHB	72	12.4	9.6-15.3
WHB	34	8.5	5.6-11.4
Ireland	**381**	**9.7**	**8.7-10.6**

Geographic origin

Sixty three (16.5%) of the patients diagnosed with TB were born outside Ireland. This represents a 43.2% increase on TB figures from 2000 (n = 44). Twenty seven were born in Africa, 23 in Asia, nine in Europe, one in South America. The country of origin was unknown in three cases.

Diagnostic details

Of the 381 TB notifications, 224 (58.8%) were definite cases which were culture confirmed. Two hundred and fifty three cases were pulmonary (66.4%), 92 cases were extrapulmonary (24.1%) and 35 cases were pulmonary and extrapulmonary TB (9.2%). In one case the TB site was unspecified (0.03%). The diagnostic breakdown in each health board is shown in table 3.

Of the 288 TB cases with a pulmonary disease component, 128 (44.4%) were sputum positive.

Of the 224 culture-confirmed cases, 204 (96.2%) of isolates were *M. tuberculosis,* seven (3.3%) were *M. bovis* and one (0.5%) was *M. africanum*. The isolate was not specified in 12 culture positive cases.

Resistance

Resistance was documented in fourteen cases out of a total of 204 *M. tuberculosis* isolates (6.9%). In 2001, two multi-drug resistant TB cases, defined as resistance to at least isoniazid and rifampicin, were notified. Three cases were resistant to isoniazid and streptomycin and one case was resistant to isoniazid, streptomycin and ethambutol. Mono-resistance to isoniazid was recorded in four cases, mono-resistance to streptomycin in three cases and mono-resistance to pyrazinamide in one case. Six of the drug-resistant cases were born outside Ireland.

HIV status

Seven patients were reported as having HIV in association with TB. Six of these cases had pulmonary TB and one had extrapulmonary TB. Five were culture positive for *M. tuberculosis*. None of these cases were resistant to any standard TB drugs. There were two deaths in this group, one of which was attributed to TB.

Outcome

The outcome was recorded in 228 cases (59.8%) in 2001. One hundred and ninety of these cases (83.3%) completed treatment. Eleven patients (4.8%) were recorded as being lost to follow up. There were 20 deaths (8.8%) recorded, of which five were attributed to TB. A summary profile of the epidemiology of TB in Ireland from 1999 to 2001 is shown in table 4.

Discussion

In Ireland, the year 2001 saw a 3.5% decrease in the TB notification rate when compared to 2000. There was an increase in the percentage of cases who were born outside Ireland (16.5% vs 11.1% in 2000). However, this percentage remains low when compared to that in other European countries. Differences in age standardised TB incidence rates persist between health board areas (figure 2). Although the highest rate was observed in the 65+ age group (20.6/100,000 population), there was a 30% decrease in this age group in 2001 (n=91) when compared with 2000

Table 3: Diagnostic categories of TB by health board, 2001

Health Board	Pulmonary	P+E	Extrapulmonary	Unspecified	Total
ERHA	115	16	41	1	173
MHB	5	1	1	0	7
MWHB	17	1	6	0	24
NEHB	24	5	9	0	38
NWHB	9	2	2	0	13
SEHB	12	3	5	0	20
SHB	44	7	21	0	72
WHB	27	0	7	0	34
Total	**253**	**35**	**92**	**1**	**381**

Table 4. Summary of epidemiology of TB in Ireland, 1999 – 2001

	1999	2000	2001
Total number of cases	469	395	381
Notification rate (per 100,000)	12.9	10.9	9.7
Foreign born TB patients	65	44	63
% culture positive patients	55.4	58.0	58.8
M. tuberculosis	242	222	204
M. bovis	11	2	7
M. africanum	–	3	1
% smear positive pulmonary cases	38.0	47.2	44.4
Monoresistance to isoniazid	4	2	4
Monoresistance to streptomycin	0	1	3
Monoresistance to pyrizinamide	0	1	1
Multi drug resistant cases	2	2	2
Deaths attributed to TB	9	6	5

(n=130). In 2001, the ERHA and the SHB had the highest rates of TB. In 2000, TB rates were highest in the MWHB and the SHB. Rates were below the national average in the MHB, MWHB, NWHB, SEHB and WHB in 2001. There were two cases of multi-drug resistant TB which is the same as the 2000 figure. As in 2000, only sixty percent of all cases had outcome information recorded.

In the future, the introduction of the Computerised Infectious Disease Reporting (CIDR) system will provide a framework whereby all existing TB data from a variety of media (paper form, Epi Info 6 and Epi 2000 databases) will be consolidated into a single database, allowing comparisons between data over a number of years. In addition, CIDR will facilitate more comprehensive integration of clinical and laboratory TB notifications resulting in more timely reporting in the future.

Acknowledgements

We would like to thank all those who participated in the collection of information including the notifying physicians, public health doctors, surveillance scientists, microbiologists, nurses, laboratory and administrative staff.

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HIV and AIDS Surveillance in Ireland, 2002

Key Points

- **During 2002, there were 364 newly diagnosed cases of HIV infection, a 22% increase in the number of cases diagnosed in 2001.**
- **The cumulative total of HIV infections reported in Ireland to the end of December 2002 is 3,009.**
- **The majority of cases diagnosed in 2002 (63.5%) were among heterosexuals. The number of cases among heterosexuals increased by 34% between 2001 and 2002.**
- **During 2002, over 80% of the cases were between 20 and 40 years of age. The mean age was 30.8 years.**
- **Of the 364 cases diagnosed in 2002, 198 (54.4%) were female and 165 (45.3%) were male. The mean age at HIV diagnosis in males was 34.0 years and 28.1 years in females.**
- **One hundred and eighty six (51.1%) of the newly diagnosed cases in 2002 were born in sub-Saharan Africa.**
- **In 2002, 57.6% of cases were resident in the Eastern Regional Health Authority (ERHA) at HIV diagnosis.**
- **There were five cases of AIDS reported to the National Disease Surveillance Centre in Ireland in Quarter 3&4 2002. This brings the number of AIDS cases reported in 2002 to 12 and the total number of AIDS cases reported in Ireland to date to 731.**
- **There were two reports of AIDS related deaths in Quarter 3&4 2002. This brings the total of AIDS related deaths reported in 2002 to 4 and the total number of AIDS related deaths which have been reported in Ireland to date to 369.**

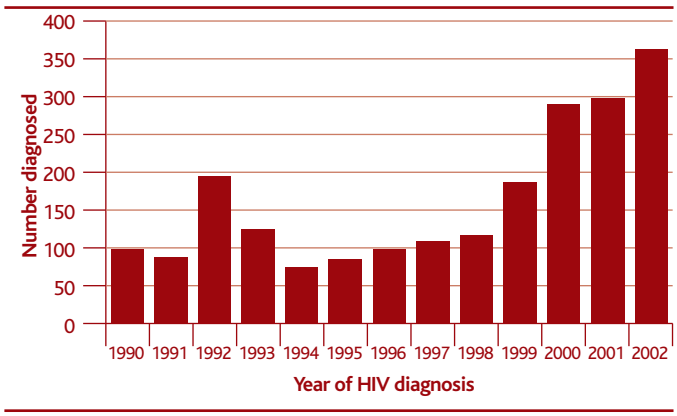

Figure 1: Annual number of HIV infections (1990 to 2002)

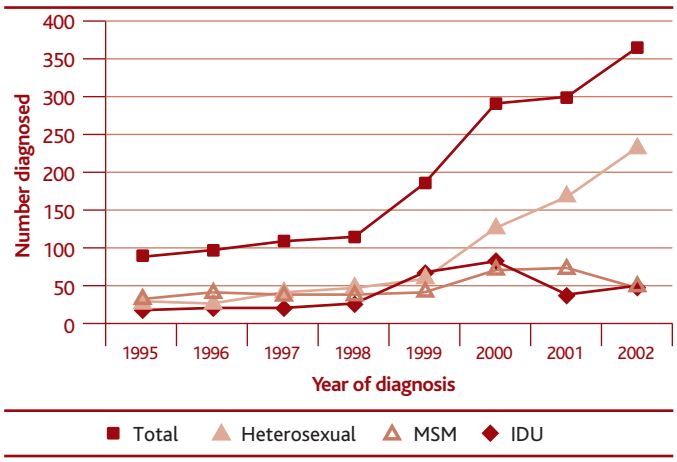

Figure 2: Newly diagnosed HIV infections in Ireland among Heterosexuals, MSM and IDUs (1995 to 2002)

Background

At the end of 2002, it was estimated that 42 million around the world were living with HIV/AIDS, including the five million people who acquired HIV in 2002[1]. HIV/AIDS is the leading cause of death in Africa and is the fourth biggest global killer. During 2002, the epidemic is estimated to have claimed 3.1 million lives[1]. Sub-Saharan Africa remains the most affected region of the world with 70% of people living with HIV/AIDS. Current projections suggest that globally an additional 45 million will become infected between 2002 and 2010, unless the world succeeds in mounting a drastically expanded global prevention effort[1].

Increasing numbers of people newly diagnosed with HIV have been seen in Ireland since the late 1990s. The national HIV case based reporting system which was introduced in Ireland in July 2001, on a recommendation of the National AIDS Strategy Committee[2], aims to ensure the collection of accurate and complete epidemiological data on the distribution and mode of transmission of HIV infection. It also enables linkage between reports of HIV infection and AIDS which will allow the progression of the disease to be monitored.

Methods

The national HIV case based reporting system has been operational since July 2001. For every newly confirmed HIV diagnosis, the National Virus Reference Laboratory (NVRL) send a partially completed HIV/AIDS surveillance report form to the clinician who requested the confirmatory test. A copy of the surveillance report form is also sent to the Director of Public Health (or nominee on his/her behalf) where the patient resides. The clinician completes the form and returns it to the relevant Director of Public Health. The forms are then forwarded to the NDSC where national figures are collated. Analysis of HIV and AIDS data is carried out by the NDSC every six months and reports are provided to clinicians, microbiologists, public health personnel, DoHC, non-governmental organizations (NGOs) and other interested parties. The report is also posted on the NDSC website. In addition, every six months, a summary of the data is forwarded to EuroHIV, the European Centre for the Epidemiological Monitoring of AIDS.

Results

A: HIV Infection

There were 364 newly diagnosed HIV infections in Ireland in 2002. This compares to 299 cases diagnosed in 2001, and represents a 22% increase. This brings the cumulative total of HIV cases reported in Ireland to December 2002 to 3,009. Figure 1 shows the number of cases diagnosed annually in Ireland from 1990 to 2002.

Exposure Category

A breakdown by exposure category in 2002 can be seen in Table 1. This is compared to the breakdown by exposure category in 2001. Figure 2 shows the trends in newly diagnosed cases among the three major risk groups since 1995.

The majority of cases diagnosed in 2002 (63.5%) were in heterosexuals. The number of cases in heterosexuals increased by 34% between 2001 and 2002. There were 46 new

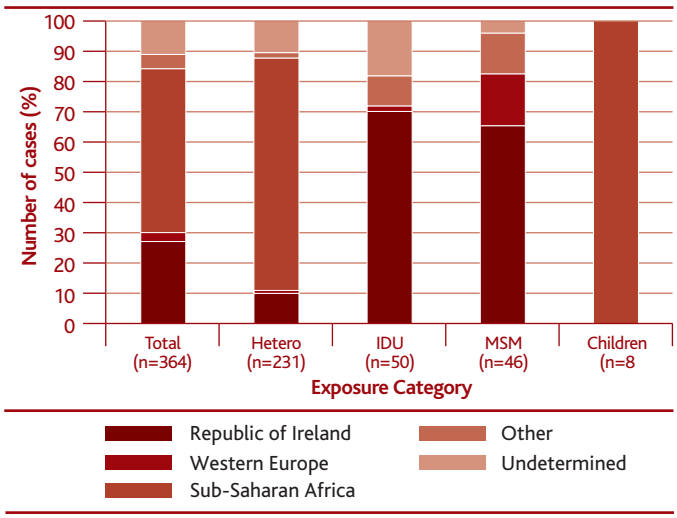

Figure 3. Geographic origin of HIV cases by exposure category (2002)

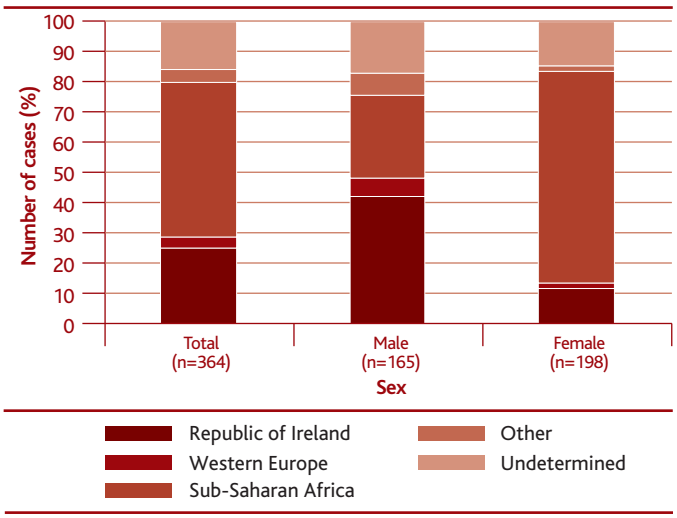

Figure 4. Geographic origin of HIV cases by sex (2002)

diagnoses in men who have sex with men (MSM) during 2002. This compares with 73 diagnosed in 2001 and represents a 37% decrease. There were 50 new diagnoses among injecting drug users (IDU) during 2002. This compares with 38 diagnosed in 2001 and represents a 32% increase.

There were 8 children diagnosed with HIV infection during 2002. In addition to these 8 children, there were 119 babies born to a HIV infected mother during 2002. Their infection status is indeterminate (i.e. they do not meet the criteria for HIV infection and are less than 18 months of age at time of test or they were born to a HIV infected mother but their antibody status is unknown).

Age Distribution and Sex

A breakdown of cases by exposure category and sex is shown in Table 2. Of the 364 cases diagnosed in 2002, 198 (54.4%) were female and 165 (45.3%) were male. Seventy two percent of all newly diagnosed heterosexual cases were female. Sixty six percent of all newly diagnosed IDUs cases were male.

A breakdown of cases by exposure category and age group is shown in Table 3. Over 80% of the cases were between 20 and 40 years of age and the mean age of cases was 30.8 years. The mean age in females was 28.1 years and in males was 34.0 years, a difference of 5.9 years. The mean age of cases in heterosexuals was 30.0 years, in IDU was 30.6 years and in MSM was 38.5 years.

Geographic Origin

Data on the geographic origin of HIV cases are available since the introduction of HIV case based reporting in July 2001. Geographic origin is based on the country of birth for adults and on the country of birth of the mother for children. Analysis of 2002 cases by geographic origin is shown in Figure 3 and 4. Of the 364 cases diagnosed in 2002, 186 (51.1%) were born in sub-Saharan Africa and 92 (25.3%) were born in the Republic of Ireland (figure 3). The majority of heterosexuals (76.6%) diagnosed in 2002 were born in sub-Saharan Africa. The majority of MSM (65.2%) and IDUs (70.0%) diagnosed in 2002 were born in the Republic of Ireland.

The majority of women (70.7%) diagnosed in 2002 were born in sub-Saharan Africa. Forty two percent of males were born in the Republic of Ireland.

Area of Residence

A breakdown of HIV cases by area of residence is shown in Table 4. Of the newly diagnosed cases in 2002, 57.7% of cases were resident in the Eastern Regional Health Authority (ERHA) at HIV diagnosis. The area of residence was unknown for 20% of the newly diagnosed cases. By exposure category, 60.6% of heterosexuals, 67.4% of MSM and 72.0% of IDUs were resident in the ERHA.

B: AIDS

AIDS cases

There were five cases of AIDS reported to the National Disease Surveillance Centre during Quarter 3&4 2002. This brings the number of AIDS cases reported in 2002 to 12 and the total number of AIDS cases reported in Ireland to the end of December 2002 to 731. Figure 5 illustrates the number of

Table 1: Newly diagnosed HIV infections in Ireland by exposure category (2001 and 2002)

Exposure category	2001		2002	
	Number	%	Number	%
Heterosexual	173	57.9	231	63.5
MSM	73	24.4	46	12.6
IDU	38	12.7	50	13.7
Children	6	2.0	8	2.2
Transfusion Recipient	2	0.7	-	-
Haemophiliac	-	-	1	0.3
Other	-	-	4	0.6
Undetermined	7	2.3	24	6.6
Total	**299**	**100**	**364**	**100**

Table 2: Newly diagnosed HIV infections in Ireland by exposure category and sex (2002)

Exposure category	Sex			
	Male	Female	Unknown	Total
Heterosexual	64	167	-	231
MSM	46	-	-	46
IDU	3	17	-	50
Children	5	3	-	8
Haemophiliac	-	1	-	1
Other	4	-	-	4
Undetermined	3	10	1	24
Total	**165**	**198**	**1**	**364**

Table 3: Newly diagnosed HIV infections in Ireland by exposure category and age group (2002)

Age group (years)	Exposure Category							
	Heterosexual	MSM	IDU	Children	Haemophiliac	Other	Undetermined	Total
0-9	-	-	-	8	-	-	-	8
10-19	14	-	1	-	-	-	-	15
20-29	112	8	24	-	-	-	16	160
30-39	86	22	22	-	-	1	5	136
40-49	14	8	2	-	1	1	3	29
50-59	5	8	1	-	-	2	-	16
60-69	-	-	-	-	-	-	-	-
Total	**231**	**46**	**50**	**8**	**1**	**4**	**24**	**364**

reported AIDS cases in Ireland since the start of the epidemic.

A breakdown of AIDS cases reported in 2002 and all AIDS cases reported to date is shown in Table 5. Seven of the twelve cases (58%) reported in 2002 were in heterosexuals. There were two cases reported in IDUs and two cases reported in MSM. Of the 12 cases reported during 2002, 9 (75%) were male and 3 (25%) were female. Of the 12 cases reported during 2002, the mean age at AIDS diagnosis was 41.4 years.

AIDS related deaths

There were two AIDS related deaths reported to the National Disease Surveillance Centre during Quarter 3&4 2002. This brings the total of AIDS related deaths reported in 2002 to 4 and the total number of AIDS related deaths which have been reported in Ireland to date to 369. It is important to note that there is a significant delay in reporting AIDS related deaths and the number reported may not accurately reflect the true number.

Discussion

Increasing numbers of people newly diagnosed with HIV infection have been seen in Ireland since the late 1990s. Between 1998 and 2002, there was over a three-fold increase in the number of newly diagnosed HIV infections. It is important to note that these figures do not represent the numbers of people infected with the HIV virus in Ireland but rather provide information on the number of new diagnoses in a given time period. The number of new diagnoses is dependent on patterns of HIV testing and reporting.

Heterosexual transmission accounts for an increasing share of new HIV infections in Ireland and over the last five years, the number of newly diagnosed HIV infections among heterosexuals has increased six-fold. During 2002, the majority of heterosexual cases were born in sub-Saharan Africa with 10% born in Ireland. Sub-Saharan Africa is the region of the world worst affected by the HIV/AIDS epidemic with 29.4 million people currently living with HIV/AIDS, including approximately 3.5 million people newly infected in 2002[1]. Therefore, the number of cases of HIV infection diagnosed among people of sub-Saharan African origin is not unexpected. It is important to remember that people from sub-Saharan Africa do not form a homogenous group and include students, immigrant workers, refugees, economic migrants, asylum seekers and others. The epidemiology of the HIV epidemic in Ireland mirrors the situation in many other Western European countries where persons originating from sub-Saharan Africa bear an increasing share of the burden of the epidemic.[3] Heterosexual transmission is now the most frequent transmission mode in Western Europe.[3]

There was a decrease in the number of cases reported in the MSM category, from 73 in 2001 to 46 in 2002. However, this decrease must be interpreted with caution as the numbers involved are small and it remains to be seen whether this downward trend will be sustained in the future. Concern has been raised in the United States over a resurgence of risky sexual behaviours and infections among men who have sex with men[4] and there have been a number of reported outbreaks of syphilis in MSM in countries in Europe, including Ireland.[5,6]

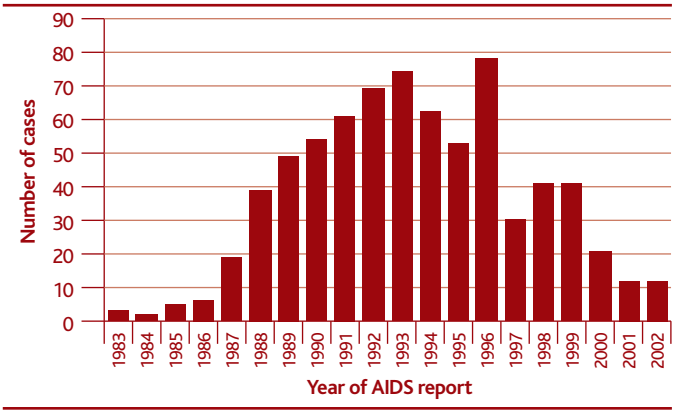

Figure 5: AIDS cases reported in Ireland (1983 to 2002)

Table 4: Newly diagnosed HIV infections in Ireland by exposure category and area of residence at diagnosis (2002)

Exposure Category	Area			
	ERHA	Non-ERHA	Unknown	Total
Heterosexual	140	64	27	231
MSM	31	10	5	46
IDU	36	5	9	50
Children	3	3	2	8
Haemophiliac	-	1	-	1
Other	3	1	-	4
Undetermined	3	2	19	24
Total	**210**	**81**	**73**	**364**

Table 5: AIDS cases reported in Ireland by exposure category (2002)

Exposure category	2001		Total	
	Number	%	Number	%
Heterosexual	7	58.3	108	14.8
MSM	2	16.7	252	34.5
IDU	2	16.7	285	39.0
Haemophiliacs	-	-	33	4.5
Transfusion Recipient	-	-	3	0.4
IDU+ MSM	-	-	10	1.4
Children	-	-	25	3.3
Other/Undetermined	1	8.3	15	2.1
Total	**12**	**100**	**731**	**100.0**

Among IDUs, there was a 32% increase in the numbers of cases diagnosed, from 38 in 2001 to 50 in 2002. However, as the numbers involved are small and the figures tend to fluctuate from year to year (for example, between 2000 and 2001, there was a 54% increase in the number of cases), these figures need to be interpreted with caution.

The majority of people diagnosed with HIV infection in 2002 were aged between 20 and 40 years. There was a notable difference in age distribution between the sexes and females were younger at HIV diagnosis then males. This trend has been seen worldwide and it has been suggested that women may be at risk for infection at an earlier age due to infection by older sexual partners.[7] Women made up nearly half of the HIV-infected people globally in 2002.[1] In addition, the availability of routine antenatal HIV screening in Ireland and differences in health seeking behaviour may result in women being diagnosed more promptly than their male counterparts.

It has been clearly shown that transmission of the HIV virus from mother to child can be dramatically reduced or prevented by antenatal screening and treatment of HIV positive women with antiretroviral drugs and by careful management of the delivery.[8] In April 1999, the Department of Health and Children officially launched the national linked antenatal HIV screening programme in Ireland. This programme recommends that HIV testing be offered to all women who attend for antenatal care. During 2002, 119 babies were born to a HIV infected mother. The infection status of these babies is indeterminate. This reflects the effectiveness of the antenatal HIV screening programme and treatment and follow up services for HIV infected pregnant women in Ireland in preventing transmission of the infection from mother to baby.

A disproportionately high number of newly diagnosed HIV infections were resident in the ERHA area. In 2002, the rate in the ERHA was 149.8 per million population compared to 32.2 per million population in the rest of the country. In particular, the rate of IDUs in the ERHA area was 25.7 per million population compared to 2.4 per million population in the rest of the country.

The introduction of highly active antiretroviral therapy (HAART) during 1996 and 1997 led to a well-documented reduction in mortality and risk of AIDS-defining illnesses in countries where HAART is available[9]. The number of AIDS cases and AIDS related deaths in Ireland has declined in all exposure categories since the mid 1990's[10]. However, it is important to note that there is a significant delay in reporting AIDS cases and AIDS related deaths and the number reported in 2002 is likely to be an underestimation of the number diagnosed.

Acknowledgements

National Virus Reference Laboratory. Surveillance Sub-Committee of the National AIDS Strategy Committee (NASC). Department of Health and Children. Consultants in Infectious Diseases/Genito-Urinary Medicine Departments of Public Health. EuroHIV, Institut de Veille Sanitaire, France

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Sexually Transmitted Infections in Ireland, 2001

Key Points

- **Total number of notified STIs increased by 9.4% in 2001, compared to 2000.**
- **The highest increases recorded during 2001, compared to 2000 were for syphilis (506.5%), infectious hepatitis B (160.0%), genital herpes simplex (23.1%), *Chlamydia trachomatis* (22.8%) and gonorrhoea (20.3%).**
- **The three most commonly notified STIs in 2001 were ano-genital warts, *Chlamydia trachomatis* and non-specific urethritis.**

Introduction

During 2001, 14 sexually transmitted infections (STIs) were legally notifiable in Ireland: ano-genital warts, candidiasis, chancroid, *Chlamydia trachomatis*, genital herpes simplex, gonorrhoea, granuloma inguinale, infectious hepatitis B, lymphogranuloma venereum, molluscum contagiosum, non-specific urethritis, *Pediculosis pubis*, syphilis and trichomoniasis. This report details the 14 STIs notifiable during 2001.

Aggregate data on the number of notified STIs from Departments of Public Health is collated quarterly. Departments of Public Health are notified of STIs mostly from STI clinics. The number of STIs notified by quarter, health board, age group and gender for 2001 are presented in this report. It should be noted that cases of infectious hepatitis B that are sexually transmitted may also be reported through the weekly infectious disease report published by NDSC. During 2001, the total number of notified STIs increased by 9.4%, when compared to 2000.

Materials and Methods

Aggregate STI data is collected quarterly from STI clinics including age group, gender and diagnosis. Rates per 100,000 population for 1989 to 1993 are based on the 1991 population census; rates for 1994 to 1999 are based on the 1996 population census and rates for 2000 and 2001 are based on the 2002 population census.

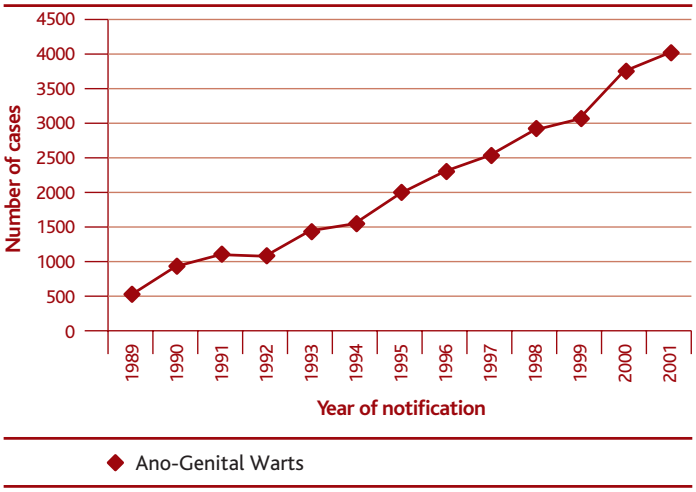

Figure 1a

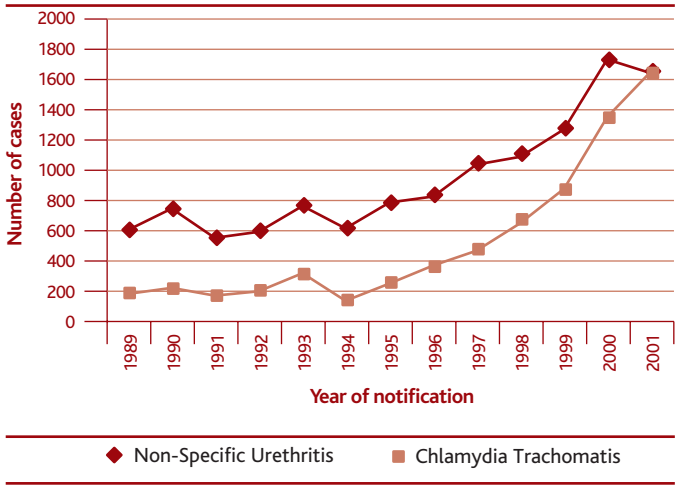

Figure 1b

Figure 1: Number of notifications of ano-genital warts, non-specific urethritis, C. trachomatis, genital herpes simplex, gonorrhoea, syphilis & infectious hepatitis B, by year between 1989 and 2001.

Results

Notified STIs between 1989 and 2001

During 2001, 9703 cases of STIs were notified compared to 8869 in 2000, a 9.4% increase (table 1). Notified STIs have been increasing steadily each year since 1994, increasing by 103.0% between 1995 and 2001 and by 335.5% between 1989 and 2001. A total of 69003 STIs have been notified since 1989, 14.1% of these were notified in 2001. The number of STIs notified in 2001 is the highest number reported in any year on record. Notified cases of ano-genital warts, candidiasis, *C. trachomatis*, genital herpes simplex, gonorrhoea, infectious hepatitis B and syphilis all increased during 2001, compared to 2000. Significantly, notified cases of syphilis increased by 506.5% and infectious hepatitis B by 160.0%. Chancroid, molluscum contagiosum, non-specific urethritis, *P. pubis* and trichomoniasis decreased in 2001, compared to 2000. No cases of granuloma inguinale or lymphogranuloma venereum were notified in 2001 or 2000. The cumulative rate per 100,000 population for all notified STIs increased in 2001 to 247.7 per 100,000 population; compared to a rate of 226.4 per 100,000 in 2000 (table 9).

Notified STIs by quarter during 2001

The total number of notified STIs in 2001 peaked during Q3 (tables 2 & 3). Ano-genital warts, chancroid and genital herpes simplex peaked during Q1 and gonorrhoea, molluscum contagiosum and non-specific urethritis during Q2. *P. pubis* peaked during quarters 1 and 2 in 2001 and candidiasis and syphilis during Q3 2001. *C. trachomatis*, infectious hepatitis B and trichomoniasis reached their highest numbers for 2001 in Q4.

Notified STIs by health board during 2001

During 2001, 50.7% (4920) of all STI notifications were from the ERHA, 14.2% (1380) from the MWHB, 11.4% (1110) from the SHB, 8.8% (856) from the WHB, 8.7% (846) from the SEHB, 6.1% (587) from the NWHB, 0.03% (3) from the MHB and 0.01% (1) from the NEHB (table 4). It is important to note that STI surveillance is mainly clinic based and there are currently no STI clinics in the MHB and NEHB.

Notified STIs by age group & gender during 2001

For 2001, where the age group was known (n=5195), 13.6% (706) of notified STIs were 0 to 19 years old, 61.5% (3195) were 20 to 29, 17.8% (924) were 30 to 39 and 7.1% (370) were aged over 40 years of age. For all STIs, the 20-29 year age group represented the largest age group, with the exception of syphilis where the majority of cases were aged between 30 and 39 years of age (tables 5, 6 & 7).

Fifty-two percent (4944) of all notified STIs were amongst males during 2001, whilst 48.8% (4732) were amongst females. Data was not available for 27 cases. The majority of cases of syphilis (82.4%), non-specific urethritis (77.4%), infectious hepatitis B (76.9%), gonorrhoea (75.9%), *P. pubis* (68.0%) and molluscum contagiosum (61.3%) were amongst males. The majority of cases of chancroid (100.0%), candidiasis (85.0%), trichomoniasis (76.6%), genital herpes simplex (62.8%), *C. trachomatis* (52.9%) and ano-genital warts (51.2%) were amongst females (tables 5, 6 & 7).

Disease-specific trends (figure 1 & tables 8 & 9)

Please note that quarterly STI data is only available from Q1 1995 & annual STI data is only available from 1989.

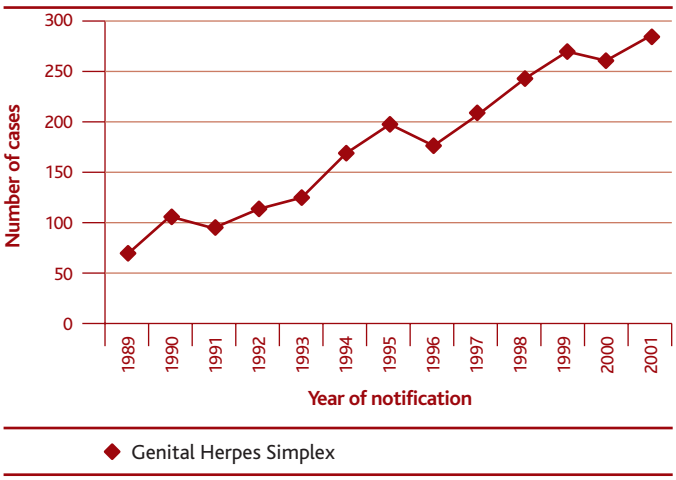

Figure 1c

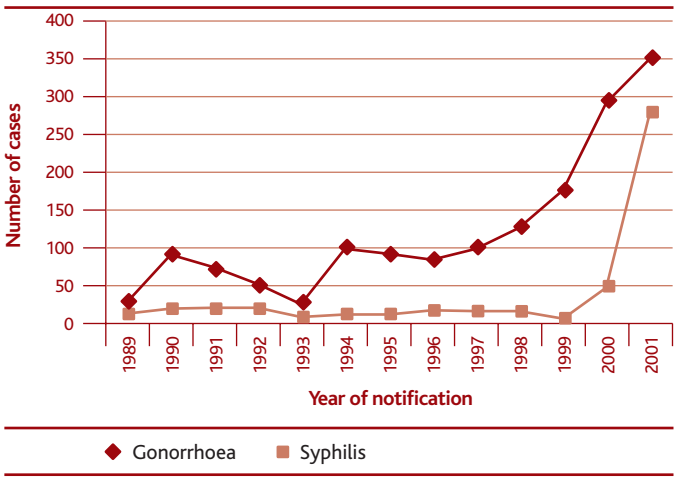

Figure 1d

Ano-genital warts
Ano-genital warts accounted for the majority (41.2%) of all STI notifications in 2001. Notifications of ano-genital warts have increased each year since 1992. In 1989, 505 (14.3/100,000) cases were notified, increasing to 1972 (54.4/100,000) in 1995 and 3993 (101.9/100,000) in 2001. From Q1 2000 to Q4 2001, notified cases of ano-genital warts have remained stable, with a mean of 966 cases per quarter. In 2001, males accounted for 48.8% of cases and females for 51.2% with gender unknown for 0.05%. Where the age group was known (in 55.5% of cases), 0-19 year olds accounted for 14.0% of cases, 65.4% of cases were 20-29, 16.1% were 30-39 and 4.6% were aged 40 years or older.

Candidiasis
Between 1990 and 1997, the mean number of notified candidiasis cases was 1293 per year, peaking in 1997 at 1521 cases (42.0/100,000). Notified cases have decreased each year since 1997, reaching 1095 in 2000 (28.0/100,000). During 2001, this decreasing trend was reversed, with 29.4 candidiasis cases per 100,000 population notified. In Q3 2001, 8.9 candidiasis cases per 100,000 population were notified, the highest rate for any quarter since Q4 1998 (9.5/100,000). Candidiasis accounted for 11.9% of all STI notifications in 2001. In 2001, males accounted for 14.8% of cases and females for 85.0%. Where the age group was known (in 55.3% of cases), 0-19 year olds accounted for 15.7% of cases, 20-29 year olds for 48.9%, 30-39 year olds for 20.6% and 14.8% were aged 40 years or older.

Chancroid
One case of chancroid was notified in 2001, in Q1. With the exception of the year 2000 (when 16 cases were notified), between 0 and 3 cases of chancroid were notified each year between 1989 and 1999.

Chlamydia trachomatis
During Q4 2001, 454 cases of *C. trachomatis* were notified, the highest number notified in any one quarter on record. From 1989 to 1995 the number of notified cases of *C. trachomatis* generally remained stable fluctuating around a mean of 205 per year. In 1995 there was a marked increase of 84.2% on the previous year (from 133 cases, 3.7/100,000 to 245 cases, 6.8/100,000). Since 1995 there has been an increasing number of cases reported each year reaching 1649 in 2001 (42.1/100,000). Notified cases have increased by 573.1% between 1995 and 2001. During 2001, the number of male cases increased by 15.6% and the number of female cases by 28.4%, when compared to 2000. In 2001, where the age group was known (in 51.1% of cases), 0-19 year olds accounted for 18.2% of cases, 20-29 year olds for 66.2%, 30-39 year olds for 12.1% and 3.6% were 40 years or older.

Genital herpes simplex
There was a 23.1% increase in the number of notified cases of genital herpes simplex during 2001 compared to 2000. Genital herpes simplex cases increased from 78 (2.2/100,000) in 1989 to 198 (5.5/100,000) in 1995 and 331 (8.5/100,000) in 2001. During 2001, the number of male cases increased by 34.8% and the number of female cases by 15.6%, when compared to 2000. In 2001, where the age group was known (in 41.1% of cases), 0-19 year olds accounted for 15.4% of cases, 20-29 year olds for 55.9%, 30-39 year olds for 20.6% and 8.1% were 40 years or older.

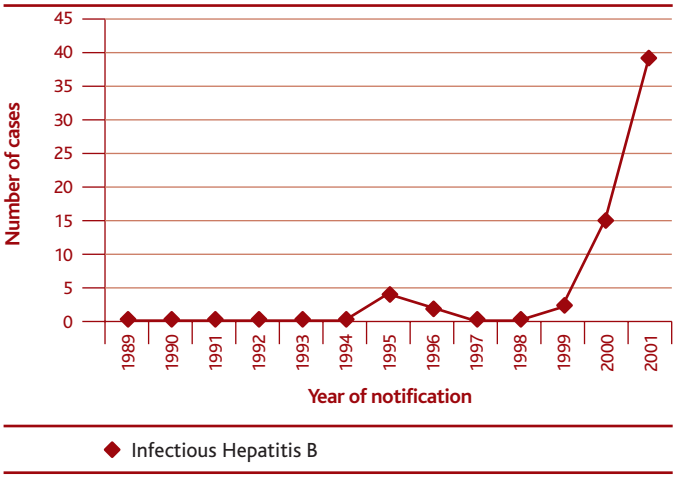

Figure 1e

Table 1: Notified sexually transmitted infections for 2001 and 2000

Sexually Transmitted Infection	2001	2000	Increase	% Increase
Ano-Genital Warts	3993	3735	258	6.91
Candidiasis	1150	1095	55	5.02
Chancroid	1	16	-15	-93.75
Chlamydia Trachomatis	1649	1343	306	22.78
Genital Herpes Simplex	331	269	62	23.05
Gonorrhoea	349	290	59	20.34
Granuloma Inguinale	0	0	0	0.00
Infectious Hepatitis B	39	15	24	160.00
Lymphogranuloma Venereum	0	0	0	0.00
Molluscum Contagiosum	111	118	-7	-5.93
Non-Specific Urethritis	1634	1726	-92	-5.33
Pediculosis Pubis	103	138	-35	-25.36
Syphilis	279	46	233	506.52
Trichomoniasis	64	78	-14	-17.95
Total	**9703**	**8869**	**834**	**9.40**

Gonorrhoea

Reported notifications of gonorrhoea have increased consistently since 1996; increasing from 83 (2.3/100,000) in 1996 to 349 (8.9/100,000) in 2001. Notifications of gonorrhoea have remained high since Q3 2000, when there was a 92.0% increase in the number of cases (from 50 in Q2 2000 to 96 in Q3 2000). During 2001, gonorrhoea cases increased by 20.3% compared to 2000. However in Q4 2001, 74 cases were notified, the lowest number since Q2 2000. In 2001, males accounted for 75.9% of cases and females for 23.5%. Where the age group was known (37.8%), 0-19 year olds accounted for 10.6% of cases, 20-29 year olds for 57.6%, 30-39 year olds for 21.2% and those 40 years or older for 10.6% of cases in 2001.

Granuloma inguinale

No cases of granuloma inguinale were notified during 2001. The number of cases of granuloma inguinale has ranged from 0 to 6 cases per year, between 1989 and 2000.

Infectious hepatitis B

Between 1989 and 1999, infectious hepatitis B cases reported through the STI quarterly notification system ranged from 0 to 4 cases per year. Between 1999 and 2000, there was a 650.0% increase in notifications, when 15 cases were notified in the last 2 quarters of 2000. During 2001, this increase has continued with 39 cases reported, a 160.0% increase on 2000. Thirteen cases were notified in Q4 2001, the highest number notified in any one quarter on record. During 2001, the number of male cases increased by 130.8% and the number of female cases increased by 350.0%, compared to 2000. In 2001, where age group data was known (in 30.8% of cases), 66.7% of cases were aged between 20 and 29 years and 33.3% of cases were aged between 30-39 years.

Lymphogranuloma venereum

No cases of lymphogranuloma venereum were notified during 2001. The number of notified cases of lymphogranuloma venereum ranged from 0 to 5 cases per year, between 1989 and 2000.

Molluscum contagiosum

Notified cases of molluscum contagiosum have increased from 31 (0.9/100,000) in 1989, to 59 (1.6/100,000) in 1995 and 111 (2.8/100,000) in 2001. During 2001, the number of molluscum contagiosum notifications decreased by 5.9% compared to 2000. Nineteen notified cases of molluscum contagiosum were reported in Q3 2001 and again in Q4 2001, the lowest quarterly levels since Q3 1999. During 2001, the number of male cases increased by 4.6% and female cases decreased by 17.3%, compared to the same period in 2000. In 2001, where the age group was known (51.4% of cases), 0-19 year olds accounted for 10.5% of cases, 66.7% were 20-29, 17.5% were 30-39 and 5.3% were aged 40 years or older.

Non-specific urethritis

Non-specific urethritis notifications increased marginally between 1990 and 1995, from 738 (20.9/100,000) in 1990 to 781 (21.5/100,000) in 1995, a 5.8% increase. Between 1995 and 2001, notified cases increased by 109.2%, to 1634 (41.7/100,000) in 2001. However compared to 2000, notified cases decreased in 2001, by 5.3%. During 2001, the number of male and female cases decreased by 4.5% and 8.5%,

Table 2: Notified sexually transmitted infections by quarter from Q1 1999 to Q4 2001

Sexually Transmitted Infection	1999				2000				2001			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Ano-Genital Warts	762	905	671	711	953	952	832	998	1060	1025	974	934
Candidiasis	269	263	273	300	317	262	272	244	222	282	347	299
Chancroid	0	0	0	1	0	3	5	8	1	0	0	0
Chlamydia Trachomatis	169	295	152	253	309	346	310	378	375	379	441	454
Genital Herpes Simplex	94	53	38	90	75	50	74	70	97	73	72	89
Gonorrhoea	21	55	59	40	54	50	96	90	86	100	89	74
Granuloma Inguinale	0	0	1	0	0	0	0	0	0	0	0	0
Infectious Hepatitis B	2	0	0	0	0	0	5	10	7	10	9	13
Lymphogranuloma Venereum	0	0	2	0	0	0	0	0	0	0	0	0
Molluscum Contagiosum	23	29	10	21	33	37	21	27	35	38	19	19
Non-Specific Urethritis	243	389	304	329	425	385	404	512	400	421	407	406
Pediculosis Pubis	35	25	21	32	37	38	25	38	30	30	19	24
Syphilis	2	1	1	2	2	7	21	16	49	72	87	71
Trichomoniasis	10	15	9	13	18	15	27	18	15	11	16	22
Total	**1630**	**2030**	**1541**	**1792**	**2223**	**2145**	**2092**	**2409**	**2377**	**2441**	**2480**	**2405**

Table 3: Notified sexually transmitted infections per 100,000 population by quarter from Q1 1999 to Q4 2001*

Sexually Transmitted Infection	1999				2000				2001			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Ano-Genital Warts	21.01	24.96	18.50	19.61	24.33	24.30	21.24	25.48	27.06	26.17	24.86	23.84
Candidiasis	7.42	7.25	7.53	8.27	8.09	6.69	6.94	6.23	5.67	7.20	8.86	7.63
Chancroid	0.00	0.00	0.00	0.03	0.00	0.08	0.13	0.20	0.03	0.00	0.00	0.00
Chlamydia Trachomatis	4.66	8.14	4.19	6.98	7.89	8.83	7.91	9.65	9.57	9.68	11.26	11.59
Genital Herpes Simplex	2.59	1.46	1.05	2.48	1.91	1.28	1.89	1.79	2.48	1.86	1.84	2.27
Gonorrhoea	0.58	1.52	1.63	1.10	1.38	1.28	2.45	2.30	2.20	2.55	2.27	1.89
Granuloma Inguinale	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Infectious Hepatitis B	0.06	0.00	0.00	0.00	0.00	0.00	0.13	0.26	0.18	0.26	0.23	0.33
Lymphogranuloma Venereum	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Molluscum Contagiosum	0.63	0.80	0.28	0.58	0.84	0.94	0.54	0.69	0.89	0.97	0.49	0.49
Non-Specific Urethritis	6.70	10.73	8.38	9.07	10.85	9.83	10.31	13.07	10.21	10.75	10.39	10.36
Pediculosis Pubis	0.97	0.69	0.58	0.88	0.94	0.97	0.64	0.97	0.77	0.77	0.49	0.61
Syphilis	0.06	0.03	0.03	0.06	0.05	0.18	0.54	0.41	1.25	1.84	2.22	1.81
Trichomoniasis	0.28	0.41	0.25	0.36	0.46	0.38	0.69	0.46	0.38	0.28	0.41	0.56
Total	**44.95**	**55.98**	**42.50**	**49.42**	**56.75**	**54.76**	**53.41**	**61.50**	**60.68**	**62.31**	**63.31**	**61.40**

Table 4: Notified sexually transmitted infections by health board for 2001

Sexually Transmitted Infection	ERHA	MHB	MWHB	NEHB	NWHB	SEHB	SHB	WHB	Total
Ano-Genital Warts	1893	0	499	0	277	354	586	384	3993
Candidiasis	532	0	145	0	57	59	100	257	1150
Chancroid	1	0	0	0	0	0	0	0	1
Chlamydia Trachomatis	905	1	219	0	42	177	197	108	1649
Genital Herpes Simplex	225	0	25	0	6	29	22	24	331
Gonorrhoea	240	0	24	0	11	33	27	14	349
Granuloma Inguinale	0	0	0	0	0	0	0	0	0
Infectious Hepatitis B	27	0	6	0	0	4	2	0	39
Lymphogranuloma Venereum	0	0	0	0	0	0	0	0	0
Molluscum Contagiosum	57	0	2	0	5	17	19	11	111
Non-Specific Urethritis	723	0	430	0	172	151	130	28	1634
Pediculosis Pubis	44	0	10	0	8	10	13	18	103
Syphilis	230	2	15	1	7	8	9	7	279
Trichomoniasis	43	0	5	0	2	4	5	5	64
Total	**4920**	**3**	**1380**	**1**	**587**	**846**	**1110**	**856**	**9703**

Table 5: Notified sexually transmitted infections by age group (years) & gender for 2001

Sexually Transmitted Infection	0-19	20-29	30-39	40+	Age unknown	Male	Female	Gender unknown	Total
Ano-Genital Warts	310	1449	357	101	1776	1947	2044	2	3993
Candidiasis	100	311	131	94	514	170	978	2	1150
Chancroid	0	0	0	0	1	0	1	0	1
Chlamydia Trachomatis	153	557	102	30	807	765	872	12	1649
Genital Herpes Simplex	21	76	28	11	195	120	208	3	331
Gonorrhoea	14	76	28	14	217	265	82	2	349
Granuloma Inguinale	0	0	0	0	0	0	0	0	0
Infectious Hepatitis B	0	8	4	0	27	30	9	0	39
Lymphogranuloma Venereum	0	0	0	0	0	0	0	0	0
Molluscum Contagiosum	6	38	10	3	54	68	43	0	111
Non-Specific Urethritis	89	576	189	64	716	1265	368	1	1634
Pediculosis Pubis	10	38	9	3	43	70	31	2	103
Syphilis	3	52	62	45	117	230	47	2	279
Trichomoniasis	0	14	4	5	41	14	49	1	64
Total	**706**	**3195**	**924**	**370**	**4508**	**4944**	**4732**	**27**	**9703**

Table 6: Notified sexually transmitted infections per 100,000 population by age group (years) for 2001*

Sexually Transmitted Infection	0-19	20-29	30-39	40+	Unknown	Total
Ano-Genital Warts	27.18	226.04	59.94	6.56	45.34	101.93
Candidiasis	8.77	48.52	22.00	6.10	13.12	29.36
Chancroid	0.00	0.00	0.00	0.00	0.03	0.03
Chlamydia Trachomatis	13.41	86.89	17.13	1.95	20.60	42.10
Genital Herpes Simplex	1.84	11.86	4.70	0.71	4.98	8.45
Gonorrhoea	1.23	11.86	4.70	0.91	5.54	8.91
Granuloma Inguinale	0.00	0.00	0.00	0.00	0.00	0.00
Infectious Hepatitis B	0.00	1.25	0.67	0.00	0.69	1.00
Lymphogranuloma Venereum	0.00	0.00	0.00	0.00	0.00	0.00
Molluscum Contagiosum	0.53	5.93	1.68	0.19	1.38	2.83
Non-Specific Urethritis	7.80	89.86	31.73	4.16	18.28	41.71
Pediculosis Pubis	0.88	5.93	1.51	0.19	1.10	2.63
Syphilis	0.26	8.11	10.41	2.92	2.99	7.12
Trichomoniasis	0.00	2.18	0.67	0.32	1.05	1.63
Total	**61.90**	**498.42**	**155.14**	**24.03**	**115.08**	**247.70**

Table 7: Notified sexually transmitted infections per 100,000 population by gender for 2001*

Sexually Transmitted Infection	Male	Female	Unknown	Total
Ano-Genital Warts	100.04	103.70	0.05	101.93
Candidiasis	8.74	49.62	0.05	29.36
Chancroid	0.00	0.05	0.00	0.03
Chlamydia Trachomatis	39.31	44.24	0.31	42.10
Genital Herpes Simplex	6.17	10.55	0.08	8.45
Gonorrhoea	13.62	4.16	0.05	8.91
Granuloma Inguinale	0.00	0.00	0.00	0.00
Infectious Hepatitis B	1.54	0.46	0.00	1.00
Lymphogranuloma Venereum	0.00	0.00	0.00	0.00
Molluscum Contagiosum	3.49	2.18	0.00	2.83
Non-Specific Urethritis	65.00	18.67	0.03	41.71
Pediculosis Pubis	3.60	1.57	0.05	2.63
Syphilis	11.82	2.38	0.05	7.12
Trichomoniasis	0.72	2.49	0.03	1.63
Total	**254.04**	**240.08**	**0.69**	**247.70**

respectively, compared to 2000. Where the age group was known (56.2% of cases), 0-19 year olds accounted for 9.7% of cases, 62.7% were 20-29, 20.6% were 30-39 and 7.0% were aged 40 years or older.

Pediculosis pubis

P. pubis notifications increased gradually between 1996 and 2000, with 79 (2.2/100,000) cases notified in 1996 and 138 (3.5/100,000) cases in 2000. This increasing trend was reversed in 2001, when 103 (2.6/100,000) cases were notified, the lowest number notified since 1997. During 2001, 70 male and 31 female *P. pubis* cases were notified, a decrease of 24.7% and 31.1%, respectively, compared to 2000. In 2001, where the age group was known (58.3% of cases), 0-19 year olds accounted for 16.7% of cases, 63.3% were 20-29, 15.0% were 30-39 and 5.0% were aged 40 years or older.

Syphilis

There has been a dramatic increase in syphilis amongst men who have sex with men (MSM) in Dublin since early 2000. This was against a low incidence of syphilis nationally throughout the 1990s, which in 1999 reached its lowest level in 10 years (6 cases, 0.2/100,000). Between Q2 and Q3 2000, syphilis notifications increased significantly by 200.0% (from 7, 0.2/100,000 to 21, 0.5/100,000). A total of 46 syphilis cases were notified through the STI quarterly notification system in 2000, the highest number on record. This was followed by a 206.0% increase between Q4 2000 (16, 0.4/100,00) and Q1 2001 (49, 1.3/100,000). In 2001, 279 (7.1/100,000) syphilis cases were notified, an increase of 506.5% compared to 2000, peaking in Q3 2001. More syphilis cases were notified in the first 3 quarters of 2001, than the yearly totals for each year between 1989 and 2000. During 2001, 82.4% (230) of cases were male and 16.8% (47) were female. The gender was unknown for 2 cases. Where the age group was known (in 58.1% of cases), 0-19 year olds accounted for 1.9% of cases, 32.1% were 20-29, 38.3% were 30-39 and 27.8% were aged 40 years or older. The age group of syphilis cases is markedly different to all other STIs notified, with the majority of cases aged between 30 and 39 years. It is important to note that these syphilis numbers differ slightly from those reported through the enhanced surveillance system.

Trichomoniasis

The mean number of trichomoniasis notifications reported between 1989 and 2001 was 68, peaking in 1991 at 163 (4.6/100,000). During 2001, 64 (1.6/100,000) cases were notified, a decrease of 18.0% compared to 2000 when 78 (2.0/100,000) cases were notified. In 2001, 21.9% (14) of cases were male and 76.6% (49) were female. Where the age group was known (in 35.9% of cases), 0-19 year olds accounted for 0.0% of cases, 60.9% were 20-29, 17.4% were 30-39 and 21.7% were aged 40 years or older.

Discussion

The three most commonly notified STIs in 2001 were ano-genital warts, *C. trachomatis* and non-specific urethritis. The highest increases recorded during 2001, compared to 2000 were for syphilis (506.5%), infectious hepatitis B (160.0%), genital herpes simplex (23.1%), *C. trachomatis* (22.8%) & gonorrhoea (20.3%).[1, 2] Recently concern has been raised over a resurgence of STIs, particularly among MSM. The rising incidence of gonorrhoea and syphilis reported since 1995 across Europe is consistent with an increase in unsafe sex,

Table 8: Notified sexually transmitted infections from 1989 to 2001

Sexually Transmitted Infection	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Ano-Genital Warts	505	917	1089	1066	1432	1532	1972	2286	2514	2886	3049	3735	3993
Candidiasis	688	1056	1257	1157	1400	1360	1271	1321	1521	1277	1105	1095	1150
Chancroid	2	0	0	2	0	2	3	1	1	0	1	16	1
Chlamydia Trachomatis	174	215	164	192	315	133	245	364	462	646	869	1343	1649
Genital Herpes Simplex	78	123	109	125	124	173	198	181	211	243	275	269	331
Gonorrhoea	27	90	73	51	24	98	91	83	98	125	175	290	349
Granuloma Inguinale	0	0	0	0	6	0	0	1	1	0	1	0	0
Infectious Hepatitis B	0	0	0	0	0	0	4	2	0	0	2	15	39
Lymphogranuloma Venereum	0	0	0	0	0	0	0	0	5	1	2	0	0
Molluscum Contagiosum	31	39	43	44	34	56	59	34	74	84	83	118	111
Non-Specific Urethritis	600	738	549	585	756	610	781	823	1034	1	1265	1726	1634
Pediculosis Pubis	60	70	72	70	77	69	86	79	81	105	113	138	103
Syphilis	12	19	20	20	8	11	11	17	16	15	6	46	279
Trichomoniasis	51	86	163	41	57	29	60	71	94	38	47	78	64
Total	**2228**	**3353**	**3539**	**3353**	**4233**	**4073**	**4781**	**5263**	**6112**	**6503**	**6993**	**8869**	**9703**

perhaps reflecting an increase in risk behaviour associated with the availability of highly active anti-retroviral therapy for HIV infection and a loss of impact of the HIV prevention campaigns of the 1980s and early 1990s.[3,4] STIs have been shown to increase genital HIV viral load and could affect the resistance patterns of genital HIV-1. Additionally, syphilis, like other genital ulcer diseases increases the risk of transmitting and acquiring HIV. [4] Since early 2000 there has been a dramatic increase in syphilis amongst MSM in Dublin; this is against a low incidence of syphilis throughout the 1990s. In response to this increase the Director of Public Health in the Eastern Regional Health Authority (ERHA) established an outbreak control team in October 2000. An enhanced surveillance system was introduced by NDSC to capture data on all syphilis cases from January 2000.[5] The enhanced surveillance data for syphilis is presented on pages 38 to 42 of this report.

While the majority of STIs notified during 2001 were from the ERHA, it is important to reiterate that people may travel from their area of residence to STI clinics outside their area. The data presented in this report, therefore did not necessarily reflect numbers of infections diagnosed among residents of a particular health board area. The increases in STIs in Ireland during 2001 are likely to be associated with an increase in unsafe sexual behaviour. Although the rise in genital chlamydia infections also reflects increased testing for this infection. In addition, improved acceptability of STI clinic services and greater public and professional awareness of certain STIs may have also contributed to the increases.

A review conducted by NDSC in 2001, *'Review of Notifiable Diseases and the Process of Notification'* undertaken at the request of the Department of Health and Children, recommends the institution of a new national system for surveillance of infectious diseases of public health importance in Ireland. The report recommends that there should be four categories of notifier: general practitioners, hospital clinicians, laboratory directors, and public health doctors, and that each of these categories of notifier would be required to notify a specific subset of diseases contained in the list of notifiable diseases. The report recommends the removal of candidiasis, molluscum contagiosum and *P. pubis* from the list of notifiable STIs in Ireland. In addition, the report recommends that the system for STI surveillance should change from collection of clinic-based aggregate data, on a quarterly basis, to the collection of timely, non-aggregate geographic based data. A subcommittee of the scientific advisory committee of the NDSC is currently undertaking a review of the surveillance of STIs in Ireland.[2]

Table 9: Notified sexually transmitted infections per 100,000 population from 1989 to 2001*

Sexually Transmitted Infection	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Ano-Genital Warts	14.32	26.01	30.89	30.23	40.62	42.25	54.38	63.04	69.33	79.59	84.09	95.35	101.93
Candidiasis	19.51	29.95	35.65	32.82	39.71	37.51	35.05	36.43	41.95	35.22	30.47	27.95	29.36
Chancroid	0.06	0.00	0.00	0.06	0.00	0.06	0.08	0.03	0.03	0.00	0.03	0.41	0.03
Chlamydia Trachomatis	4.94	6.10	4.65	5.45	8.93	3.67	6.76	10.04	12.74	17.82	23.97	34.28	42.10
Genital Herpes Simplex	2.21	3.49	3.09	3.55	3.52	4.77	5.46	4.99	5.82	6.70	7.58	6.87	8.45
Gonorrhoea	0.77	2.55	2.07	1.45	0.68	2.70	2.51	2.29	2.70	3.45	4.83	7.40	8.91
Granuloma Inguinale	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.03	0.03	0.00	0.03	0.00	0.00
Infectious Hepatitis B	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.06	0.00	0.00	0.06	0.38	1.00
Lymphogranuloma Venereum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.03	0.06	0.00	0.00
Molluscum Contagiosum	0.88	1.11	1.22	1.25	0.96	1.54	1.63	0.94	2.04	2.32	2.29	3.01	2.83
Non-Specific Urethritis	17.02	20.93	15.57	16.59	21.44	16.82	21.54	22.70	28.52	29.87	34.89	44.06	41.71
Pediculosis Pubis	1.70	1.99	2.04	1.99	2.18	1.90	2.37	2.18	2.23	2.90	3.12	3.52	2.63
Syphilis	0.34	0.54	0.57	0.57	0.23	0.30	0.30	0.47	0.44	0.41	0.17	1.17	7.12
Trichomoniasis	1.45	2.44	4.62	1.16	1.62	0.80	1.65	1.96	2.59	1.05	1.30	1.99	1.63
Total	**63.19**	**95.10**	**100.38**	**95.10**	**120.06**	**112.32**	**131.85**	**145.14**	**168.56**	**179.34**	**192.85**	**226.41**	**247.70**

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Information and Communications Technology

NDSC continued to grow through 2002 both in terms of the number of staff and the range of activities carried out. IT staff have responsibility for the management, purchase and support of the following systems and functions:

- network systems and infrastructure
- information security
- email system
- NDSC website
- telephone system & fax machines
- mobile phones
- mobile computing equipment
- building access control system
- security video system

Information Governance
Due to continuing growth of NDSC, increasing volumes of data and information held by NDSC and forthcoming requirements of the CIDR project, a decision was taken to review existing information security structures and policies. An Information Governance Committee consisting of NDSC staff form all disciplines was formed- "To establish a framework to ensure the privacy, confidentiality and security of information within the NDSC and to ensure that the policies relating to these are implemented and complied with."

One of the first actions of the Information Governance Committee was to review IT security. The primary recommendations were:

- upgrading the internet firewall,
- enforcing stricter email security
- improving security on the NDSC IT network
- investigating the possibility of achieving accreditation to an internationally recognised standard for Information Security.

It was agreed to resource and action all these recommendations in 2002.

The initial assessments performed by the committee recognized that all NDSC's core roles involve information handling. To ensure that NDSC maintains the highest standards of confidentilaity for all the information we are entrusted with it has been decided to persue accreditation to the ISO Information Security Standard. This standard is represented in Ireland by IS17799 and covers all aspects of information security for all data formats. A proposal summarising the benefits of achieving this accrediation and identifying the related resource requirements has been drafted and was put before the NDSC Board early in 2003.

IT Support Staff
There are now three IT support staff comprising of an IT Specialist and two IT Officers. This team provides administration and support for all aspects of the centre's IT activities detailed above.

Enhanced surveillance of syphilis, 2000-2002

Key Points

- **Syphilis cases increased dramatically in early 2000**
- **An outbreak of syphilis among men who have sex with men in Dublin, peaked in July 2001**
- **Late syphilis cases among non-nationals also increased**
- **There now remains a high level of endemic syphilis**

Introduction

Outbreaks of syphilis among men who have sex with men (MSM) have been reported across Europe and the US over the last few years. Since early 2000 there has been a dramatic increase in syphilis amongst MSM in Dublin.[1, 2, 3, 4] This was against a low incidence of syphilis throughout the 1990s, which in 1999 reached its lowest level in 10 years.[3] In response to this increase in syphilis the Director of Public Health in the Eastern Regional Health Authority (ERHA) established an outbreak control team in October 2000.[5] Interventions to control the outbreak were targeted primarily at MSM in Dublin. An enhanced surveillance system was introduced by NDSC to capture data on all syphilis cases from January 2000.[3]

It should be noted that the number of syphilis cases reported through the quarterly STI notification system differ slightly from the number of syphilis cases reported through the syphilis enhanced surveillance system. This report presents the epidemiology of all syphilis cases reported to NDSC through the enhanced surveillance system between January 2000 and December 2002. Data reported is provisional and due to delays in reporting to NDSC, the 2002 data is estimated to be higher than the data presented in this report. All cases and stages of syphilis are detailed, with particular emphasis on the recent outbreak. Syphilis progresses in four stages: primary, secondary, latent (early and late) and tertiary. Early syphilis (primary, secondary and early latent) is infectious. Late syphilis (late latent and tertiary) is non-infectious.[6]

Table 1: Number of notified cases of syphilis by notifying health board in Ireland (January 2000 to December 2002)

Health board/ authority	Total syphilis cases	Early *(infectious)* syphilis	Late *(non-infectious)* syphilis	Unknown syphilis stage
ERHA	511	356	124	31
MHB	1	0	0	1
MWHB	27	11	13	3
NEHB	2	2	0	0
NWHB	8	6	2	0
SEHB	18	12	6	0
SHB	7	5	1	1
WHB	21	18	2	1
Total	**595**	**410**	**148**	**37**

Table 2: Percentage of total, early and late syphilis cases in Ireland by geographic origin (January 2000 to December 2002)

Geographic Origin	% Total (n=595)	% Early (n=410)	% Late (n=148)
Ireland	62.2	76.1	30.4
Western Europe *(excl. Ireland)*	7.9	9.5	4.1
Central Europe	4.0	2.2	9.5
Eastern Europe	7.1	2.7	18.9
Sub-Saharan Africa	8.9	3.2	24.3
Other	3.4	2.9	5.4
Unknown	6.6	3.4	7.4

Materials and Methods

An enhanced surveillance system was implemented by NDSC to capture data on all syphilis cases from January 2000. Demographics recorded on all cases included age, sex, country of birth and health board area of diagnosing clinic. Clinical details and at risk behaviour data were also collected.

Results

All syphilis cases (n=595)

Between January 2000 and December 2002, 595 cases of syphilis were notified to NDSC through the enhanced syphilis surveillance system. Five hundred and eleven (85.9%) of the 595 cases attended STI clinics or general practitioners in the greater Dublin area (table 1). Of the 595 cases, 410 (68.9%) were early (infectious) syphilis, 148 (24.9%) were late syphilis and 37 (6.2%) were of unknown syphilis stage. Four hundred and fifty-six (76.6%) cases were male, 137 (23.0%) were female and data was incomplete for 2 cases. Three hundred and forty-eight (58.5%) cases were amongst MSM (296 were homosexual and 52 were bisexual); 232 (39.0%) were amongst heterosexuals and sexual orientation was not recorded for 15 cases.

Eighty-six syphilis cases were notified through the enhanced surveillance system in 2000, 306 in 2001 and 203 in 2002. The total number of syphilis cases peaked in Q3 2001(figure 1).

Early (infectious) syphilis cases (n=410)

Four hundred and ten early syphilis cases were notified to NDSC between January 2000 and December 2002, peaking in July 2001 (figure 2). One hundred and eighty-five (45.1%) early syphilis cases were primary syphilis, 141 (34.4%) were secondary, 76 (18.5%) were early latent and 8 (2.0%) were early syphilis of unknown stage. Two hundred and fifty-eight (62.9%) early cases were symptomatic, 127 (31.0%) were asymptomatic; data was not recorded for 25 cases. Three hundred and sixty-three (88.5%) cases were male, 46 (11.2%) were female and gender data was missing for 1 case. The mean age for male cases was 35 years (ranging from 18 to 67 years) and 29 years (ranging from 13 to 49 years) for female cases (figure 3).

Three hundred and twelve (76.1%) early syphilis cases were among MSM (64.4% were homosexual and 11.7% were bisexual), 91 (22.2%) were heterosexual and 7 (1.7%) were of unknown sexual orientation (figure 2). Three hundred and twelve (76.1%) early syphilis cases were born in Ireland (Table 2); of which 262 (84.0%) were MSM, 48 (15.4%) were heterosexual and 2 were of unknown sexual orientation. Eighty-seven cases were not born in Ireland; 47 (54.0%) of these were MSM, 36 (41.4%) were heterosexual and 4 were of unknown sexual orientation. Eleven early syphilis cases were of unknown nationality.

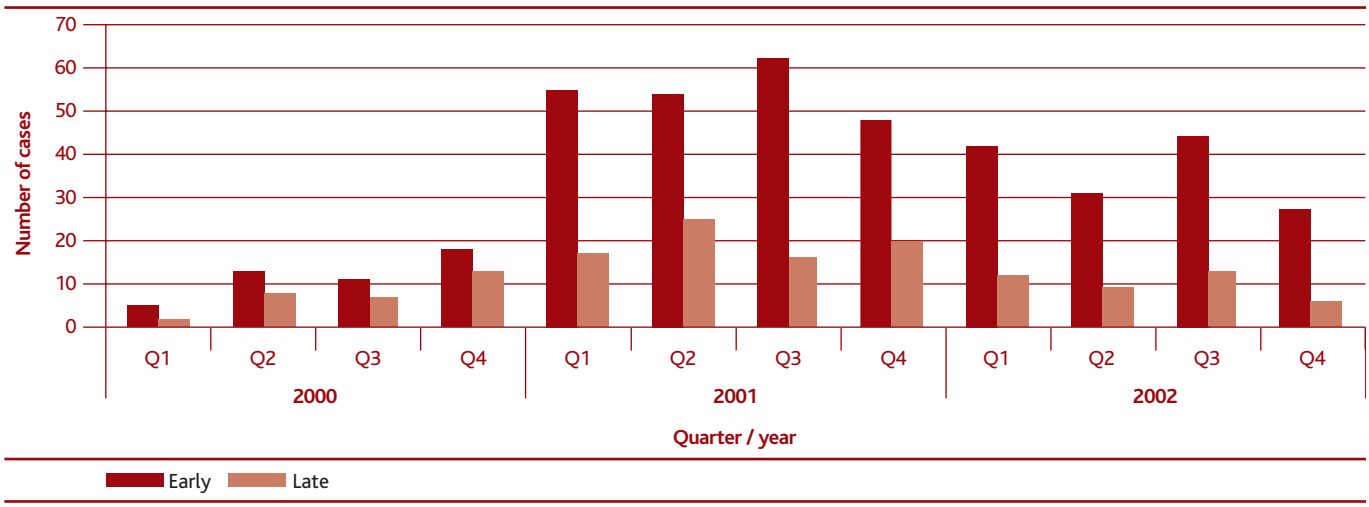

Figure 1: Number of early (infectious) and late (non-infectious) syphilis cases in Ireland by quarter and year of diagnosis (n=548).

HIV status & concurrent STIs
Seventy-three (17.8%) early syphilis cases were HIV positive (67 male, 5 female & 1 of unknown gender). Sixty-three (86.3%) of these were MSM (52 homosexual and 11 bisexual) and 10 (13.7%) were heterosexual. HIV was newly diagnosed in 18 (24.7%) of the 73 HIV positive cases. Twelve cases infected with HIV and infectious syphilis were co-infected with another STI. Seven cases were co-infected with syphilis, HIV and gonorrhoea.

Eighty-one (19.8%) early syphilis cases were concurrently infected with at least one other STI (excluding HIV). Ten (2.4%) early syphilis cases were concurrently infected with 2 or more STIs (excluding HIV). One hundred and thirty-three (32.4%) early syphilis cases gave a history of having had an STI in the past, 90.2% of these cases were MSM.

Risk behaviour
Five early syphilis cases reported links to the commercial sex industry. Seven male cases reported sexual contact with male commercial sex workers (CSWs) and 5 male cases reported sexual contact with female CSWs in the past. In attempting to identify the source of infection numerous networks were associated with the increase in early syphilis cases: 179 cases attended saunas, 157 cases implicated bars or clubs, 21 made contact through internet chat rooms and 30 had sexual contact outdoors or in parks. Eighty-two (20.0%) early syphilis cases had sex abroad in the three months prior to diagnosis (with London, Manchester and Amsterdam commonly reported).

Information on sexual contacts was available for 86.7% of early syphilis cases notified between January 2000 and December 2002. The median number of sexual contacts self-reported in the 3 months prior to diagnosis was one for male heterosexuals (range 0-5), one for female heterosexuals (range 0-3), six (range 0-100) for male homosexuals and 3 (range 0-40) male and one (range 0-4) female for male bisexuals.

Late syphilis cases (n=148)
One hundred and forty-seven late latent syphilis cases and 1 tertiary syphilis case were notified to NDSC between January 2000 and December 2002. Seventy-three (49.3%) of these were male, 74 (50%) were female and the gender data was missing for 1 case. The mean age for female cases was 32 years (ranging from 21 to 84 years) and 41 years (ranging from 19 to 81 years) for male cases. One hundred and sixteen (78.4%) of the late syphilis cases were heterosexual (42 male & 74 female), 29 (19.6%) were MSM and 3 were of unknown sexual orientation.

Ninety-two (62.2%) of the late syphilis cases were non-nationals (31 male and 61 female) and 45 (30.4%) were born in Ireland (Table 2). Of the 45 cases born in Ireland, 7 were female and 38 were male. Twenty-six of the Irish-born late syphilis cases were MSM, 18 were heterosexual and one was of unknown sexual orientation. Ninety-eight percent of the late syphilis cases in non-nationals were heterosexual and 2.2% were MSM.

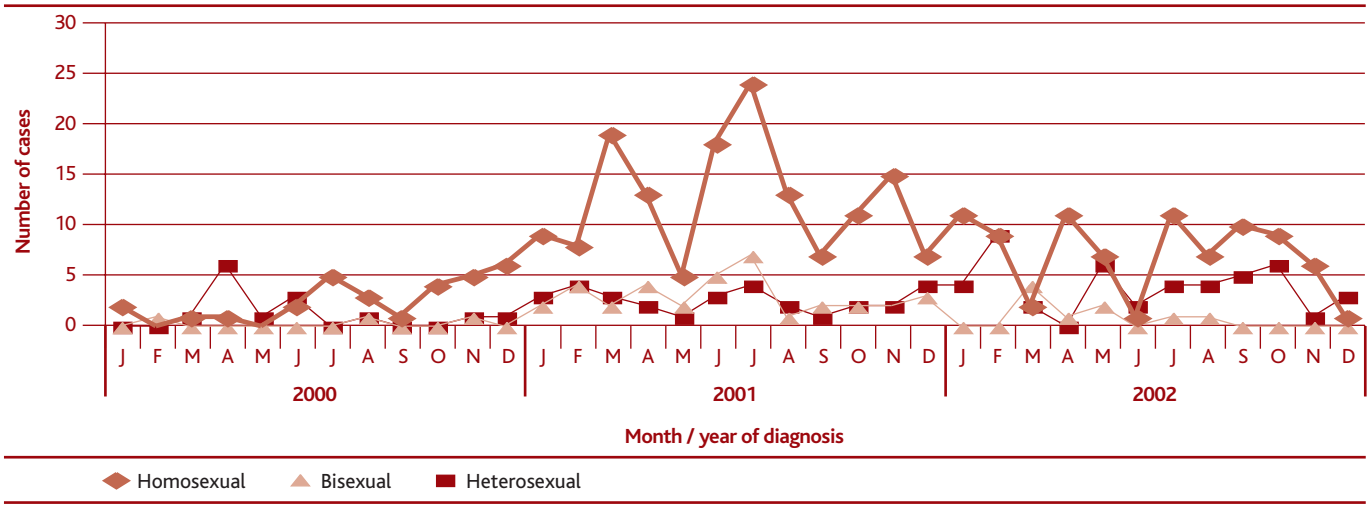

Figure 2. Early (infectious) syphilis cases by sexual orientation and months of diagnosis in Ireland (n=403).

Antenatal Screening (n=81)

Eighty-one syphilis cases were identified through antenatal screening. Fifty-one (63.0%) of these cases were late syphilis cases, 20 (24.7%) were early syphilis cases and 10 were of unknown syphilis stage. The majority of late syphilis cases (61.5%, n=83) attended STI clinics because of antenatal referral. Self-referral was the commonest reason for early (infectious) syphilis cases attending STI clinics. Sixty cases identified through antenatal screening were non-nationals, 4 were Irish and 17 were of unknown nationality. Four cases identified through antenatal screening were also HIV positive.

Six congenital syphilis cases have been reported to NDSC between January 2000 and December 2002. Intrauterine death was reported in 2 of the 6 congenital cases. In three of the cases the mother was diagnosed with late latent syphilis, two mothers were diagnosed with secondary syphilis and one was diagnosed with primary syphilis.

Discussion

Two distinct groups have been associated with the increase in syphilis in Ireland: (1) an outbreak of early (infectious) syphilis mainly among MSM in Dublin and (2) late syphilis cases particularly among non-nationals. Changes in sexual behaviour patterns across Europe are reflected in Ireland with large numbers of sexual contacts and the anonymous nature of contacts & other at risk behaviour.[1, 7, 8] Other worrying trends associated with this outbreak include the numbers of newly diagnosed HIV cases and concurrent STI infections among early (infectious) syphilis cases and the reported congenital cases. It is notable that 20% of infectious syphilis cases in Ireland reported sexual contact abroad, in particular in London, Manchester and Amsterdam, where recent syphilis outbreaks have also been reported.[1,2,3] The syphilis outbreak in Ireland peaked in July 2001 and there now remains a high level of syphilis endemicity.

Intervention measures have proven effective for case finding in the context of this outbreak.[5] On-site testing in particular has accessed a population that may otherwise not have attended for screening. It has also provided publicity, increased awareness of the outbreak and knowledge about syphilis, and fostered trust between the gay and bisexual community and the health sector. The links developed in the course of the outbreak will provide the basis for collaboration on future sexual health projects.

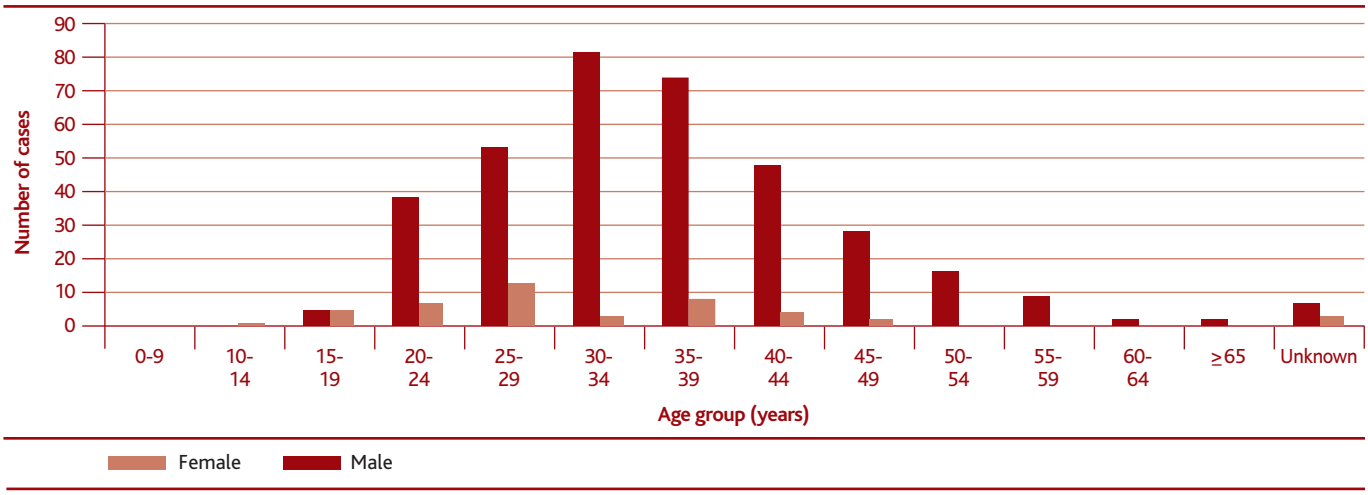

Figure 3: Early (infectious) syphilis cases in Ireland by age group (years) and gender, January 2000 to December 2002 (n=409)

Acknowledgements

The authors would like to thank Sarah Jackson (NDSC), Piaras O'Lorcain (ERHA) and all those who provided data for this report, particularly the STI clinics, GPs and the Departments of Public Health and the syphilis outbreak control team.

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ESEN 2

Ireland is one of 16 countries participating in the European Sero-Epidemiology Network 2 (ESEN2). The aim of this project is to co-ordinate and harmonise the serological surveillance of immunity to communicable disease in Europe. As part of Ireland's participation in this project, immunity to eight diseases will be monitored (measles, mumps, rubella, pertussis, diphtheria, varicella zoster, hepatitis A and hepatitis B).

In order to provide a context for this study, Ireland completed an organisational analysis of national vaccination programmes in November 2002. This analysis described the history and development of national vaccination programmes and will be a key element in the interpretation of results from all participating countries. Furthermore, to facilitate comparisons between countries, it is necessary for each country to test an agreed set of standards supplied by reference laboratories throughout Europe. The National Virus Reference Laboratory began work on this aspect of the project in early 2002. In collaboration with the NDSC and the National Virus Reference Laboratory, hospitals from six health boards / authorities began collecting samples for the ESEN2 study in August 2002.

Testing for the measles, mumps, rubella, varicella zoster, hepatitis A and hepatitis B work-packages is being carried out at the National Virus Reference Laboratory, Dublin while testing for the diptheria and pertussis work-packages is being carried out at the Communicable Disease Surveillance Centre, Colindale, London. The ESEN2 project is due to be completed in early 2004.

Figure 1. Countries Participating in ESEN2: Belgium, Bulgaria, Czech Republic, Finland, Germany, Greece, Ireland, Israel (not shown on map), Italy, Luxembourg, Netherlands, Romania, Slovenia, Spain, Sweden, United Kingdom.

Viral Hepatitis, 2002

Key Points

- **Hepatitis A decreased for the third consecutive year, reaching an all-time low of 0.7 cases/100,000 population.**
- **The number of hepatitis B notifications continued to increase in 2002, with 458 cases being notified (11.7 cases/100,000 population).**
- **There were 89 notifications of "viral hepatitis, type unspecified", similar to 2001. Most of the unspecified viral hepatitis cases notified in 2002 were due to hepatitis C. In addition 68 cases were notified as aggregate data from STI clinics in the ERHA.**
- **Comprehensive information on the epidemiology of viral hepatitis and on the specific risk groups affected by viral hepatitis is not available. Surveillance data would be greatly improved by the introduction of laboratory notification, case definitions for each infection and enhanced surveillance, as well as by specifying hepatitis C as a notifiable disease.**

Viral Hepatitis

Viral hepatitis is notifiable under three categories: type A, type B and type unspecified. These classifications were brought in under the 1981 Infectious Disease Regulations. Prior to this, infective hepatitis was notifiable. The numbers of notifications under these categories since 1956 are illustrated in figure 1. The trends in these historical data reflect both changes in the process and practice of notification as well as the changing epidemiology of viral hepatitis in Ireland. Given the large numbers of unspecified viral hepatitis notifications (particularly between 1982 and 1988), and a surprisingly small number of hepatitis B cases notified in the early eighties (when a large outbreak occurred in injecting drug users (IDUs)[1]) it appears that viral hepatitis type A and B categories were under-utilised when first introduced.

Hepatitis A

Introduction

Hepatitis A virus causes an acute, self-limiting disease. It is transmitted via the faecal-oral route, and is most common in areas of the world with poor sanitation. The clinical severity of hepatitis A infection increases with age. Childhood infection is usually quite mild, the majority of children under 5 years showing no symptoms, but people infected as adults can suffer severe and prolonged illness. Hospitalisation and mortality rates also increase with age.[2] Hepatitis A is preventable by vaccine. Currently in Ireland vaccination is recommended for people in certain high risk groups such as close contacts of known cases, travellers to high endemicity countries, patients with chronic liver disease and those at occupational risk.[3]

Table 1. Notified cases of hepatitis A, number and rate /100,000 population by age group, 2001 and 2002

	2001		2002	
Age group (years)	Number	Rate	Number	Rate
0-4	9	3.2	0	0.0
5-9	26	9.8	4	1.5
10-14	19	6.7	2	0.7
15-19	5	1.6	1	0.3
20-24	10	3.0	2	0.6
25-34	20	3.2	6	1.0
35-44	10	1.8	2	0.4
45-54	6	1.2	1	0.2
55-64	3	0.9	2	0.6
65+	4	0.9	6	1.4
Total	**112**	**2.9**	**26**	**0.7**

Table 2. Notified cases of hepatitis B, number and rate/100,000 population by age group, 2001 and 2002

	2001		2002	
Age group (years)	Number	Rate	Number	Rate
0-4	3	1.1	6	2.2
5-9	6	2.3	4	1.5
10-14	8	2.8	5	1.8
15-19	20	6.4	23	7.3
20-24	1	12.5	65	19.8
25-34	64	26.6	241	39.0
35-44	66	11.7	88	15.6
45-54	15	3.1	14	2.9
55-64	4	1.1	2	0.6
65+	1	0.2	0	0
Total*	**342**	**8.7**	**458**	**11.7**

** Total includes cases of unknown age*

Materials and methods

Hepatitis A is a notifiable disease under the Infectious Disease Regulations (1981). Aggregate data on notifications are available from 1982 and disaggregate data (including age and sex) since mid-2000.

Data on hospital discharges with any diagnosis of hepatitis A (up to 6 diagnoses are recorded) were obtained from the HIPE (Hospital In-Patient Enquiry) Unit of the Economic and Social Research Institute for the years 1999-2001. The HIPE system is an event based system.

The number of liver transplants with an aetiology of viral hepatitis between 1993 and 2002 was obtained from the National Liver Transplant Unit, St Vincent's University Hospital.

The number of deaths with an underlying cause of hepatitis A between 1990 and 2002 was obtained from the Central Statistics Office (CSO). Data for 2001 and 2002 are provisional.

Results

Clinical Notifications

In 2002 the number of hepatitis A cases notified continued to decrease for the third consecutive year, from 112 in 2001 to 26 cases in 2002 (figure 1). This was the lowest number of cases reported in a year since 1982, giving an incidence of just 0.7 cases/100,000 population. The age standardised incidence rates varied between health boards, from no cases in the MHB and WHB to 1.4 cases/100,000 in the SHB.

The majority (n=17) of cases in 2002 were female. Numbers and rates of hepatitis A decreased from the levels in 2001 in all age groups except those 65 years and over (table 1).

Morbidity and mortality

A diagnosis of hepatitis A was the principal diagnosis recorded in 310 hospital discharges between 1999 and 2001 (there were 485 discharges in total with any diagnosis of hepatitis A). The number of discharges a year decreased from 144 in 1999, to 104 in 2000 and 62 in 2001. There was a small excess of female cases over the three years (54%), and the mean age was 24 years (range <1 year-83 years). The majority (95%) of cases were in-patients, the median length of stay of in-patients was 4 days (range 1-66 days). The average length of stay increased with age, from 4 days in people under 15 years of age to 17 days in people 65 years and older.

There were no liver transplants between 1993 and 2002 with an underlying aetiology of hepatitis A.

There were 10 deaths due to hepatitis A between 1990 and 2002, the majority (n=7) being women.

Discussion

The incidence of hepatitis A continued to decrease in 2002, with less than one case notified per 100,000 population. This decrease occurred in most age groups. However, as can be seen in figure 1, the incidence of hepatitis can vary greatly from year to year. Hepatitis A has the potential to cause large scale community outbreaks in susceptible populations (and the majority of Irish people under the age of 30 are now likely to be susceptible to hepatitis A)[4]. The burden of illness associated

Table 3. Number and mean age of discharges with a principal diagnosis of hepatitis B (1999-2001), by sex.

	Males		Females	
Principle diagnosis	Number of discharges	Mean age (years)	Number of discharges	Mean age (years)
Acute or unspecified hepatitis B	98	31.7	27	26.6
Chronic hepatitis B	64	38.2	16	26.4

Table 4. Number and mean age of hospital discharges with a principal diagnosis of hepatitis C or unspecified viral hepatitis (1999-2001), by sex.

	Males		Females	
Principle diagnosis	Number of discharges	Mean age (years)	Number of discharges	Mean age (years)
Acute or unspecified hepatitis C	208	32	94	35
Chronic hepatitis C	440	35	358	43
Unspecified viral hepatitis	60	35	55	33

with hepatitis A can be high, especially those infected as adults. As well as the more traditional sources of outbreaks such as contaminated of food and water which continue to occur around the world, outbreaks in injecting drug users have occurred in the UK and other low-incidence countries.[5,6] These outbreaks have in some instances spilled over into the general community.[6] Risk factor information is not collected at a national level in Ireland. More detailed information, including risk factor details, is required to monitor and inform prevention and control strategies and to plan services.

A proposal is currently being prepared for the European Commission to develop a European surveillance network on hepatitis A. One of the major areas to be included in this network will be information on the molecular epidemiology of hepatitis A. Molecular epidemiology can be used for a variety of purposes, such as estimating the prevalence of subtypes of hepatitis A at global or country level, helping identify the country of origin of a case, monitoring shifts in viral strains over time, and is particularly useful for linking apparently sporadic cases occurring in different countries to a common source. Currently no molecular typing of hepatitis A is carried out in Ireland. The participation of Ireland in this network would necessitate the development of this service in the future.

More information on the epidemiology of hepatitis A in Ireland is available at http://www.ndsc.ie/Publications/EPI-Insight/2003Issues/d608.PDF.

Hepatitis B

Introduction

Hepatitis B virus is spread via infected body fluids including blood. Only a small proportion of acute hepatitis B cases (10% children and 30-50% of adults) develop clinical symptoms. Chronic infection can develop and is associated with increased risks of chronic liver disease and liver cancer. The proportion of cases who go on to develop chronic infection decreases with age, from 90% of babies infected at birth to around 10% of people infected as adults.[2] In Ireland hepatitis B infection is known to be prevalent in certain populations such as IDUs[7], prisoners,[8] and immigrants from high endemicity countries.[9,10] A vaccine is available for the prevention of hepatitis B infection. Currently immunisation is recommended for individuals who are at increased risk of infection because of their occupation, lifestyle or other factors.[3]

Materials and Methods

The Infectious Disease Regulations (1981) specify hepatitis B as a notifiable disease. Currently no case definitions exist for any of the notifiable diseases, and there is therefore no requirement in the notification process to distinguish between cases of acute and chronic hepatitis B.

The National Virus Reference Laboratory (NVRL) provided data on the number of new hepatitis B surface antigen (HBsAg) positive samples identified between 1990 and 2001.

Data on hospital discharges with any diagnosis of hepatitis B (up to 6 diagnoses are recorded) were obtained from the HIPE system for the years 1999-2001.

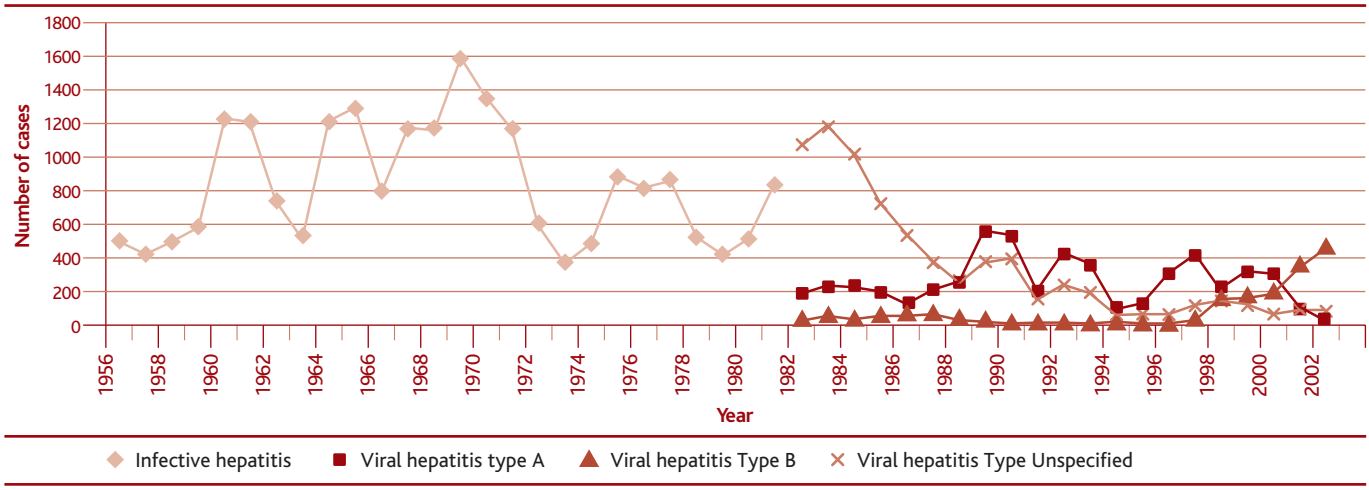

Figure 1. Viral hepatitis notifications 1956-2002 (Sources of data: 1956-1981 Quarterly reports of births, deaths, marriages and certain infectious diseases (Department of Health), 1982 –2000 Department of Health and Children, 2001 onwards NDSC)

The number of liver transplants with an aetiology of viral hepatitis between 1993 and 2002 was obtained from the National Liver Transplant Unit, St Vincent's University Hospital.

The number of deaths with an underlying cause of hepatitis B between 1990 and 2002 was obtained from the CSO. Data for 2001 and 2002 are provisional.

Results

Clinical notifications

The increase in hepatitis B notifications seen in recent years continued in 2002, with a total of 458 cases being notified (figure 2). The national incidence rate was 11.7/100,000 population, with the highest rates being reported by the SHB, MHB and SEHB (figure 3).

The largest increases in 2002 were seen in those aged between 20 and 44 years of age (table 2). Just over half (52%) of all notified cases were between the ages of 25 and 34 years. The sex distribution was approximately equal (218 male, 213 female).

In addition, it is likely that some hepatitis B cases in 2002 will be notified as sexually transmitted infections (STIs). These infections are notified separately to the weekly notifications, in aggregate form on a quarterly basis. Unfortunately the STI reporting system is not as timely as the weekly notification system and the hepatitis B data for 2002 are not currently available. While the cases of hepatitis B notified through this system may be duplicates of cases reported through the weekly notification system, it is more likely that they are new cases as they would have been identified through a different route (i.e. identified in STI clinics). The number of cases of hepatitis B notified through this system has increased in recent years, from 2 in 1999, to 15 in 2000, with 39 cases being reported in 2001.

Morbidity and mortality

In total, for the years 1999 to 2001 there were 205 hospital discharges with a principal diagnosis of hepatitis B (there were 1190 discharges in total with any diagnosis of hepatitis B). One hundred and twenty five of these had a diagnosis of acute or unspecified hepatitis B, and 80 had chronic hepatitis B. The age and sex distribution of the discharges with a principal diagnosis of acute or unspecified and chronic hepatitis B can be seen in table 3. The majority of discharges with a principal diagnosis of either acute or unspecified (n=115) or chronic hepatitis B (n=54) were in-patients, their median lengths of stay being 6 days and 2 days respectively.

Six liver transplants have been carried out with an underlying aetiology of hepatitis B since the National Liver Transplant Unit was established in 1993, accounting for approximately 2.3% of all liver transplants.

Hepatitis B was recorded as the primary cause of death of 25 people between 1990 and 2002, 80% being male.

Discussion

Hepatitis B notifications have increased dramatically in recent years. This increase may reflect the introduction of screening programmes. Many of the notified cases are chronically infected asylum seekers. In the SHB 95-96% of cases notified in 2000-2002 were asylum seekers.[11] Asylum seekers currently undergo voluntary health screening, which includes testing for hepatitis

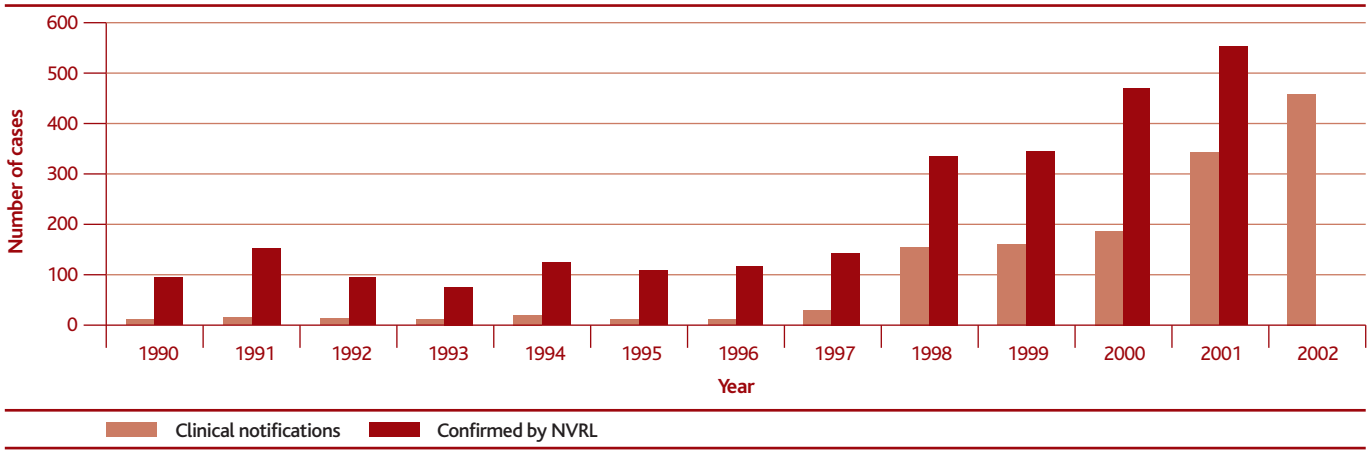

Figure 2. Number of cases of hepatitis B notified and HBsAg positive samples identified by the NVRL, 1990-2002.

B infection. The high proportion of female cases notified might also be a result of antenatal screening of pregnant women.

Laboratory data on hepatitis B are not routinely available as laboratories are not obliged to notify notifiable diseases. In the case of a disease such as hepatitis B, whose definitive diagnosis requires laboratory confirmation, laboratory notification is essential to accurately estimate the incidence and prevalence of disease. A review of notifiable diseases and the process of notification carried out by the NDSC at the request of the Department of Health and Children has recommended that laboratories should be specified as notifiers.[12] Case definitions to cover both acute and chronic disease have also been proposed.

Although hepatitis B is a notifiable disease, under-reporting is common as demonstrated by the discrepancy between the number of HBsAg positive samples detected by the National Virus Reference Laboratory and the substantially smaller number of hepatitis B cases reported to the NDSC (see figure 2). Information currently reported on individual cases is inadequate. More detailed information which would need to be gathered through enhanced surveillance including risk factor details, is required to monitor and inform prevention and control strategies and to plan services.

More information on the epidemiology of hepatitis B in Ireland is available at http://www.ndsc.ie/Publications/EPI-Insight/2003Issues/d728.PDF.

Viral hepatitis Type Unspecified (including hepatitis C)

Introduction

Several other viral agents can cause hepatitis including hepatitis C, hepatitis delta and hepatitis E. By far the most common of these is the hepatitis C virus. Hepatitis C is spread via infected body fluids. Initial infection is mainly asymptomatic (around 90% of cases). However, between 50% and 80% of cases go on to develop chronic infection.[2] Approximately half of chronically infected people eventually develop cirrhosis or liver cancer. There is no vaccine currently available for the prevention of hepatitis C.

Materials and Methods

The current list of notifiable diseases includes "viral hepatitis, type unspecified". Hepatitis C may be notified under this category, but it is not currently a notifiable disease in its own right. Since the NDSC started collecting disaggregate data in mid-2000, many of the notifications of unspecified viral hepatitis have included information on the cause of the hepatitis (e.g. hepatitis C virus).

Data on hospital discharges with a diagnosis of hepatitis C, hepatitis delta, hepatitis E, other specified viral hepatitis and unspecified viral hepatitis (up to 6 diagnoses are recorded) were obtained from the HIPE Unit for the years 1999-2001.

The number of liver transplants with an underlying aetiology of viral hepatitis between 1993 and 2002 was obtained from the National Liver Transplant Unit, St Vincent's University Hospital.

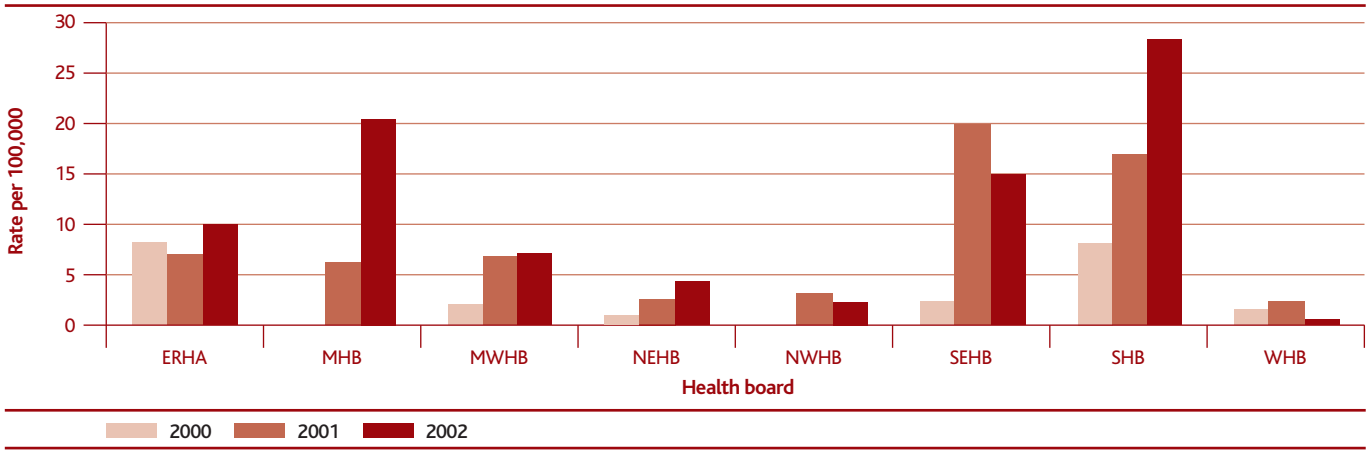

Figure 3. Rate of notified hepatitis B per 100,000 population by Health Board, 2000-2002

The number of deaths with an underlying cause of other specified (i.e. other than hepatitis A and hepatitis B) and unspecified viral hepatitis between 1990 and 2002 was obtained from the CSO. Data for 2001 and 2002 are provisional.

Results

Clinical notifications

There were 89 cases of unspecified viral hepatitis notified in 2002. This was similar to the number notified in 2001 (n=90). Ninety three percent of the cases in 2002 were identified as hepatitis C.

The incidence of unspecified hepatitis was 2.3 cases/100,000 population in 2002. Rates varied across health boards, with SEHB having the highest rate. The SEHB has experienced an increase in the rate of notified unspecified viral hepatitis in the last 3 years (figure 4). Hepatitis C was given as the cause of all cases of unspecified viral hepatitis in the SEHB notified in 2001 and 2002. The age and sex distribution of notified cases can be seen in figure 5.

In addition the ERHA notified a number of cases of viral hepatitis type unspecified as aggregate STI data. While these cases may be duplicates of cases reported through the weekly notification system, it is likely that they are new cases of hepatitis C infection identified during screening carried out at STI clinics. These data have not been available for inclusion in the annual report in previous years due to the lack of timeliness of the STI data. In 2002 there were 68 cases notified this way. This was a decrease compared to 2001 when 90 cases were notified in aggregate form to the ERHA.

Morbidity and mortality

Over the three years 1999-2001 there were 1113 discharges with a principal diagnosis of other specified hepatitis and a further 115 with a principal diagnosis of unspecified viral hepatitis. The vast majority (1100) had a principal diagnosis of hepatitis C (there were 6085 discharges in total with any diagnosis of hepatitis C). A small number (n=13) of discharges were coded as hepatitis delta, hepatitis E or other specified viral hepatitis. The mean age of hospitalised cases of acute or unspecified hepatitis C, chronic hepatitis C, and unspecified viral hepatitis by sex can be seen in table 4. The majority of cases of acute or unspecified hepatitis C (n=272) or chronic hepatitis C (n=558) were in-patients, their median length of stay being 2 days and 1 day respectively.

The National Liver Transplant Unit carried out 21 liver transplants with an underlying aetiology of hepatitis C infection, accounting for 8% of all transplants since 1993.

There were 52 deaths due to other specified viral hepatitis between 1990 and 2002. In addition there have been 32 deaths from unspecified viral hepatitis over the same period (CSO). The number of deaths due to other specified viral hepatitis has increased over this time period, reaching an annual maximum of 15 deaths in 2002 (provisional data, by year of registration), while those coded as unspecified viral hepatitis have decreased.

Discussion

There is little routine information available on hepatitis C in Ireland as it is not currently a notifiable disease (although it may be notified as viral hepatitis, type unspecified). The need

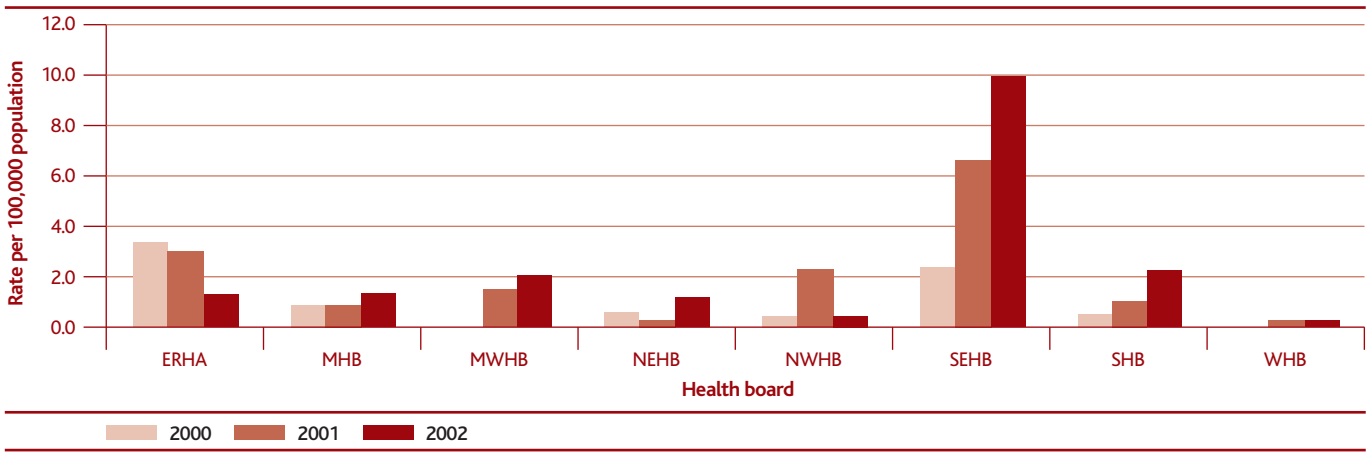

Figure 4. Rate of notified viral hepatitis type unspecified per 100,000 population by health board, 2000-2002

for hepatitis C to be made notifiable, as well as the need for laboratories to be specified as notifiers, has been recognised.[12] The specification of hepatitis C as a notifiable disease and laboratory reporting should greatly improve the quality of routine data on hepatitis C. Enhanced surveillance would also enable identification of risk factors and this information could be used to monitor and inform prevention and control strategies and to plan services.

National hepatitis C database

The Consultative Council on Hepatitis C commissioned a review of health services available for people infected with hepatitis C through the administration in this state of blood and blood products. One of the recommendations of the review was that a national database of people infected with hepatitis C through the administration of blood or blood products within the state be established for research purposes at an independent coordinating agency and run in association with relevant groupings.[13] There was consensus that a unique opportunity exists for internationally significant research which can inform both treatment and understanding of the nature of the hepatitis C process, and there was agreement that hepatitis C research in Ireland would be greatly advanced by the availability of a national database of those affected by the virus. The NDSC was asked to set up this database, and the preparatory work was started in 2002.

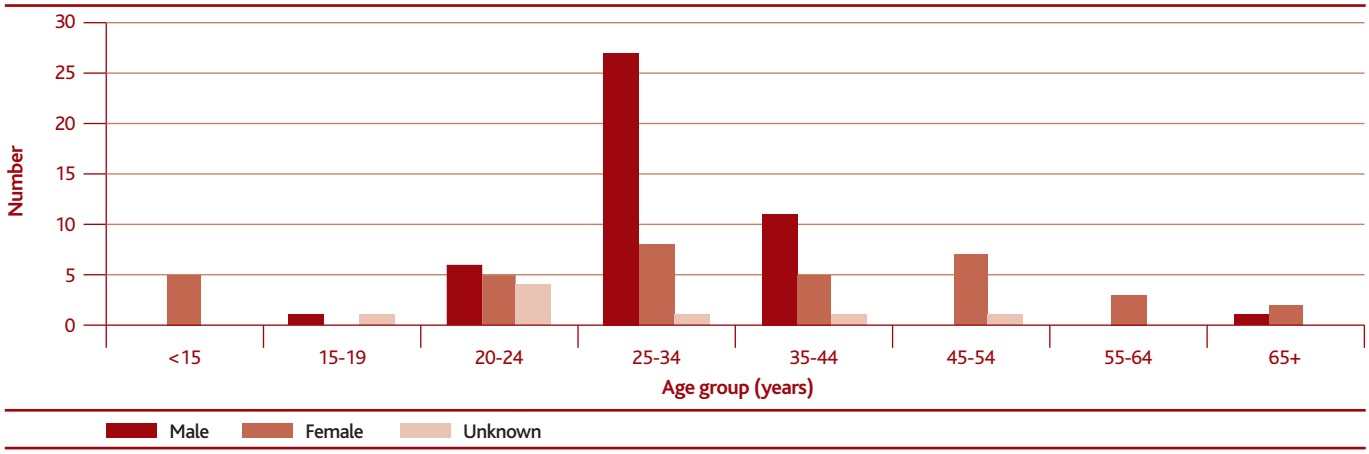

Figure 5. The age and sex distribution of cases of notified viral hepatitis type unspecified, 2002

Acknowledgments

NDSC would like to thank staff in the Departments of Public Health for the provision of data. The NDSC is also extremely grateful to the NVRL, CSO, HIPE Unit and the Liver Transplant Unit, St Vincent's University Hospital for their help and data.

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Salmonella in Ireland, 2002

Key points

- **The incidence of salmonellosis in Ireland appears to be decreasing, as evident from the weekly clinical notification data.**
- **The crude incidence rate per 100,000 population of salmonellosis in Ireland in 2002 was 10.2, compared to 11.8 in 2001**
- **There were 416 clinical isolates of *Salmonella enterica* referred to the National Salmonella Reference Laboratory in 2002 for serotyping, phage typing and antimicrobial sensitivity tests**
- **19.7% of cases were associated with travel outside of Ireland in 2002**

Introduction

Salmonella is a bacterial zoonotic pathogen that is a relatively common cause of foodborne illness in Ireland and worldwide. At present there are over 2,500 known serotypes of *Salmonella*. In recent years, two serotypes, namely, *S. enterica* serotype Enteritidis and *S. enterica* serotype Typhimurium have accounted for the majority of cases of human salmonellosis.

Salmonellosis presents as an acute enterocolitis, with sudden onset of headache, abdominal pain, diarrhoea, nausea and occasionally vomiting. Fever is almost always present. Dehydration, especially amongst vulnerable populations such as infants, the immunocompromised and the elderly, may be severe. *S. Typhi* and *S. Paratyphi* can cause enteric fever, a severe systemic life threatening condition, but this is very rare in Ireland and mainly travel-associated.

A wide range of domestic and wild animals, as well as humans can act as the reservoir for this pathogen, although chronic carriage is rare in humans.

Prevention, surveillance and control of *Salmonella* infections is of major public health importance. Measures have been implemented from farm to fork in an attempt to control spread of this zoonotic agent.

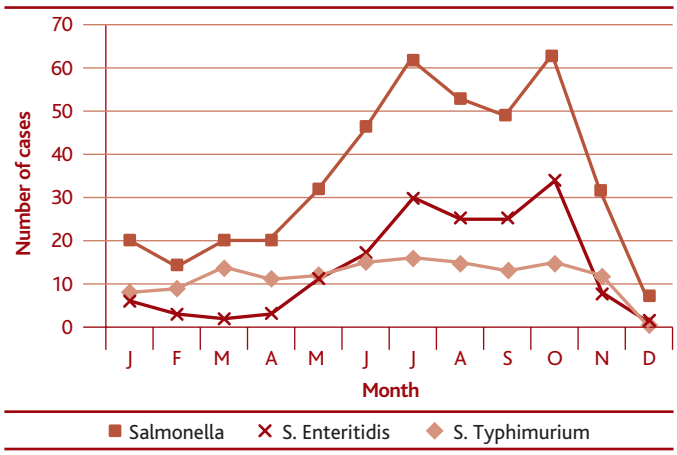

Figure 1. Isolates of Salmonella enterica, S. Enteritidis and S. Typhimurium referred to NSRL by month, 2002. (Note: month refers to the date the isolate was received in the reference laboratory).

Table 1. Analysis of clinical isolates of S. enterica (n=416) referred to NSRL, (2002) by age-group and gender.

Age group (years)	No. of isolates (%)	Male	Female	Unknown
0-4	89 (22)	43	38	8
5-14	39 (9)	22	16	1
15-24	59 (14)	32	26	1
25-34	66 (16)	30	33	3
35-44	40 (10)	21	19	0
45-54	42 (10)	20	22	0
55-64	30 (7)	15	14	1
65+	30 (7)	16	13	1
Unknown	21 (5)	7	12	2
Total	**416 (100)**	**206**	**193**	**17**

Materials and Methods

The National Salmonella Reference Laboratory (NSRL) 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 NSRL and weekly clinical notifications for the year 2002. These data enable us to provide an overview of the epidemiology and burden of disease caused by *Salmonella* infections in Ireland today.

Results - NSRL data

Demographic information

There were 416 clinical isolates of *S. enterica* referred to NSRL in 2002. The male: female ratio was 1.05:1. The age groups and sex of those affected are shown in Table 1.

Seasonality

There was a marked seasonality in the overall number of human cases of *S. enterica* reported in 2002, with a peak seen in both July and October 2002 (see Figure 1). *S.* Enteritidis cases were also shown to have this seasonal variation, but this was not seen for *S.*Typhimurium cases.

Serotyping, phage typing and antibiotic susceptibility results

The breakdown of *Salmonella* serotypes by health board is shown in Table 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.

The trend which began in 2001 of *S.* Enteritidis taking over from *S.* Typhimurium as the predominant serotype associated with human salmonellosis in Ireland, was again continued in 2002 (see Table 3). The next most commonly isolated serotypes in 2002 were *S.* Bredeney and *S.* Kentucky. There were 5 isolates of *S. Typhi* detected. Three of these were travel-associated.

Travel-association

82 isolates (19.7%) reported to NSRL in 2002 were found to be travel-associated. The majority of these cases were associated with travel to Spain (n=26). The next most common country reported was Tunisia (n=6), followed by Thailand (n=5), Pakistan (n=4) and Portugal (n=4). Further analysis of the 26 cases associated with travel to Spain revealed that 19 of these were *S. Enteritidis*. Interestingly a variety of different phage types of *S.* Enteritidis were reported viz., 7 of PT1, 4 of PT6, 2 of PT4 and one each of PT12, PT14b, PT3, PT5a, and PT8.

Antimicrobial resistance

The antimicrobial susceptibility of the most commonly isolated serotypes in 2002 are presented in Table 4. High levels of resistance were again found among *S.* Typhimurium isolates, particularly *S.* Typhimurium DT104. Many of these isolates were found to be resistant to at least five antimicrobial agents, viz. ampicillin, chloramphenicol, streptomycin, sulphonamide and tetracycline (ACSSuT).

Table 2. Serotypes of Salmonella enterica by health board, 2002.

Serotype	ERHA	MHB	MWHB	NEHB	NWHB	SEHB	SHB	WHB	Total
Adelaide	0	0	0	0	1	0	0	0	1
Agama	0	0	0	0	0	0	1	0	1
Agona	1	0	0	3	0	1	0	0	5
Alachua	0	0	0	0	0	0	0	1	1
Apapa	1	0	0	0	0	0	0	0	1
Bareilly	1	0	0	0	0	0	0	0	1
Braenderup	0	1	0	1	0	0	0	0	2
Brandenburg	2	0	1	0	0	0	0	0	3
Bredeney	0	0	1	0	0	1	0	0	2
Colindale	1	0	0	0	0	0	0	0	1
Corvallis	1	0	0	0	0	0	0	0	1
Dublin	1	0	4	0	2	0	0	2	9
Durban	2	0	0	0	0	0	0	0	2
Enteritidis	57	8	16	10	10	15	29	20	165
Give	2	0	0	0	0	0	0	0	2
Hadar	2	0	1	0	0	2	1	0	6
Heidelberg	1	0	0	0	1	0	0	0	2
Infantis	1	0	0	0	0	0	2	0	3
Java	0	0	0	0	2	0	0	1	3
Johannesburg	1	0	0	0	0	0	0	0	1
Kentucky	0	0	0	0	0	0	0	1	1
Kottbus	1	1	0	4	0	0	0	0	6
Lexington	0	0	0	0	0	1	0	0	1
Mbandaka	0	0	1	0	0	1	0	1	3
Menston	0	0	0	0	0	0	0	1	1
Muenster	0	0	0	0	0	0	0	1	1
Newport	3	0	0	0	0	0	1	1	5
Ohio	1	1	0	0	1	0	0	0	3
Oranienburg	1	0	0	0	0	0	0	0	1
Panama	1	0	0	0	0	1	0	0	2
Poona	0	0	0	2	0	0	0	0	2
Putten	0	0	0	0	0	0	0	3	3
Redhill	1	0	0	0	0	0	0	0	1
Rissen	0	0	0	1	0	0	0	0	1
Rough	0	0	0	0	0	1	0	0	1
Schwarzengrund	0	0	0	0	1	0	0	0	1
Senftenberg	1	0	0	1	0	0	0	0	2
Singapore	0	0	1	0	0	0	0	0	1
Stanley	3	0	1	0	0	1	1	1	7
Thompson	1	0	0	0	0	0	0	0	1
Typhi	3	0	1	0	1	0	0	0	5
Typhimurium	45	12	10	15	11	28	4	15	140
Urbana	1	0	0	0	0	0	0	0	1
Virchow	5	0	0	0	2	2	0	1	10
Worthington	0	0	0	0	0	0	1	0	1
Unknown	0	1	0	2	0	0	0	0	3
Total	**141**	**24**	**37**	**39**	**32**	**54**	**40**	**49**	**416**
CIR*	**10.9**	**11.7**	**11.7**	**12.7**	**15.2**	**13.8**	**7.3**	**13.9**	**11.5**

**CIR = Crude incidence rate / 100,000 population*

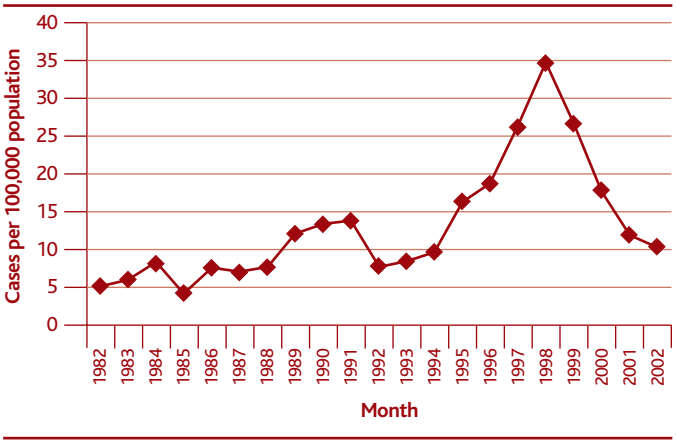

Figure 2. Crude rate of Salmonellosis in Ireland per 100,000 population 1982-2002.

Table 3. Serotypes of S. enterica referred to NSRL (1998-2002).

Serotype	1998	1999	2000	2001	2002
Serotype	1998	1999	2000	2001	2002
S. Enteritidis	60 (8)	155 (33)	239 (36)	248 (46)	165 (40)
S. Typhimurium	578 (80)	200 (42)	286 (43)	165 (30)	140 (34)
S. Bredeney	15 (2)	55 (12)	24 (4)	11 (2)	2 (0.5)
S. Kentucky	14 (2)	12 (3)	15 (3)	4 (1)	1 (0.2)
All other serotypes	54 (7)	52 (11)	101 (15)	115 (21)	108 (26)
Total	**721**	**474**	**665**	**543**	**416**

Results - 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 rose in the 1990s to peak in 1998, and has been steadily decreasing since then (Figure 2). The total number of notifications in 2002 was 369 compared to 433 in 2001, and 640 in 2000.

Discussion

The importance of *Salmonella enterica* as an enteric pathogen and the significant burden of human illness that it is responsible for, is evident from the data presented in this report.

Similar trends regarding the epidemiology of this pathogen were noted in 2002 as in previous years. All age-groups were seen to be affected but the highest incidence was again noted in the 0-4 age-group. Both males and females were equally affected. There was a marked seasonality as reported in previous years with a peak in cases noted in July and October 2002. Interestingly when the two commonest serotypes are compared in terms of seasonality, *S.* Enteritidis is seen to follow this pattern, but it is not evident for *S.* Typhimurium (as shown in Figure 1).

Analyses of the serotyping results revealed that in 2002, *S.* Enteritidis was the predominant serotype, followed by *S.* Typhimurium. This followed the change in trend that was first seen in 2001. For three years prior to that (1998-2000), *S.* Typhimurium had been the commonest serotype in Ireland.

Improvements and advances in the detailed typing laboratory data being generated by the NSRL is enabling us to monitor salmonella trends more accurately and is providing us with comprehensive information regarding the epidemiology of this pathogen in Ireland. In particular, the advent of molecular typing methods being employed by NSRL such as plasmid profiling and Pulsed Field Gel Electrophoresis (PFGE) has greatly enhanced our ability to identify clusters and outbreaks and examine trends in human, food and veterinary isolates to track this zoonotic agent through the food chain.

On a European and international level, the European-based network Enter-net has proven in recent years to be invaluable in terms of sharing knowledge and expertise, enabling ourselves and our international colleagues to track clusters and epidemics of salmonellosis and trace back through a complex global food chain to identify the source of outbreaks.

When the antimicrobial susceptibilities of the various serotypes isolated in 2002 were examined, high levels of resistance were again found among *S.* Typhimurium isolates, particularly *S.* Typhimurium DT104. Many of these isolates were found to have the penta-resistance phenotype (ACSSuT) that was reported in previous years. This continues to be a worrying trend.

One of the more notable features of the data reported to NSRL in 2002 has been the emergence of travel-associated cases with almost 20% of the cases identified by NSRL having acquired the illness outside of Ireland. The majority of cases were associated with travel to Spain and the serotype most commonly linked with Spain was *S.* Enteritidis. However a

Table 4. Antimicrobial susceptibilities of human Salmonella enterica serotypes isolated in Ireland in 2002.

	% Resistance						
Serotype (Number)	**Amp**	**Chl**	**Strep**	**Sulph**	**Tet**	**Trim**	**Nal**
S. Enteritidis (165)	8	0	2	2	4	1	31
S. Typhimurium (140)	72	56	74	78	79	17	4
S. Virchow (10)	30	0	0	40	40	40	90
S. Dublin (9)	0	0	0	11	0	0	0
S. Stanley (7)	0	28	57	57	71	28	28
S. Heidelberg (2)	0	0	50	0	50	0	0
S. Bredeney (2)	50	0	50	0	50	0	0

Amp = Ampicillin, Chl = Chloramphenicol, Strep = Streptomycin, Sulph = Sulphonamide, Tet = Tetracycline, Trim = Trimethoprim, Nal = Naladixic acid

wide variety of phage types of *S.* Enteritidis were reported in these travel-associated cases. It is quite probable that the overall proportion of travel-associated cases will increase in coming years and a greater diversity of serotypes and sub-types will be detected.

In conclusion, although the overall incidence of human salmonellosis has decreased in Ireland over the past number of years (in line with the control programmes in place for *S.* Enteritidis and *S.* Typhimurium), there is still no room for complacency regarding this pathogen as it is quite likely that the relative importance of other serotypes will increase, and the burden of illness due to this pathogen remains very significant.

Acknowledgements

We wish 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 NSRL for analysis. In addition, we would like to thank the Departments of Public Health and Community Care Areas for providing the clinical notification data.

Operational Support and Medical Advice

The medical team provides expert support and advice on communicable diseases. NDSC doctors receive queries via e-mail and telephone from the general public, health professionals and others (Figure A). The queries concern a range of health topics (Figure B).

SARS Information Line

The SARS Information Line was set up during the 2003 SARS outbreak and was operated by NDSC staff. A total of 250 queries were dealt with during a 4-week period. The majority came from the general public (Figure C).

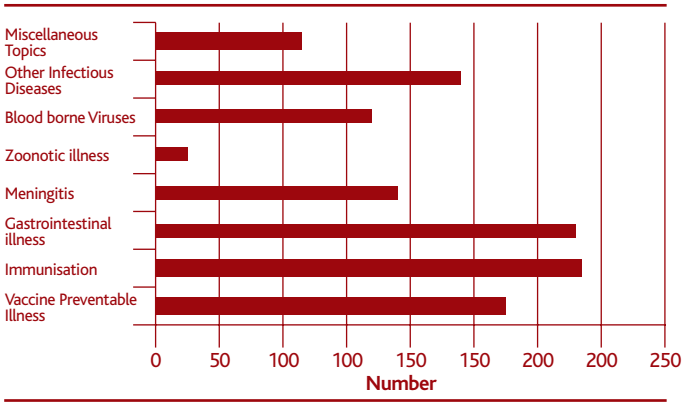

Figure 2. Health topics dealt with by Operational Support (End September 1999 to 13th August 2003)

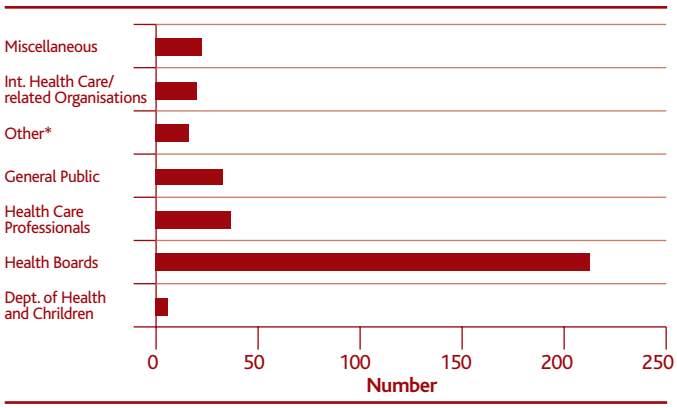

Figure 1. Sources of contact with Operational Support (from September 1999 to13th August 2003).
**Other Irish Statutory Bodies / Governement Departments / Public Representatives.*

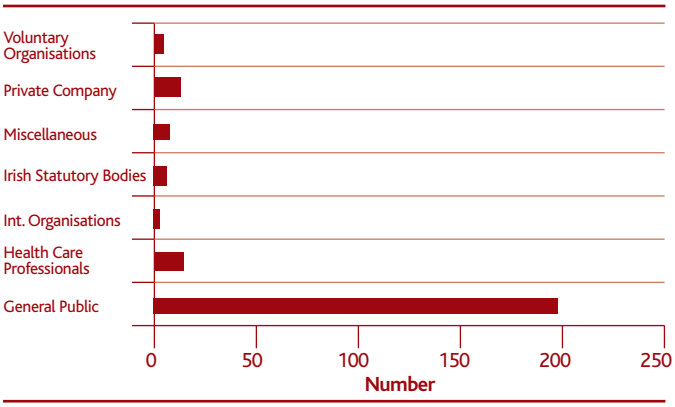

Figure 3. SARS database of queries dealt with from 18th March 2003 to 11th of April 2003.

Campylobacteriosis in Ireland, 2001

Key points

- **Campylobacter continues to be the most common bacterial cause of gastroenteritis in Ireland, despite a decrease in the overall numbers reported in 2001**
- **In 2001, there were 1286 laboratory confirmed cases of Campylobacteriosis in Ireland (compared to 1613 cases in 2000, and 2085 cases in 1999).**
- **The highest burden of illness was again seen in the 0-4 age group in 2001.**
- **Campylobacteriosis was found predominantly in males in several age groups.**

Introduction

Infections due to *Campylobacter spp* are the most commonly isolated bacterial cause of human gastrointestinal illness in Ireland, the UK and many countries globally with temperate climates. *Campylobacter jejuni* is the predominant species associated with human illness, with the remainder mostly being *C. coli* and *C. lari*.

Campylobacteriosis presents as a diarrhoeal illness. The diarrhoea is often bloody and is frequently associated with acute abdominal pain. Symptoms may subside after a number of days or may persist for weeks. Rarely, some long-term sequelae may develop such as arthritis and approximately one in every 1000 cases leads to a severe neurological disorder called Guillain-Barré Syndrome (GBS).

This review presents data from the third year of the NDSC national survey of the incidence of human campylobacteriosis in Ireland. Valuable information has again been derived regarding the epidemiology of laboratory-confirmed campylobacteriosis which supplements further investigations in this field by the Food Safety Authority of Ireland and other partners in infectious disease surveillance and control.

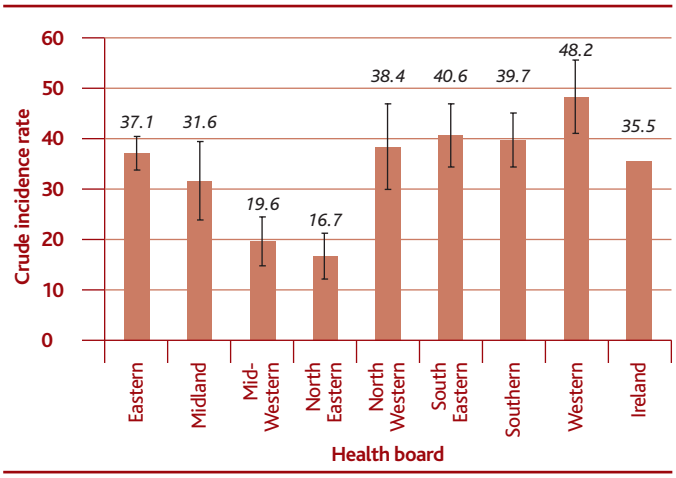

Figure 1 illustrates crude rates (cases/100,000 population) of human campylobacteriosis for each health board in Ireland. (2001)

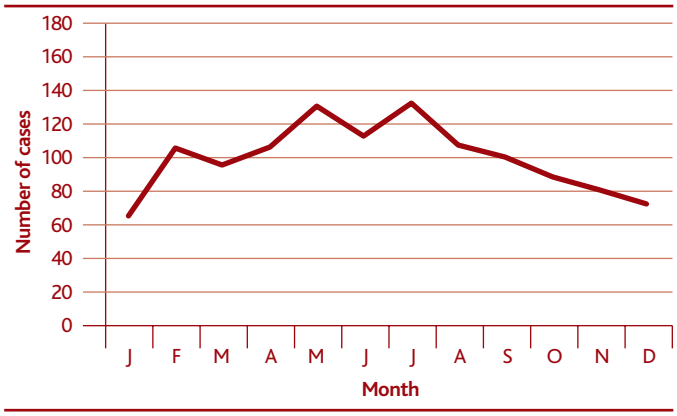

Figure 2: Total cases of campylobacteriosis by month of notification (2001) in Ireland.

Methods

NDSC requested public health doctors and laboratories to provide disaggregated information on all laboratory-confirmed cases of campylobacteriosis diagnosed in 2001.

The following minimum dataset was requested: identifier, date of birth/age, sex, address and date of onset/isolation/reporting. In regions where laboratory surveillance systems were in place, this information was requested from their databases. Duplicates were removed where detected. Data were assigned a health board and a county where address was supplied. Analyses were carried out using MS Access and SPSS. Direct methods of standardisation were applied using the Irish population as the standard population. Population data were taken from the 1996 census. Species differentiation of isolates was not requested.

Results

Information on *Campylobacter* was obtained from all Health Boards. Information on age was not available in 3% of cases and information on sex was incomplete in 1% of cases. Those cases for whom age was not supplied are not presented in age standardised charts.

Incidence

In total, 1286 cases of laboratory-confirmed campylo-bacteriosis were reported in 2001 in Ireland. This gives a crude incidence rate (CIR) of 35.5 per 100,000 population. This compared with a CIR of 44.5 per 100,000 in 2000 and 57.5 in 1999 (Table 1). Figure 1 shows the crude incidence rate by health board.

Sex

Males accounted for 55.7% of cases and females 43.2%, (1.2% not available). This was a very consistent finding with the same ratio also observed in 2000 and 1999.

Seasonality

Campylobacter is known to have a well characterised seasonal distribution, with a peak in late spring/early summer seen each year. In 2001, this seasonal pattern remains similar but the characteristic peak seen in previous years was not as pronounced. Figure 2 shows the occurrence of cases by month for Ireland in 2001.

Age

Age standardised incidence rates (ASIR) were then calculated to allow comparisons between areas to be made without the confounding effects of age (Figure 3). In 2001, the highest incidence was recorded in the western region of the country, with the lowest incidence seen in the north eastern region. These data are consistent with those observed in 1999 and 2000.

Table 4 shows the crude incidence rates and age standardised incidence rates (per 100,000 population) by health board in 2001

The age-standardised data is mapped and presented in Figure 4.

Figure 5 shows the breakdown of cases in each age group for Ireland.

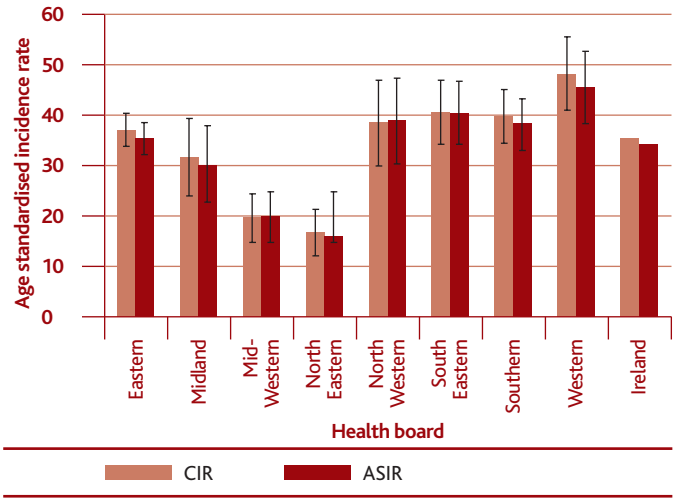

Figure 3: Age standardised incidence rates compared to crude incidence rates in each health board, 2001.

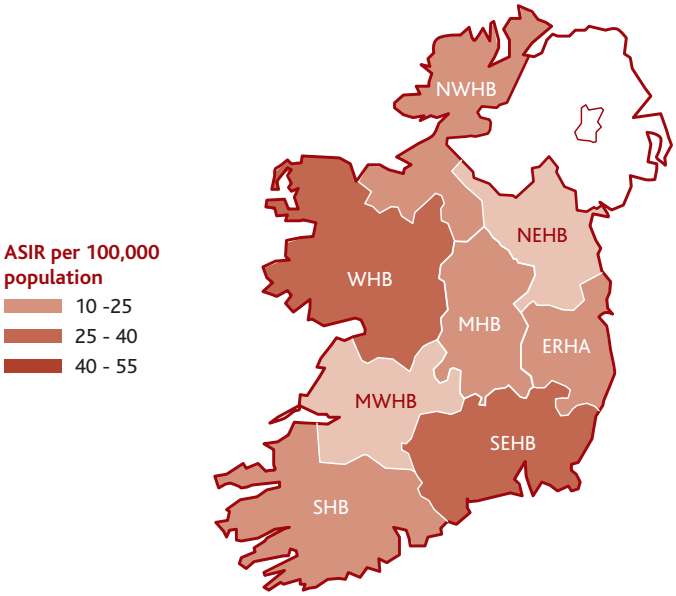

Figure 4. Age-standardised rates of campylobacteriosis in Ireland by health board, 2001

This demonstrates that there is a large burden of illness in children under 5 years of age, and mirrors the results found in 1999 and 2000. When we examine age specific incidence rates for each age group, the burden of illness in this age group is even more evident (Figure 6)

Gender distribution

The variance in gender distribution that was noted in 1999 and 2000 was again evident from analysis of the data in 2001. In every age-group except 55-64 years there was a predominance of male cases. This is shown in Figure 7 when the data are adjusted for age and sex.

Discussion

This review presents data from the third year of the NDSC national survey of the incidence of human campylobacteriosis in Ireland. Valuable information has again been derived regarding the epidemiology of laboratory-confirmed campylobacteriosis. These data reveal a crude incidence rate of 35.5 cases per 100,000 persons in Ireland in 2001. Overall a decrease was seen in Ireland when compared with 2000 CIR (44.5/100,000). This decrease was most notable in three health board regions, viz. Western, Southern and South-Eastern. Despite the reduction in numbers however, campylobacteriosis remains the single biggest cause of bacterial gastroenteric infection in Ireland (almost three times the number of salmonellosis cases reported in 2001). It should also be noted that these are laboratory confirmed cases and the real burden of illness is even higher.

Higher rates were seen for the same period in Northern Ireland (52.4/100,000), England and Wales (107.6/100,000) and Scotland (106.1/100,000). These data also represented a decrease from 2000 figures for Northern Ireland and Scotland, however the rates in England and Wales increased for the year 2001.

The burden of human gastrointestinal illness due to *Campylobacter* in Ireland is evident from the data available from three years of this national study and work towards its control has been identified as a priority. To this end, a report was published in 2002 by the Food Safety Authority of Ireland entitled "Control of *Campylobacter* species in the food chain".[1] This was the work of a multi-disciplinary expert group convened to examine existing knowledge regarding the control and prevention of human infection with *Campylobacter spp*, and also to recommend measures to reduce the risk of infection with this zoonotic organism throughout the food chain. A number of key recommendations have been made in this report including the need for more extensive epidemiological data on human cases of campylobacteriosis in Ireland.

It has been recognised that investigations are needed in Ireland to examine the epidemiology of this organism and attempt to provide answers to the questions that the data presented in this report pose, such as, the high incidence in very young children, the bias towards male cases and the geographical distribution of cases. To address this, it is hoped to conduct a matched case-control study in Ireland later this year to examine risk factors for human cases of *Campylobacter* infection.

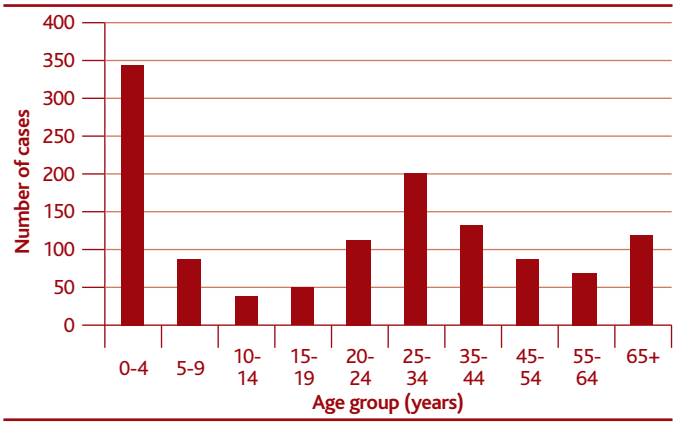

Figure 5. Cases of campylobacteriosis by age group for Ireland in 2001

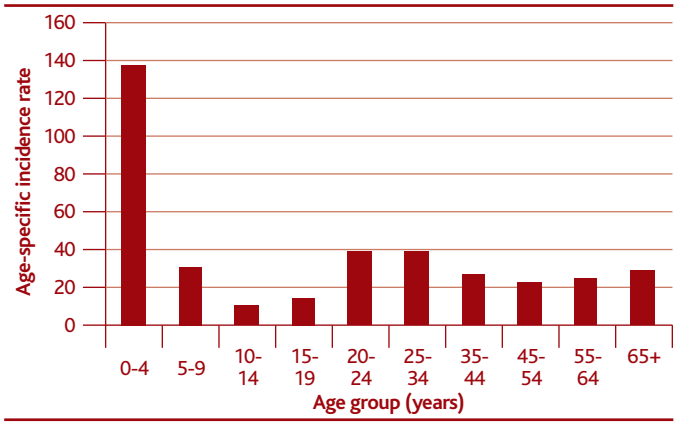

Figure 6. Age specific incidence rates for campylobacteriosis in Ireland, 2001

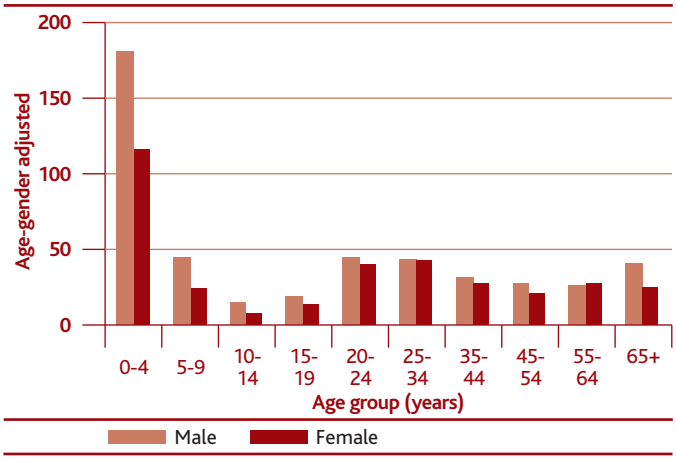

Figure 7: Age-gender adjusted incidence according to age-group in 2001.

Table 1: Number of cases and CIR by health board in Ireland for 2001 and 2000.

	2001		2000	
Board	**No. of cases**	**CIR (incl. 95% C.I.)**	**No of cases**	**CIR (incl. 95% C.I.)**
ERHA	481	37.1 [33.8-40.4]	472	36.4 [33.1-39.7]
Midland	65	31.6 [23.9-39.3]	63	30.7 [23.1-38.2]
Mid-Western	62	19.6 [14.7-24.4]	73	23.0 [17.7-28.3]
North Eastern	51	16.7 [12.1-21.2]	51	16.7 [12.1-21.2]
North Western	81	38.4 [30.0-46.8]	100	47.4 [38.1-56.7]
South Eastern	159	40.6 [34.3-46.9]	226	57.7 [50.2-65.3]
Southern	217	39.7 [34.4-45.0]	337	61.6 [55.1-68.2]
Western	170	48.2 [41.0-55.5]	291	82.6 [73.1-92.1]
Ireland	**1286**	**35.5**	**1613**	**44.5**

Table 2. Number of cases by health board and sex, in 2001.

Health Board	Total	Males	Females	Unknown
ERHA	481	269	210	2
Midland	65	40 2	2	3
Mid-Western	62	28	34	-
North Eastern	1	27	24	-
North Western	81	50	31	-
South Eastern	159	90	69	-
Southern	217	126	88	3
Western	170	86	77	7
Ireland	**1286**	**716**	**555**	**15**

Table 3. Cases by month (2001) for each health board in Ireland

	E	M	MW	NE	NW	SE	S	W	Total
Jan	14	5	6	1	5	15	9	11	66
Feb	27	5	7	2	8	21	20	15	105
Mar	29	3	4	6	1	12	24	16	95
Apr	28	10	5	5	7	11	32	8	106
May	40	12	10	7	10	11	23	17	130
Jun	28	7	6	6	10	8	29	18	112
Jul	53	5	5	3	7	22	18	19	132
Aug	45	2	5	4	8	12	14	17	107
Sept	37	3	2	4	9	11	17	17	100
Oct	34	2	9	3	5	11	12	12	88
Nov	26	5	1	3	6	15	10	14	80
Dec	27	6	2	7	5	10	9	6	72
N/K	93	0	0	0	0	0	0	0	93
Total	**481**	**65**	**62**	**51**	**81**	**159**	**217**	**170**	**1286**

Most cases of campylobacteriosis are sporadic and it is thought that the primary mode of transmission is foodborne. Suggested risk factors for infection have included ingestion of undercooked poultry meats and handling raw poultry, but also contact with pets, especially puppies, consumption of unpasteurised milk or dairy products and drinking water from contaminated/ untreated supplies. In addition, the fact that *Campylobacter* has a low infectious dose (500 organisms or less), implies that cross-contamination of ready-to-eat foods by raw meats may be an important source of infection. The role of person-to-person transmission of campylobacteriosis is thought to be very low.

C. jejuni and *C. coli* can be isolated from the intestines of healthy farm animals, poultry, pets and wild birds. These organisms rarely cause disease in these animals and the carriage rate is believed to be quite high, particularly in poultry. The lack of sub-typing information in Ireland has meant that currently it is not possible to trace human cases of campylobacteriosis back through the food chain.

The strong seasonal distribution of human cases of campylobacteriosis is another extremely interesting feature of this disease, with a peak seen in late spring/early summer seen each year. The WHO European Centre for Environment and Health (ECEH) is currently undertaking a European study to examine the effects of global climate change on a number of gastroenteric pathogens including *Campylobacter spp*. From examination of retrospective surveillance and meteorological data from a large number of countries, it is hoped to be able to extrapolate the mechanisms governing the impact of weather and climate on foodborne and waterborne illness.

Table 4. Crude incidence rates and Age standardised incidence rates (per 100,000 population) by health board in 2001

Health Board	CIR [95% CI]	ASIR [95% CI]
ERHA	37.1 [33.8-40.4]	35.4 [32.2-38.6]
Midland	31.6 [23.9-39.3]	30.2 [22.7-37.8]
Mid-Western	19.6 [14.7-24.4]	19.8 [14.8-24.7]
North Eastern	16.7 [12.1-21.2]	15.9 [14.8-24.7]
North Western	38.4 [30.0-46.8]	38.9 [30.4-47.4]
South Eastern	40.6 [34.3-46.9]	40.4 [34.1-46.7]
Southern	39.7 [34.4-45.0]	38.2 [33.0-43.4]
Western	48.2 [41.0-55.5]	45.4 [38.3-52.6]
Ireland	**35.5 [33.5-37.4]**	

Table 5. Age-distribution by health board

Age group (years)	E	M	MW	NE	NW	SE	S	W	Total
0-4	93	23	24	7	24	45	65	61	342
5-9	19	4	3	6	7	14	25	11	9
10-14	10	1	2	4	4	7	4	3	35
15-19	14	2	3	2	3	6	13	8	51
20-24	61	5	4	4	5	9	9	16	113
25-34	88	8	11	14	9	25	33	15	203
35-44	66	3	4	5	10	11	17	16	132
45-54	47	4	1	1	6	16	12	3	90
55-64	33	4	1	2	7	8	12	3	70
65+	38	8	9	3	6	17	17	21	119

Acknowledgements

NDSC sincerely thanks and acknowledges all those who provided information for the third year of this report on the epidemiology of campylobacteriosis in Ireland. As was the case last year, many public health doctors, surveillance scientists, medical microbiologists and medical scientists made special efforts to obtain their data for this period to allow NDSC complete an accurate and relatively complete database of laboratory-confirmed cases of campylobacteriosis. We are particularly grateful for the availability of quality information from INFOSCAN (Southern, South Eastern and Mid-Western Health Boards) and LSS (Eastern Health Board) which made data collection very efficient.

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1. www.fsai.ie/publication_list_index.htm

The Epidemiology of Verocytotoxigenic *E. coli* O157 in Ireland, 2002

Key Points

- ***E. coli* O157 is an emerging pathogen and a serious global health concern.**
- **In 2002, there were 70 confirmed cases of VTEC O157 infection in Ireland, the highest number reported since 1998.**
- **The highest burden of illness was recorded in children under 5 years of age.**
- **Five cases of haemolytic uraemic syndrome were reported among confirmed cases.**
- **Fifty seven per cent of cases had a date of onset of illness between July and September.**

Introduction

Verotoxigenic *E. coli* (VTEC) are so-called because of their ability to produce one or both of two verotoxins (VT1 and VT2). They cause a wide range of illnesses, from mild diarrhoea to haemorrhagic colitis with severe abdominal pain and bloody diarrhoea. Illness is usually self-limiting and resolves after about eight days. However, 2-7% of cases develop haemolytic uraemic syndrome (HUS), a form of renal failure; this is a more likely complication in young children. In fact, VTEC are the most common cause of diarrhoea-associated HUS in children.[1] In adults, VTEC infection may be followed by thrombotic thrombocytopaenic purpura (TTP).

The primary reservoir is cattle, although VTEC have been isolated from a variety of healthy animal carriers including sheep, horses, goats and wild birds. While this organism was first recognized as a foodborne pathogen (the 'burger bug'), it is now known that it can also be transmitted through water, the environment and by direct contact with infected animals. Person-to-person spread has also been documented.

E. coli O157 is the most commonly reported VTEC in Ireland, the UK and the US, although other serogroups are capable of causing the same spectrum of illness, including O26, O111, O103 and O145. Many cases of O26 have been reported in Ireland, including several cases in children during an outbreak in 1999.[2]

Facilities for VTEC diagnosis and confirmation in Ireland have improved greatly over the last few years. Since October 2000, the Public Health Laboratory at Cherry Orchard Hospital, Dublin has provided an *E. coli* O157 and non-O157 diagnostic

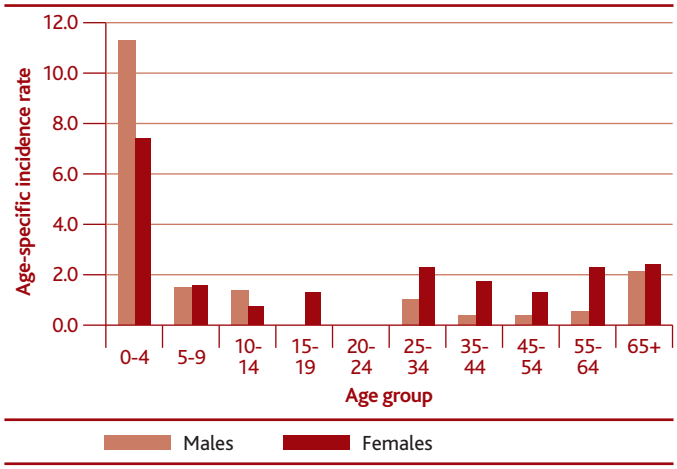

Figure 1. Age-gender specific incidence rate (per 100,000 population) of confirmed cases of VTEC O157, Ireland 2002

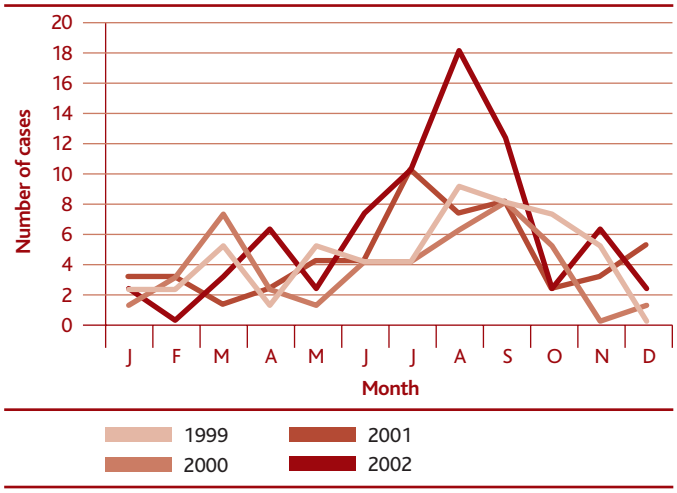

Figure 2. Confirmed cases of VTEC O157 by month of onset of symptoms, Ireland, 1999-2002

service for clinical and food samples, including *E. coli* serotyping and verotoxin detection.

Methods

This is the fourth year that NDSC, in co-operation with Directors of Public Health in each health board region, have operated the epidemiological surveillance system for VTEC O157. Since 1999, specialists in public health medicine, senior area medical officers, area medical officers, microbiologists, medical laboratory scientists, surveillance scientists, infection control nurses, principal environmental health officers, and environmental health officers participate in a system whereby a standard dataset of information is collected at health board level on each case identified, and reported to NDSC. This information includes socio-demographic data, clinical data, possible risk factors and information on links between cases. Some participants in the system also report non-O157 VTEC. 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 are subsequently confirmed as not H7 or Shiga toxin producing are removed from the database. A travel-associated case is defined as one where there has been international travel within two weeks prior to onset of illness.

Results

Seventy confirmed cases of VTEC O157 were notified to NDSC that had a date of onset of symptoms during 2002. Two of these cases occurred in non-residents and are not therefore included in the estimation of population-based rates. These two cases are however, included in the descriptive epidemiology. The numbers of confirmed cases and the crude incidence rates of VTEC O157 in Ireland from 1996-2002 are shown in table 1.

Suspect/Probable cases

An additional 9 suspect/probable cases were reported to NDSC in 2002 that were not subsequently confirmed. These included 4 from the Mid-Western Health Board, three from the Southern Health Board and 1 each from the Western and North-Western Health Boards. Four of these cases had HUS. The remaining 5 cases were symptomatic contacts of confirmed cases; one of these was found positive by serodiagnosis. However, as these cases do not fit the case definition for confirmed cases, they are not included in any of the following analyses.

Regional distribution

As in previous years, regional variation was noted in the numbers of cases reported (Table 2), with the highest rates in the Midland, Western and South-Eastern Health Boards. These

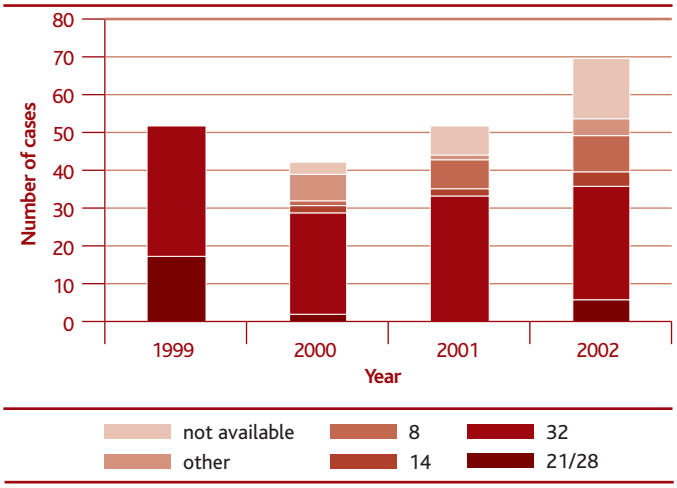

Figure 3. VTEC O157 phage types in Ireland 1999-2002

Table 1. Number of cases of confirmed VTEC O157 and crude incidence rate (95% CI) in Ireland, 1996-2002

Year	Numbers of confirmed cases (incl. non-residents)	Crude incidence rate* (95% CI) per 100,000 population
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	37(42)	0.9 (0.6-1.3)
2001	50 (52)	1.3 (0.9-1.6)
2002	68 (70)	1.7 (1.3-2.2)

** For the years 1996-1999, census figures for 1996 were used while figures from the 2002 census were used to calculate rates from 2000-2002. The latter rates consequently differ from those published previously.*

*** Data for the years 1996-1998 were taken from the report of the FSAI VTEC Working Group.[3]*

3 health board regions appear to have consistently higher rates of VTEC O157 infection.

Age-sex distribution

The highest incidence rate was recorded for young children, a trend also noted over the last few years (Figure 1).

Clinical Features

In total, 61 out of the 70 confirmed cases (87%) were symptomatic. Reported symptoms among symptomatic cases included: bloody diarrhoea in 31 cases (51%), and HUS in 5 cases (8%). Of the 5 cases of HUS, 4 occurred in children under 5 years of age. One person who was admitted to hospital with VTEC O157 in 2002 developed additional medical problems during their hospital stay and died a number of weeks later. It is unclear to what extent the VTEC infection contributed to the precipitation of their subsequent medical problems.

Seasonality of VTEC O157 cases

The majority of cases in 2002 occurred in late summer/early autumn, with a peak in August (figure 2).

Travel-association

Nine cases were travel-associated. The countries visited within 14 days of onset of illness were Canada (1), UK (1), France (1), Spain (4), Canary Islands (1) and Tunisia (1).

Microbiological Investigation

In 2002, phage typing results were available for 54 cases out of 70. In total seven different phage types were reported. As in previous years, the predominant type detected was PT 32 (n=30). This was followed in frequency by PT 8 (n=9), PT 21/28 (n=6) and PT 14 (n=4), all of which were previously reported in Ireland (Figure 3).

Epidemiological Investigation

As a result of following up apparently sporadic cases in 2002, 14 family outbreaks were detected by health board personnel among 29 confirmed cases, demonstrating the importance of investigating each case of VTEC infection. No general outbreaks were reported and no links were found with any food or water source.

Risk exposures

Descriptive epidemiological information was collected on all reported cases in an attempt to identify potential risk factors for exposure to VTEC. Seven (10%) cases reported consumption of unpasteurised milk or cheese. Of 58 cases where information was collected on water source, the water supply was public in 34 (59%) cases, private well water in 12 (21%) cases, from a group scheme in 6 (10%) cases and recorded as other (not public and not well) in 6 (10%) cases. Contact with farm animals was reported in 25 (36%) cases.

Non-O157 VTEC

In 2002, one confirmed VTEC O26 was reported to the enhanced surveillance system.

Discussion

Seventy confirmed cases of VTEC O157 infection (1.7 per 100,000 population) were reported in Ireland in 2002, the highest rate recorded since 1998. The Irish incidence rate is comparable to that published for Northern Ireland in 2002

Table 2. Crude incidence rate (CIR) and age standardised incidence rate (ASIR) with 95% confidence intervals of confirmed cases of VTEC O157 by health board of residence, Ireland, 2002

Health board	CIR [95% CI] per 100,000	ASIR [95% CI] per 100,000
ERHA	0.9 (0.4-1.3)	0.9 (0.4-1.4)
MHB	6.7 (3.3-10.0)	6.5 (3.2-9.8)
MWHB	0.3 (0.3-0.9)	0.3 (0.3-0.9)
NEHB	0.3 (0.3-0.9)	0.3 (0.3-0.8)
NWHB	1.4 (0.2-2.8)	1.4 (0.2-3.0)
SEHB	3.5 (1.8-5.3)	3.5 (1.7-5.3)
SHB	0.5 (0.1-1.1)	0.5 (0.1-1.1)
WHB	4.7 (2.6-6.9)	4.8 (2.6-7.0)
Total	**1.7 (1.3-2.2)**	

(1.6/100,000).[4] Higher rates have consistently been reported for Scotland (4.5/100,000 in 2002).[5]

Fifty-seven per cent of cases had a date of onset between July and September. While a higher incidence during this time is a feature of VTEC infection, the particularly high rate in the summer of 2002 was influenced by the reporting of 14 cases of VTEC O157 in the Midland Health Board region with a date of onset during these 3 months. Two family outbreaks made up half of these cases, while the remaining 7 cases had 3 different phage types. Certain parts of the country appear to have consistently higher rates of VTEC O157 infection. The Midland Health Board, along with the Western and South-Eastern Health Boards, reported the highest rates of infection in 2000, 2001 and 2002.

Nine HUS cases were reported to the surveillance system in 2002, but only 5 were confirmed as being caused by *E. coli* O157. The remaining 4 suspect cases were all under 7 years of age; 2 were male and 2 were female. Three of the four also suffered from bloody diarrhoea. In HUS surveillance studies in different countries, up to 91% of cases were found to have evidence of VTEC infection.[1] It is possible that some or all of these 4 suspect cases were caused by VTEC.

An additional probable case in the database was epidemiologically linked to a confirmed case but was confirmed only by serodiagnosis. The current case definition requires cases to be culture positive. While this case is a laboratory-confirmed case, it is not included in our analyses because it falls outside the case definition. Under the new case definition in the proposed infectious disease legislation, cases of HUS and TTP which are serodiagnosed as being caused by VTEC, will be included.

The reporting of a VTEC O26 case again in 2002 highlights the importance of extending the enhanced surveillance system to non-O157 VTEC. This was probably not the only confirmed case of O26 in Ireland in 2002. Additional O26 cases were notified under the weekly notification system, although their toxin-producing abilities are not reported.

Acknowledgements

We wish to acknowledge the co-operation of microbiologists, medical laboratory scientists, SAMOs, AMOs, SPHMs, surveillance scientists, infection control nurses, PEHOs, and EHOs, for participating in the enhanced surveillance system.

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Invasive *Haemophilus* influenzae in Ireland, 1996-2002

Key Points

- **Incidence of Hib disease increased in 2002, particularly in <5 year olds**
- **No increase due to non-b *H. influenzae* strains observed**
- **Number of true Hib vaccine failures ranged from 2-4 per year**
- **Surveillance of invasive *H. influenzae* in Ireland requires strengthening**

Introduction

Diseases of early childhood associated with *Haemophilus influenzae* type b (Hib) can now be prevented by vaccination. Hib was a leading cause of serious invasive infections such as meningitis, epiglottitis, pneumonia and septicaemia, prior to the licensing of the Hib conjugate vaccines. It was the most common cause of bacterial meningitis and occurred primarily among children under five years of age. The Hib vaccine was introduced in Ireland in October 1992 as part of the primary childhood immunisation schedule. A catch-up programme was also initiated at that time offering the vaccine to those under five years of age. The vaccine is specific for the diseases caused by Hib but does not protect against infections caused by other Haemophilus strains. Despite the fact that the incidence of Hib disease has dramatically declined since the introduction of the vaccine, it is essential that the incidence of all invasive *H. influenzae* infections continue to be closely monitored in Ireland. This will ensure that any changes in the epidemiology of the disease are detected promptly, that reasons for these changes are identified and that the necessary public health interventions are taken.

Materials and Methods

National data on invasive *H. influenzae* for 1996-1998 was collated by Dr Jerry Fogarty, Department of Public Health, WHB, while from 1999 onwards data have been collated by NDSC. NDSC obtains these data from three main sources:

1. Enhanced bacterial meningitis surveillance system (on an ongoing basis)

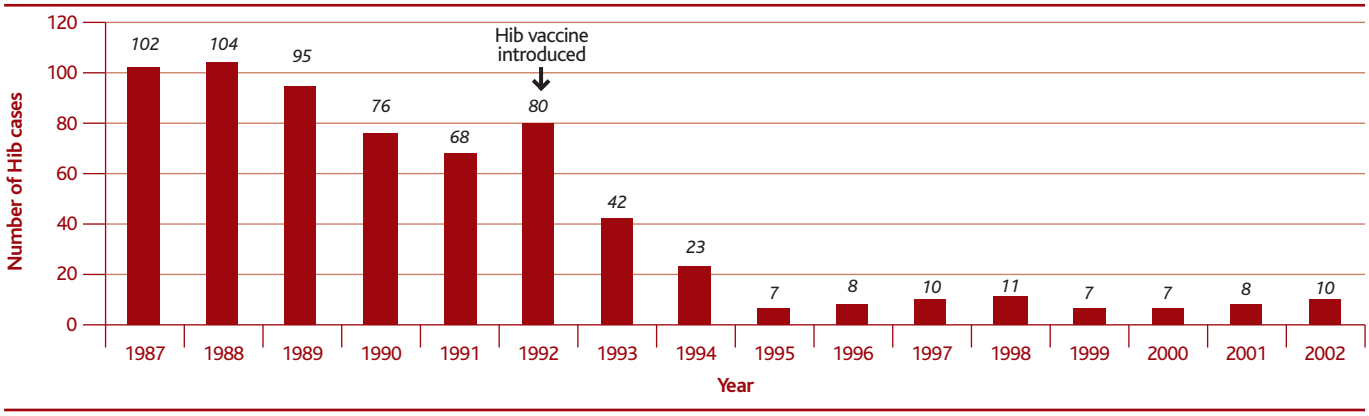

Figure 1. Invasive H. influenzae type b infections in Ireland, 1987-2002. Updated from J. Fogarty forum 1996.

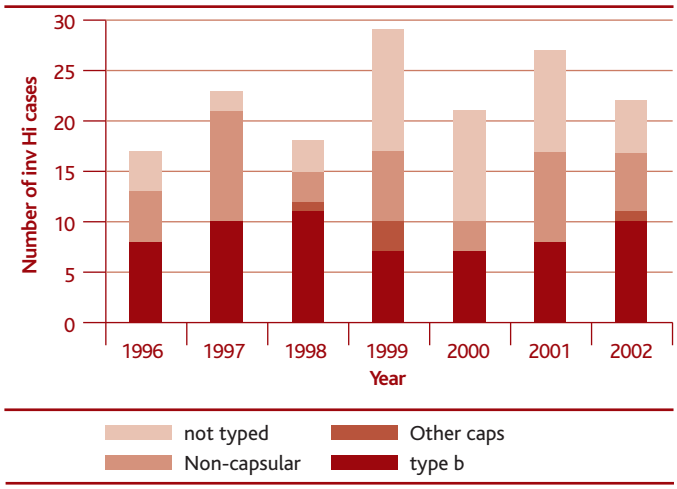

Figure 2. Number of invasive H. influenzae infections by serogroup (1996-2002)

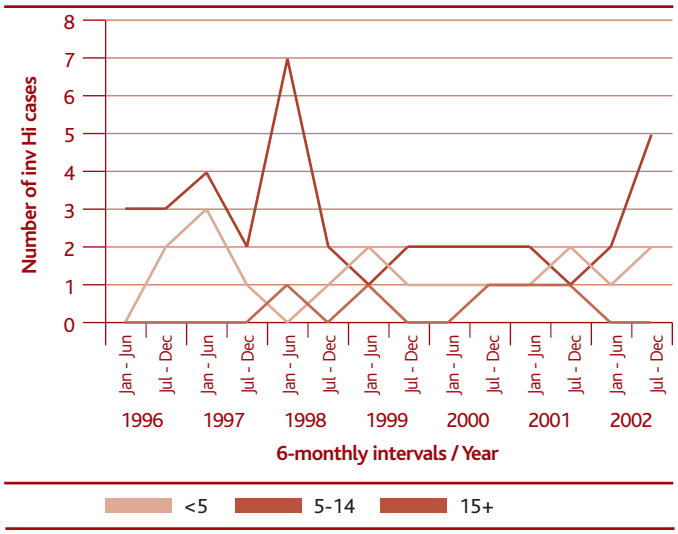

Figure 3. Number of invasive Hib cases in Ireland by age group

2. Directly from the laboratories/microbiologists (approximately once a year)

3. PHLS Haemophilus Reference Unit, Oxford, UK (occasionally)

Details of all invasive cases are inputted in an MS Access database. Vaccination details of cases are sought by Departments of Public Health if (i) the case was born after 1986 and (ii) the isolate is type b or has not been typed. In the event of a vaccine failure details on vaccination dates, vaccine brand and batch numbers are obtained.

A case is defined as invasive *H. influenzae* disease in a person with an isolate from a normally sterile site.

Hib vaccine failures are defined as:

True vaccine failure (TVF): Invasive Hib disease occurring (i) greater than two weeks after one dose of Hib vaccine given at age greater than one year, or (ii) greater than one week after three doses given at age less than one year.
Apparent vaccine failure (AVF): Invasive Hib disease occurring where the case was incompletely immunised or insufficient time had elapsed to be considered a TVF.

Possible vaccine failure (PVF): Invasive *H. influenzae* in a vaccinated child but where the isolate was not serotyped. Such a failure may be a possible true vaccine failure (PTVF) or a possible apparent vaccine failure (PAVF).

Results

Epidemiology of invasive H. influenzae

Since the Hib vaccine was introduced in 1992, the number of invasive *Haemophilus influenzae* type b (Hib) infections has declined from approximately 100 cases per year in the late 1980s to approximately 10 cases per year from the mid-1990s onwards (Figure 1).

Between 1996 and 2002, 156 cases of invasive *H. influenzae* were reported in Ireland, which is an average of 22 cases per year (0.61/100,000 total population; denominator data from 1996 census) (Figure 2). Over that period, 40% of the invasive cases were confirmed as Hib. However, the proportion of Hib cases may be higher since the serotype had not been determined (not typed) for 29% of the cases reported.

An increase in Hib infections was observed in 2002 (n=10; 0.26/100,000 total population, denominator data from 2002 census) when compared with the previous three years; this gives a mean of seven cases per year (Figure 2). This increase in 2002 was most pronounced in the latter half of the year and was predominantly in the less than five year olds (Figure 3). A similar increase due to other *H. influenzae* serotypes has not been observed in this age group (Figure 4).

The numbers of invasive *H. influenzae* and invasive *H. influenzae* type b (Hib) cases reported between 1996-2002 by age group are presented in Table 1a & 1b, respectively. Thirty five percent of the invasive *H. influenzae* cases occurred in under 5 year olds, while 31% occurred in over 65 year olds.

Table 1a. Number of invasive H. influenzae cases by age group

Year	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	>65	Total
1996	3	5	0	0	0	0	1	2	2	4	17
1997	7	4	0	2	2	2	0	1	1	4	23
1998	4	7	1	0	1	1	0	1	0	3	18
1999	2	2	2	0	2	1	1	6	2	11	29
2000	5	5	1	0	1	0	1	1	0	7	21
2001	2	2	2	2	4	1	2	1	2	9	27
2002	0	7	0	0	1	1	0	2	1	9	21
Total	**23**	**32**	**6**	**4**	**11**	**6**	**5**	**14**	**8**	**47**	**156**

Table 1b. Number of invasive H. influenzae type b cases by age group

Year	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	>65	Total
1996	1	5	0	0	0	0	0	1	1	0	8
1997	3	3	0	0	0	1	0	0	1	2	10
1998	3	6	1	0	0	0	0	1	0	0	11
1999	1	2	1	0	0	0	0	1	1	1	7
2000	2	2	1	0	0	0	0	0	0	2	7
2001	1	2	2	0	0	0	1	0	0	2	8
2002	0	7	0	0	0	0	0	0	0	3	10
Total	**11**	**27**	**5**	**0**	**0**	**1**	**1**	**3**	**3**	**10**	**61**

Sixty two percent of Hib cases reported between 1996 and 2002 occurred in under 5 year olds (38/61). Seven cases of Hib infection occurred in this age group in 2002, which is an age specific incidence rate of 2.5 per 100,000 in 2002 (denominator data from 2002 census).

Between 1996 and 2002, 55 cases of invasive *H. influenzae* in children under 5 years of age have been reported. The disease presentations in these children were as follows: meningitis (n=18); septicaemia (n=14); meningitis & septicaemia (n=4); epiglottitis (n=7); osteomyelitis/septic arthritis (n=4); pneumonia (n=4); cellulitis (n=1); other (n=1) and unknown/not reported (n=2).

Hib vaccine failures

Since 1996, 28 Hib vaccine failures have been reported in Ireland (19 TVF, 7 AVF, 1 PTVF, 1 PAVF). The vaccination status is unknown for an additional five cases and therefore these potentially could be vaccine failures also. The number of TVF tends to vary between 2 and 4 per year (Figure 5). Eighty nine percent (17/19) of the TVF occurred in the 1-4 years age group. The two exceptions were both between 5-9 years of age. Four AVF occurred in children less than one year of age and three in 1-4 years old children. The PTVF was in a 1-4 year old and the PAVF was in a child less than one year of age. One third (13/38, 34%) of the Hib cases that occurred in under 5 year olds between 1996 and 2002 had not been vaccinated (Figure 6).

Discussion

In England & Wales, an increase in Hib infections been observed particularly in the under 5 year olds. A similar increase has not been seen with other *H. influenzae* serotypes. The incidence rate of Hib disease in this age group increased from 1.0 in 1999, to 1.86 in 2000, to 2.7 in 2001 to 4.17 in 2002.[1] The majority of these Hib cases (approx 90%) occurred in vaccinated children, thereby leading to concerns in the UK regarding the efficacy of the Hib vaccine.

Possible reasons for the increase in Hib disease in the UK include[2]

1. Random variation in Hib disease occurrence

2. Decreasing herd immunity

3. Rapid infant vaccination schedule in the UK of 3 doses at 2, 3 and 4 months with no booster dose and also subsequent waning of the initial impact of the catch-up campaign

4. A reduced immune response to Hib vaccines in part of the vaccinated population may be occurring, which could be related to the use of a combination acellular pertussis, diphtheria, tetanus and Hib vaccine during 2000-2001, which produces lower Hib antibody levels, compared with whole-cell pertussis and Hib combinations. A similar increase in invasive Hib has not been seen in other countries using acellular pertussis vaccines; these countries mostly use a routine booster at 12-15 months.

Although the number of cases of invasive *H. influenzae* reported in Ireland did not change greatly between 1996 and 2002, an increase in Hib infections was observed in 2002. This increase was most marked in the under 5 year olds, seven

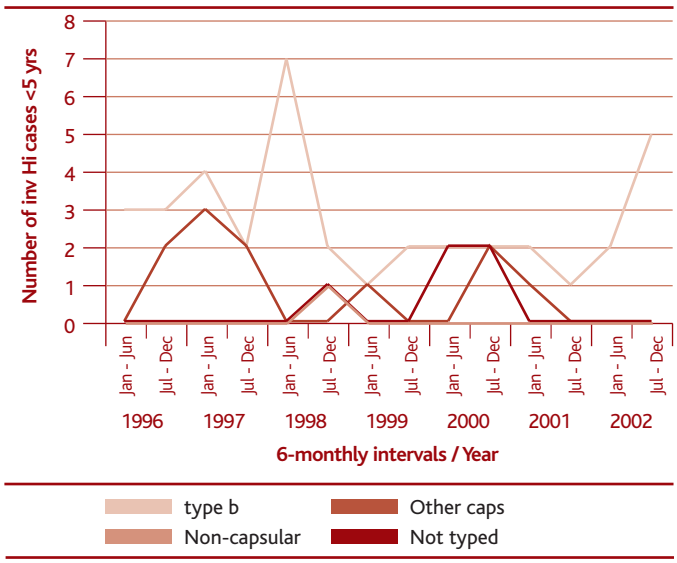

Figure 4. Number of invasive H. influenzae infections by serogroup in under-5 year olds

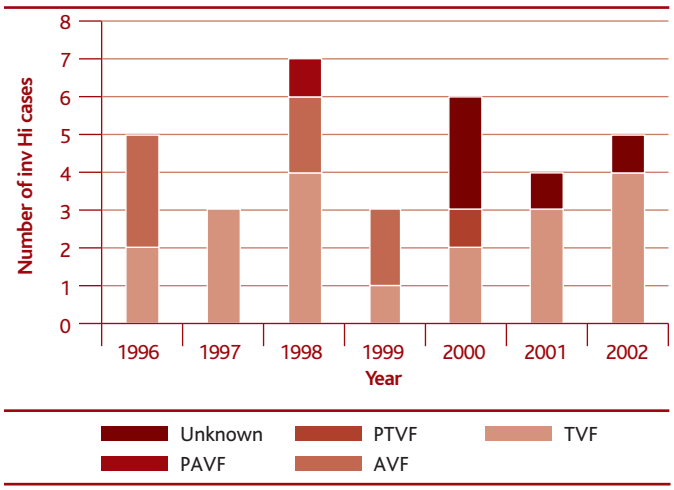

Figure 5. Number of Hib vaccine failures in Ireland, 1996-2002

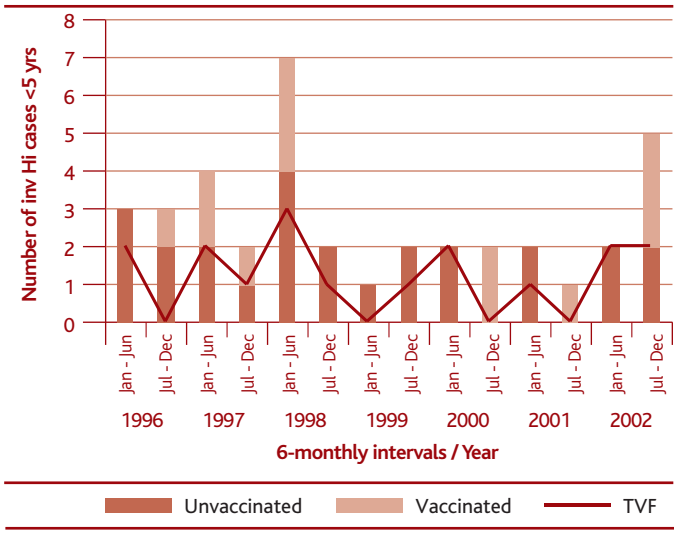

Figure 6. Number of H. influenzae type b cases and true vaccine failures (TVF) in <5 year olds.
Note: The difference between the number vaccinated and TVF is due to Apparent Vaccine Failures or where failure type not known

cases (2.5/100,000) were reported with five of these seen in the latter half of 2002. The increase in this age group continued into the first half of 2003 with six cases being reported to the end of June. Although the incidence of Hib infections in the under five year olds in Ireland in 2002 was similar to that reported in England and Wales in 2001, a far greater proportion of the cases in England & Wales were in vaccinated individuals (90%) when compared with Ireland (57%). Hib vaccine uptake at 24 months in UK is 94% compared to 84% in Ireland. Based on these observations it would indicate poor uptake of the Hib vaccine in Ireland may be as much a contributory factor to the recent increase in Hib infections as to any particular issue regarding the efficacy of the vaccine.

It is vital that the surveillance of invasive *H. influenzae* is improved in Ireland. Such improvements would ensure that any changes in trends of the disease can be detected in a timely manner and assist in identifying the reasons for these changes. Such information in return would enable informed public health decisions and actions to be taken regarding improved prevention of the disease if so required.

Acknowledgements

The authors would like to thank staff in the microbiology laboratories, Community Care Areas and Departments of Public Health for kindly providing data for this report.

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Influenza-like illness activity & surveillance during the 2002/2003 season

Key Points

- **Influenza activity in Ireland was mild during the 2002/2003 season, peaking in February 2003**
- **Influenza B was the predominant circulating strain**
- **Respiratory syncytial virus positive detections reached the highest level on record during the 2002/2003 season**
- **Human cases of influenza A (H7N7) and influenza A (H5N1) were detected in the Netherlands and Hong Kong, respectively during the 2002/2003 season**

Introduction

Influenza is one of the commonest and oldest diseases known to man. The impact on public health varies depending on the circulating strain of virus and the level of pre-existing immunity in the community each season.[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 varies considerably and is responsible for epidemics and pandemics.[3] Influenza A viruses are divided into three subtypes, on the basis of 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, necessitating the annual reformulation of the influenza vaccine, which is based on the current circulating strains. 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.[3,4]

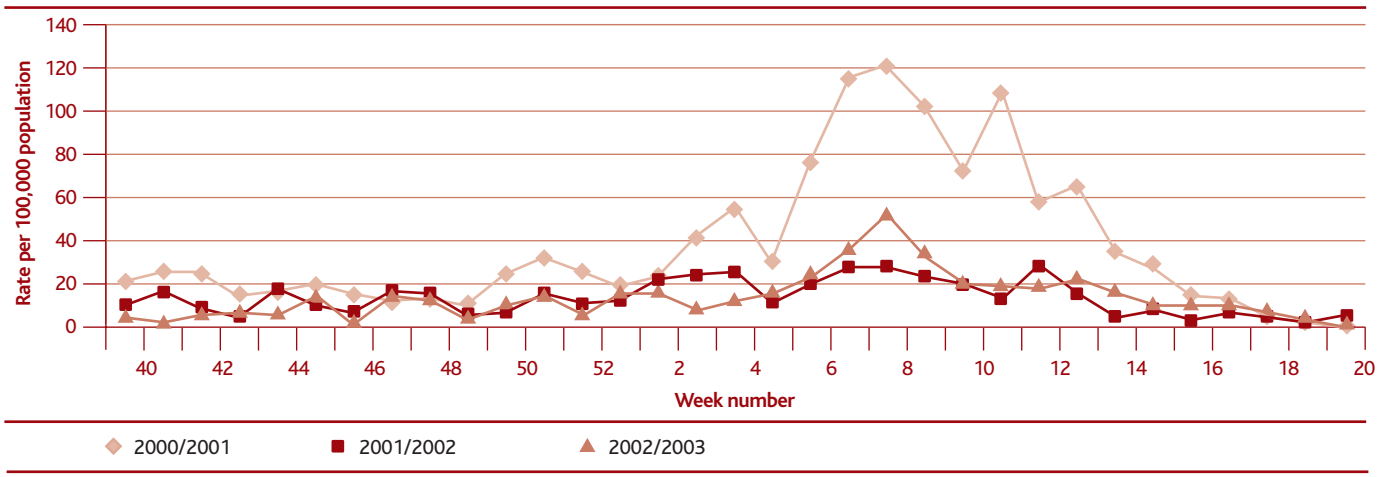

Figure 1: GP consultation rate for influenza-like illness per 100,000 population by report week, during the 2000/2001, 2001/2002 and 2002/2003 influenza seasons.

Table 1: Sentinel GP influenza results by type and season for the 2000/2001, 2001/2002 & 2002/2003 influenza seasons.

Season	Total swabs	Positive swabs	% Positive	Influenza A	Influenza B
2000/2001	329	140	42.6	55	85
2001/2002	242	65	27.0	64	1
2002/2003	**249**	**86**	**34.5**	**27**	**59**
Total	**820**	**291**	**35.5**	**146**	**145**

The 2002/2003-influenza season was the third year of influenza surveillance using computerised sentinel general practices in Ireland. The National Disease Surveillance Centre (NDSC) is working in collaboration with the National Virus Reference Laboratory (NVRL) and the Irish College of General Practitioners (ICGP) on this surveillance project. Influenza activity in Ireland was mild during the 2002/2003-influenza season, peaking in February 2003, with influenza B predominating.

Materials and Methods

Clinical data

Thirty-four general practices were recruited to report electronically, on a weekly basis, the number of patients with influenza-like illness (ILI). 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. In total, the 34 sentinel general practices represent 2.4% of the national population. Practices were located in all health boards with their location based on the population of each health board.

Virological data

Sentinel GPs were requested to send a combined nasl and throat swab on one patient per week where a clinical diagnosis of ILI was made. Swabs were sent to the NVRL for testing using Shell Vial and PCR techniques and results were reported to NDSC. The NVRL also reported on a weekly basis the results of respiratory specimens referred mainly from hospitals. Antigenic characterisation was conducted by Millhill, London.

Regional influenza activity

The Departments of Public Health sent an influenza activity index (no report, no activity, sporadic-, localised-, regional- or widespread activity) every week, to NDSC. The activity index is analogous to that used by the WHO global influenza surveillance system and the European Influenza Surveillance Scheme (EISS). The index is based on sentinel GP ILI consultation rates, laboratory-confirmed cases of influenza, sentinel hospital admissions data and/or sentinel school absenteeism levels. One sentinel hospital was located in each health board. Sentinel primary and secondary schools in each health board were located in close vicinity to the sentinel GPs.

Weekly influenza surveillance report

NDSC produced a weekly influenza report, which was posted on the NDSC website each Thursday. Results of clinical and virological data were reported, along with a map of influenza activity and a summary of influenza activity worldwide.

Results for the 2002/2003-influenza season

Clinical data

GP consultations for influenza-like illness (ILI) were reported on a weekly basis per 100,000 population from week 40 2002 to week 20 2003 (figure 1). Influenza activity was very mild during the 2002/2003-influenza season, similar to the 2001/2002 season. The peak GP consultation rate occurred during week 8, with a rate of 52.6 per 100,000 population. This is compared to a peak rate of 29.0 per 100,000 in the 2001/2002 season and 121.0 per 100,000 in the 2000/2001-influenza season. The peak age specific consultation rate during the 2002/2003 season was in the 10-14 year age

Table 2: Sentinel GP influenza results by type, subtype and report week for the 2002/2003 influenza season

Week number	Total swabs	Positive swabs	Percentage positive	Influenza A (H1)	Influenza A (H3N2)	Influenza B
40	4	0	0.0	0	0	0
41	1	0	0.0	0	0	0
42	4	0	0.0	0	0	0
43	3	0	0.0	0	0	0
44	3	0	0.0	0	0	0
45	7	0	0.0	0	0	0
46	1	0	0.0	0	0	0
47	4	0	0.0	0	0	0
48	6	0	0.0	0	0	0
49	3	0	0.0	0	0	0
50	5	0	0.0	0	0	0
51	8	0	0.0	0	0	0
52	5	0	0.0	0	0	0
1	7	0	0.0	0	0	0
2	11	1	9.1	0	0	1
3	9	1	11.1	0	1	0
4	15	3	20.0	0	2	1
5	16	5	31.3	0	1	4
6	16	12	75.0	1	0	11
7	17	11	64.7	1	0	10
8	21	11	52.4	0	1	10
9	12	9	75.0	0	2	7
10	9	7	77.8	0	0	7
11	8	3	37.5	0	0	3
12	7	4	57.1	0	3	1
13	10	5	50.0	2	2	1
14	10	4	40.0	0	3	1
15	8	7	87.5	2	3	2
16	7	0	0.0	0	0	0
17	6	3	50.0	0	3	0
18	4	0	0.0	0	0	0
19	2	0	0.0	0	0	0
20	0	0	0.0	0	0	0
Total	**249**	**86**	**34.5**	**6**	**21**	**59**

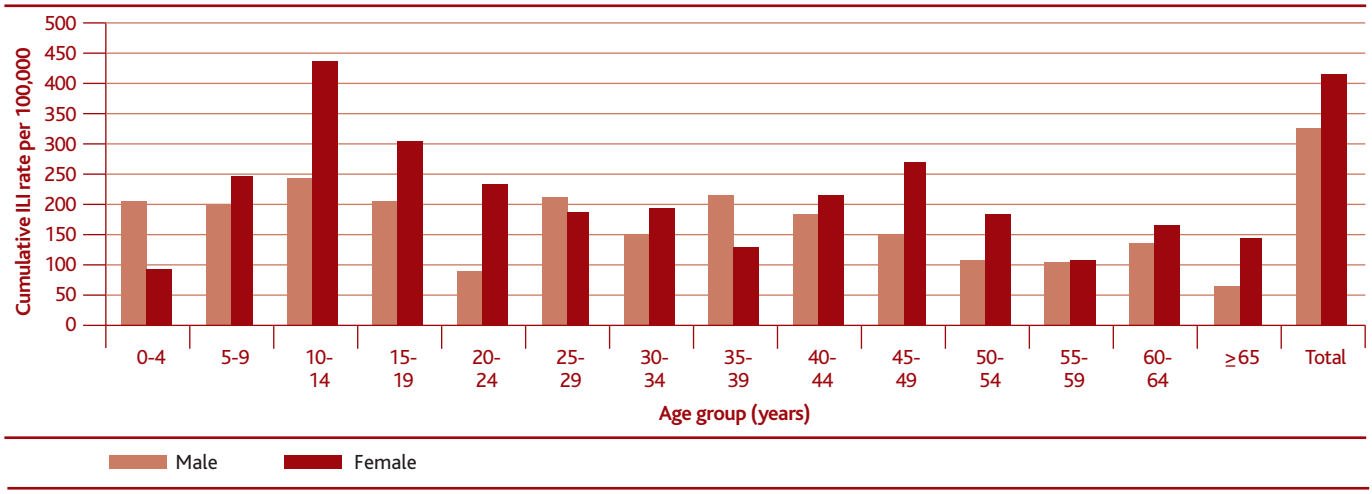

Figure 2: Cumulative age and sex specific ILI rate per 100,000 population from week 40 2002 to week 20 2003. The denominator used in the age and sex specific consultation rate is from the 2002 census data; this assumes that the age and sex distribution of the sentinel general practices is similar to the national age and sex distribution.

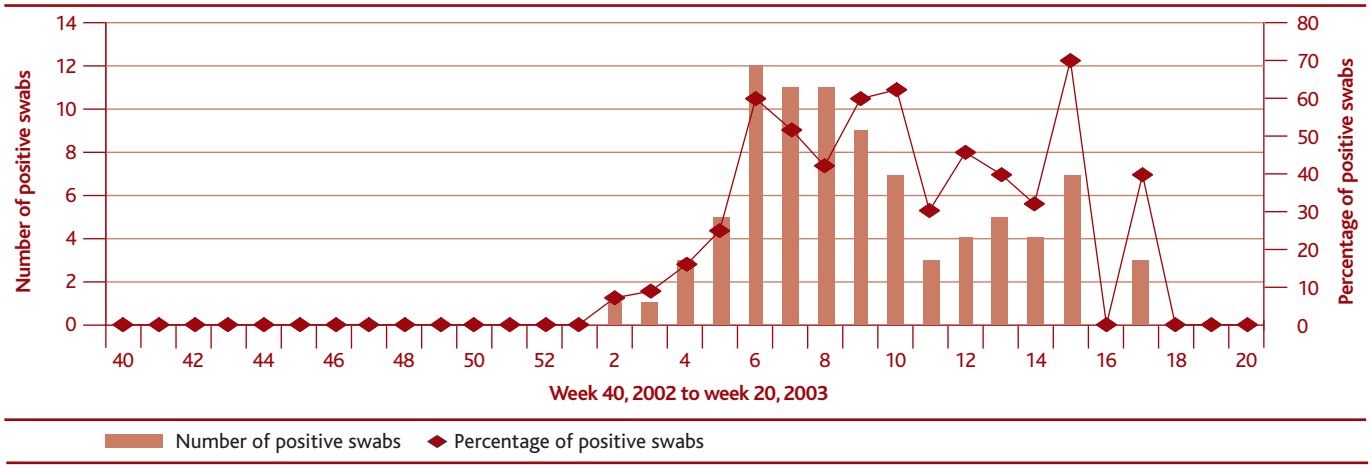

Figure 3: Number and percentage of sentinel influenza virus positive detections during the 2002/2003-influenza season.

group (figure 2). A total of 347 ILI cases were reported by sentinel GPs during the 2002/2003 season.

Virological data
Since the start of the 2002/2003-influenza season, the NVRL have tested 249 sentinel specimens for influenza virus, 86 (34.5%) were positive: 27 influenza A and 59 influenza B (tables 1 & 2). Influenza B was the predominant circulating influenza virus type this season, circulating between weeks 2 and 15 2003. This was followed by detection of influenza A between weeks 3 and 17 2003. The highest number of positive swabs detected this season was during weeks 6, 7, & 8 with between 52.4%-75.0% of swabs positive (figure 3), coinciding with the period of peak clinical activity. Influenza A accounted for 31.4% of positive swabs this season: 6 influenza A (H1) and 21 influenza A (H3N2). Influenza B accounted for 68.6% of positive swabs. Positive influenza virus detections peaked in the 10-14 year age group, mainly infected with influenza B (figure 4).

The NVRL tested a total of 1032 non-sentinel respiratory specimens mostly from hospitals during the 2002/2003 influenza season. Four (0.39%) were positive for Adenovirus, 303 (29.4%) for respiratory syncytial virus (RSV), 4 (0.39%) for parainfluenza virus type 1, 1 (0.10%) for parainfluenza virus type 2, 4 (0.39%) for parainfluenza virus type 3 and 1 (0.10%) for influenza A virus.

Vaccination status & antigenic characterisation
Of the 86 positive influenza virus cases, 64 (74.4%) were not vaccinated, 2 (2.3%) were vaccinated and 20 (23.3%) were of unknown vaccination status. The NVRL referred one influenza B and 2 influenza A (H3N2) virus isolates to the WHO Laboratory in London for antigenic characterisation. The influenza B virus was antigenically closely related to B/Hong Kong/330/2001-like virus. The 2 influenza A (H3N2) isolates were closely related to A/Panama/2007/99. All isolates were covered by the 2002/2003 influenza vaccine.

Influenza activity by health board/authority
Regional influenza activity peaked between weeks 5 and 13 2003, with 4 to 7 health boards reporting sporadic activity weekly. During week 8, the period of peak clinical activity, localised influenza activity was reported from the NEHB, with 6 other health boards reporting sporadic activity (figure 5). In some health boards increases in the number of ILI cases were reflected by increases in hospital respiratory admissions and also occasionally by increases in school absenteeism. Between weeks 6 and 8, increased absenteeism was reported in several sentinel primary and secondary schools in the ERHA, NEHB and the SEHB, often associated with ILI.

Respiratory Syncytial Virus
Respiratory syncytial virus (RSV) is the single most important cause of hospitalisation for viral respiratory tract disease in infants and young children and is a major cause of nosocomial infection.[5] The NVRL have been collecting data on RSV positive specimens since September 1988. RSV data from the NVRL provides comprehensive surveillance of RSV infection in infants treated in hospitals and is a good indicator of seasonal patterns. Between October 2002 and May 2003, the number of RSV positive detections from hospital respiratory specimens referred to the NVRL reached the highest level on record.[6,7] Three hundred and three RSV

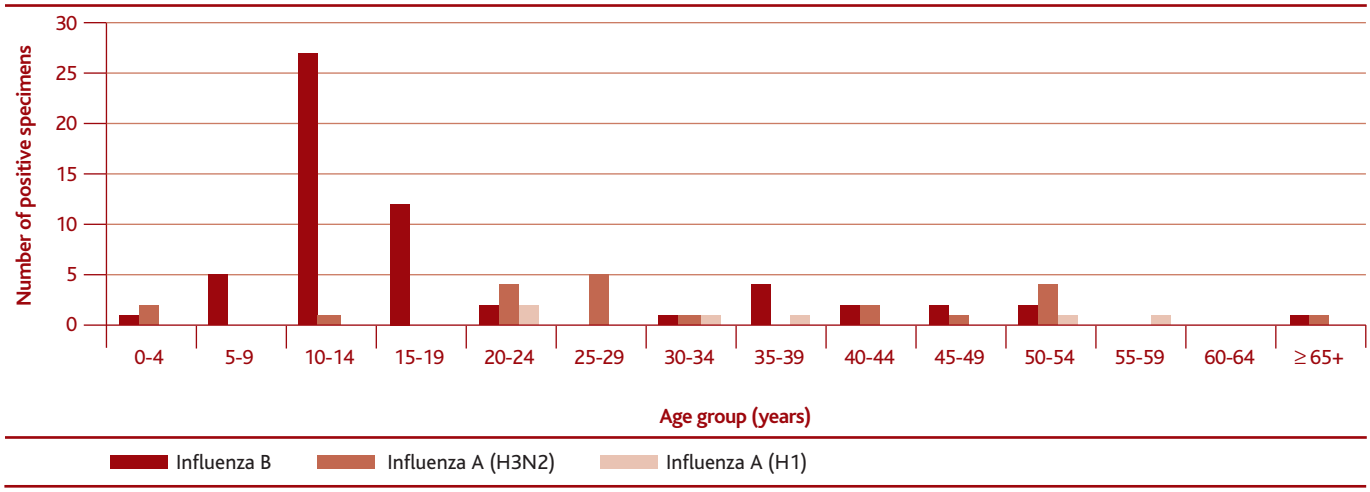

Figure 4: Number of sentinel swabs positive for influenza virus by type, subtype and age group (years), between week 40 2002 and week 20 2003.

positive specimens were detected (figure 6), peaking in weeks 48 and 49 2002, earlier than normal. RSV usually peaks in late December /early January each year. Prior to the 2002/2003 season, the highest number of RSV positive specimens detected by the NVRL was 250 in the 1998/1999 season. Of the 303 positive RSV cases identified between October 2002 and May 2003, 11.2% (34) were less than 1 month old, 67.7% (205) were between 1 and 6 months, 16.8% (51) were between 7 and 12 months and 2.3% (7) were over 12 months old.

During the 2002/2003 season, the NVRL carried out a pilot study to assess the incidence of RSV in sentinel specimens. All sentinel specimens received at the NVRL, from week 40 2002 to week 5 2003 (n=77), which tested negative for influenza were included in the study. This timeframe coincided with the RSV season for 2002/2003. The pilot was carried out using molecular technology. Of the 77 sentinel swabs tested, 7 (9.1%) were positive for RSV. Subsequent subtype analysis identified 4 of the samples as RSV A and 3 as RSV B viruses. These results confirm international experience and suggest that consideration should be given to expanding the respiratory screen in sentinel specimens to include RSV in future surveillance.

Influenza activity worldwide

In Northern Ireland, morbidity levels for influenza and ILI were low during the 2002/2003 season, with influenza B predominating. Laboratory confirmed RSV infection peaked in weeks 50 and 51, 2 to 3 weeks earlier then expected, as in the Republic of Ireland.[8] In England, Scotland and Wales, ILI consultation rates peaked in January 2003, with the highest consultation rates among children. During late January and early February 2003, influenza B outbreaks were reported in schools in England.[9]

Across Europe, influenza activity was heterogeneous during the 2002/2003 season. Influenza B was the dominant type until week 6 2003, mainly circulating in the south west and west of Europe. From week 7 2003, influenza A was the dominant type, mainly circulating in Central Europe. More than 99% of the viruses reported by EISS have been closely related to the 2002/2003 influenza vaccine strains. A very small number of influenza A (H3N2) viruses (detected in England, Norway, and Switzerland) have, however, shown reduced reactivity to A/Panama/2007/99 antiserum (similar to A/Fujian/411/2002).[10]

In February 2003, outbreaks of highly pathogenic avian influenza, influenza A (H7N7), were reported in several Dutch poultry farms. Following this, avian cases were reported in Belgium and Germany. Human cases of conjunctivitis and ILI, including one death, were associated with the outbreaks. There was also evidence of human-to-human transmission in the Netherlands and Belgium.[11]

In the US, the 2002/2003 influenza season was also mild, peaking in February 2003. Influenza A (H1) and B viruses circulated widely, with the predominant virus varying by region and time of season.[12] In Canada, influenza A (H1N2) was the predominant circulating subtype during the 2002/2003 season; all viruses identified in Canada this season were closely related to the current vaccine strains.[13]

Figure 5: Map of influenza activity by health board during week 8 2003, the period of peak influenza activity

In Hong Kong, influenza activity was mild to moderate during the 2002/2003 season, with influenza A (H3N2) peaking in March 2003.[14] In February 2003, an outbreak of influenza A (H5N1) in Hong Kong was limited to two cases, one of who died; both cases were members of the same family. The influenza virus that infected these two cases contained no human genes (the virus genes were purely avian in origin); therefore the risk of human-to-human transmission was very low and unlikely to lead to an epidemic. The virus belongs to a different genetic lineage then that of a similar H5N1 virus that caused an outbreak in Hong Kong in 1997, resulting in 18 human cases and six deaths.[15]

The WHO announced the composition of the vaccine for the 2003/2004 Northern Hemisphere influenza season on the 28th of February 2003: A/New Caledonia/20/99 (H1N1)-like virus, A/Moscow/10/99-(H3N2)-like virus (the widely used vaccine strain is A/Panama/2007/99) and B/Hong Kong/330/2001. They recommend that all people in high-risk groups and healthcare workers caring for them be vaccinated as a matter of urgency.[16] This strategy would reduce the burden of influenza and reduce cases of respiratory disease that could be mistaken for SARS or raise suspicion requiring costly investigations.

Discussion

Influenza activity was mild in Ireland during the 2002/2003-influenza season; similar to the 2001/2002 season.[17] This low level of influenza activity was also reflected throughout much of Europe.[10] Influenza B was the predominant virus type circulating this season in Ireland. Influenza activity can be measured not only by GP consultation rates, and laboratory confirmed cases of influenza but also through school and work absenteeism, hospital admission rates, sales of "over the counter" medications and deaths. It is of interest to note that the majority of influenza B cases identified in Ireland were aged between 10 and 19 years of age, corresponding with the highest GP consultation rates for ILI. The peak in influenza B detections also coincided with increases in school absenteeism associated with ILI. Increases in the number of ILI cases were also reflected by increases in hospital respiratory admissions in some health boards.

Further expansions and improvements in the present influenza surveillance system are now being planned for forthcoming seasons, including an increase in the number of sentinel GPs, testing sentinel specimens for respiratory syncytial virus and increasing the number of sentinel swabs. The detection of influenza A (H7N7) in the Netherlands and influenza A (H5N1) in Hong Kong during the 2002/2003-influenza season has emphasised the importance of a timely national surveillance system for influenza.

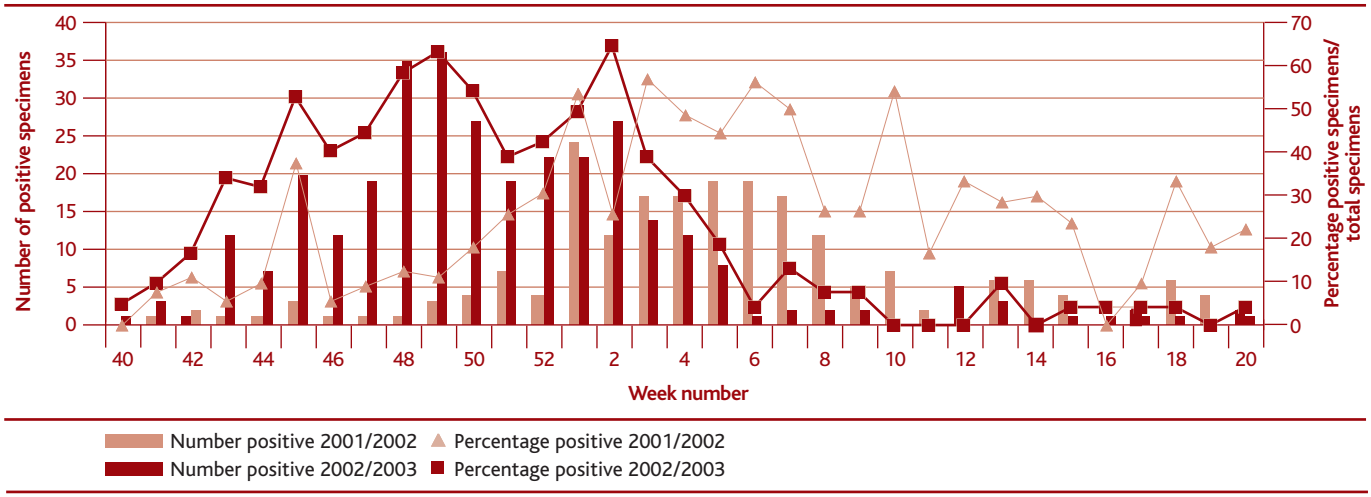

Figure 6: Number and percentage of non-sentinel RSV positive specimens detected during the 2001/2002 and 2002/2003 influenza seasons.

Acknowledgements

Special thanks are due to the sentinel GPs, the Departments of Public Health, schools and hospitals who provide data throughout the influenza season.

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Corporate Services

The corporate services division provides NDSC with the necessary resources, skills, competencies, internal support structures and systems, and policies and procedures to achieve its objectives.

The divisional objectives are:

- To ensure NDSC has a qualified and competent workforce necessary to meet its objectives and that NDSC is an employer of choice
- To develop and implement systems, policies and procedures that ensure the most effective and efficient use of NDSC's financial resources to enable it to achieve its objectives
- To facilitate the enhanced performance of NDSC by the provision of office accommodation and other support services
- To provide skilled administration support to the functional teams at NDSC
- To ensure NDSC meets all its obligations and requirements in relation to planning and compliance issues

Office Accommodation
At the beginning of 2002 NDSC was accommodated in three offices: at Sir Patrick Dun's Hospital, Lower Grand Canal Street, Dublin 2, at 11-12 Warrington Place, Dublin 2, and at 60 Lower Baggot Street, Dublin 2.

As part of the NDSC office accommodation plan and following the approval of the Department of Health and Children, work commenced on the fit-out of the new NDSC offices at 25-27 Middle Gardiner Street, Dublin 1, in January 2002. A staff consultation process was carried out for all aspects of the building design and development, which proved to be an invaluable source of ideas and advice. The move to Gardiner Street was completed in late April 2002 and NDSC began operating from its new offices on 29th April 2002. The provision of new modern offices with high standard meeting and technology facilities has greatly facilitated the development of NDSC during 2002.

Human Resources
During 2002 NDSC continued to expand its staff through the recruitment of highly qualified and experienced medical, scientific, IT and administration professionals. NDSC encourages staff to avail of training courses considered to be of value to them in their work and in their personal development. In addition to attendance at relevant courses, seminars and conferences during 2002, many staff of NDSC availed of the opportunity to attend computer skills courses during the year. In line with NDSC's policy of supporting a work-life balance, flexible working was introduced at the Centre in 2002.

Finance
Following the appointment of an Accountant at NDSC in October 2002, a new computer-based accounting system was implemented to facilitate the extraction of cost data and management information and new financial procedures were approved and introduced accordingly.

Surveillance of Outbreaks of Infectious Intestinal Disease in Ireland, 2001

Key points

- **64 outbreaks of IID were reported to the national outbreak surveillance system in 2001, compared to 33 in 2000**
- **These outbreaks were responsible for at least 2500 persons becoming ill**
- **Norovirus (or suspect viral) outbreaks have emerged as the primary cause of IID outbreaks**

Introduction

Investigation of outbreaks of infectious diseases is one of the most important and challenging components of public health. Outbreak investigations aim to identify the source of the outbreak, institute control measures and prevent additional cases. The information gathered during outbreak investigations can be used to determine possible ways of preventing future outbreaks. The Food Safety Authority of Ireland (FSAI) was responsible for initiating the first enteric outbreak system in Ireland in 1998 and commenced collection on outbreaks of illness caused by infectious intestinal disease (IID) in that year.

In July 2001, the National Disease Surveillance Centre (NDSC) took over this function and set up a national surveillance system for all outbreaks of infectious disease in Ireland. The data for 2001 was therefore gathered by FSAI and NDSC.

Objectives of surveillance

The principal objectives of the national outbreak surveillance system are to gain information on the epidemiology of all outbreaks of infectious disease in Ireland.

More specific objectives include estimating the burden of illness caused by outbreaks, identifying high-risk groups in the population and estimating the workload involved in the management of outbreaks. The information gathered can be used to inform public health professionals about the causes and factors contributing to outbreaks, to target prevention strategies and to monitor the effectiveness of prevention programmes.

Table 1. Number of outbreaks of IID and total numbers ill in each health board area 2001.

Health Board	Number of Outbreaks	Number ill
ERHA	21	673
MHB	6	294
MWHB	1	140
NEHB	12	258
NWHB	0	0
SEHB	9	150
SHB	12	525
WHB	3	466

Table 2. Number of cases of Illness arising as a result of outbreaks of IID, by Pathogens: 2001.

Pathogen	Number of Outbreaks	Number ill
Campylobacter spp	1	14
Cryptosporidium spp	2	6
E. coli O157	11	42
Norovirus	9	802
Rotavirus	1	7
Salmonella Enteritidis	1	7
Salmonella Heidelberg	1	2
Salmonella Typhimurium	1	2
Shigella sonnei	1	4
Staph aureus	1	5
Suspect Viral	28	1401
Not Known	7	214
Total	**64**	**2506**

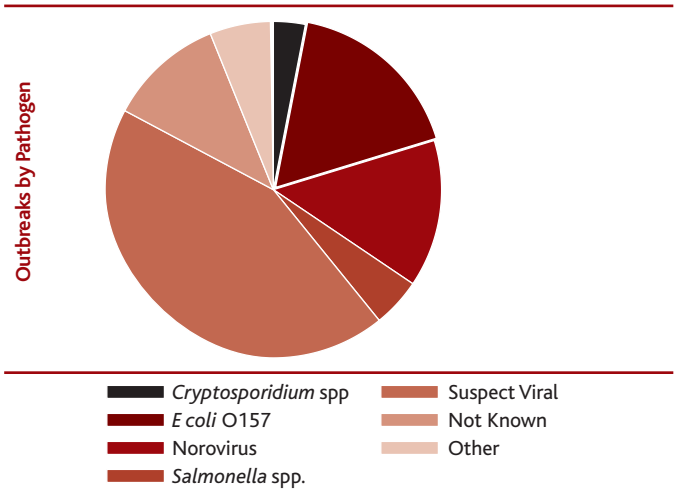

Figure 1. Outbreaks of IID reported in 2001 by pathogen

Outbreak definitions

Outbreak
Two or more linked cases thought to have a common exposure who experience a similar illness, or proven infection. Outbreaks may be general or confined to one household (family) and may involve cases locally, nationally and internationally.

General Outbreak
An outbreak affecting members of more than one private residence or residents of an institution.

Methods of surveillance of outbreaks

Since July 2001, outbreaks are reported to NDSC by the Departments of Public Health using a preliminary notification form (by fax or email). A full report is then forwarded by the lead investigator once more complete data are available. The data collected include information on the source of reporting of the outbreak, the extent of the outbreak, mode of transmission, location, pathogen involved, laboratory investigation, morbidity and mortality data, suspect vehicle and factors contributing to the outbreak. These data are then stored and analysed in a Microsoft Access database.

Results

During 2001, 64 outbreaks of infectious gastrointestinal disease were reported in Ireland, resulting in 2506 people becoming ill. Eighty one people were reported to have been hospitalised (3%). Table 1 shows the regional distribution of outbreaks during 2001.

Causative Pathogen
One of the prominent features of the outbreaks reported in 2001 was the proportion due, or suspected as being due to gastroenteric viruses (Figure 1). Norovirus (NV) - the virus responsible for Winter Vomiting Disease, previously known as "Norwalk-like virus" or Small Round Structured Virus - was confirmed as being responsible for nine (14%) outbreaks of IID. Another 28 outbreaks were not laboratory-confirmed but were suspected as having a viral cause, meaning that 58% of outbreaks were either confirmed NV, or suspected viral in aetiology. *E. coli* O157 accounted for eleven outbreaks (17% of the reported total). Ten of these outbreaks occurred in private homes and one was associated with a crèche. There were three outbreaks due to *Salmonella enterica*. Two of these, (the outbreaks caused by *S.* Heidelberg and *S.* Enteritidis) were both due to person-to person transmission and the outbreak due to *S.* Typhimurium was confined to one household and thought to be associated with animal contact. There were two *Cryptosporidium* spp outbreaks; both of these had a waterborne route of transmission. The first report of an outbreak due to *Campylobacter* spp was received in 2001.

When the number of people becoming ill as a result of reported outbreaks of IID is examined, viral or suspected viral causes were responsible for 2203 cases of illness, representing 88% of those becoming ill. Bacterial and protozoal causes account for approximately three percent of reported illness (Table 2).

Mode of Transmission
In 2001, the majority of outbreaks of IID were associated with person-to-person transmission or person-to-person

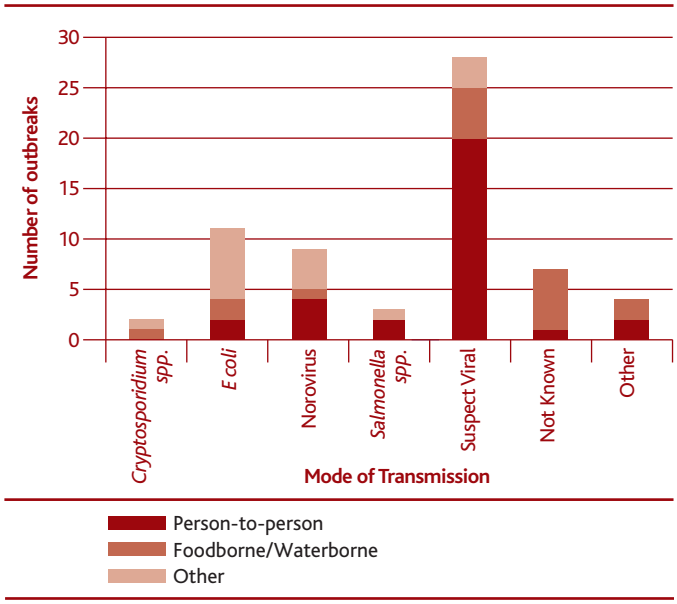

Figure 2. Number of Outbreaks of IID by pathogen and by Mode of Transmission (2001).

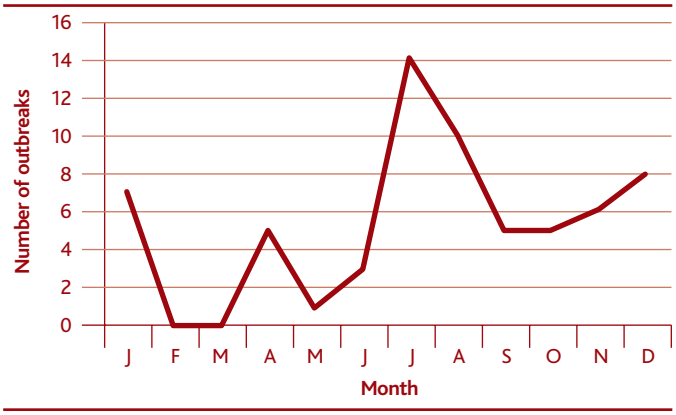

Figure 3. Number of outbreaks of IID reported by month, 2001.

transmission in conjunction with foodborne/ waterborne transmission (as seen in Table 3). Interestingly however, when the number of people ill is examined, a suspect waterborne or combined waterborne/ person-to-person mode of transmission was seen to account for the majority of cases ill (36% of cases). The route of transmission was not known in a quarter of the reported outbreaks.

When the mode of transmission is analysed by pathogen (as seen in Figure 2), the role of person-to-person spread is seen to explain the high attack rates in the confirmed or suspect noroviral outbreaks.

Location

Excluding private households, hotels were the commonest cited location of outbreaks of IID during 2001(Table 4). Hotel outbreaks were also responsible for causing the greatest number of people to become ill. Residential homes and hospitals were the next most common outbreak settings.

Seasonal distribution

When the outbreaks are analysed in terms of seasonality, it is noted that in 2001 the largest number of outbreaks occurred in the summer months, with a peak seen in July (as shown in Figure 3). Many of the noroviral outbreaks associated with tourist settings occurred during this period.

Conclusions

In Ireland in 2001 the number of outbreaks reported was 64 which is an increase over the previous three years where there was an average of 34 outbreaks reported each year. This database includes information on all reported outbreaks of IID but there is still likely to be a considerable degree of under-reporting of outbreaks as many family outbreaks are not formally investigated and hence not reported at national level.

One of the most striking features of the analysis of the outbreak data in 2001 has been the emergence of viruses as a prime cause of outbreaks of gastroenteritis. Over half of all reported outbreaks were shown to either be confirmed norovirus or suspect viral aetiology. The significant morbidity associated with these viral outbreaks is evident as the data reveals that confirmed or suspected viral causes were responsible for 2203 cases of illness in 2001, representing 88% of those becoming ill in outbreaks of IID. Undoubtedly the true burden of illness due to this pathogen is even higher than this.

Another important feature of these viral outbreaks is the range of locations in which they occurred. Outbreaks were seen to occur in healthcare settings (hospitals and nursing homes) and were also associated with commercial catering/ tourist settings such as hotels and restaurants. Because of this, viral outbreaks were noted to take place throughout the year, with the majority occurring in the summer months.

The importance of water as a mode of transmission is also evident from the data presented here. Just seven outbreaks were associated with a suspect waterborne or waterborne combined with another route of transmission, however these outbreaks were seen to account for over 40% of all cases reported ill during outbreaks of IID.

In recent years, with the advent of food safety agencies in

Table 3. Number of cases of illness arising as a result of outbreaks of IID, by mode of transmission (2001).

Mode of Transmission	Number of Outbreaks	Number ill
Person-to-person	18	357
Foodborne	10	143
Waterborne	3	417
P-P/Animal	2	4
P-P/Airborne	1	45
P-P/Foodborne	10	205
P-P/Waterborne	2	493
Waterborne/Animal	1	2
Foodborne/Waterborne	1	150
Unknown	16	690
Total	**64**	**2506**

Table 4. Number of cases of illness arising as a result of outbreaks of IID, by location in 2001.

Location	Number of Outbreaks	Number ill
Crèche	3	29
Hospital	7	117
Hotel	15	1228
Private House	16	47
Residential Institution	9	556
Restaurant / Café	6	163
School	2	73
Staff Canteen	2	58
Other	4	235
Total	**64**	**2506**

Ireland such as the Food Safety Authority of Ireland and the Food Safety Promotion Board (Safefood), many efforts are being made to reduce the burden of illness due to foodborne disease in this country and in many areas significant advances have been made, e.g. Salmonella control programmes. However, as we become better at controlling the threat of some aetiological agents of IID, other threats will emerge to pose new challenges. We must consider and safeguard to the greatest possible degree, the quality of our drinking water. We must become better at identifying outbreaks by newer agents as well as those well known to us. Effectively formulated policy depends on high quality data. As the quality of data improves, particularly in relation to the factors contributing to outbreaks of IID, so will our ability to control and prevent such disease outbreaks.

Acknowledgements

We wish to sincerely thank all the contributors to the outbreak surveillance system, namely, Directors of Public Health, Specialists in Public Health Medicine, Senior Area Medical Officers, Area Medical Officers, Surveillance Scientists, Clinical Microbiologists and Environmental Health Officers. In addition we wish to particularly acknowledge Dr Margaret Fitzgerald and the Public Health Unit of FSAI for providing the outbreak data from Jan-June 2001.

Antimicrobial Resistance in Ireland, 2002

Key Points

In 2002,

- **1042 invasive isolates of *Staphylococcus aureus* were reported. The proportion of isolates that were methicillin-resistant *S. aureus* (MRSA) was 42.7%, one of the highest in countries reporting to EARSS.**

- **278 invasive isolates of *Streptococcus pneumoniae* were reported. The proportion that was penicillin-non-susceptible *S. pneumoniae* (PNSP) was 11.5%, which is moderately high compared to other European countries. Of the 32 PNSP isolates identified, four were found to be high-level resistant [minimum inhibitory concentration (MIC) ≥2 mg/L] and 27 were determined to have intermediate levels of resistance (MIC 0.1-1.0 mg/L). No MICs were available for one isolate.**

- **741 invasive isolates of *E. coli* were reported. The proportions of isolates that were resistant to third-generation cephalosporins, fluoroquinolones and aminoglycosides were 3.0%, 5.4% and 2.7%, respectively. These figures are low compared with other European countries.**

- **168 invasive isolates of *E. faecalis* were reported. The proportion of isolates that were vancomycin-resistant was 2.4%. Although this figure is low, it is higher than observed in most other European countries (<1%).**

- **85 invasive isolates of *E. faecium* were reported. The proportion of isolates that were vancomycin-resistant was 11.1%, which is moderately high compared with most other European countries.**

- **Implementation of the Strategy for the control of Antimicrobial Resistance in Ireland (SARI) continued in 2002 with the Department of Health and Children providing S6.9 million of SARI funding to the Health Boards and convening the SARI National Committee.**

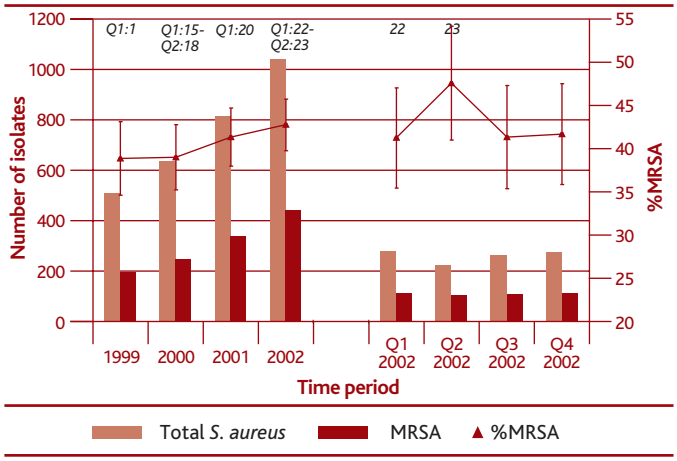

Figure 1. Trends for S. aureus by time period: by year for 1999-2002 and by quarter for 2002 (Q1-Q4) – total numbers of S. aureus/MRSA and percentage MRSA with 95% confidence intervals. Changes in the numbers of laboratories participating in the surveillance system are indicated above the chart.

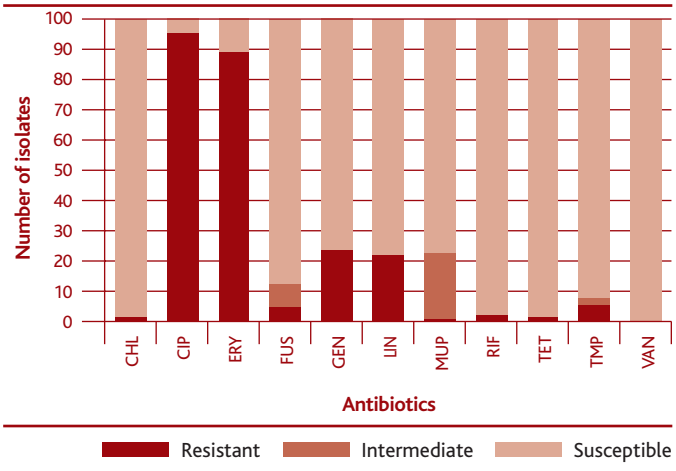

Figure 2. Antibiogram results of MRSA isolates (n=400) referred to NMRSARL during 2002.

Antibiotic codes: CHL – chloramphenicol, CIP – ciprofloxacin, ERY – erythromycin, FUS – fusidic acid, GEN – gentamicin, LIN – lincomycin, MUP – mupirocin, RIF – rifampicin, TCY – tetracycline, TMP – trimethoprim, VAN – vancomycin.

European Antimicrobial Resistance Surveillance System

The European Antimicrobial Resistance Surveillance System (EARSS) was established in 1998 and is funded by DG SANCO of the European Commission. It is an international network of national surveillance systems, encompassing over 600 laboratories in 28 countries, which aims to collect comparable and reliable antimicrobial resistance data on invasive infections of *Staphylococcus aureus*, *Streptococcus pneumoniae*, *Escherichia coli*, and *Enterococcus faecium/faecalis* for public health action.

EARSS in Ireland started in 1999 with the surveillance of *S. aureus and S. pneumoniae* and expanded in 2002 to include three further pathogens, *E. coli* and the enterococci, *E. faecalis* and *E. faecium*. Three additional laboratories joined the program in 2002 bringing the total number of participating laboratories to 23 giving an estimated population coverage of 90%.

Protocol

Data are collected on the first invasive isolate per patient per quarter of *S. aureus* and enterococci (from blood only) and *S.pneumoniae* and *E. coli* [from blood and cerebrospinal fluid (CSF)]. Laboratories report routinely generated qualitative disc diffusion data on:

- oxacillin/methicillin for *S. aureus*
- oxacillin/penicillin for *S. pneumoniae*
- ampicillin, cetotaxime/ceftriaxone and/or ceftazidime [third-generation cephalosporins (3GCs)], ciprofloxacin/ofloxacin and gentamicin for *E. coli*. Laboratories are also asked to specifically test for the presence of extended-spectrum beta-lactamases (ESBLs)
- ampicillin, high-level gentamicin and vancomycin for enterococci.

All methicillin-resistant *S. aureus* (MRSA) isolates are submitted to the National MRSA Reference Laboratory (NMRSARL) at St James's Hospital, where minimum inhibitory concentrations (MICs) are determined for oxacillin and vancomycin. Up to the end of June 2002, all isolates of *S.pneumoniae* were submitted to the Pneumococcal Referral Laboratory at RCSI/Beaumont but this service was suspended due to funding problems. Laboratories are now requested to submit data on MICs or Etests performed in-house for penicillin and cefotaxime or ceftriaxone on all penicillin-non-susceptible *S. pneumoniae* (PNSP) isolates.

Results

S. aureus

In 2002, 1042 reports of *S. aureus* isolates from bacteraemia were received from 23 laboratories, of which 445 (42.7%) were resistant to methicillin. There was a peak in Q2 when the proportion of MRSA was 47.5% compared with the other three quarters of the year when the proportion ranged from 41.2-41.7% (see Figure 1).

Data from the NMRSARL showed that gentamicin resistance among MRSA isolates decreased from 33.9% in 2001 (and an initial high of 58.4% in 1999) to 24.0% in 2002. This continues to reflect the growing trend in which epidemic strains of MRSA that are less multi-resistant to antibiotics are becoming more prevalent. Resistance data to other common anti-staphylococcal antibiotics among the MRSA isolates referred to the NMRSARL are shown in Figure 2.

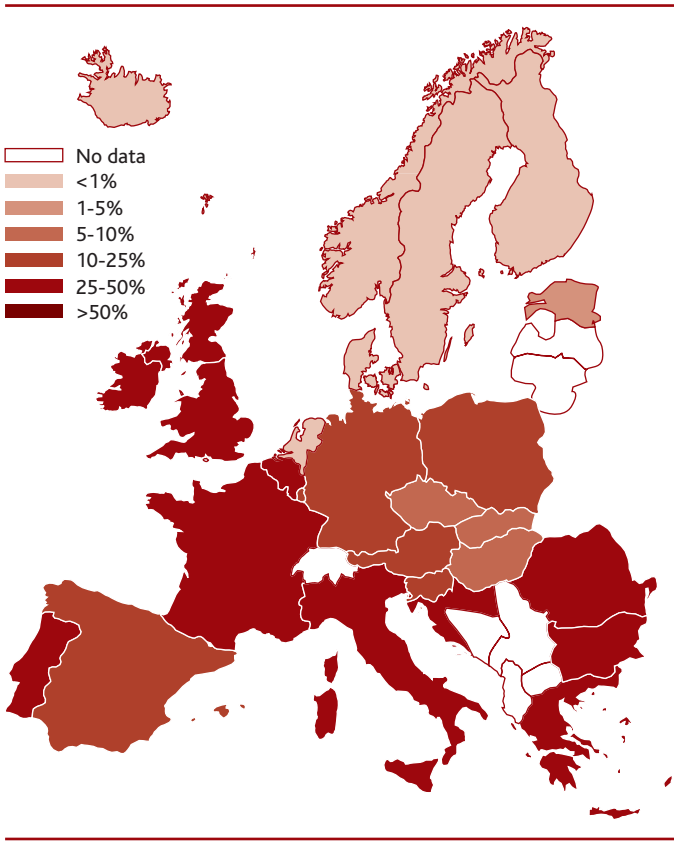

Figure 3. Map illustrating the distribution of MRSA in EARSS countries in 2002.

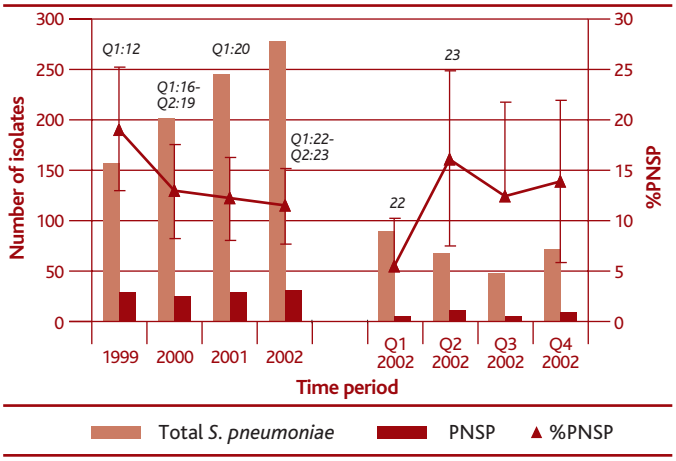

Figure 4. Trends for S. pneumoniae by time period: by year for 1999-2002 and by quarter for 2002 (Q1-Q4) – total numbers of S. pneumoniae/PNSP and percentage PNSP with 95% confidence intervals. Changes in the numbers of laboratories participating in the surveillance system are indicated above the chart.

The overall annual proportion of MRSA observed in Ireland remains high and is comparable with proportions observed in the UK, France and most southern European countries (see Figure 3). The Scandinavian countries and The Netherlands report the lowest proportions of MRSA in Europe.

S. pneumoniae

In 2002, 278 reports of *S. pneumoniae* isolates from bacteraemia/meningitis were received from 23 laboratories. The majority (n = 275) of isolates were from blood but three were from CSF. Thirty-two isolates (11.5%) were PNSP.

As in previous years, a seasonal variation was seen in the numbers of *S. pneumoniae* isolates reported with a peak in Q1 and a trough in Q3, reflecting the busy winter and quieter summer periods, respectively (see Figure 4). Of the 32 PNSP isolates reported, MIC data for penicillin and cefotaxime were available for 31 and 23 isolates, respectively. Four isolates were found to be high-level penicillin resistant (MIC ≥ 2 mg/L) and the remaining 27 isolates were determined to have intermediate levels of resistance (MIC 0.1-1.0 mg/L). Three isolates were resistant to cefotaxime (MIC ≥1.0 mg/L), of which one exhibited high-level resistance to penicillin and two were intermediate to penicillin. The remaining 20 isolates were cefotaxime susceptible (MIC ≤0.5 mg/L).

Data on susceptibility to erythromycin or clarithromycin were available for 236 isolates. Thirty (12.7%) were reported to be resistant.

Of the three CSF isolates reported in 2002, all were susceptible to penicillin.

Based on the total population of 3,917,203 in the Republic of Ireland as determined in the 2002 census and approximately 90% coverage of the population by the EARSS surveillance system, the crude incidence of invasive pneumococcal disease in Ireland is estimated to be 7.8 per 100,000 population. In 1999, the incidence was estimated to be 6.6 per 100,000.[1]

The overall annual proportion of PNSP observed in Ireland remains moderately high (see Figure 5) compared to the UK, Scandinavia and some central European countries, such as Germany, which are generally associated with lower PNSP proportions. Higher proportions of PNSP are observed in Belgium, southern Europe and some countries of the former Eastern Bloc.

E. coli

In 2002, 741 reports of *E. coli* isolates from bacteraemia/meningitis were received from 21 laboratories. The majority (n=739) of isolates were from blood but two were from CSF.

The proportions of isolates reported that were resistant to ampicillin, 3GCs, fluoroquinolones (ciprofloxacin/ofloxacin) and gentamicin were 62.2%, 3.0%, 5.4% and 2.7%, respectively.

The total numbers of *E. coli* isolates and proportion of resistance reported by quarter for 3GCs, fluoroquinolones and gentamicin are shown in Figure 6. For all three antibiotic classes, the proportions that were resistant were highest for Q1 and Q4 and lowest for Q2 and Q3.

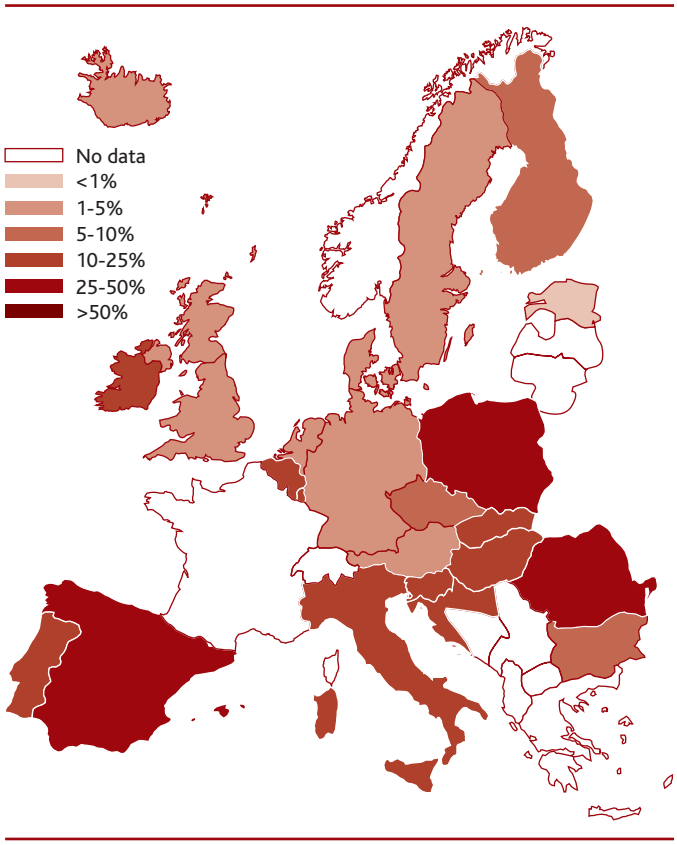

Figure 5. Map illustrating the distribution of PNSP in EARSS countries in 2002.

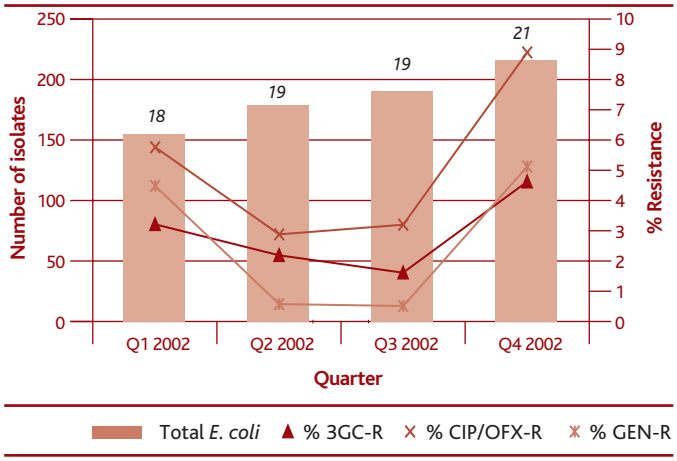

Figure 6. Trends for E. coli by quarter for 2002 – total numbers of E. coli and percentage resistance to 3GCs, ciprofloxacin/ofloxacin (CIP/OFX) and gentamicin (GEN). Number of participating laboratories is indicated for each quarter.

Seventeen isolates were identified as multi-drug resistant [defined as resistance to three or more of the mandatory antibiotics (ampicillin, 3GCs, fluoroquinolones and gentamicin)]:

- five isolates were resistant to ampicillin, 3GCs, fluoroquinolones and gentamicin - ESBL data were reported on two of these, and both were positive
- eight were resistant to ampicillin, fluoroquinolones and gentamicin
- three were resistant to ampicillin, 3GCs and fluoroquinolones
- one was resistant to ampicillin, 3GCs and gentamicin

In total, 224 (30%) of the 741 isolates were examined for the presence of ESBLs. ESBLs were detected in five (2.2%) of these.

The two CSF isolates, one from a newborn child aged 6 days and one from an adult aged 48 years, were resistant to ampicillin and susceptible to 3GCs and gentamicin. One of these isolates was also tested for susceptibility to ciprofloxacin and was susceptible.

The proportion of ampicillin resistance reported in participating countries in Europe in 2002 was generally categorised as moderately-high (25-50%) to high (>50%). The proportion in Ireland was high (62.2%) and was comparable with proportions seen in France, Spain and Portugal. Only Sweden reported <25% resistance to ampicillin. The proportion of resistance to 3GCs, fluoroquinolones and gentamicin observed in Ireland in 2002 was low compared with most other European countries (see Figures 7-9). The lowest proportions of resistance were observed in the Scandinavian countries while the highest proportions were seen in Southern and Eastern Europe.

E. faecalis

In 2002, 168 reports of *E. faecalis* isolates from bacteraemia were received from 21 laboratories.

The total numbers of *E. faecalis* isolates and proportion of resistance reported by quarter for ampicillin, high-level gentamicin and vancomycin are shown in Figure 10.

Thirteen (8.1%) isolates were reported to be ampicillin-resistant. Ampicillin resistance in *E. faecalis* is unusual and further investigation of these isolates is warranted to confirm their identity as speciation of enterococci can be problematic.

Twenty isolates (39.2%) of the 51 tested were reported to be high-level gentamicin resistant but only three of these were confirmed by MIC determination. Most Irish laboratories do not routinely test enterococci for susceptibility to high-level gentamicin and so there may be some problems associated with methodology and interpretation of the results obtained. In light of this, caution should be exercised in drawing conclusions from these data.

Four (2.4%) isolates were reported to be vancomycin resistant.

One isolate was resistant to ampicillin, high-level gentamicin and vancomycin. This isolate is one of the 13 ampicillin-resistant *E. faecalis* isolates mentioned above for which

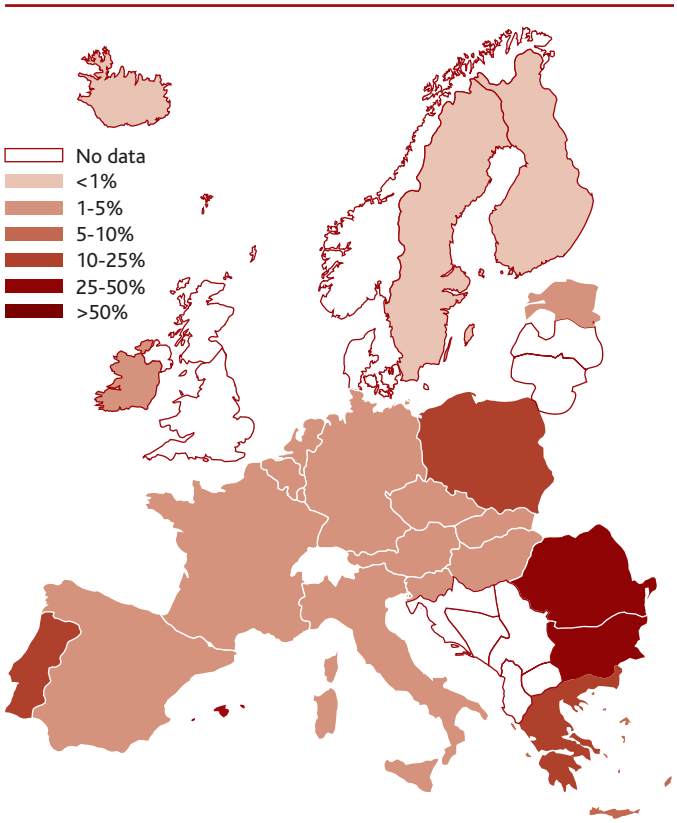

Figure 7. Map illustrating the distribution of resistance to 3GCs among E. coli in EARSS countries in 2002.

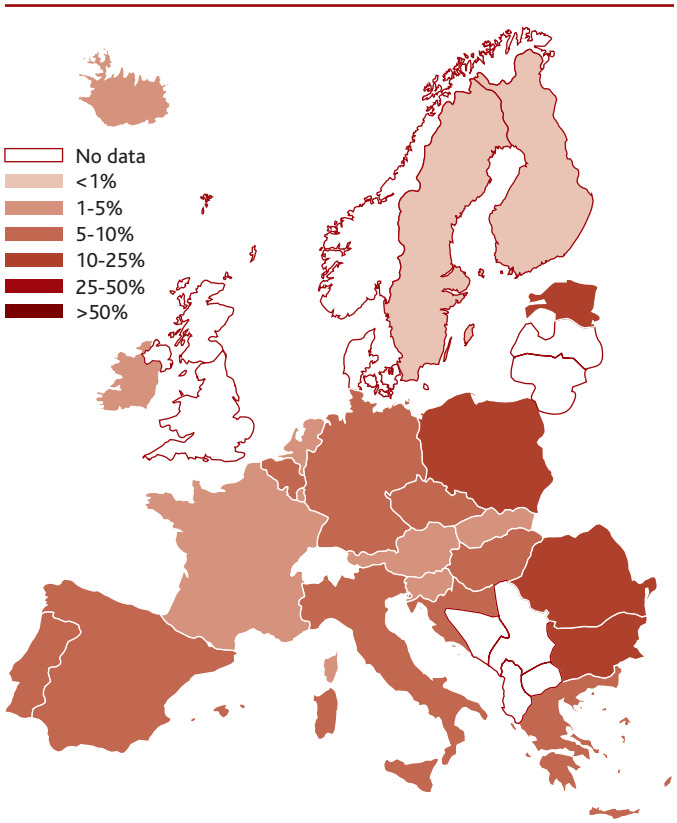

Figure 8. Map illustrating the distribution of resistance to aminoglycosides among E. coli in EARSS countries in 2002.

confirmation of the species identity might be helpful.

In 2002, the proportion of resistance to high-level gentamicin observed in Ireland, as well as in most other European countries (see Figure 11), was generally high (25% and higher). The majority of countries reported proportions of <1% for vancomycin resistance (see Figure 12). The proportion in Ireland was slightly higher than this and was comparable with Finland, Germany and the Netherlands.

E. faecium

In 2002, 85 reports of *E. faecium* isolates from bacteraemia were received from 21 laboratories.

The total numbers of *E. faecium* isolates and proportion of resistance reported by quarter for ampicillin, high-level gentamicin and vancomycin are shown in Figure 13.

Seventy-two (88.9%) of the 81 isolates for which ampicillin susceptibility data were available were reported to be ampicillin-resistant, which is not unexpected as most *E. faecium* are resistant to this antibiotic.

Five (16.7%) of 30 isolates tested were reported to be high-level gentamicin resistant. Three of these were confirmed by MIC determination.

Nine (11.1%) isolates were reported to be vancomycin resistant.

One isolate was resistant to ampicillin, high-level gentamicin and vancomycin.

In 2002, the proportion of resistance to high-level gentamicin observed in Ireland was moderately high (10-25%), which is at the lower end of the spectrum observed across Europe (see Figure 14). The majority of countries reported proportions of <5% for vancomycin resistance (see Figure 15). The proportion in Ireland was moderately high (10-25%) and together with Italy, Greece and Croatia, was one of the highest observed in Europe.

Additional information

For the most up-to-date maps showing the distributions of resistance for all the EARSS pathogens in Europe, see: http://www.earss.rivm.nl/PAGINA/interwebsite/home_earss.html

The quarterly EARSS Newsletter produced by NDSC can be accessed on the NDSC website: http://www.ndsc.ie/Publications/AntimicrobialResistance-EARSSReports/

The Future

In Ireland, we have one of the highest rates of participation by laboratories in EARSS in Europe, which is an excellent result considering that participation by laboratories is entirely voluntary. Ideally, all laboratories in Ireland should participate in the surveillance system to give a complete picture of antimicrobial resistance and thereby allow more detailed analysis.

The Strategy for the control of Antimicrobial Resistance in Ireland (SARI) was launched in June 2001. Compared to most European countries Ireland has a shortage of relevant health professionals needed for the diagnosis, surveillance, management and prevention of infectious diseases. The initial

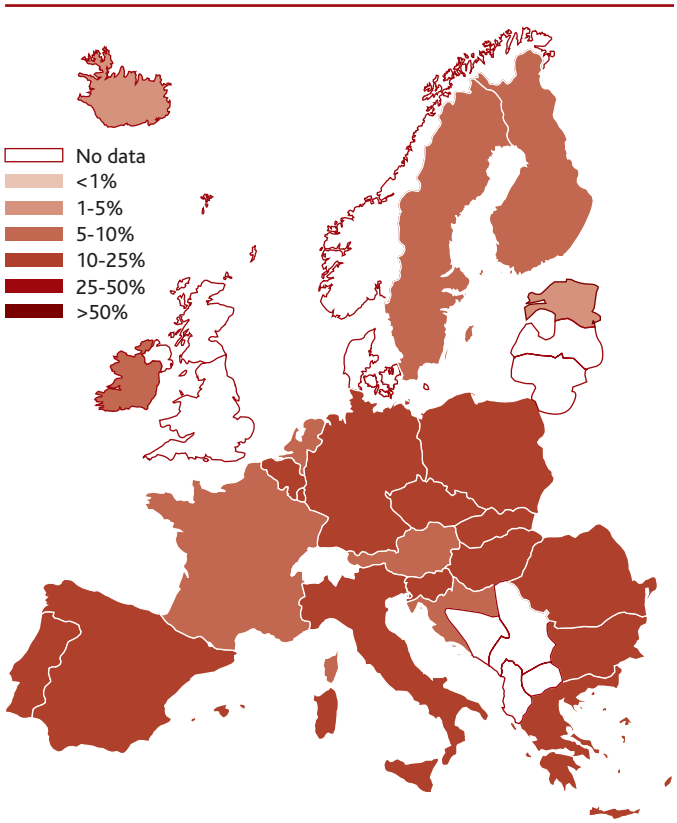

Figure 9. Map illustrating the distribution of resistance to fluoroquinolones among E. coli in EARSS countries in 2002.

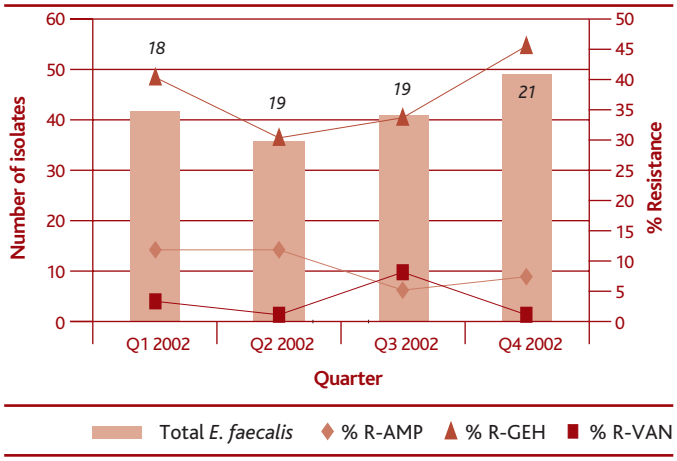

Figure 10. Trends for E. faecalis by quarter for 2002 – total numbers of E. faecalis and percentage resistance to ampicillin (AMP), high-level gentamicin (GEH) and vancomycin (VAN). Number of participating laboratories is indicated for each quarter.

focus in implementing SARI has been to correct this shortfall. Up to the end of 2002 the Department of Health and Children have provided a total of s6.9 million in recurring SARI funding, divided among each Health Board/Authority on a population basis.

Each Health Board/Authority has a multi-disciplinary Regional SARI Committee to oversee regional surveillance programmes, educational interventions and other aspects of regional SARI implementation.

The SARI National Committee, based at DoHC, was set up and met for the first time in 2002. The committee includes representatives from various professional bodies and healthcare organisations and other key groups.

The organisations/bodies represented on the SARI National Committee are:
- Academy of Medical Laboratory Science
- Consumers' Association of Ireland
- Department of Agriculture, Food and Rural Development
- Department of Health and Children (3 representatives)
- Department of Health, Social Services and Public Safety, Northern Ireland (Observer) analysis.
- Faculty of Paediatrics
- Faculty of Pathology
- Faculty of Public Health Medicine
- Faculty of Veterinary Medicine
- Food Safety Authority of Ireland
- Health Board/Authority CEO Group (3 representatives)
- Infection Control Nurses' Association
- Irish College of General Practitioners
- Irish Pharmaceutical Healthcare Association
- National Disease Surveillance Centre
- Pharmaceutical Society of Ireland
- Royal College of Physicians of Ireland
- Royal College of Surgeons in Ireland
- University Dental School and Hospital

The National Committee is responsible for developing national policies, guidelines and strategies, as well as overseeing the funding of national level SARI implementation projects.

Five multidisciplinary SARI working groups advice the National Committee on specific areas of SARI implementation, namely:
- Surveillance of antimicrobial resistance
- Surveillance of antibiotic consumption
- Community antibiotic stewardship
- Hospital antibiotic stewardship
- Infection control

The working groups prepared draft recommendations for consideration by the SARI National Committee.

As SARI implementation progresses, and the current shortfall in relevant staffing is corrected, national guidelines can be adapted for local and regional implementation. Copies of the SARI report can be downloaded from the NDSC website (www.ndsc.ie).

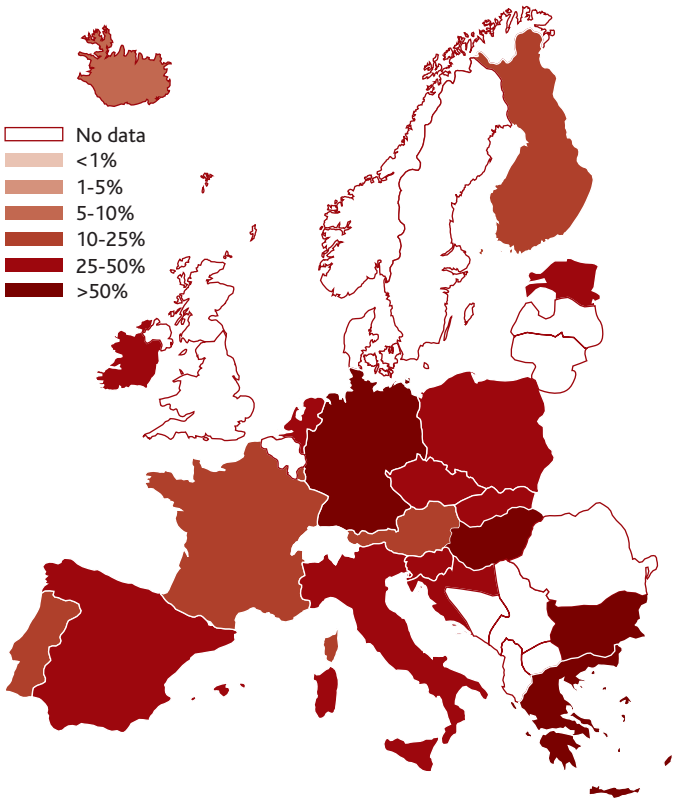

Figure 11. Map illustrating the distribution of high-level resistance to aminoglycosides among E. faecalis in EARSS countries in 2002.

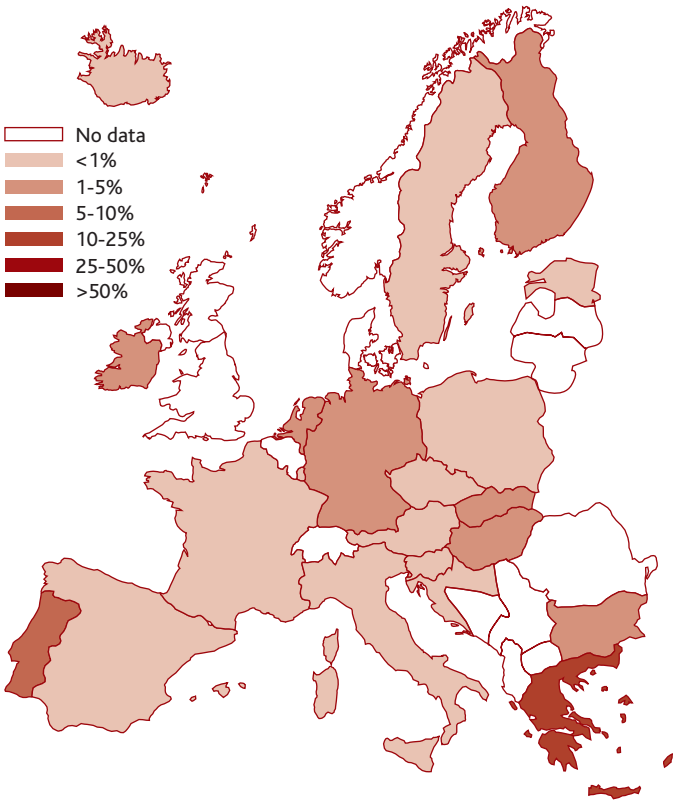

Figure 12. Map illustrating the distribution of resistance to glycopeptides among E. faecalis in EARSS countries in 2002.

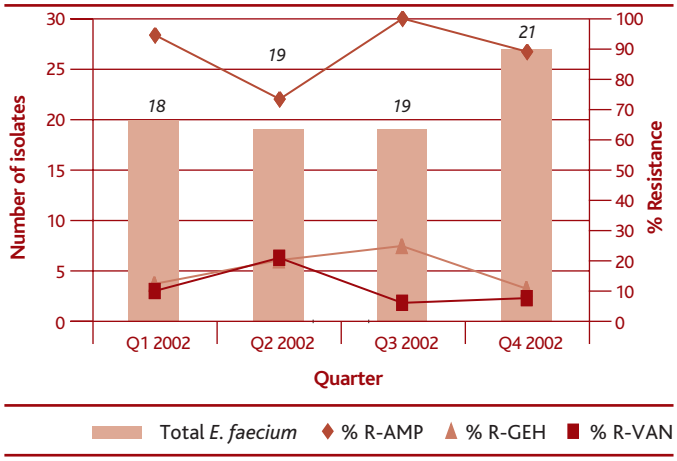

Figure 13. Trends for E. faecium by quarter for 2002 – total numbers of E. faecium and percentage resistance to ampicillin (AMP), high-level gentamicin (GEH) and vancomycin (VAN). Number of participating laboratories is indicated for each quarter.

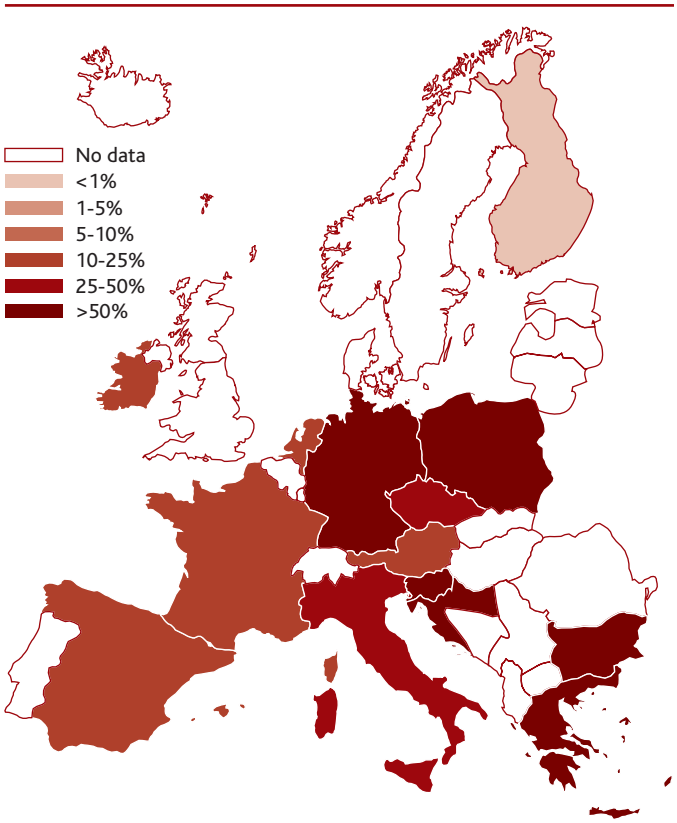

Figure 14. Map illustrating the distribution of high-level resistance to aminoglycosides among E. faecalis in EARSS countries in 2002..

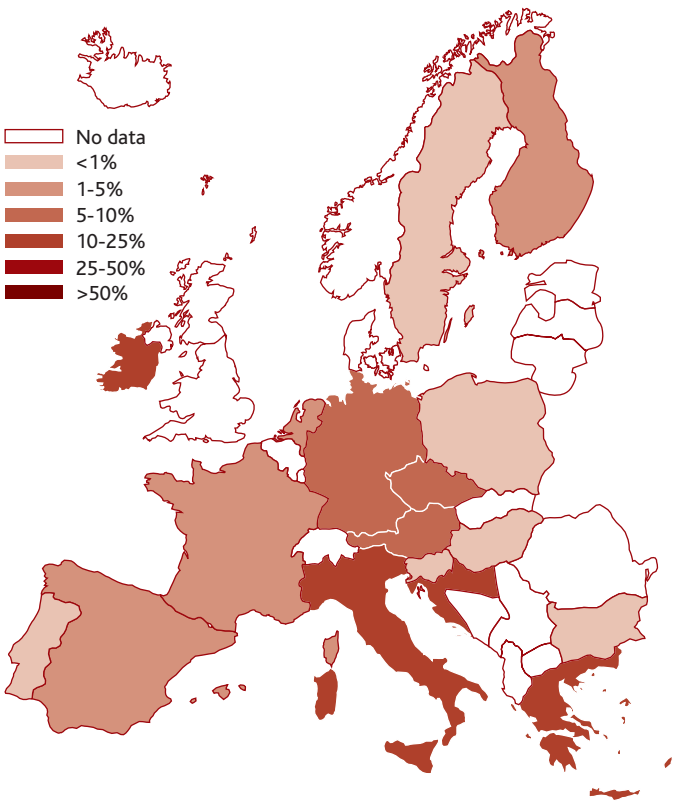

Figure 15. Map illustrating the distribution of resistance to glycopeptides among E. faecium in EARSS countries in 2002.

Acknowledgements

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References

1. Bennett D, Lennon B, Humphreys H, Cafferkey M. Penicillin Susceptibility and Epidemiological Typing of Invasive Pneumococcal Isolates in the Republic of Ireland. *J Clin Microbiol 2003*; **41**: 3641-3648.

Infectious Disease Notifications, 2002

Key Points

- **Acute viral meningitis notifications declined in 2002 compared to 2000 and 2001.**
- **Bacterial meningitis, gastroenteritis, rubella, salmonellosis, viral hepatitis type A and whooping cough notifications continued to decline in 2002.**
- **Food poisoning notifications increased in 2002 compared to 2001.**
- **An increase in measles notifications was observed in late 2002.**
- **Viral hepatitis type B notifications continued to rise in 2002.**

Introduction

The Health Act, 1947, enables the Minister for Health and Children to specify by regulation diseases that are infectious. The infectious diseases currently notifiable in Ireland are regulated in the 1981 Infectious Disease Regulations, which were revised in 1985, 1988 and 1996. These regulations require medical practitioners, who become aware of or who suspect a person is suffering from or is a carrier of an infectious disease specified in the regulations, to notify the relevant medical officer in the appropriate health board. Under the Infectious Disease (Amendment) Regulations, 2000, the medical officers in the health boards furnish weekly notification data to NDSC. At NDSC the data is collated and analysed, and a weekly infectious disease report on national data is produced. This weekly analysis of notification data provides timely information about potential or actual outbreaks of infectious disease.

A summary of the 2002 infectious disease data is presented in this report. The purpose of this review is to identify and describe infectious disease patterns and trends in Ireland during 2002.

Materials and Methods

Since July 1st 2000, the health boards provide case based information (ID number, date of birth, age, sex, date of onset, date of notification/week of notification, Community Care Area, county, disease and organism-if available) by the Wednesday of each week, to NDSC, on infectious diseases (excluding sexually transmissible infections) notified to them during the previous week. At NDSC this information is inputted onto a MS Access database and analysed using MS Access and Excel.

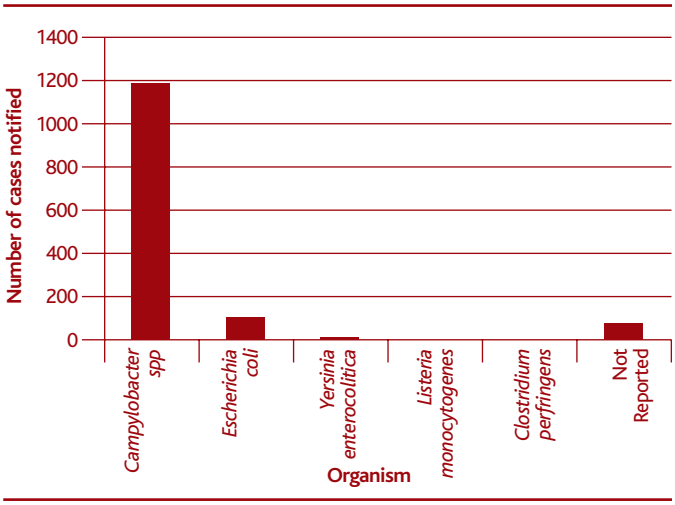

Figure 1. Food poisoning (bacterial other than salmonella) notifications in 2002 by organism.

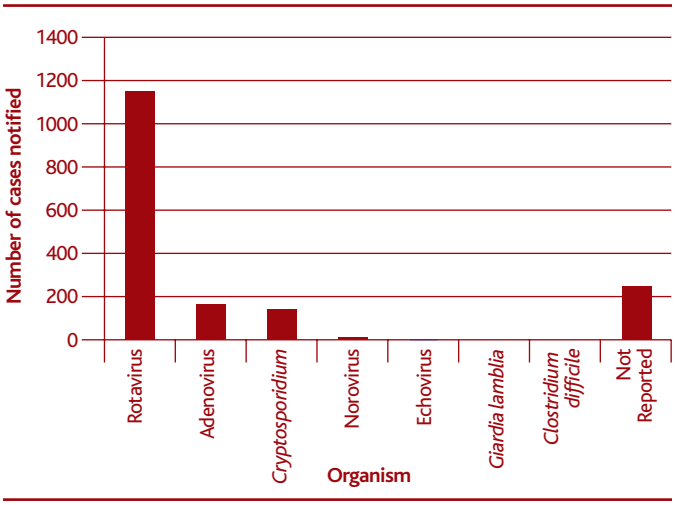

Figure 2. Gastroenteritis (when contracted by children under 2 years of age) notifications in 2002 by organism.

Incidence rates were calculated using population data taken from the 2002 census.

Notifiable infectious diseases in 2002, excluding sexually transmissible infections (STIs), are presented in this report. A report on the 2001 notifiable STIs is presented in a separate chapter within this document.

Results

Notifiable infectious diseases

Table 1 compares annual notifiable infectious disease figures for 2002 with annual figures obtained from 1982-2001. There were several notable disease trends, in 2002, compared to previous years:

- a 4.5-fold reduction in the number of acute viral meningitis cases notified in 2002 compared to 2001
- bacterial meningitis (including meningococcal septicaemia) notifications in 2002 are the lowest since the enhanced surveillance system commenced in 1997
- food poisoning (bacterial other than salmonella) notifications increased in 2002 compared to 2001
- gastroenteritis (when contracted by children under 2 years of age), rubella, viral hepatitis type A and whooping cough notifications continued to decline in 2002 compared to previous year
- salmonellosis (other than typhoid or paratyphoid) notifications are the lowest when compared to the previous seven years
- notifications of viral hepatitis type B continued to rise in 2002 compared to previous years

In 2002, as for 2001, no cases of acute anterior poliomyelitis, anthrax, variant Creutzfeldt Jakob disease (vCJD), diphtheria, plague, rabies, smallpox, typhus, viral haemorrhagic disease or yellow fever were notified. In addition, in 2002, no cases of ornithosis or tetanus were reported.

The numbers of infectious diseases notified in 2002 by health board, by age group and sex are outlined in tables 2, 3 and 4, respectively.

Acute encephalitis

Four cases of acute encephalitis were notified in 2002, similar to five cases in 2001. The causative organism was reported as herpes simplex virus type 1 for one case while the causative organism was not reported for the remaining three cases. Three of the cases were less than fifteen years of age (table 3). Three of the cases were female and one case was male (table 4).

Acute viral meningitis

In 2002, 36 cases of acute viral meningitis were notified, in contrast to 161 cases notified in 2001. This represents a 4.5-fold decrease in notified cases. In 2000, 98 cases of acute viral meningitis were notified. Seventy-eight percent of cases, in 2002, occurred in those aged less than 15 years while 47% of

Table 1. Annual number of infectious diseases notified in Ireland, 1982-2002

Infectious disease	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Acute Anterior Poliomyelitis	1	0	1	0	0	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	5	4
Acute Viral Meningitis	54	191	163	120	161	81	101	52	300	86	104	39	90	74	77	32	32	27	98	161	36
Anthrax	0	0	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	28	26
Bacterial Meningitis (including meningococcal septicaemia)*	124	141	192	100	147	111	128	115	131	155	225	203	241	382	410	508	491	587	586	396	297
Brucellosis	159	126	126	115	53	38	22	20	15	27	26	28	14	6	10	7	15	19	15	14	4
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Creutzfeldt Jakob Disease**	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	3	6	1	2	6	5
vCreutzfeldt Jakob Disease**	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	NN	0	0	1	0	0	0
Diphtheria	0	0	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	1219	1394
Gastroenteritis (when contracted by children under 2 years)	2404	2987	3242	3317	3815	3900	3241	3410	3758	4132	3410	3832	3043	3234	2997	2968	3483	2917	2796	2057	1747
Infectious Mononucleosis	55	196	233	214	145	186	286	211	208	188	208	206	183	156	216	212	217	198	151	150	173
Infectious Parotitis (Mumps)***	NN	NN	NN	NN	NN	NN	271	709	48	53	43	44	33	27	422	285	57	38	52	40	32
Influenzal Pneumonia	6	76	93	37	153	53	73	42	94	139	48	55	6	31	54	29	4	15	20	2	2
Legionnaires' Disease	2	2	1	0	0	0	4	2	1	0	2	0	1	1	2	6	2	2	9	3	6
Leptospirosis	4	14	8	5	4	6	3	5	5	4	9	5	2	1	6	8	12	6	7	9	8
Malaria	33	17	12	32	41	28	30	23	12	11	15	9	12	9	14	8	17	17	19	11	20
Measles	1897	6180	5725	9903	451	201	936	1248	556	135	179	4328	1233	235	228	185	204	147	1603	241	243
Ornithosis	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3	0
Plague	0	0	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	0	0
Rubella	166	2395	2060	668	799	444	1156	440	258	206	155	179	206	100	602	113	83	62	97	57	33
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	428	369
Smallpox	0	0	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	3	0
Tuberculosis*!	975	924	837	804	602	581	575	638	613	640	604	598	524	458	434	416	424	469	395	381	400*!
Typhoid & Paratyphoid	2	4	3	1	1	0	2	0	0	4	3	1	1	4	4	0	3	0	1	4	5
Typhus	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	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	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	112	26
Viral Hepatitis Type B	26	54	33	57	55	63	32	20	11	15	13	11	20	11	11	31	155	160	187	342	458
Viral Hepatitis Unspecified	1066	1192	1022	731	544	381	253	371	398	152	240	190	60	66	67	122	147	125	65	90	89
Whooping Cough	1073	1728	3061	3689	1482	1717	1170	2217	803	843	860	869	353	436	261	459	252	179	152	142	131
Yellow Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0

Note: 1982-1999, data collated by DoHC
** Since 1997, figures taken from the Enhanced Surveillance System for Bacterial Meningitis*
*** CJD and vCJD not notifiable (NN) in Ireland, prior to 1997*
**** Infectious Parotitis (Mumps) not notifiable (NN) in Ireland prior to 1988*
**! Taken from the Enhanced TB Surveillance System, figure for 2002 provisional.*

Table 2. Number of notifiable infectious diseases by health board in 2002

Infectious disease	ERHA	MHB	MWHB	NEHB	NWHB	SEHB	SHB	WHB	Total
Acute Encephalitis	**	**	**	**	**	**	**	**	4
Acute Viral Meningitis	23	0	1	4	2	1	2	3	36
Bacillary Dysentery (Shigellosis)	14	2	0	2	0	2	5	1	26
Bacterial Meningitis (including meningococcal septicaemia)***	108	24	32	27	16	26	47	17	297
Brucellosis	**	**	**	**	**	**	**	**	4
Cholera	**	**	**	**	**	**	**	**	1
Creutzfeldt Jakob Disease	4	0	1	0	0	0	0	0	5
Food Poisoning (bacterial other than salmonella)	501	107	33	44	89	243	164	213	1394
Gastroenteritis (children < 2 years of age)	645	97	28	101	72	250	317	237	1747
Infectious Mononucleosis	53	2	45	12	1	29	23	8	173
Infectious Parotitis (Mumps)	17	2	1	1	0	2	9	0	32
Influenzal Pneumonia	**	**	**	**	**	**	**	**	2
Legionnaires' Disease	3	0	0	0	0	1	0	2	6
Leptospirosis	0	1	1	1	0	4	1	0	8
Malaria	13	1	2	0	0	1	2	1	20
Measles	105	18	10	41	1	14	18	36	243
Rubella	19	2	3	5	1	2	1	0	33
Salmonellosis (other than typhoid or paratyphoid)	117	16	22	46	30	57	37	44	369
Tuberculosis*!	156	18	26	24	12	52	79	33	400*!
Typhoid & Paratyphoid	4	0	0	0	1	0	0	0	5
Viral Hepatitis Type A	7	0	4	1	1	5	8	0	26
Viral Hepatitis Type B	139	46	24	15	5	63	164	2	458
Viral Hepatitis Unspecified	18	3	7	4	1	42	13	1	89
Whooping Cough	32	13	10	8	2	33	12	21	131

*** Data not reported to health board level when total figures for ROI less than 5 cases.*

**** Taken from the Enhanced Surveillance System for Bacterial Meningitis*

**! Taken from the Enhanced TB Surveillance System, figure for 2002 provisional*

Table 3. Number of notifiable infectious diseases by age group (years) in 2002

Infectious disease	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Unknown	Total
Acute Encephalitis	2	0	1	0	0	0	0	0	0	1	0	4
Acute Viral Meningitis	17	4	7	2	0	3	2	1	0	0	0	36
Bacillary Dysentery (Shigellosis)	4	1	1	1	6	9	2	1	1	0	0	26
Bacterial Meningitis (including meningococcal septicaemia)**	171	28	25	26	14	10	7	2	6	8	0	297
Brucellosis	0	0	0	0	1	1	0	0	2	0	0	4
Cholera	1	0	0	0	0	0	0	0	0	0	0	1
Creutzfeldt Jakob Disease	0	0	0	0	0	0	0	0	2	3	0	5
Food Poisoning (bacterial other than salmonella)	433	74	38	52	112	221	148	92	58	127	39	1394
Gastroenteritis (children < 2 years of age)	1730	0	0	0	0	0	0	0	0	0	17	1747
Infectious Mononucleosis	9	5	23	87	24	16	5	1	1	0	2	173
Infectious Parotitis (Mumps)	10	7	3	3	2	4	0	1	2	0	0	32
Influenzal Pneumonia	0	0	0	0	0	0	0	2	0	0	0	2
Legionnaires' Disease	0	0	0	0	0	2	1	2	1	0	0	6
Leptospirosis	0	0	0	1	0	1	3	2	0	1	0	8
Malaria	3	2	0	0	0	8	5	1	1	0	0	20
Measles	179	30	21	5	4	0	1	2	0	0	1	243
Rubella	29	2	1	0	0	0	0	0	0	0	1	33
Salmonellosis (other than typhoid or paratyphoid)	92	17	16	15	36	57	29	38	31	26	12	369
Tuberculosis*!	5	7	5	7	26	85	68	49	40	82	26	400*!
Typhoid & Paratyphoid	0	0	0	0	0	5	0	0	0	0	0	5
Viral Hepatitis Type A	0	4	2	1	2	6	2	1	2	6	0	26
Viral Hepatitis Type B	6	4	5	23	65	241	88	14	2	0	10	458
Viral Hepatitis Unspecified	4	1	0	2	15	36	17	8	3	3	0	89
Whooping Cough	72	25	15	2	0	0	3	7	0	0	7	131

*** Taken from the Enhanced Surveillance System for Bacterial Meningitis*

**! Taken from the Enhanced TB Surveillance System, figure for 2002 provisional*

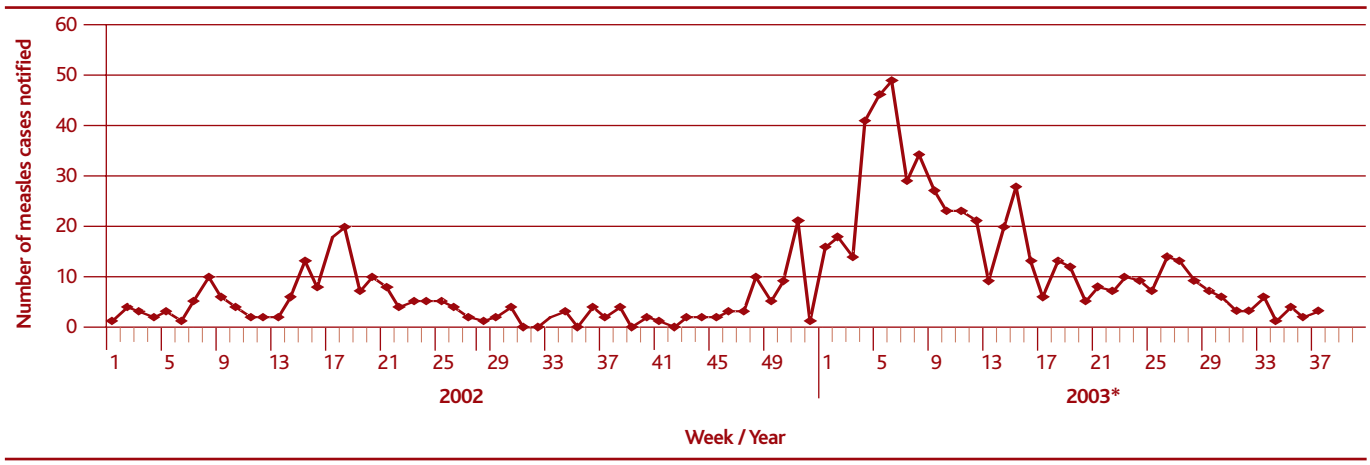

Figure 3. Weekly number of measles cases notified in Ireland, 2002/2003.*
**Please Note: Data for 2003 are up to Week 37, 2003 (week ending 13/09/2003). 2003 data are provisional.*

cases were in the age group 0-4 years. In 2002, the age specific incidence rate of those aged 0-4 years was 6.1/100,000, compared to 15.8/100,000 in 2001. In 2002 twenty cases occurred in males, 15 in females, while sex was not reported for one case. The causative organism for one case was reported as coxsackievirus B5 while the causative organism was not reported for the remaining 35 cases. Coinciding with the decrease in acute viral meningitis notifications, the National Virus Reference Laboratory (NVRL) reported a decrease in the number of laboratory confirmed non-polio enterovirus (NPEV) isolates in 2002 were 72 cases reported in 2002 in contrast to 170 cases in 2001.[1,2]

Bacillary dysentery
Twenty-six cases (0.66/100,000) of bacillary dysentery (shigellosis) were notified in 2002 similar to 28 cases in 2001. Seventy-three percent of cases in 2002 occurred in those aged 20 years or older while 58% of all cases were aged between 20 and 34 years. Eighteen cases (69%) were female, seven cases (27%) were male while sex was not reported for one case. Eleven cases were due to *Shigella sonnei*, four due to *Shigella flexneri*, two due to *Shigella boydii* and species was not reported for nine cases.

Bacterial meningitis *(including meningococcal septicaemia)*
Bacterial meningitis (including meningococcal septicaemia) notifications declined in 2002 (n=297) compared to the previous seven years. Enhanced surveillance of bacterial meningitis (including meningococcal septicaemia) commenced in Ireland in 1997. A detailed report on bacterial meningitis notifications in 2002, obtained through the enhanced surveillance system, is presented as a separate chapter within this document.

Brucellosis
Four cases of brucellosis were notified in 2002 compared to 14 in 2001. All four cases in 2002 were male and all were aged 20 years or older.

Cholera
In 2002, one case of cholera was notified. Laboratory tests identified *Vibrio cholerae* serogroup O1 biotype El Tor serotype Ogawa as the causative organism. The infection was acquired in Bangladesh.

Creutzfeldt Jakob disease (CJD)
In 2002, five cases of classical CJD were notified compared with six in 2001. Four cases occurred in males and one in a female. All five cases were aged greater than 54 years.

Food poisoning *(bacterial other than salmonella)*
Food poisoning (bacterial other than salmonella) notifications increased in 2002, with 1394 cases (35.6/100,000) notified, compared to 1219 cases (31.1/100,000) notified in 2001. The highest incidence rates and the highest number of cases in 2002 were in those aged 0-4 years (156/100,000, n=433, 31%) followed by those aged 25-34 years (35.8/100,000, n=221, 16%). In 2002, in the majority of cases, the causative organism was *Campylobacter spp* (n=1193, 86%), followed by *Escherichia coli* (n=108, 8%) including verocytotoxigenic *E. coli* (VTEC), *Yersinia enterocolitica* (n=8), *Listeria monocytogenes* (n=2) and *Clostridium perfringens* (n=1),

while the causative organism was not reported for 82 (6%) cases (figure 1).

Comprehensive reports on campylobacter (2001) and VTEC (2002) in Ireland are presented as separate chapters elsewhere within this document.

Gastroenteritis *(when contracted by children under 2 years of age)*
Notifications of gastroenteritis in those aged less than 2 years continued to decline in 2002 compared to previous years with 1747 cases (44.6/100,000) notified in 2002. The causative organisms were reported as rotavirus (n=1148, 66%), adenovirus (n=170, 10%), *Cryptosporidium* (n=149, 9%), norovirus (n=20, 1%), echovirus (n=7, 0.4%), *Giardia lamblia* (n=2, 0.1%) and *Clostridium difficile* (n=1, 0.1%) while the causative organism was not reported for 250 (14%) cases (figure 2).

Infectious mononucleosis
During 2002, 173 cases of infectious mononucleosis were notified compared to 150 in 2001 and 151 in 2000. In 2002, the highest age specific incidence rates occurred in the 15-19 year olds (27.8/100,000, n=87) followed by the 10-14 year olds (8.1/100,000, n=23). Of the 173 cases notified, 102 cases (59%) occurred in females, 69 cases (40%) occurred in males while sex was not reported for two cases.

Infectious parotitis (mumps)
Thirty-two cases of infectious parotitis (mumps) were notified in 2002 compared to 40 cases in 2001. In 2002, the cases were aged between <1 year and 62 years (mean age=15.3 years and median age=8.5 years) with 63% of cases aged less than 15 years. The highest number of cases and the highest age specific rates were in the 0-4 year olds (3.6/100,000, n=10) followed by the 5-9 year olds (2.7/100,000, n=7). Approximately two-thirds of the cases were male (n=21) and one third were female (n=11).

Influenzal pneumonia
Two cases of influenzal pneumonia were notified in 2002. Both cases in 2002 were male and in the age group 45-54 years.

Legionnaires' disease
Six cases of Legionnaires' disease were notified in 2002 while three cases were notified in 2001. The six cases in 2002 were aged between 32 and 61 years (mean age=43.9 years and median age=43.5 years). Three of the cases were male and three were female. One of the six cases of *Legionella* was confirmed by serology, one by both urinary antigen detection and culture of sputum, three by urinary antigen detection and for one case the laboratory method of confirmation was not reported. The culture confirmed case was reported as *Legionella pneumophila* serogroup 1. All six cases were known to have survived. Three of the cases were travel-associated (Lanzarote, Portugal and Sicily) and were notified to the European Working Group for Legionella Infections (EWGLI) surveillance scheme. The aim of this surveillance scheme (EWGLI) is to detect cases of travel-associated Legionnaires' disease and thereby rapidly identify outbreaks and implement control measures. [3]

Leptospirosis
Eight cases of leptospirosis were notified in 2002 similar to nine cases in 2001. All eight cases were aged greater than 15 years (mean age=41.3 years and median age=42.5 years) and seven of the cases were male, reflecting the fact that the infection is usually found in males of working age. The possible source of infection was; contact with animals (n=3), river water (n=2), gardening/firewood (n=1) and source unknown (n=2). Five of the cases were reported to have survived while the outcome was not reported for three of the cases.

Malaria
During 2002, twenty cases of malaria were notified. Fourteen (70%) cases were male, five (25%) were female and sex was not reported for one case. The cases ranged in age from under one year to 57 years (median age=33 years and mean age=27.7 years). Eight of these cases were Irish, eight were Nigerian, one was recorded as African and nationality was not reported for three cases. Countries where the malaria infection was acquired included Nigeria (n=9), Ghana (n=3), Africa, Gambia, Kenya/Tanzania, Liberia, Zambia (one case each) and for three cases the country was unspecified. The reasons for travel to a malarious region were: visiting family in country of origin (n=6), holiday (n=5), new entrant to Ireland (n=2), foreign visitor ill while in Ireland, business/professional travel, volunteer worker (n=1 each) and unknown (n=4). In thirteen cases *Plasmodium falciparum* was the causative organism, *Plasmodium vivax* in one case and the malarial parasite was not reported for the remaining six cases. Information on malaria prophylaxis was available for 14 of the 20 cases. Eight cases did not take any malaria prophylaxis. Of the remaining six cases who took malaria prophylaxis while abroad, all discontinued prophylaxis within one month following return to Ireland (three of these patients discontinued prophylaxis on return to Ireland due to illness/treatment for malaria). Twelve cases recovered and the outcome was not reported for the remaining eight cases.

Measles
During 2002, 243 cases (6.2/100,000) of measles were notified. The majority of cases and the highest age specific incidence rates (n=179, 74%, 64.5/100,000) were in the age group 0-4 years followed by those in the age group 5-9 years (n=30, 12%, 11.4/100,000). Of the 243 cases notified, 132 cases were male, 106 cases were female and sex was not reported for five cases.

There were two peaks in measles activity in 2002. The first increase in measles notifications was observed in April/May 2002. During week 17 and week 18, 18 and 20 cases of measles were notified, respectively (figure 3). Of these 38 cases, 14 were notified by the NEHB, 11 were notified by the WHB and the remainder were notified by the ERHA (n=6), SHB (n=3), MHWB (n=2) and SEHB (n=2).

A second increase in measles notifications commenced in late November 2002, this continued into early 2003 (figure 3; 2003 data are provisional). The majority of these cases were notified in the ERHA and MHB followed by the WHB. [4]

The WHO have targeted 2010 for measles elimination in the

European Region. Despite the introduction of a measles vaccine in 1985 in Ireland followed by the MMR in 1988 measles continues to be a problem with outbreaks occurring.[5] A national measles elimination plan needs to be developed and implemented in order to eliminate measles in Ireland. A vital component to eliminating measles in Ireland will include increasing the uptake of MMR. Since the national collation of cohort based immunisation uptake data commenced in Ireland in Quarter 1 1999, MMR1 uptake at 24 months has been as low as 69% (Quarter 4, 2001) and has not exceeded 83% (Quarter 4 2000). An enhanced measles surveillance system also needs to be implemented in order to facilitate the control and elimination of measles in Ireland.

Rubella
The number of rubella notifications continued to decline in 2002, compared to previous years, with 33 cases notified giving a national incidence rate of less than one case per 100,000. Thirty-two of the cases notified in 2002 were less than 15 years of age (age unreported for remaining case), with 88% of the cases aged less than five years. Nineteen cases were male, 13 cases were female and sex was not reported for one case.

Salmonellosis *(other than typhoid or paratyphoid)*
Salmonellosis (other than typhoid or paratyphoid) notifications decreased further in 2002 with 369 cases (9.4/100,000) notified, the lowest number of cases notified since 1994. In 2002, the highest age specific incidence rate (33/100,000, n=92) was in those less than five years of age followed by those aged 20-24 years (11/100,000, n=36). In 2002, the breakdown by serotype was as follows: *Salmonella* Enteritidis (n=80), *S*. Typhimurium (n=55), *S*. Virchow (n=4), *S*. Newport (n=3), *S*. Stanley (n=3), *S*. Dublin (n=2), *S*. Heidelberg (n=2), S. Infantis (n=2), *S*. Othmarschen (n=2), *S*. Panama (n=2), *S*. Agona, *S*. Anatum, *S*. Bareilly, *S*. Brandenburg, *S*. Bredeney, *S*. Colindale, *S*. Corvallis, *S*. Durban, *S*. Give, *S*. Hadar, *S*. Johannesburg, *S*. Kentucky, *S*. Kottbus, *S*. Montevideo, *S*. Ohio, *S*. Redhill, *S*. Thompson, *S*. Urbana, *S*. Worthington (n=1, each) while serotype details were not reported for 53% of cases (n=195). A separate and comprehensive report on salmonella is presented elsewhere within this document.

Tuberculosis
The final figure for 2002 tuberculosis data will not be available until late 2003, however, a provisional figure of 400 cases were notified through the enhanced national tuberculosis surveillance system. In 2001, 381 cases were notified. A separate and comprehensive report on the 2001 data is included elsewhere within this document.

Typhoid and Paratyphoid
Five cases of typhoid and paratyphoid were notified in 2002 similar to four cases notified in 2001. *Salmonella typhi* was the aetiological agent in all five cases. The countries of infection were India, Nigeria, Pakistan, Philippines and not reported (n=1 each). All five cases were in the age group 25-34 years. Four of the cases were female and one case was male.

Viral hepatitis type A
The number of viral hepatitis type A cases notified decreased 4-fold in 2002 compared to 2001, with 26 cases (0.7/100,000) notified in 2002 and 112 cases (2.9/100,000) notified in 2001. A comprehensive report on viral hepatitis is presented as a separate chapter within this document.

Viral hepatitis type B
Cases of viral hepatitis type B continued to increase in 2002 with 458 cases notified (11.7/100,000). In contrast in 2000 and 2001, 187 and 342 cases were notified, respectively. A more detailed report on viral hepatitis is presented as a separate chapter within this document.

Viral hepatitis unspecified
In 2002, 89 cases (2.3/100,000) of viral hepatitis type unspecified were notified. A separate and more detailed report on viral hepatitis is presented elsewhere in this document.

Whooping cough
During 2002, 131 cases (3.3/100,000) of whooping cough were notified, contributing to a continued decline in incidence (table 1). The majority (85%) of cases were aged less than 15 years and 55% of cases were in the age group 0-4 years. In 2002, 12 cases (9%, 12/131) occurred in those aged 15 years or older while in 2001 only three cases (2%, 3/142) were reported in those aged 15 years or older. In 2002, the causative organism was reported as *Bordetella pertussis* for 28 cases while the causative organism was not reported for the remaining cases.

Discussion
The collection of notifiable infectious disease data allows the incidence and trends of infectious diseases to be monitored, thereby aiding decisions relating to infectious disease control and prevention. An increase in the incidence of a particular disease may indicate a new health problem requiring public health intervention. For example, following the increase in measles activity observed in Ireland starting in late 2002, the affected health boards implemented control measures to curb the spread of the disease.[4] The study of infectious disease trends can be used to assess the impact of various public health initiatives. For example, the continued decline in Ireland of meningococcal disease particularly Group C highlights the success the meningococcal group C conjugate (MenC) vaccine has had since its introduction in October 2000 (table 1).

The list of notifiable diseases specified in the current infectious disease regulations has not been subject to regular review and a number of diseases of public health concern requiring infectious disease control are not currently included e.g. enterohaemorrhaghic *Escherichia coli* (including *E. coli* O157, O26 and O111) and influenza. There are also a number of other limitations to the current notification system. There are no case definitions for the current list of notifiable infectious diseases, therefore, for the majority of diseases both suspected and confirmed cases are notifiable making differences in disease rates difficult to interpret. In addition, the regulations do not specify laboratories, an important source of infectious disease data, as notifiers of infectious diseases. Due to these and other short-comings of the current notification process a review of the notification

Table 4. Number of notifiable infectious diseases by sex in 2002

Infectious disease	Male	Female	Unknown	Total
Acute Encephalitis	1	3	0	4
Acute Viral Meningitis	20	15	1	36
Bacillary Dysentery (Shigellosis)	7	18	1	26
Bacterial Meningitis (including meningococcal septicaemia)**	148	149	0	297
Brucellosis	4	0	0	4
Cholera	1	0	0	1
Creutzfeldt Jakob Disease	4	1	0	5
Food Poisoning (bacterial other than salmonella)	693	673	28	1394
Gastroenteritis (children < 2 years of age)	902	817	28	1747
Infectious Mononucleosis	69	102	2	173
Infectious Parotitis (Mumps)	21	11	0	32
Influenzal Pneumonia	2	0	0	2
Legionnaires' Disease	3	3	0	6
Leptospirosis	7	1	0	8
Malaria	14	5	1	20
Measles	132	106	5	243
Rubella	19	13	1	33
Salmonellosis (other than typhoid or paratyphoid)	186	176	7	369
Tuberculosis*!	251	146	3	400*!
Typhoid & Paratyphoid	1	4	0	5
Viral Hepatitis Type A	9	17	0	26
Viral Hepatitis Type B	218	213	27	458
Viral Hepatitis Unspecified	46	35	8	89
Whooping Cough	60	68	3	131

*** Taken from the Enhanced Surveillance System for Bacterial Meningitis*
**! Taken from the Enhanced TB Surveillance System, figure for 2002 provisional*

system was carried out with the aim of developing an effective surveillance system to address current public health concerns. A number of recommendations made by the review, including amending the infectious disease regulations to include laboratories as notifiers of infectious diseases and specifying a new list of notifiable diseases, are hoped to be implemented by the end of 2003.

This new list of notifiable diseases will include diseases highlighted for surveillance by the European Union and will no longer include a couple of currently notifiable diseases that do not require public health action (e.g. infectious mononucleosis and ornithosis). Case definitions will be included with this new list. In the coming years, with the implementation of recommendations from this review and also with the implementation of computerised infectious disease reporting (CIDR) Ireland will have a vastly improved surveillance system reflecting current public health concerns.

Acknowledgements

The authors would like to sincerely thank everyone who contributed to the surveillance of notifiable infectious diseases in Ireland including GPs, clinicians, microbiologists, and medical, scientific and administrative staff in the Community Care Areas and in the Departments of Public Health. Special thanks to everyone involved in cleaning and validating the data.

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Immunisation Uptake in Ireland, 2002

KEY POINTS

- **Annual immunisation uptake rates at 24 months continued to decline in 2002.**
- **MMR_1 uptake at 24 months was 72.5%.**
- **D_3, P_3, $Polio_3$, T_3 and Hib_3 uptake at 24 months was between 82-83%.**
- **$MenC_3$ uptake at 12 months was 74%.**

Introduction

In 2002, the National Immunisation Advisory Committee of the Royal College of Physicians of Ireland issued an updated report on Immunisation Guidelines for Ireland.[1] The recommended primary childhood immunisation schedule is that children are vaccinated against diphtheria (D), tetanus (T), pertussis (P, acellular pertussis vaccine), polio, *Haemophilus influenzae* type b (Hib) and group C meningococcal disease (MenC) at 2, 4 and 6 months and against measles, mumps and rubella (MMR) at 15 months. It also recommends that children receive the BCG vaccine at birth or by one month of age. A booster dose of DTaP/Polio should be given at 4-5 years of age and the second dose of MMR should also be given at this time. To effectively control vaccine-preventable diseases, it is essential that 95% of children complete the primary childhood immunisation schedule by two years of age. The meningococcal group C conjugate (MenC) vaccine was introduced to the primary childhood immunisation schedule in October 2000. A catch-up programme was also launched at this time, offering the vaccine to all those under 23 years of age. The MenC catch-up programme was completed nationally by March 2002.

Materials and Methods

Each health board is responsible for maintaining an immunisation register. In 2002, the health boards provided NDSC with quarterly immunisation uptake data on children who reached their first or second birthday (uptake at 12 and 24 months, respectively) during the quarter in question and who had completed the primary immunisation schedule (i.e. D_3, P_3, T_3, $Polio_3$, Hib_3, $MenC_3$ and MMR_1; subscript signifies number of doses). $MenC_3$ uptake data at 12 months was

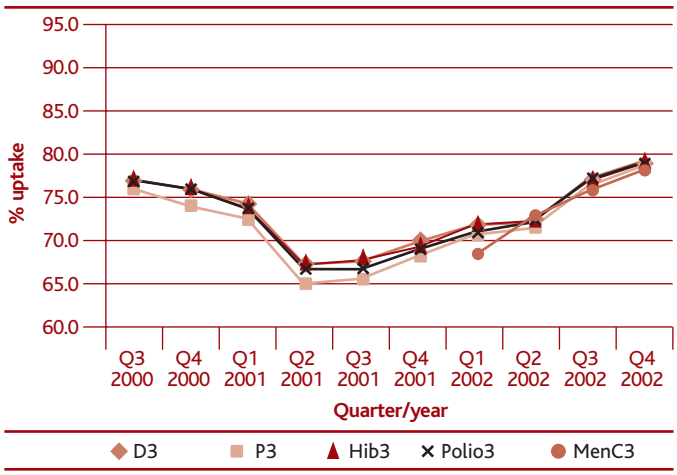

Figure 1. Quarterly immunisation uptake rates at 12 months in Ireland (Note scales range from 60-95% on this figure)

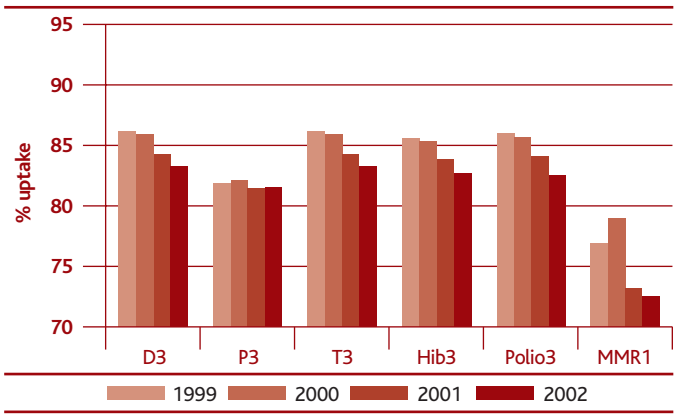

Figure 2. Annual immunisation uptake rates at 24 months (Note scales range from 70-95% on this figure)

collated nationally for the first time in 2002, however, $MenC_3$ uptake rates at 24 months were only available from quarter 3 2002 onwards. Data on the number eligible for immunisation in each cohort, the number who completed the primary immunisation schedule and the percentage immunised were provided. NDSC collated and analysed these data in MS Excel. The annual uptake rates presented in this report were calculated from the quarterly reports submitted by the health boards.

In July/August 2002, the eight health boards in Ireland ran reports on MenC uptake in those targeted by the catch-up programme (1-22 year olds). Uptake data was extracted according to annual birth cohort (1978-1999). For the less than five year olds, denominator data was obtained from the health board birth registers, whereas for those aged five years or greater, denominator data was extrapolated from the 1996 census.

Results

Immunisation uptake rates at 12 months in 2002

Overall, immunisation uptake at 12 months in 2002 (i.e. for the cohort born between 01/01/2001 & 31/12/2001) was 75% for D_3, T_3, Hib_3 and $Polio_3$, and 74% for P_3 and $MenC_3$. Uptake rates at 12 months in 2002 by health board are presented in Table 1. Uptake rates ranged from 68% in ERHA to 84-85% in NWHB for D_3, P_3, T_3, Hib_3 and $Polio_3$ and from 68% in ERHA to 82% in the MWHB for $MenC_3$.

Uptake of all vaccines at 12 months increased steadily throughout 2002. By quarter 3 2002 the rates had recovered to levels last seen in quarter 3 2000. The uptake rates at 12 months in quarter 4 2002 were the highest recorded to date (Figure 1). $MenC_3$ uptake at 12 months was collated nationally for the first time in 2002. The uptake for $MenC_3$ increased by 10% between quarter 1 (68%) and quarter 4 2002 (78%).

Immunisation uptake at 24 months in 2002

Immunisation uptake rates at 24 months in 2002 (i.e. for the cohort born between 01/01/2000 & 31/12/2000) were 83% for D_3, T_3, Hib_3 and $Polio_3$, 82% for P_3 and 73% for MMR_1. The national uptake rate for $MenC_3$ (quarter 3 and quarter 4 only) was 75%. Uptake rates at 24 months in 2002 by health board are presented in Table 2. Rates for D_3, T_3, P_3, Hib_3 and $Polio_3$ ranged from 77-78% in ERHA to 90-92% in NWHB, while MMR_1 uptake rates ranged from 64% in ERHA to 82% in SEHB. Uptake rates for $MenC_3$ for the second half of 2002 varied from 65% in the ERHA to 85% in the MWHB.

In 2002, immunisation uptake rates at 24 months declined for all antigens apart from P_3 when compared with previous years (Figure 2). D_3, T_3, $Polio_3$ and Hib_3 uptake all declined by 1% to 83%. MMR_1 uptake decreased slightly (0.7%) while uptake of P_3 showed a very small increase (0.1%) (Figure 2).

The uptake of MMR_1 increased throughout 2002 (Figure 3), and by quarter 4 2002 the levels were approaching the levels seen between quarter 3 1999 and quarter 2 2000. An increase in uptake of the other vaccines was also observed in quarter 4 2002, but the fluctuations have not been as dramatic as those seen for MMR_1 (Figure 3).

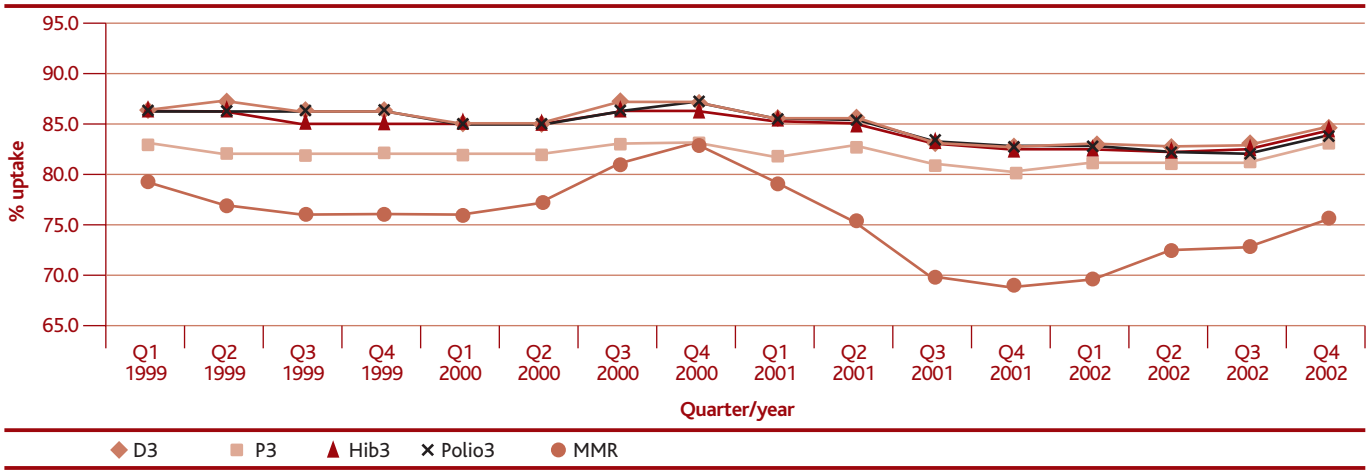

Figure 3. Quarterly immunisation uptake rates at 24 months in Ireland (Note scales range from 65-95% on this figure)

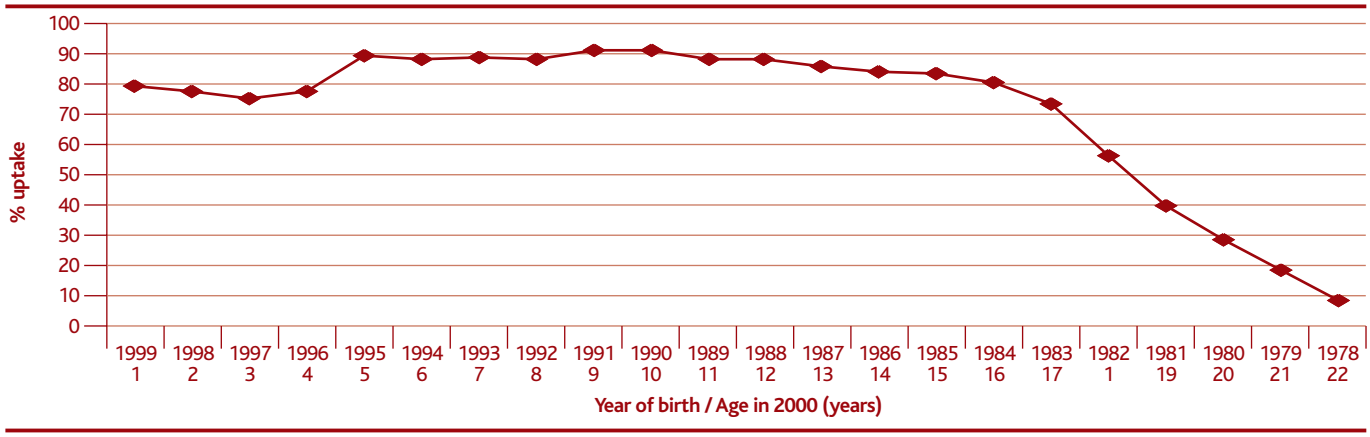

Figure 4. MenC uptake in Ireland in those targeted by MenC catch-up programme i.e. those aged between 1-22 years in 2000 (1978-1999 birth cohorts)

MenC uptake in those targeted by the catch-up programme

National uptake of the MenC vaccine from the catch-up programme was 70% overall in the 1-22 year olds (Figure 4). It was highest in the 5-12 year olds (89%) and 13-17 year olds (81%). It declined to 77% in the 1-4 year olds, while only 30% of the 18-22 year olds availed of the vaccine.

Discussion

Immunisation uptake figures at 12 months in 2002 (74-75%) displayed an improvement on those recorded in 2001 (68-70%).[2] Although overall uptake at 24 months declined slightly in 2002, uptake of all antigens did improve in the latter half of the year. In particular a recovery in MMR_1 uptake was observed which reached 75% in quarter 4, compared to the same period in 2001 when it had declined to 69%, which is the lowest uptake rate for MMR_1 recorded to date. Despite the improvement in MMR_1 uptake throughout 2002, the maximum MMR_1 uptake of 83% recorded in quarter 4 2000 has not been reached in Ireland since. These uptake rates still fall well short of the target uptake of 95%, the level required at 24 months to effectively control vaccine-preventable diseases. While MMR_1 uptake rates continue to remain at these low levels, Ireland is going to continue experiencing outbreaks of measles, mumps and rubella.

The highest uptake levels of MenC vaccine through the catch-up programme were achieved in the 5-17 year age group. This age group corresponded to those in primary and secondary school who would have largely been targeted by immunisation teams visiting the schools, or alternatively, if missed at school, this group also had the option of being vaccinated by their local GP. These uptake figures demonstrate that high uptake levels can be achieved when specific groups are targeted and when the combined efforts of dedicated vaccination teams in schools and GPs are well co-ordinated. A marked decline in uptake for MenC was noted in those aged 18 years and over, decreasing from 56% in 18 year olds to 8.5% in 22 year olds. The poor MenC uptake in this age group reflects the difficulty in targeting and in communicating preventive health messages to young adults. Although immunisation teams visited colleges and extensive advertising was undertaken, getting vaccinated was not a high priority for many college students. Furthermore, this group of the population is generally very healthy and rarely have cause to attend their GP so opportunistic vaccination was difficult. However, the impact of the MenC campaign was reflected in the 90% decline in notifications in Group C disease observed between 2000 and 2002. Furthermore, there were no deaths in 2002 due to group C disease whereas on average six people died each year from the disease prior to the introduction of the vaccine. Therefore, the MenC vaccine has been a great public health success story in Ireland, with major reductions in group C morbidity and mortality being observed since its introduction.

Table 1. Immunisation uptake rates in children 12 months of age in 2002

% Uptake at 12 months
Cohort born 01/01/2001 - 31/12/2001

Health Board	No. in cohort	D_3	P_3	T_3	Hib_3	$Polio_3$	$MenC_3$
ERHA	21,812	68	68	68	68	68	68
MHB	3,654*	74	73	74	74	74	73
MWHB	4,854	83	81	83	82	82	82
NEHB	6,074	80	80	80	80	81	78
NWHB	3,102	85	84	85	84	85	81
SEHB	6,596	82	81	82	82	82	81
SHB	7,999*	78	76	78	77	77	76
WHB	5,158*	73	72	73	74**	73	70
Ireland	**59,249**	**75**	**74**	**75**	**75**	**75**	**74**

** As the number in cohort varied depending on the vaccine, the most commonly used number was taken*
*** Based on data from Quarter 2-4 only*

Table 2. Immunisation uptake rates in children 24 months of age in 2002

% Uptake at 24 months
Cohort born 01/01/2000 - 31/12/2000

Health Board	No. in cohort	D_3	P_3	T_3	Hib_3	$Polio_3$	$MenC_3$*	MMR_1
ERHA	21,733	78	77	78	78	77	65	64
MHB	3,535	81	79	81	80	81	79	72
MWHB	4,851	86	84	86	86	86	85	80
NEHB	5,362	91	90	91	90	90	81	79
NWHB	2,924	92	90	92	91	91	82	80
SEHB	6,303	88	85	88	87	87	84	82
SHB	7,926	84	82	84	83	83	79	76
WHB	4,979	83	81	83	82	82	73	74
Ireland	**57,613**	**83**	**82**	**83**	**83**	**83**	**75**	**73**

** Based on uptake rates for Quarter 3 and Quarter 4 2002 only*

Acknowledgements

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Computerised Infectious Disease Reporting System (CIDR)

Key Points:

- **CIDR is a national multi-agency partnership project to introduce an internet based integrated electronic system for surveillance of both clinical and laboratory information on communicable diseases in Ireland**

- **CIDR will provide high quality timely information for surveillance and control of communicable diseases, and for surveillance of anti-microbial resistance**

- **CIDR will be a robust, enterprise-strength solution that will be adaptable with changing surveillance needs**

Introduction
CIDR is an internet based Computerised Infectious Disease Reporting (CIDR) system being developed by the National Disease Surveillance Centre in collaboration with its partners, the Department of Health and Children, the Health Boards, the Food Safety Authority of Ireland and the Food Safety Promotion Board, and with the help of external IT consultants who advise on each step of the process. CIDR aims to provide an integrated and standardised electronic surveillance system to collect, collate, analyse and disseminate good quality laboratory-based and clinical notification data on communicable disease in a timely manner in Ireland. CIDR will provide:

- An easily accessible one-stop shop for surveillance and control of communicable diseases and antimicrobial resistance

- One common system for all surveillance work

- Standard reports on line and the ability to customise reports to your needs

- Controlled and secure access to information
- An adaptable and flexible system that can meet future needs

CIDR System Design
In October 2001 a EU Tender for detailed design of the CIDR core system, including specification of the hardware configuration and software infrastructure required to operate CIDR was initiated. By July 2002 Fujitsu Consulting completed the design, including the uploading of data from Laboratory Information Management Systems (LIMS) to CIDR.

CIDR System Development
A second, restricted, EU procurement was initiated in May 2002 to identify a partner to develop, implement and support the CIDR system from the design documentation. Following confirmation of funding for CIDR development in January 2003, the contract was awarded to Fujitsu Consulting. By the end of 2003, both development and user acceptance testing of the system will be completed. The CIDR system has been built using the latest .NET development environment with SQL Server 2000 as the backend database and it makes extensive use of XML technology, in line with the inter-operability requirements of e-government initiatives.

Access to the CIDR system will be provided via the Government Virtual Private Network (G-VPN). This provides a cost-effective network with increased security and enhanced bandwidth for public sector organisations, including the health service. Other health agencies utilising this network include the General Medical Services Payments Board (GMS-PB) and the General Registry Office (GRO). Public health departments, community care offices and clinical microbiology laboratories will enter and retrieve infectious disease information from CIDR via standard browser software on their personal computers. No additional software will be required.

To ensure that information within CIDR is stored and accessed appropriately, the core system is firewall-protected and access to the system is limited to authorised users. In addition to usernames and passwords these users will require authentication provided by unique key fob tokens. Information transmitted from local PCs to the core system will be protected by 128-bit encryption.

The information in CIDR will come from two principal sources. Public health doctors working in community care offices and public health departments will register clinical notifications on the system. Clinical microbiology laboratories in hospitals will upload files exported from their laboratory information systems into CIDR, again using standard browser software. These files will be transformed and translated by the core system in the CIDR format. To ensure that this is done accurately and that the files exported by the laboratory information system contain the appropriate information, CIDR users will be able to view uploaded data in its unmodified state and after transformation / translation. Laboratories will authorise all information prior to its release for view by public health and other CIDR partners.

Information from these sources will be combined into events of infectious diseases. This means that for example for an event of TB, all clinical epidemiological and laboratory information on this disease in an individual will be available in the one place, and can be reported on.

The information collected and stored by CIDR will be available for analysis utilising a report writing / business intelligence application called 'Business Objects'. This software enables information to be retrieved from complex relational databases in a user-friendly fashion yet leaves the underlying data safe. As with the CIDR application itself, viewing and analysing CIDR information with 'Business Objects' will require only standard browser software locally.

CIDR Pilot implementation
Following user acceptance testing, pilot implementation will commence in the North Eastern Health Board, in NDSC and in the 4 reference laboratories, namely the National Virus Reference Laboratory, the Irish Meningococcal and Meningitis Reference Laboratory, the Salmonella Reference Laboratory and the Methicillin Resistant Staphylococcus Aureus Laboratory. National implementation will happen subsequently.

CIDR Project Team
During 2002 and 2003 the CIDR project team has grown. The team now includes the following new members: Colm Grogan, Senior Surveillance Scientist, Gillian Cullen, Surveillance Scientist, John Foy and Liam O'Connor, IT officers, Orla Bannon, administrative lead on training, Karen Savage CIDR Communications Officer and Deirdre Hyland administrative officer.

CIDR committees work
The CIDR committees continue to work hard to support the work of the CIDR project in developing and delivering this major public health initiative. This is much appreciated by the CIDR project team. Dr Ann Shannon stepped down as Chair of the National Business Rules Committee in 2002, and has been replaced by Dr Peter Finnegan. We wish to thank Dr Ann Shannon for all her hard work as Chair of this committee. One of the important pieces of work completed by this committee was a national template Business Rules for participation in CIDR, which was agreed in 2002. The suitability of this template will be tested in the pilot implementation locations.

Website
www.ndsc.ie

The NDSC website (www.ndsc.ie) continues to be one of the most important communications tools available to NDSC. A wide range of information is published on the web site, including versions of all reports produced by the NDSC, weekly and annual infectious disease statistics, disease specific factsheets, press releases and other general information.

Following the move to a new website design at the end of 2001 the level of use of the site increased significantly during the year. At the beginning of 2002 the average number of log-ons to the site per day was 374. During the last quarter it averaged 575 users per day.

Usage information for the NDSC website during 2002 was as follows:

Figure 1 represents the total number of connections to the site for each quarter of 2002 and for Q4 2001. The 2001 figure is included for reference purposes.

Table 1 indicates that the transfer of data from the site increased at a slightly greater rate than the number of connections to the site. The ratio of connections in Q4 2001 compared to Q4 2002 is approximately 1:3, whereas the ratio of data downloaded for the same period is 1:3.6.

The number of different national domains from which users connected to the NDSC website increased from 58 different countries in Q4 2001 to 74 in Q4 2002 (see Table 1).

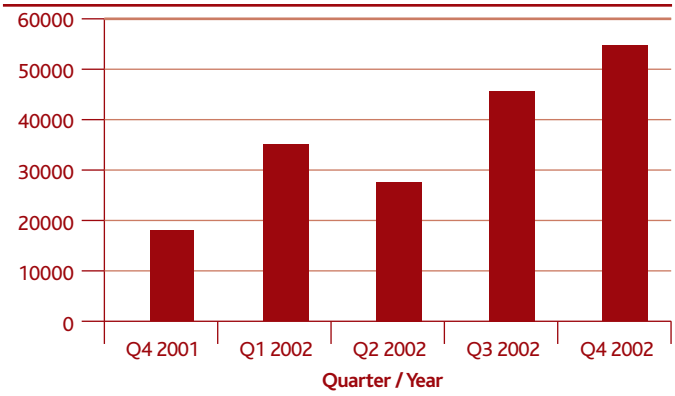

Figure 1. Number of Connections to the NDSC Website per Quarter.

Quarter	Total Connections	Average Daily Transfer Rate (MB/day)	No. of Distinct National Domains Connecting Site
Q4 2001	17607	14	58
Q1 2002	33748	22	62
Q2 2002	26725	22	70
Q3 2002	44099	39	72
Q4 2002	52968	51	74

Glossary of Terms

ERHA – Eastern Regional Health Authority
(Dublin, Kildare, Wicklow)

MHB – Midland Health Board
(Laois, Offaly, Longford, Westmeath)

MWHB – Mid-Western Health Board
(Clare, Limerick, Tipperary NR)

NEHB – North Eastern Health Board
(Cavan, Monaghan, Louth, Meath)

NWHB – North Western Health Board
(Donegal, Sligo, Leitrim)

SEHB – South Eastern Health Board
(Carlow, Kilkenny, Tipperary SR, Waterford, Wexford)

SHB – Southern Health Board
(Cork, Kerry)

WHB – Western Health Board
(Galway, Mayo, Roscommon)

ACE – Assistant Chief Executive

CSSD – Central Sterile Suppliers Department

EHSS – Eastern Health Shared Services

FPHM – Faculty of Public Health Medicine

FSAI – Food Safety Authority of Ireland

FSPB – Food Safety Promotions Board

IBTS – Irish Blood Transfusion Service

IMU – Information Management Unit

NDSC – National Disease Surveillance Centre

OLHSC – Our Lady's Hospital for Sick Children

TCD – Trinity College Dublin

UCD – University College Dublin