Annual Report 2008
Health Protection Surveillance Centre

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

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Introduction

For obvious reasons, 2009 has been a very busy year for those involved in the surveillance of infectious disease. Credit is due to everyone in public health departments around the country and within HPSC for managing to analyse and report on trends and developments in 2008 which make up this report, despite the considerable workload caused by the influenza pandemic.

In 2008 we saw a marked resurgence in mumps cases predominantly affecting those aged between 15 and 24 years. Complications included inflammation of the testes, deafness, pancreatitis, meningitis, mastitis and encephalitis. Fifty seven outbreaks of mumps were reported in 2008, mainly in educational settings. Efforts to control the outbreak by promoting vaccine uptake in third level institutions were largely unsuccessful and lead to a decision in 2009 to target older children in secondary schools with an MMR campaign. Thankfully, this approach has resulted in a decline in cases but a more complete MMR catch up in primary and secondary schools is required to prevent further outbreaks of mumps and the other two diseases covered by MMR – measles and rubella.

Invasive *Streptococcus pneumoniae* infection caused three deaths amongst children in 2008. The introduction of the pneumococcal conjugate vaccine to the childhood programme in September 2008 was very welcome especially as an increasing proportion of cases of this disease in Ireland have been shown to be resistant to penicillin. Routine hepatitis B vaccine was introduced at the same time. It will be many years before the effects of the hep B vaccine in childhood will impact on the hepatitis B figures and therefore it is essential that those in high risk groups continue to be targeted for this vaccine.

The absence of a formal streptococcal reference laboratory highlights the need for improved funding of reference facilities in Ireland. It will be important over the coming years that any reductions in funding for health services do not negatively impact on our capacity to detect and monitor infectious disease threats.

The 2008/2009 influenza season was one of the most intense in the past 10 years. H3N2 predominated and was associated with an increase in mortality in the early part of 2009. Efforts over the past number of years to strengthen influenza surveillance continued in the 2008/2009 season as part of the pandemic preparedness process. The emergence of a new pandemic strain in April 2009 emphasised the importance of influenza surveillance and the recently developed capacity to monitor this infection on a year round basis.

The on-going rise in cases of Verotoxigenic *E. coli* continues to give cause for concern. Fifteen cases of VTEC-associated haemolytic uraemic syndrome occurred, 50% of which were associated with non-O157 VTEC. Person to person transmission was suspected to have played a role in 21 VTEC outbreaks in 2008, including three crèche associated outbreaks. This highlights the importance of implementing hygiene precautions early when dealing with diarrhoeal illness and the importance of seeking laboratory confirmation of outbreaks of infectious intestinal disease. Drinking untreated water from private wells also remains an important risk factor for VTEC infection in Ireland.

In 2008 a significant outbreak of salmonellosis (*S. Agona*) occurred resulting in the identification of 11 Irish cases and 152 cases in the UK and five other European countries. Epidemiological investigations identified contaminated meat products produced in an Irish food plant as the source of the outbreak, which was eventually halted following the closure of the implicated section of the plant and the recall of the implicated products.

Cases of leptospirosis continue to increase in 2008 and Ireland has one of the highest rates in Europe. The disease occurs mainly in adult males, through exposure to farm animals and rodent infested environments in watersports.

Bloodborne infections continue to occur at a high rate in Ireland. New hepatitis C cases continue to occur unabated, mainly through injecting drug use. New HIV cases have increased and the incidence is higher in Ireland than the average for Western Europe. Heterosexual transmission accounted for 56% of cases

where the route of transmission was known. Sexually transmitted infections showed a 20% increase in 2007, the latest year for which data are available. There is a continuing problem with syphilis especially in the men who have sex with men (MSM) community, many of whom report oral sex as the main risk factor.

It is good to see that national immunisation rates continue to improve. However, in 2008 national uptake at 24 months for diphtheria, tetanus and pertussis, and other childhood vaccines, were 2-3% below the target uptake of 95%. MMR uptake was 6% below the target uptake.

It is also positive to see that antibiotic consumption in outpatients decreased during 2008 for the first time since the year 2000. The overall antibiotic consumption rate remains mid to high in comparison with other EU countries. The proportion of MRSA of all invasive *S. aureus* infections decreased in 2008 to 33.7%, down from 38.5 % in 2007. This is the second successive year in which a decrease has been observed and this downward trend is highly significant and very welcome. Antimicrobial resistance continues, however, to be a major problem in other pathogens and highlights the ongoing commitment required to reduce the burden in Ireland.

Once again, I'd like to thank the Scientific Advisory Committee, along with the HPSC sub committees for all their hard work. Special thanks also to all the staff at HPSC whose commitment and professionalism is reflected throughout this report and whose tireless efforts in the midst of an influenza pandemic have made this report possible.

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01

Vaccine Preventable Diseases

1.1 *Haemophilus influenzae* (invasive)

Summary

Number of cases, 2008: 22
Number of cases, 2007: 31
Number of cases, 2006: 38
Crude incidence rate, 2008: 0.5/100,000

In 2008, 22 cases of invasive *Haemophilus influenzae* disease were notified in Ireland (0.5/100,000 total population). This a marked reduction compared to the previous years when 31 and 38 cases were notified in 2007 and 2006, respectively (Figure 1).

The main change in 2008, when compared to 2007, is the continuing, albeit slower, decline in the overall number of cases due to non-capsular and type b strains (Figure 1). No other noteworthy change in the number of cases due to other serotypes has been observed in recent years.

Non-capsular strains accounted for the majority of the invasive *H. influenzae* cases notified in 2008 (50%, n=11/22). The remaining cases were due to *H. influenza* type b (n=5, 22.7%), type f (n=3), and three isolates that were not typed. The cases ranged in age from three weeks to 88 years. The incidence rates were highest in infants <1 year (8.2/100,000) and those aged 65+ years (1.7/100,000) (Table 1).

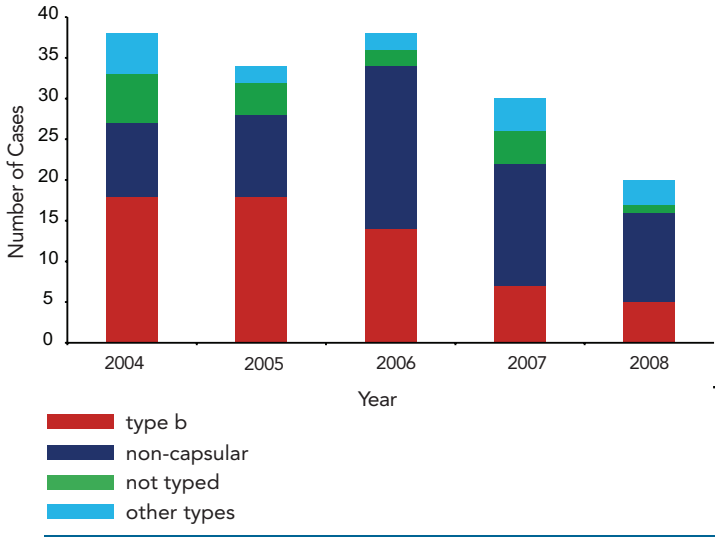

Figure 1. Annual number of invasive Haemophilus influenzae cases notified in Ireland, 2004-2008

Cases occurring in children <10 years of age (n=9) and elderly adults >=65 years (n=8) accounted for 77% of the invasive *H. influenzae* notifications in 2008 (Table 1)

The clinical manifestations of invasive *H. influenzae* disease in the nine children <10 years of age in 2008 were two cases of meningitis and one case each of meningitis/septicaemia, epiglottitis, pneumonia and septic arthritis along with three cases where the clinical diagnosis was not reported. A breakdown by clinical diagnosis for all age groups by year between 2004 and 2008 is presented in Table 2.

Two invasive *H. influenzae* related deaths were reported in 2008, both of which occurred in adults over 65 years of age. One was associated with a type b strain and was the primary cause of death (the patient was unvaccinated). The second death was associated with a non-capsular *H. influenzae* strain.

H. influenzae type b (Hib) accounted for 23% of the invasive *H. influenzae* notifications in 2008, with five cases being notified (0.12/100,000 total population). Three of the five Hib cases (60%) occurred in children <=4 years of age, with two cases occurring in infants <1 year and one in the 1-4 years age group. Of these three cases, two were unvaccinated and one had received one dose of the Hib vaccine. Similarly, in 2007, three of the seven Hib cases notified (42.9%) occurred in

children <=4 years of age. In 2006, when 14 cases in total were notified, the number of Hib cases in children <=4 years of age was five (35.7%). The introduction of a Hib booster catch-up campaign for children under four years of age in November 2005 and a routine Hib booster dose at 12 months in September 2006 is continuing to reduce the incidence of Hib disease in young children in 2008.

In 2008, no true Hib vaccine failures were reported, thus highlighting the positive impact the Hib booster catch up campaign has had in Ireland. In contrast, in 2007, two true Hib vaccine failures occurred in children aged 14 years or less, one of whom died from septicaemia. Both children received three doses of Hib vaccine when they were less than one year of age. Of note was the fact that one of the two true vaccine failures in 2007 occurred in a slightly older child, aged 10-14 years, who would not have been targeted by the catch-up programme.

In 2008, one apparent Hib vaccine failure occurred (in a child under one year of age), compared to none in 2007 and three in 2006. Apparent failures are defined as cases in children who are incompletely vaccinated.

Since September 2008, the, Hib booster dose has been administered at 13 months of age as part of the routine childhood immunisation schedule in addition to the three doses at 2, 4 and 6 months of age. Vaccination is routinely recommended for those at increased risk of Hib disease.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 8th July 2009. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

Table 1. Number and incidence rates of invasive Haemophilus influenzae cases by serotype plus number of Hib vaccine failures by age group, 2008

	Type b	Type e	Type f	Non-capsular	Not Typed	Total	ASIR of Hib	ASIR of all H. influenzae	TVFs
<1	2	0	2	1	0	5	3.3	8.2	0
1-4	1	0	1	0	0	2	0.4	0.8	0
5-9	0	0	0	1	1	2	0.0	0.7	0
10-19	0	0	0	0	0	0	0.0	0.0	0
20-34	0	0	0	1	0	1	0.0	0.1	0
35-54	1	0	0	1	0	2	0.1	0.2	0
55-64	0	0	0	1	1	2	0.0	0.5	0
65+	1	0	0	6	1	8	0.2	1.7	0
All Ages	5	0	3	11	3	22	0.1	0.5	0
CIR	0.12	0.00	0.07	0.26	0.07	0.52	-	-	-

CIR, crude incidence rate per 100,000 total population
ASIR, age specific incidence rate per 100,000
TVFs, true Hib vaccine failures

Table 2. Number of invasive Haemophilus influenzae cases by clinical diagnosis, 2004- 2008

Clinical Diagnosis	2004	2005	2006	2007	2008	2004-2008	% of Total
Septicaemia	8	14	13	6	3	44	27.0%
Meningitis	3	9	3	2	2	19	11.7%
Septicaemia/ Meningitis	1	0	1	0	1	3	1.8%
Pneumonia	5	0	3	6	3	17	10.4%
Epiglottitis	1	3	3	1	1	9	5.5%
Cellulitis	1	1	2	1	1	6	3.7%
Septic arthritis	0	1	0	0	1	2	1.2%
Osteomyelitis	1	0	0	0	0	1	0.6%
Unknown	18	6	13	15	10	62	38.0%
Total	**38**	**34**	**38**	**31**	**22**	**163**	**100%**

Table 3. Incidence rates of invasive Haemophilus influenzae by HSE area, 2004-2008

HSE Area	2004	2005	2006	2007	2008
E	1.1	1.0	0.9	0.8	0.5
M	0.5	0.5	0.2	0.5	0.3
MW	0.8	0.3	0.8	0.6	0.8
NE	0.2	1.1	0.2	0.0	0.0
NW	0.4	0.0	2.0	0.4	0.0
SE	1.3	0.5	1.0	1.3	0.8
S	3.0	0.8	3.4	0.8	1.7
W	0.5	1.4	0.7	1.4	0.5
Ireland	**0.9**	**0.8**	**0.9**	**0.7**	**0.5**

1.2 Measles

Summary

Number of cases, 2008: 55
Number of confirmed cases, 2008 :13
Crude incidence rate, 2008: 1.3/100,000
Crude confirmed incidence rate, 2008: 0.3/100,000

In 2008, there were 55 measles cases (1.3/100,000) notified in Ireland. This is similar to 2007 when 53 cases were notified.

Forty-two cases (76%) in 2008 were classified as possible while 13 (24%) were classified as confirmed, giving a crude confirmed incidence rate of 0.3 per 100,000 population. Ten of the confirmed cases were laboratory confirmed while three were epidemiologically linked to a laboratory confirmed case. In 2007, 20 (38%) of the 53 measles cases notified were classified as confirmed.

In 2008, measles cases ranged in age from three months to 41 years. The largest number of cases (n=27) and the highest age specific incidence rate (22.3/100,000) were in the age group one to two years (figures 1 and 2). Of the 55 measles cases 30 (55%) were female and 25 (45%) were male.

Laboratory results were provided for 22 (40%) cases in 2008. Ten cases were laboratory positive for measles. Twelve cases were laboratory negative for measles, however, for six of these the oral fluid specimens were not taken at the optimal time following disease onset or the date of specimen collection in relation to disease onset was unknown (the optimal time for collecting oral fluid specimens for measles IgM testing is greater than seven days to two months following disease onset). All cases that were laboratory negative for measles were classified as possible cases.

Measles vaccine in Ireland is available as part of the combined measles-mumps-rubella (MMR) vaccine. In Ireland, vaccination with the first dose of MMR is routinely recommended at twelve months of age and the second dose at four to five years of age.

Vaccination data were reported for 46 (84%) measles cases in 2008. Thirty-one cases (n=31/46, 67%) were unvaccinated; seven (n=7/31, 23%) of these were less than 12 months of age.

Thirteen cases (n=13/46, 28%) had one dose of MMR vaccine; twelve (92%) of these were less than six years of age. Only two (15%) of these 13 cases were classified as confirmed.

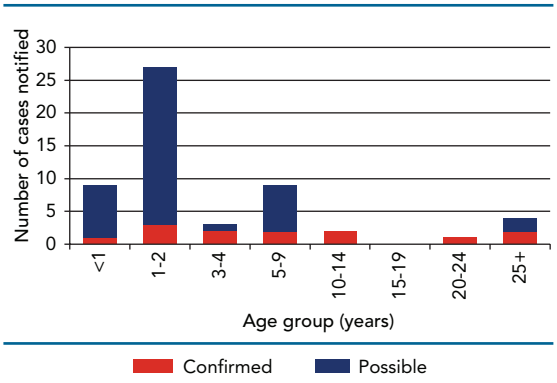

Figure 1. Number of notified measles cases in 2008 by age group and case classification

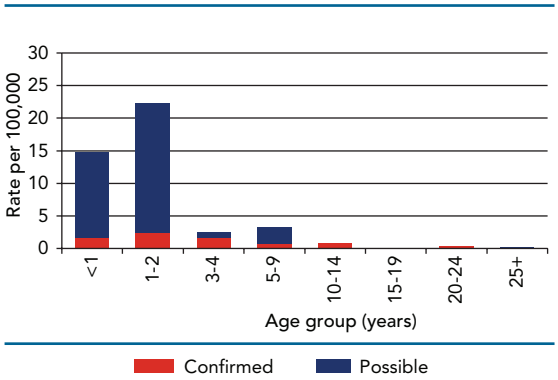

Figure 2. The age specific incidence rates (per 100,000) of notified measles cases in 2008 by case classification

Two cases (n=2/46, 4%) were reported as having received two doses of MMR. Only one of these cases was classified as a confirmed case; this case was reported to have an underlying illness.

Seven cases were hospitalised representing 17 percent (n=7/42) of all cases with known hospitalisation status. The seven cases ranged in age from nine months to 11 years with four cases classified as confirmed and three classified as possible. One case was hospitalised for one day, one was hospitalised for three days while the number of days hospitalised was not reported for the remainder. Of the seven hospitalised cases, three were unvaccinated and three were reported to have one dose of MMR. The remaining hospitalised case had two doses of MMR; this case was reported to have an underlying illness.

Information on measles associated complications was reported for 32 cases. One case, aged 11 months, was reported to have pneumonia while one case, aged 17 months, had otitis media. The remaining 30 cases had no complications.

Four cases were reported as being infected outside Ireland. The country of infection for two confirmed cases was reported as India and the countries of infection for two possible cases were reported as Poland (n=1) and the United Kingdom (n=1).

Two localised measles outbreaks were notified during 2008, with a total of six cases attributed to these outbreaks. Both outbreaks were in private houses.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 11th August 2009. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

EU data are available at www.euvac.net and WHO European data are available at http://data.euro.who.int/CISID/.

1.3 Meningococcal Disease

Summary

Number of cases, 2008: 168
Number of cases, 2007: 179
Number of cases, 2006: 209
Crude incidence rate, 2008: 4.0/100,000

In 2008, 168 cases (4.0/100,000) cases of invasive meningococcal disease (IMD) were notified in Ireland. This was a notable decrease from the previous two years when 179 cases (4.2/100,000) and 209 cases (4.9/100,000), were notified in 2006 and 2005, respectively (figure 1). When compared with rates reported in 1999 and 2000, incidence rates have substantially declined in recent years (figure 1).

Based on the meningococcal disease case definition, 157 of the 168 cases (93.5%) notified in 2008 were classified as definite, none as presumed and 11 (6.5%) as possible. The vast majority of the cases (93.5%; n=157/168) were laboratory confirmed. Most cases were confirmed by PCR alone (53.5%, 84/157). Confirmation of the remaining 73 cases was by culture only (n=11), by PCR and/or culture (n=66). None were confirmed by serology or microscopy exclusively.

In 2008, male cases (n=100) exceeded female cases (n=68), resulting in a male to female ratio of 1.22:1.0. Cases ranged in age from two weeks to 91 years (median age of two years). The incidence of IMD was highest in infants and young children. Age specific incidence rate (ASIR) was highest among infants <1 year of age (68.8/100,000), followed by children in the 1-4 year age group (24/100,000), and the 15-19 year age group (5.9/100,000) (table 1).

In 2008 the overall incidence of IMD in Ireland was highest in the HSE-NE area (6.1/100,000) followed by the HSE-SE area (5.9/100,000) (table 2).

Neisseria meningitidis serogroup B was the pathogen most commonly associated with IMD in 2008 and accounted for 149 (89%) of the 168 notifications (figure 1). Since 2003 serogroup B has accounted for 80% or more of annual IMD notifications (figure 1).

IMD due to serogroup C has remained at very low levels over the last six years with no more than five

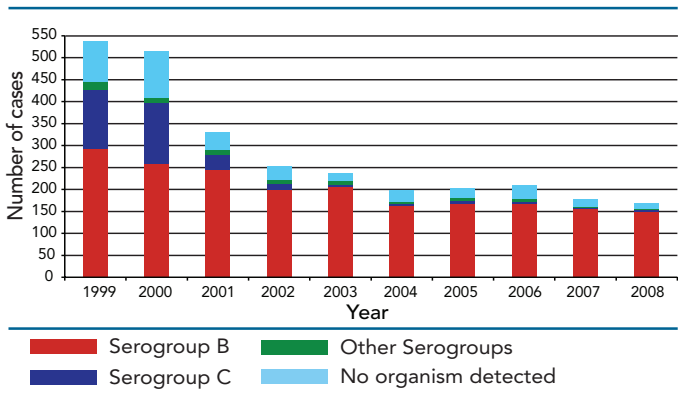

Figure 1. Number of invasive meningococcal disease (IMD) notifications in Ireland by serogroup, 1999-2008

cases occurring annually. In 2008, four (0.09/100,000) serogroup C cases arose (figure 1). All four cases occurred in adults (age range 17-46 years), one of whom was vaccinated and another who died. One MenC vaccine failure also occurred in 2007, 2006 and again in 2005, while no failures arising in either 2004 or 2003.

These recent low incidence rates highlight the huge impact the introduction of the MenC conjugate vaccine in October 2000 has had in almost eliminating IMD due to serogroup C (figure 1). Prior to the introduction of this vaccine, the serogroup C incidence rate in 1999 was 3.7 per 100,000 total population.

There were eight IMD related notified deaths in 2008 (case fatality ratio of 4.8%) compared to an average of six deaths between 2005 and 2007. The case fatality ratio (CFR) was highest amongst cases 25+ years of age (17.6%) as a result of three deaths from 17 cases (table 1). The next highest CFR occurred in children aged 5-9 years (8.3%) and adults aged 20-24 years or more (7.7%) (table 1).

Six of the eight deaths in 2008 were due to serogroup B disease (age range 15 months to 64 years) and one death each was caused by serogroup C (in an unvaccinated adult aged >25 years) and by serogroup W135 (in a child aged between 5-9 years).
In marked contrast to the 11 deaths reported in 2000 due to serogroup C disease (out of a total of 139 cases), only one such death (an adult aged > 25 years) was reported in 2008 (out of a total of four cases). This was the first death from this disease since 2004. One death from serogroup C disease occurred in 2003 and in 2004, both in adults over 55 year of age. In 2001 three deaths from serogroup C disease were reported, one in a child <15 years of age and two in adults aged between 20 and 64 years. Since 2001, the decline in the annual number of serogroup C deaths has been quite significant, especially in those aged under 25 years of age with no deaths being reported during this period of time. (table 3).

Despite a reduction in the overall incidence in recent years, IMD continues to be treated as a serious public health concern due to its associated severity, high mortality rate and serious adverse sequelae.

Table 1. Number of cases, deaths, age-group specific incidence rates and case fatality ratios of IMD in Ireland, 2008

Age Group	No. Cases	ASIR	No. Deaths	CFR (%)
<1	42	68.8	0	0%
1-4	58	24.0	3	5.2%
5-9	12	4.2	1	8.3%
10-14	9	3.3	0	0%
15-19	17	5.9	0	0%
20-24	13	3.8	1	7.7%
25+	17	0.6	3	17.6%
All ages	168	4.0	8	4.8%

ASIR, age specific incidence rate per 100,000 population
CFR, case fatality ratio

Effective vaccination is necessary for the complete prevention and control of IMD. Although effective vaccines are available against serogroups A, C, W135 and Y forms of the disease, a suitable vaccine against serogroup B disease, the most common form of IMD in Ireland, is not yet available. Until such time that an effective MenB vaccine, suitable for use in infants, is on the market, IMD will remain a significant cause of morbidity and mortality in children and young adults in Ireland.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 16th July 2009.

These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

Table 2. Number of cases and age specific incidence rates per 100,000 population of IMD by HSE area, 2008

HSE area	<1	1-4	5-9	10-14	15-19	20-24	25+	Total
E	23.4	12.1	2.1	3.4	6.1	4.3	0.9	2.7
M	132.1	31.7	0.0	0.0	11.4	5.5	0.0	5.2
MW	19.6	44.8	0.0	4.2	3.9	0.0	0.0	3.3
NE	110.1	27.6	6.7	11.1	3.7	7.1	0.8	6.1
NW	59.4	21.9	0.0	0.0	5.8	0.0	0.7	3.0
SE	133.5	33.3	12.2	0.0	6.2	3.1	0.7	5.9
S	104.9	35.4	9.6	2.5	7.1	2.1	0.7	5.3
W	69.5	13.2	0.0	3.7	3.4	6.2	0.0	2.7
Ireland	**68.8**	**24.0**	**4.2**	**3.3**	**5.9**	**3.8**	**0.6**	**4.0**

Table 3. Number of cases, deaths and case fatality ratios by year of meningococcal serogroups B and C disease in Ireland, 1999-2008

	Meningococcal B			Meningococcal C		
Year	No. Cases	No. Deaths	CFR%	No. Cases	No. Deaths	CFR%
1999	292	12	4.1%	135	5	3.7%
2000	258	13	5.0%	139	11	7.9%
2001	245	8	3.3%	35	3	8.6%
2002	199	8	4.0%	14	0	0%
2003	206	11	5.3%	5	1	20%
2004	163	7	4.3%	5	1	20%
2005	169	5	3.0%	5	0	0%
2006	168	5	3.0%	4	0	0%
2007	157	6	3.8%	2	0	0%
2008	149	6	4.0%	4	1	25%

1.4 Mumps

Summary

Number of cases, 2008: 1,385
Number of cases, 2007: 142
Crude incidence rate, 2008: 32.7/100,000

Mumps notifications had declined in 2007 (n=142) following a national mumps outbreak that began at the end of 2004, however, mumps notifications increased again in 2008 with 1,385 cases (32.7/100,000) notified (figure 1). In contrast, in the six years prior to 2004 there were on average 43 mumps cases notified each year (figure 1). Sixty percent of cases in 2008 were notified between late September and the end of December.

In 2008, of the 1,385 mumps cases notified 51% (n=705) were classified as confirmed, 17% (n=231) were classified as probable and 32% (n=446) were classified as possible (three cases had no case classification specified).

In 2008, cases ranged in age from two months to 73 years; with a mean age of 22 years and a median age of 20 years (age was unknown for 17 cases). The largest number of cases and the highest age specific incidence rates were in those aged 15-19 years and 20-24 years (figures 2 and 3). Of the 1,385 mumps cases, 57% (n=785) were male and 43% (n=596) were female (gender was unreported for four cases).

Of the 865 mumps cases where vaccination data were reported 27% (n=234/865) were unvaccinated, 34% (n=296/865) had one dose of the measles-mumps-rubella vaccine (MMR) and 39% (n=335/865) were reported to have received two doses of MMR. The vaccination date was reported for 61% (n=182/296) of cases reported to have received one dose of MMR. Both vaccination dates were reported for 35% (n=116/335) of cases vaccinated with two doses of MMR. One third (n=111/335) of the cases reported to have received two doses of MMR were laboratory confirmed.

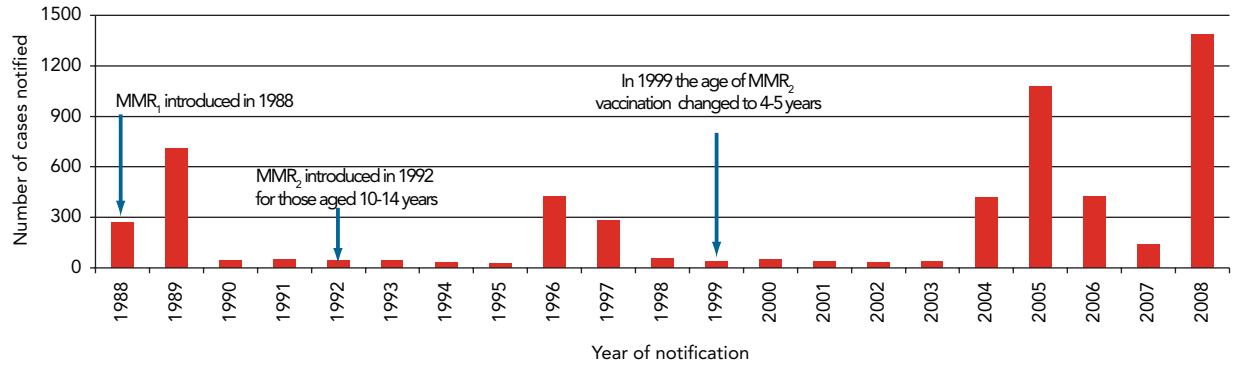

Figure 1. Number of mumps notifications by year and year of introduction of the measles-mumps-rubella (MMR) vaccine in Ireland
MMR_1- first dose of MMR
MMR_2- second dose of MMR
1988-June 2000 data collated by DoHC
July 2000-2008 data collated by HPSC

Of the 895 cases where hospitalisation data were reported seven percent (n=65/895) were hospitalised. The number of days hospitalised was reported for 62% of these (n=40/65) hospitalised cases. The number of days the cases were hospitalised ranged from one to 18 with a median of four days and a mean of five days.

Reported complications of mumps included orchitis (14%, n=74/523), deafness (1%, n=9/892), pancreatitis (0.9%, n=8/886), meningitis (0.8%, n=7/905), mastitis (0.6%, n=5/893) and encephalitis (0.3%, n=3/903).

University/college was reported as the setting in which the case had most likely acquired mumps for 54% of cases where this information was provided (n=338/629) and primary or secondary school was reported for 12% (n=74/629) of cases.

Fifty-seven outbreaks of mumps were notified during 2008 with 580 associated cases of illness. The majority of these cases were associated with outbreaks in educational settings. The outbreak locations included 18 universities/colleges (with 388 ill), 17 private houses (with 49 ill), seven schools (with 37 ill), six community outbreaks (with 33 ill), two summer schools (with 14 ill), one crèche (with three ill), one third level college/ community (with 41 ill), one training centre (with three ill), one workplace (with three ill), an outbreak associated with a business/commercial centre (with three ill), an outbreak associated with social contacts (with two ill) and an outbreak associated with a sports team (with four ill). As some of these outbreaks continued into 2009 the final number of cases associated with these outbreaks may change.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 14th August 2009. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

EU data are available at www.euvac.net.

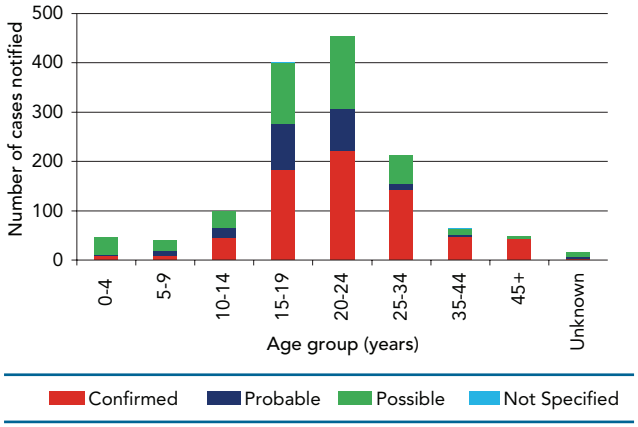

Figure 2. Number of notified mumps cases in 2008 by age group and case classification.

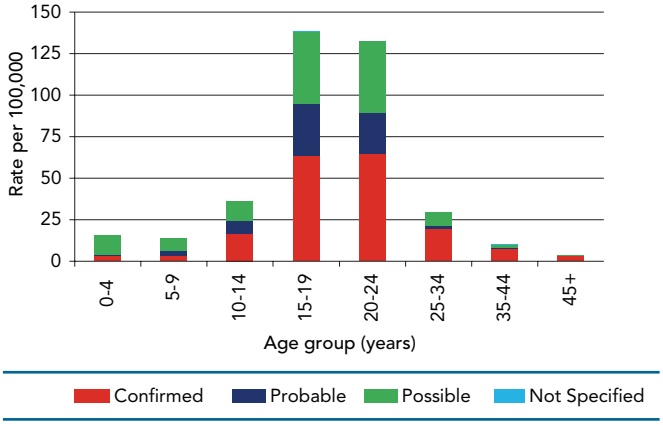

Figure 3. The age specific incidence rates (per 100,000) of notified mumps cases in 2008 (age is unknown for 17 cases).

1.5 Other forms of Bacterial Meningitis

Summary

Bacterial meningitis, Not Otherwise Specified
Number of cases, 2008: 40
Number of cases, 2007: 33
Number of cases, 2006: 46
Crude incidence rate, 2008: 0.94/100,000

Apart from *Neisseria meningitidis*, which is considered the most common cause of bacterial meningitis in Ireland, other forms of the disease do occur, including those caused by non-notifiable organisms, details of which are presented below. For information on invasive meningococcal disease (*Neisseria meningitidis*), see a separate chapter within this report. The figures presented in this chapter are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 6th and 7th July 2009.

Haemophilus influenzae
In 2008, three cases of meningitis due to *H. influenzae* were notified, all of whom were under one year of age. Two of the cases were attributable to a type f infection and the third was caused by a type b disease. The latter patient had been incompletely vaccinated. No deaths were reported. See a separate chapter on invasive *H. influenzae* disease for further details.

***Leptospira* species**
One case of leptospirosis meningitis was notified in 2008 in an adolescent male following a leisure-related river water contact. The causative organism was identified as a *Leptospira interrogans* serovar *icterohaemorrhagiae*. See a separate chapter on non-IID zoonotic diseases for further details.

Listeria species
Two cases of listeriosis meningitis were notified in males in 2008, one of whom was over 65 years of age. No deaths were reported. See a separate chapter on listeriosis disease for further details.

Streptococcus pneumoniae
In 2008, 32 cases of pneumococcal meningitis were notified, compared to 35 in 2007 and 24 in 2006. Cases in 2008 ranged in age from one week to 85 years. There were five pneumococcal meningitis related reported deaths, all but one were adults. See a separate chapter on invasive pneumococcal disease for further details.

***Streptococcus pyogenes* (Streptococcus group A infection (invasive) (iGAS))**
There were two reported cases of iGAS causing meningitis in 2008, both of whom recovered. In contrast, there were no cases in 2007, but there was one each in 2006 and 2005. See a separate chapter on iGAS infection for further details.

Mycobacterium species
In 2008, five tuberculosis meningitis cases were notified (provisional). Cases ranged in age from 10-73 years. One tuberculosis meningitis death was also reported. See a separate chapter on tuberculosis for further details.

Bacterial meningitis (not otherwise specified)
In total 40 cases of meningitis under this disease category were notified in 2008, among which two patients died. The causative pathogens were identified in 23 of these. No causative pathogen was identified for 17 of the 40 (42.5%) notifications in 2008, a decrease compared to 2007 (66.7%; n=22/33) and 2006 (78.2%; n=36/46).

Among the bacterial meningitis (not otherwise specified) cases notified in 2008 were 11 cases of *Escherichia coli* meningitis, all but one was one month old or less, with no deaths reported. Six cases of Group B streptococci meningitis were also notified in 2008 with all but one being under five months of age and with no deaths reported. In addition, three cases of meningitis caused by *Staphylococcus aureus* were reported in 2008, one of which died. Other meningitis notifications include one each caused by the following pathogens: *Citrobacter koseri* in a one month infant, *Enterococcus* species in an adult and *Serratia liquefaciens* in a 3-month old infant, all of whom recovered.

Table 1. Annual notifications of bacterial meningitis other than meningococcal disease, 2006-2008

Notified under	Causative organism	2006	2007	2008	2006-2008
Haemophilus influenzae disease (invasive)	*Haemophilus influenzae*	4	2	3	9
Leptospirosis	*Leptospira* species	1	1	1	3
Listerosis	*Listeria* species	1	1	2	4
Streptococcus pneumoniae infection (invasive)	*Streptococcus pneumoniae*	24	35	32	91
Streptococcus Group A infection (invasive)	Streptococcus Group A *(S. pyogenes)*	1	0	2	3
Tuberculosis*	*Mycobacterium* species	7	7	5	19
	Citrobacter koseri	0	0	1	1
	Coagulase Negative Staphylococci	1	0	0	1
	Escherichia coli	3	0	11	14
	Enterococcus species	0	0	1	1
Bacterial meningitis, NOS	*Gemella* species	0	1	0	1
(not otherwise specified)	*Klebsiella pneumoniae*	1	0	0	1
	Proteus mirabilis	0	1	0	1
	Serratia liquefaciens	0	0	1	1
	Staphylococcus aureus	1	0	3	4
	Streptococcus Group B (*S. agalactiae*)	4	9	6	19
	Unknown	36	22	17	75
	Total Bacterial Meningitis, NOS	46	33	40	119
Total**		**84**	**79**	**85**	**248**

Notes
* Tuberculosis meningitis figures for 2007 and 2008 are provisional

1.6 Pertussis

Summary

Number of cases, 2008: 104
Number of cases, 2007: 77
Crude incidence rate, 2008: 2.5/100,000

One hundred and four cases (2.5/100,000) of pertussis were notified in 2008 compared to 77 cases in 2007. Of the 104 cases in 2008 71 (68%) were classified as confirmed, two (2%) as probable and 31 (30%) as possible.

In 2008, the majority of cases (n=54, 52%) and the highest age-specific incidence rate (88.4/100,000) were in children aged less than one year with 48 percent (n=50) of all cases aged less than six months (figures 1 and 2). Sixty-five cases (63%) were female, 36 were male (35%) while gender was not reported for three cases (3%).

In Ireland it is recommended that children be vaccinated with an acellular pertussis-containing vaccine at two, four and six months of age and a booster dose at four to five years of age. Since 2008 a booster with low dose acellular pertussis vaccine is recommended at 11-14 years of age.

The vaccine provides protection in over 80% of children who are fully vaccinated. However, protection declines over time, with little or no protection 10-12 years after primary immunisation, if no booster doses are administered.

In 2008, the vaccination status was reported for 60 (58%) pertussis cases. Thirty-three (n=33/60, 55%) cases were unvaccinated; these cases ranged in age from one month to 16 years with two thirds (n=22) aged less than six months. Nine unvaccinated cases (n=9/33, 27%) were less than two months of age and were therefore not eligible for pertussis vaccine in the Irish schedule. Eighteen (n=18/60, 30%) cases were reported as incompletely vaccinated, but this included nine cases (n=9/18, 50%) who were less than six months of age and were therefore not eligible for three doses of pertussis vaccine in the Irish schedule. Nine (n=9/60, 15%) cases were reported as completely vaccinated, with one of the nine cases reported/known to have received a booster dose. The case vaccinated with the booster dose was aged 13 years.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 11th August 2009. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

EU data are available at www.euvac.net.

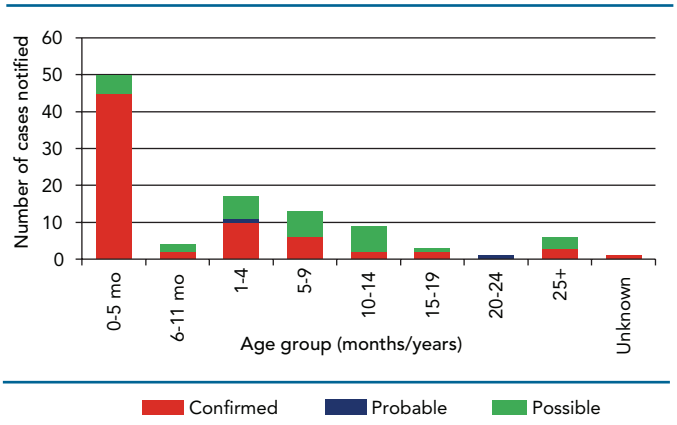

Figure 1. Number of notified pertussis cases in 2008 by age group and case classification. "Mo" in graph indicates months i.e. 0-5 months and 6-11 months, the remaining age groups are in years.

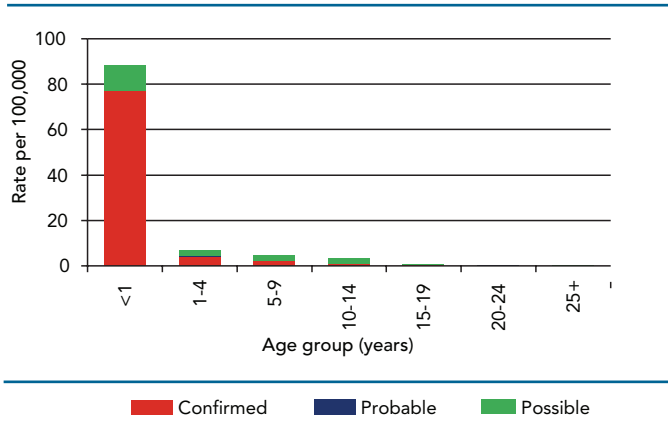

Figure 2. The age specific incidence rates (per 100,000) of notified pertussis cases in 2008 by case classification.

1.7 Rubella

Summary

Number of cases, 2008: 40
Number of confirmed cases, 2008: 2
Crude incidence rate, 2008:1.0/100,000
Crude confirmed incidence rate, 2008: 0.05/100,000

In 2008, 40 cases (1.0/100,000) of rubella were notified in Ireland compared to 19 cases in 2007.

Two of the cases in 2008 were classified as confirmed giving a crude confirmed incidence rate of 0.05 per 100,000 total population. Both confirmed cases were in the age group 25-34 years (figure 1). Thirty seven cases in 2008 were classified as possible; over two thirds of these were less than three years of age (figure 1). One case, in the age group 1-2 years, was classified as probable (figure 1). The age specific incidence rates by case classification are shown in figure 2.

Of the 40 rubella cases 26 (65%) were male and 14 (35%) were female. Of the two confirmed cases one was male and one was female.

Rubella vaccine in Ireland is available as part of the combined measles-mumps-rubella (MMR) vaccine.

In Ireland, vaccination with the first dose of MMR is routinely recommended at twelve months of age and the second dose at four to five years of age.

Vaccination status was reported for 31 (78%) of the rubella cases in 2008. Fourteen cases (n=14/31, 45%) were unvaccinated and three cases (n=3/31, 10%) were reported as incompletely vaccinated. Fourteen cases (n=14/31, 45%) were reported as completely vaccinated for their age, only three (n=3/14, 21%) of these were reported to have two doses of MMR. All 31 cases where vaccination status was reported were classified as possible cases.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 30th July 2009. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

WHO European data are available at http://data.euro.who.int/CISID/.

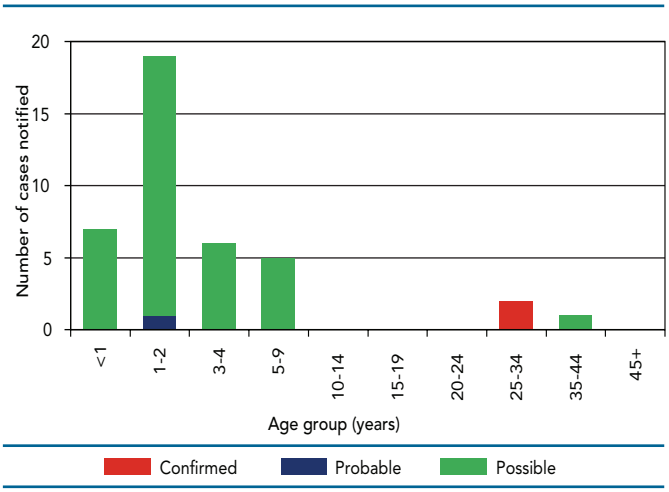

Figure 1. Number of notified rubella cases in 2008 by age group and case classification.

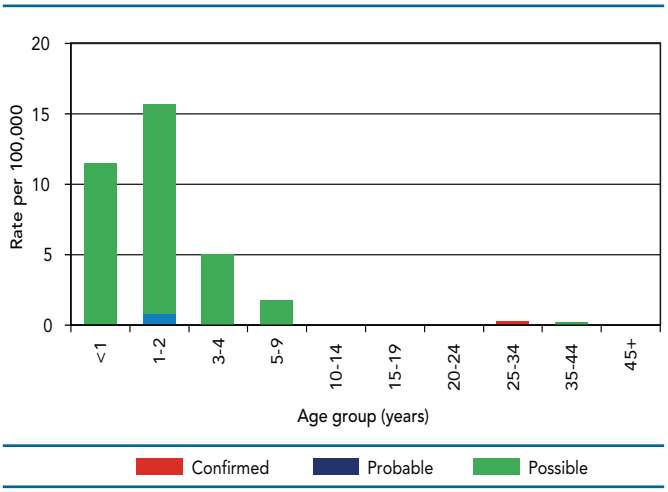

Figure 2. The age specific incidence rates (per 100,000 population) of notified rubella cases in 2008 by case classification.

1.8 *Streptococcus pneumoniae* (invasive)

Summary

Number of cases in 2008: 465
Number of cases in 2007: 361
Number of deaths in 2008 17
Number of deaths in 2007: 18
Crude incidence rate, 2008: 11/100,000

Invasive infections due to *Streptococcus pneumoniae* are notifiable in Ireland since January 2004 and data on these notifications are collated in the Computerised Infectious Disease Reporting (CIDR) system. For the purposes of this report the term invasive pneumococcal disease (IPD) will be used to describe these infections.

In 2008, 465 cases of IPD (11/100,000) were notified in Ireland, increasing from 361 cases (8.5/100,000) in 2007 (figure 1), representing a 29% increase. There has been a steady increase in IPD notifications each year since 2004. However, this increase is considered to be a reflection of improved reporting of IPD cases by laboratories in particular, through the infectious disease notification system, with the result that the notification figures now more closely reflect the IPD figures as reported through the European Antimicrobial Resistance Surveillance System (EARSS) (figure 1).

In 2008, 405 (87.1%) IPD cases notified were classified as confirmed, 59 (12.7%) as probable and 1 as possible (0.2%). Of the 161 (34.6%) cases that has a clinical diagnosis reported, 49.1% (n=79) had a clinical diagnosis of meningitis and/or septicaemia, 48.4% (n=78) had pneumonia and other diagnoses accounted for the remainder (2.5%); muscoskeletal infection (n=2), abscess (n=1) and soft tissue (n=1).

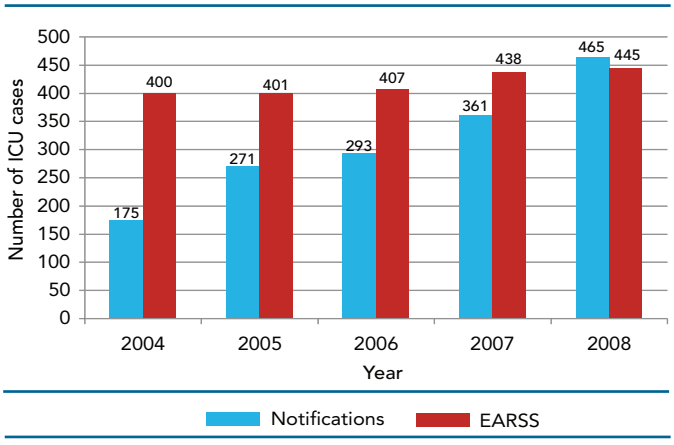

Figure 1. Annual number of invasive pneumococcal disease cases reported through the infectious disease surveillance system and the EARSS, 2004-2008

More cases occurred in males (57%; n=265) than in females (43%; n=200). Cases ranged in age from 1 week to 93 years with a median age of 59 years. The elderly i.e. those aged 65 years and older accounted for the greatest proportion of case (42%, n=195), followed by children <5 years of age (15.7%, n=73) (figure 2).

Similar to 2007, in 2008 the incidence of IPD was high in the very young and very old and was relatively low in the age groups in between (figure 2). In children, the incidence was highest in infants <1 year of age (50.8/100,000), followed by the 1 year old children (34.7/100,000). In the age groups thereafter the incidence declined and did not exceed 14 cases per 100,000 in those aged 2-64 years.
In the elderly the incidence increased considerably, almost doubling between each of these age groups, from 28.9 cases per 100,000 in the 65-74 year olds, to 48.3 cases per 100,000 in the 75-84 year olds to the highest incidence rate of all of 89.5 cases per 100, 000 in those aged 85 years and older (figure 2).

Outcome was reported for only 25% (n=115) of the notifications in 2008 and therefore the figures presented in this section will underestimate the mortality due to IPD in Ireland. Based on the data available, 17 deaths associated with IPD infection were reported in 2008. Three deaths occurred in children (all < 5 years of age) and the remainder (n=14) were in adults, age range 28-90 years. The clinical presentation for 16 of the 17 deaths was reported; 13 had meningitis and/or septicaemia and three had pneumonia.

The IPD notification figures presented in this report are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 11th

September 2009. These figures may differ slightly from those previously published due to ongoing updating of notification data on CIDR. EARSS data were obtained from the Whonet database at HPSC.

A collaborative pilot-project was established in April 2007 between RCSI Beaumont Hospital, The Children's University Hospital, Temple Street and HPSC to offer a typing service to Irish Microbiology laboratories for all isolates of *Streptococcus pneumoniae* submitted. Amongst the isolates typed to date, this includes 379 isolates (excluding duplicates etc.) with a specimen date in 2008. Based on the results from these 379 isolates, 32 different serotypes were identified. The most common serotypes in circulation were 14, 4, 9V, 7F, 8, 23F and 6B accounting for over half (52.5%) of the isolates typed (figure 3). The seven serotypes contained in PCV7 occurred in the 12 top most prevalent serotypes associated with IPD in Ireland in 2008. Sixty nine percent of isolates from children aged <2 years had serotypes covered by PCV7.

One objective of this project was to establish the serotype distribution of IPD isolates in circulation in Ireland prior to the introduction of the pneumococcal conjugate 7-valent vaccine (PCV7, Prevenar) to the childhood immunisation schedule, which took place in September 2008. This objective has been achieved. The current focus of the project is to continue offering a typing service in order to effectively monitor the impact of introducing PCV7, to investigate vaccine failures and to inform future public health policy regarding immunisation schedules and the value of introducing expanded valency vaccines following their licensing. The pilot typing project continues throughout 2009. However, permanent funding of this project is critical to ensure the above very important health protection objectives can be delivered on.

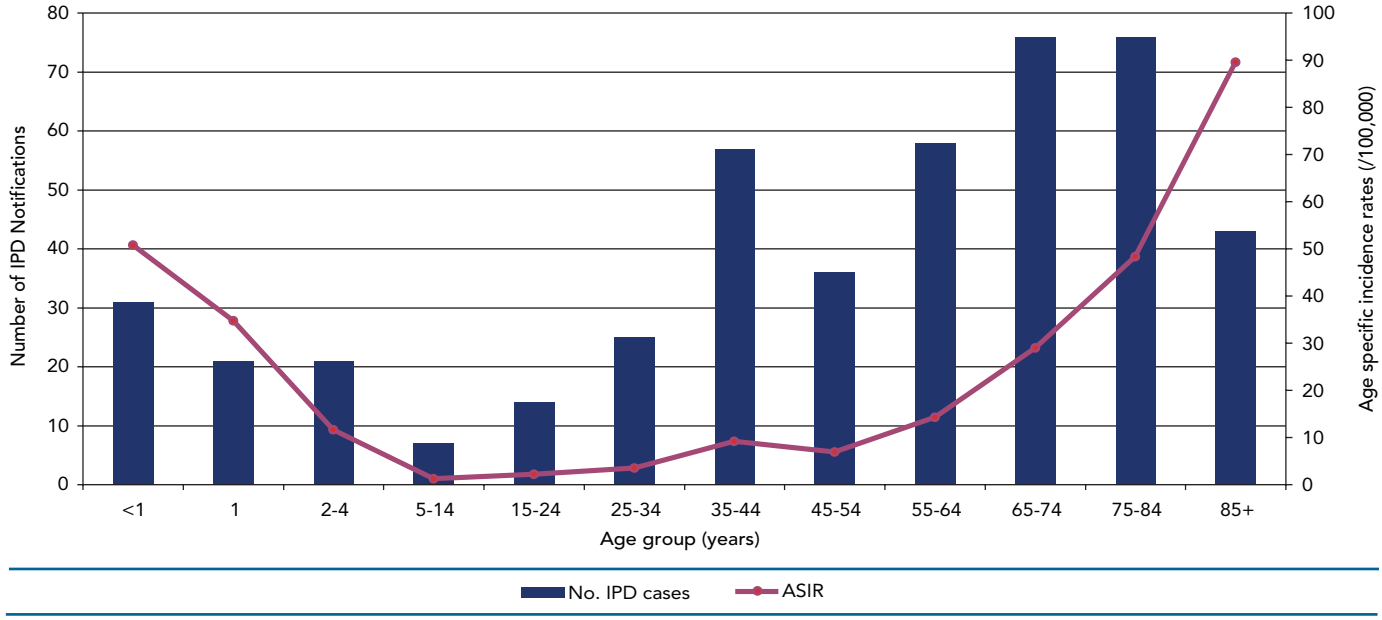

Figure 2. Number and age specific incidence rates (ASIR) of invasive pneumococcal disease notifications by age group, 2008

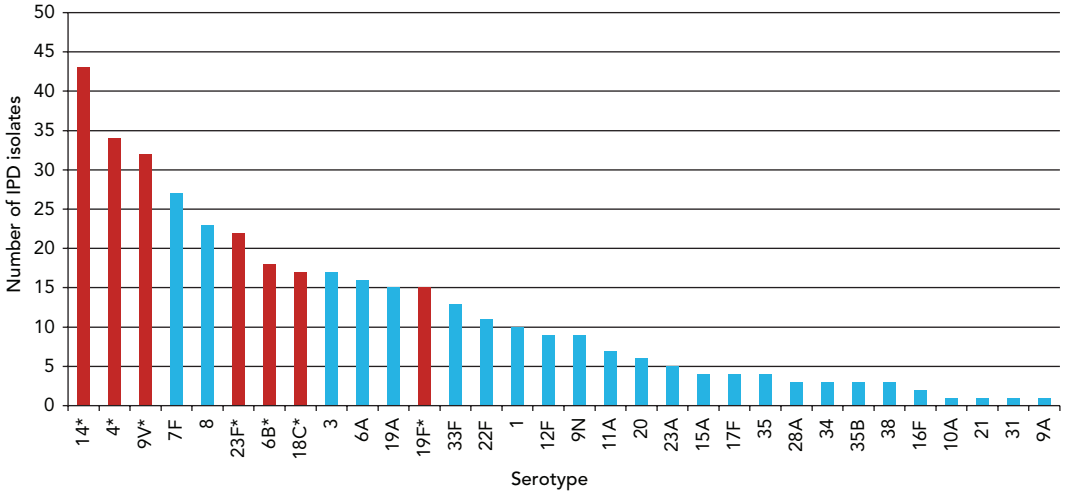

Figure 3. Serotype distribution of invasive Streptococcus pneumoniae isolates in Ireland, 2008 (n=379)

**Bars highlighted in red indicate serotype is covered by PCV7 vaccine*

1.9 Tetanus

Summary

Number of cases, 2008: 2
Number of cases, 2007: 1

Two cases of tetanus were notified in 2008. The cases were in the age groups 20-24 years and 65+ years and both were male. Risk factors for infection were reported for both cases; one case had wound injuries from a road traffic accident and one had a wound injury from a fall outdoors. The immunisation status of the case aged ≥65 years was unknown while the case aged 20-24 years had no history of tetanus immunisation. Both cases were given a tetanus vaccine at the time of injury; only one of the cases was given tetanus immunoglobulin G (TIG) at the time of injury.

Summary of data since 1981:
Twelve cases of tetanus were reported since tetanus became notifiable in November 1981. The cases ranged in age from 15 to 84 years with a mean age of 53 years and a median age of 61 years (age was unknown for two cases). The number of tetanus cases notified by age group is shown in figure 1. Two deaths were reported in cases aged >60 years.

Of the 12 tetanus cases seven (58%) were male, three (25%) were female while gender was unreported for two (17%).

The following wound injuries (n=8) were reported among the 12 notified cases: wound injuries from a road traffic accident (n=1), wound from a fall outdoors (n=1), wound associated with a dog bite (n=1), wound from a kitchen knife (n=1), gardening associated leg wound (n=1), leg scratches in an avid gardener (n=1), hand wound associated with a clean piece of wood (n=1) and a farming associated hand wound (n=1).

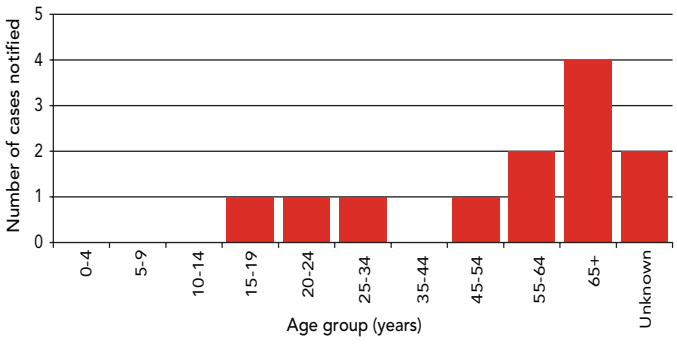

Figure 1. Tetanus cases notified (n=12) from 1982 to 2008 by age group

Vaccination data were reported for five of the 12 cases, three of whom were either unvaccinated or vaccination status at the time of injury was unknown. All three cases received a tetanus vaccine at the time of injury. One case, in the age group 15-19 years, was reported to have received three doses of tetanus vaccine as a child and a booster at four years and again at five-six years of age. One case was reported to have received a single tetanus vaccine around 40 years prior to infection and at the time of injury.

Tetanus vaccine provides protection in 90-95% of children who are fully vaccinated. However, as protection declines over time up to 50% of 20-year-olds and up to 70% of 70-year-olds may be unprotected if they have not received boosters. The childhood immunisation schedule in Ireland recommends children receive a dose of tetanus toxid-containing vaccine at two, four and six months of age and booster doses at four-five years and 11-14 years of age.

Persons aged 10 years or over (who are unimmunised or partly immunised) are recommended three doses of tetanus toxoid with intervals of at least one month between doses. A booster dose of tetanus toxoid should be given five years after the primary course and again 10 years later. For more detailed information on tetanus immunisations please see the document Immunisation Guidelines for Ireland available at www.immunisation.ie.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 18th August 2009. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

02

Respiratory and Direct Contact Diseases

2.1 Influenza

Summary

2008/2009 Influenza Season
Peak influenza-like illness rate: 120.6/100,000
% of influenza positive sentinel specimens: 56.9
Dominant circulating (sub)type: A (H3)
European data available at: www.euroflu.org

HPSC is working in collaboration with the NVRL, the ICGP and the Departments of Public Health on the influenza sentinel surveillance project. Fifty-four general practices (located in all HSE-Areas) were recruited to report electronically, on a weekly basis, the number of patients who consulted with influenza-like illness (ILI). Sentinel GPs were requested to send a combined nasal and throat swab on at least one ILI patient per week to the NVRL. Other indicators of influenza activity include a network of sentinel hospitals reporting admission levels, sentinel schools reporting absenteeism and enhanced surveillance of hospitalised influenza cases in 0-14 year olds.

Influenza activity in Ireland was high during the 2008/2009-influenza season, peaking during week 2 2009 at 120.6 per 100,000 population (figure 1). During the peak of activity, the majority of ILI cases reported were in the 15-64 year age group. A baseline threshold of 17.8 ILI GP consultations per 100,000 population was also used for the first time in Ireland during the 2008/2009 season.

The NVRL tested 353 sentinel specimens for influenza virus during the 2008/2009 season. Two hundred and one (56.9%) sentinel specimens were positive for influenza: 147 influenza A (129 A H3 and 18 A H1N1) and 54 influenza B.

Influenza A (H3) was the predominant subtype detected during 2008/2009. Influenza A (H3), accounted for 87.8% of subtyped positive sentinel specimens. The majority of positive influenza sentinel cases were in the 15-64 year age group (84.3%).

The NVRL tested 2,756 non-sentinel respiratory specimens during the 2008/2009 season, 73 (2.6%) of which were positive: 59 influenza A and 14 influenza B.

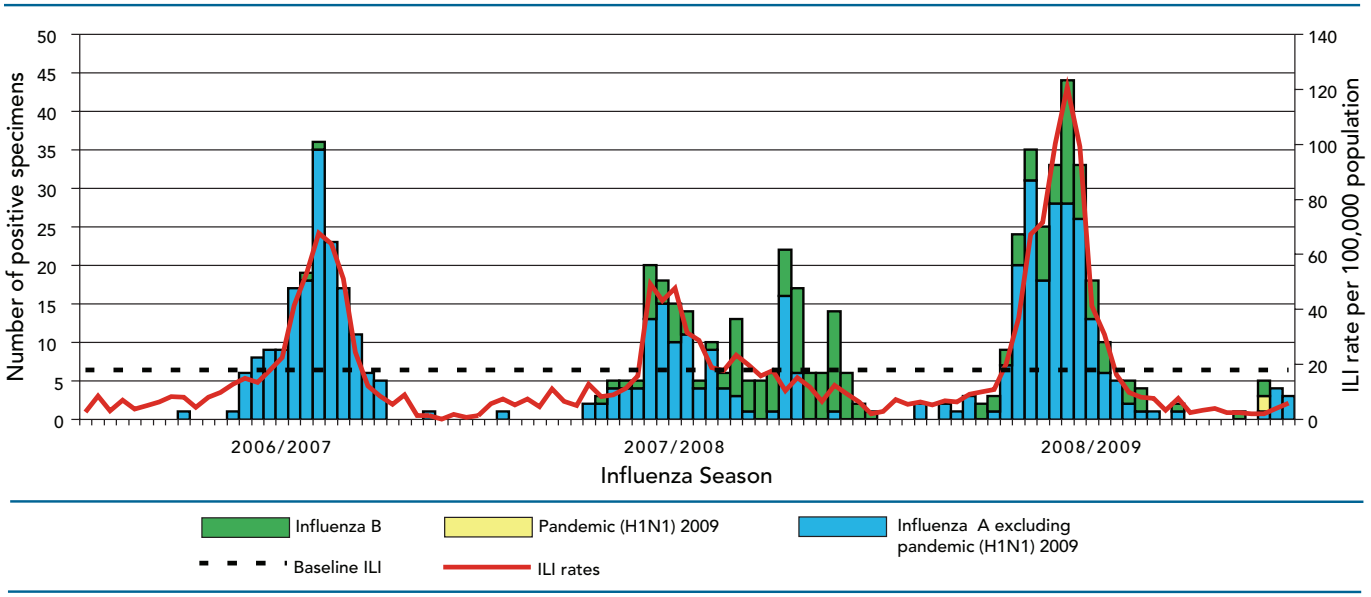

Figure 1: GP ILI consultation rate per 100,000 population and the number of positive influenza specimens detected by the NVRL by week and season, 2006/2007 to 2008/2009

The NVRL completed genetic characterisation for two influenza A(H3) and five influenza B viruses during 2008/2009. Both A(H3) viruses were characterised as A/Brisbane/10/2007-like virus. All five influenza B viruses were characterised as B/Malaysia/2506/2004-like (B/Victoria/2/87 lineage).

The NVRL conducted nucleotide sequencing on 10 influenza A(H1) specimens taken by sentinel GPs in Ireland during 2008/2009, nine (90%) of which were resistant to oseltamivir and one was sensitive.

Of the 201 positive influenza virus detections from sentinel specimens, 171 (85.1%) were unvaccinated, 10 (5.0%) were vaccinated and vaccination status was unknown in 20 (10.0%) cases. Of the 10 vaccinated cases, influenza A (H1) was detected in one case, influenza A(H3) in 7 cases and influenza B in two cases.

Overall, influenza activity was most intense in HSE-E, -NE and -SE during the 2008/2009 season. Seven influenza/ILI outbreaks were reported to HPSC during the 2008/2009 season. Influenza A was detected in four outbreaks, influenza B in one and the remaining two outbreaks were suspected influenza/ILI.

Hospital respiratory admissions (as a proportion of total hospital admissions) in sentinel hospitals peaked during week 52 2008 (figure 2), two weeks prior to the peak in sentinel GP ILI consultation rates. Absenteeism in several sentinel schools was also at elevated levels during peaks in ILI consultation rates.

A total of 434 influenza notifications were reported on CIDR during the 2008/2009 influenza season. Of the 434 notifications, 116 were patients aged between 0 to 14 years, 37 of whom were hospitalised. Enhanced data were completed for all 37 cases. Twenty-four enhanced cases were positive for influenza A, 10 were positive for influenza B and influenza type was not reported for three cases. Symptoms included fever (30/37), cough (30/37), gastrointestinal manifestations (14/37) and sore throat (12/37). Complications included bronchitis, croup, primary viral pneumonia, secondary bacterial pneumonia, bone marrow dysfunction and other respiratory complications. The mean number of days hospitalised was 3 (ranging from 0-10). Three cases were in an at-risk category for influenza vaccine. No cases were vaccinated. Twenty-seven cases recovered, one died, outcome was unknown for five and outcome was not reported in four cases.

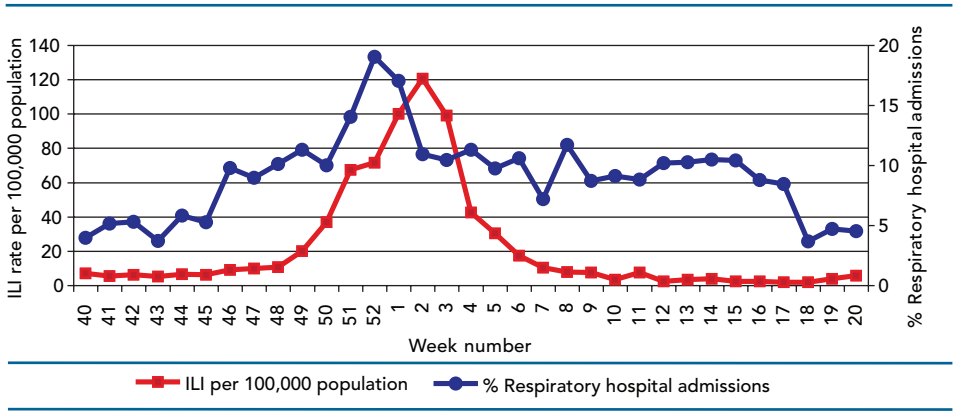

Figure 2: Respiratory admissions as a percentage of total hospital admissions in ten sentinel hospitals and GP ILI consultation rate per 100,000 population by week for the 2008/2009 influenza season

Four influenza associated deaths were registered with the General Register Office (GRO) during the 2008/2009-influenza season. Influenza was the secondary cause of death and not the primary cause in all four cases. One death was in the 15-64 year age group and three deaths were in those aged 65 years and older.

On 25th April 2009, a public health emergency of international concern was declared by the World Health Organization (WHO) due to an outbreak of pandemic (H1N1) infection in Mexico and the USA. WHO has described this virus as a new strain of influenza A(H1N1) not previously detected in humans and containing a mix of swine, human and avian influenza virus genes. On 11th June 2009, WHO raised the pandemic alert level from phase five to phase six, declaring the outbreak a pandemic.

For the forthcoming season, existing surveillance systems have been strengthened and a number of additional measures have been put in place in Ireland to improve surveillance of ILI/influenza and pandemic influenza (H1N1) 2009. The number of sentinel general practices has been increased to 62. In addition, virological surveillance in sentinel practices has been expanded so that each practitioner takes at least 5 swabs per week from ILI patients. The NVRL will continue monitoring oseltamivir resistance. Non sentinel influenza virology data will also be included from Cork University Hospital and University College Hospital in Galway. Surveillance of hospitalised cases and outbreaks of pandemic (H1N1) 2009 will continue and intensive care unit (ICU) surveillance of pandemic (H1N1) is currently being implemented. Mortality surveillance monitoring excess all cause deaths and pneumonia and influenza deaths has also been augmented and is now undertaken in a more timely manner. Data from these surveillance systems will assist in guiding the management and control of the pandemic

Further information on influenza is available at www.hpsc.ie

2.2 Legionellosis

Summary

Number of cases in 2008: 11
Crude incidence rate: 2.6/1,000,000
Number of deaths in 2008: 1

In 2008, 11 cases of legionnaires' disease were notified in Ireland, a rate of 2.6/million population. This was a slight drop in the rate recorded in the previous two years but the numbers are small (Table 1). One death was recorded in 2008. Five cases were notified from HSE East, two each from HSE Midlands and HSE South, and one each from HSE North East and HSE West.

The majority of cases (54.5%) were male. The median age was 62 years, with a range from 47 to 82 years.

There were ten confirmed cases and one probable case. The organism involved was *Legionella pneumophila* serogroup 1 in nine cases while the *Legionella* species was unknown in two cases. Urinary antigen testing was the method of diagnosis in eight cases and serology in three cases.

Of the 11 cases, three were travel-associated, one was nosocomial and seven were community-associated. Countries of travel included Spain (1), Turkey (1), and Bulgaria (1). A case of legionnaires' disease is defined as travel-associated if the patient spent one or more nights away from home in accommodation used for commercial purposes (hotels, holiday apartments) in the 10 days before onset of illness. Travel-associated cases may involve travel within Ireland or abroad.

Pontiac fever

In 2008, there was one laboratory-confirmed case of pontiac fever. There were 36 suspect pontiac fever cases associated with a workplace outbreak of legionellosis.

Outbreak

In 2008, there was an outbreak of legionnellosis involving two cases of legionnaires' disease and 36 suspect cases of pontiac fever. Pontiac fever is a self-limiting flu-like illness. The incubation period is 24-48 hours and patients recover spontaneously.

All the suspect pontiac fever cases were diagnosed on clinical grounds and were also epidemiologically linked to the two confirmed cases of legionnaires' disease. None had positive serology. The majority of cases (63.9%) were female. The median age was 35.5 years, with a range from 20 to 58 years.

Table 1. Number of legionnaires' disease cases per million population notified in Ireland, 2000-2008

Age group (years)	2000	2001	2002	2003	2004	2005	2006	2007	2008
<30	1	0	0	1	0	0	0	1	0
30-39	2	1	2	0	0	2	0	4	0
40-49	1	1	3	0	1	4	8	4	2
50-59	1	0	0	1	1	1	2	2	3
60-69	2	1	1	2	1	1	1	3	4
70+	2	0	0	3	1	1	2	2	2
Total	**9**	**3**	**6**	**7**	**4**	**9**	**13**	**16**	**11**
CIR	**2.3**	**0.8**	**1.5**	**1.8**	**0.9**	**2.1**	**3.1**	**3.8**	**2.6**

2.3 Invasive Group A Streptococcal Disease

Summary

Number of cases, 2008: 68

Crude incidence rate, 2008: 1.60 per 100,000 population

Notifications

Sixty-eight cases of invasive Group A streptococcal (iGAS) disease were notified in 2008. This corresponds to 1.60 iGAS cases per 100,000 population (95% confidence interval, 1.25 to 2.03 per 100,000) and represents an increase when compared to 2007 when the iGAS rate was 1.34 per 100,000 population (95% CI, 1.02 to 1.74 per 100,000).

Of the 68 cases:

- 66 were confirmed - defined as patients with group A Streptococcus (GAS), or *Streptococcus pyogenes*, isolated from a sterile site
- one was probable - defined as a clinically compatible case and meeting the probable laboratory criteria for streptococcal toxic shock syndrome (STSS), i.e., isolated from a non-sterile site such as the throat or vagina
- one was not specified (in an 18 month old male with no clinical details provided)

Patient demographics

Of the 68 cases, 36 (53%) were males and 32 (47%) were females, with ages ranging from 10 months to 89 years. The age and sex specific rates of iGAS cases are shown in Figure 1. Children aged up to 9 years and adults aged over 55 years were most affected.

Geographic spread and seasonal variation

Table 1 outlines the numbers and crude incidence rates (CIRs) of iGAS disease by HSE area from 2004 to 2008. Of note, the highest number of cases in 2008 occurred in the HSE-E (n=31) while the highest CIRs were in the HSE-NE (2.5 per 100,000 population) and the HSE-W (2.4 per 100,000 population).

Although the numbers of iGAS notified to date have been low and it is not possible to discern distinct seasonal variations, the majority of notifications to date have been made during the first half of the year (data not shown). In 2008, the majority of cases (n=36) occurred in the first four months of the year.

Enhanced surveillance data

Enhanced data fields were entered for 48 (71%) of the 68 cases reported in 2008, compared with 70% (40 of 57 cases) in 2007. Of the 48 cases for which enhanced data were available, there was a wide variation in the fields completed. Thirteen laboratories were identified as the source for 39 cases.

Isolate details

GAS was isolated from a sterile site from 39 of 48 cases for which enhanced data were available, primarily from blood cultures (33 isolates, or 85%) but also abscesses (3), deep tissue (2) and joint (1).

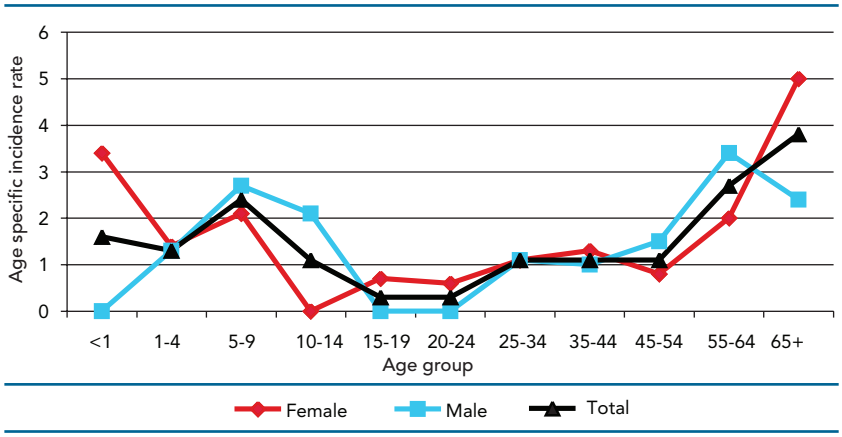

Figure 1. Age and sex specific rates of iGAS disease in 2008

No serological typing data, based on the detection of M and T-proteins, were available. This is predominantly due to the absence of a streptococcal reference laboratory in this country and thus laboratories are required to send their isolates to reference facilities abroad.

Clinical details
As in 2007 and previous years, bacteraemia (35 cases, including cases where bacteraemia was not specifically stated but GAS was isolated from blood) and cellulitis (17) were the most common clinical presentations, followed by pneumonia (6), septic arthritis (6), streptococcal toxic shock syndrome (STSS) (7; 2 of which were implied based on the clinical presentation given), necrotising fasciitis (4), puerperal sepsis (3), meningitis (2) and myositis (2). Note that cases could have more than one clinical presentation. Table 2 outlines the clinical syndromes associated with the 35 cases for which data on clinical presentation were provided:

Risk factors
Risk factors associated with iGAS disease included the following:
- age over 65 years (18)
- skin and wound lesions (11)
- diabetes (5)
- steroid use (4)
- malignancy (3)
- non-steroidal anti-inflammatory drugs (NSAID) (3)
- intravenous drug use (IVDU) (2)
- varicella infection (2)
- alcoholism (1)

Note that cases could have one or more associated risk factors. No risk factors were identified for 38 cases. Among the seven cases with STSS, age over 65 years was identified as a risk factor in four cases, NSAID use in two and steroid use diabetes, malignancy and skin lesions in one each. No risk factors were identified for two STSS cases.

Clinical management
Surgical intervention was required for nine patients (compared to two in 2007), ranging in age from 26 to 76 years, with clinical presentations that included one or more of the following:
- necrotising fasciitis (3) +/- myositis
- cellulitis (4)
- septic arthritis (2)

Admission to the intensive care unit was required for seven patients (compared to five in 2007), ranging in age from 5 to 77 years, with clinical presentations that included one or more of the following:
- bacteraemia and STSS (3) [one with pneumonia]
- bacteraemia and necrotising fasciitis (1)
- STSS and necrotising fasciitis (1)
- bacteraemia and pneumonia (1)

Table 1. Numbers (n) and Crude Incidence Rates (CIRs) per 100,000 population of iGAS disease by HSE area, 2004-2008.

HSE Area	2004		2005		2006		2007		2008	
	n	CIR	n	CIR	n	CIR	n	CIR	n	CIR
HSE-E	25	1.7	19	1.3	37	2.5	28	1.9	31	2.1
HSE-M	0	0.0	1	0.4	2	0.8	0	0.0	0	0.0
HSE-MW	1	0.3	3	0.8	2	0.6	2	0.6	1	0.3
HSE-NE	1	0.3	3	0.8	5	1.3	3	0.8	10	2.5
HSE-NW	0	0.0	3	1.3	1	0.4	3	1.3	3	1.3
HSE-SE	7	1.5	1	0.2	4	0.9	10	2.2	8	1.7
HSE-S	1	0.2	1	0.2	3	0.5	4	0.6	5	0.8
HSE-W	0	0.0	18	4.3	7	1.7	7	1.7	10	2.4
IRELAND	35	0.8	49	1.2	61	1.4	57	1.3	68	1.6

Length of ICU stay was provided for four cases: 2, 3, 7 and 10 days. Surgical intervention was required for the two patients with necrotising fasciitis.

Other epidemiological information
One case (puerperal sepsis in a 31 year old female) was reported as having been hospital-acquired compared to none in 2007. As in 2007, no outbreaks of iGAS were notified in 2008.

Outcome
Outcome at 7-days following GAS isolation was reported for 27 cases:
- 26 were still alive (including the probable case)
- one patient died (age 84 years, with diabetes, steroid and NSAID use and presenting with STSS)

In addition to the above:
- three cases (ages 16, 46 and 52 years) were reported to have died but it was not stated if these deaths were directly attributable to iGAS
- four cases were still ill at the time of reporting to CIDR and their final outcome was not ascertained

Of the seven STSS cases, one patient died resulting in a case fatality rate (CFR) of 14%, while four were still ill or recovering and one was recovered. No final outcome was provided for one patient, but was alive after 7 days.

The case fatality rate (CFR) for outcome from iGAS disease reported at 7-days in 2008 was 4%, a decrease from 19% (five deaths) in 2007.

Antimicrobial susceptibility
Antimicrobial susceptibility data were reported on 38 iGAS isolates (37 from blood and one from a joint fluid) by ten laboratories in 2008. All isolates were susceptible to penicillin (n=37), clindamycin (n=5) and vancomycin (n=31). Resistance to erythromycin was reported in three of 30 (10%) isolates and to tetracycline in one of 12 (8%) isolates.

Conclusion
In 2008, there were 11 more cases of iGAS reported in Ireland than in the previous year, an increase of almost 20%. This could be a genuine increase in the incidence of iGAS or could represent better reporting

Table 2. Clinical syndromes of 35 patients with iGAS disease in 2008

- bacteraemia, cellulitis, myositis and necrotising fasciitis (1)
- bacteraemia, cellulitis, pneumonia and STSS (1)
- bacteraemia, meningitis, septic arthritis and STSS (1)
- bacteraemia, cellulitis and meningitis (1)
- bacteraemia, pneumonia and STSS (1)
- bacteraemia, cellulitis and STSS (1)
- bacteraemia, myositis and necrotising fasciitis (1)
- bacteraemia and pneumonia (1)
- bacteraemia and cellulitis (7)
- bacteraemia and septic arthritis (2)
- bacteraemia and STSS (1)
- cellulitis and necrotising fasciitis (1)
- necrotising fasciitis and STSS (1)
- pneumonia and STSS (1)
- bacteraemia without a focus (5)
- cellulitis (3)
- puerperal sepsis (3)
- septic arthritis (3)

of this disease, which only became notifiable in Ireland as of 2004. The number of cases notified in Ireland still remains low compared to other Northern European countries and the US. Data reported to the Strep-Euro Program for 2003 and 2004 showed that the highest rates of iGAS disease were in Northern Europe with age-standardised rates of 3.31 and 3.10 per 100,000 population in the UK and Sweden, respectively. The estimated rate of iGAS disease in the US in 2008 [provisional data from CDC's Active Bacterial Core Surveillance (ABCS) Program] was 3.8 per 100,000 population while the mortality rate was 0.5. Certain serotypes of GAS are known to be more virulent than others, e.g. serotypes M1 and M3, but in the absence of a streptococcal reference laboratory in this country, no serological typing data are available to investigate such a link between Irish isolates and severity of disease. While enhanced data were available for 71% of cases, improved completion of the enhanced questionnaire for all cases will further augment our understanding of iGAS disease in Ireland.

HPSC thanks the microbiology laboratories for their contribution to date and encourages those that do not, to complete enhanced data forms and to submit antimicrobial susceptibility data on all iGAS cases along with their EARSS quarterly returns.

The figures presented in this summary are based on data extracted from the Computerised Infectious Diseases Reporting (CIDR) System on 22nd August 2009.

Further information on iGAS disease in Ireland including national guidelines is available at: http://www.ndsc.ie/hpsc/A-Z/Other/GroupAStreptococcalDiseaseGAS/

2.4 Tuberculosis, 2007

Summary

Number of cases in 2007: 480
Number of culture confirmed cases: 315
Crude incidence rate in 2007: 11.3/100,000
Number of TB deaths in 2007: 7
Number of cases in 2008*: 470
Crude incidence rate in 2008*: 11.1/100,000

In 2007, 480 cases of tuberculosis (TB) were notified in Ireland, corresponding to a crude notification rate of 11.3 per 100,000 population. This is slightly higher than the rates reported between 2000 and 2006, which ranged from 9.7 to 11.0 per 100,000 population, but is lower than the crude incidence rates reported between 1991 and 1999, which ranged from 11.5/100,000 to 18.2/100,000. A summary of the epidemiology of TB in Ireland during 2007 is shown in table 1. Number of cases and crude incidence rates from 1991 to 2008 with three-year moving averages are also shown in figure 1.

The highest crude incidence rate was reported in HSE South at 16.4 per 100,000 population. The next highest rates were reported in HSE East (14.6) and HSE West (10.6). Rates reported in HSE Northeast (6.1), Southeast (6.3) and Midlands (6.4) were significantly lower than the national incidence rate. Differences in age-standardised TB incidence rates were also found between HSE areas with HSE South having the highest rate (16.4/100,000) in 2007 followed by HSE East (13.3) and HSE West (10.4). The remaining HSE areas had rates ranging from 6.2 to 8.2/100,000.

The highest age-specific rate in 2007 occurred among those aged 25-34 years old (17.9/100,000) followed by those aged 65 years and over (16.9/100,000). The rate among males (14.0/100,000) was higher than that among females (8.7/100,000) and rates among males were higher than females for all age groups except in the 0-14 year age group where the rate was the same (4.7/100,000). The highest rate among males (26.1/100,000) was in the group aged 65 years and older while the highest rate in females (16.6/100,000) was in the 25-34 year age group. The male to female ratio (1.6:1) reported in 2007 was consistent with the rate reported in previous years.

During 2007, 40.0% (192 cases) of TB cases were born outside Ireland. This is higher than reported between

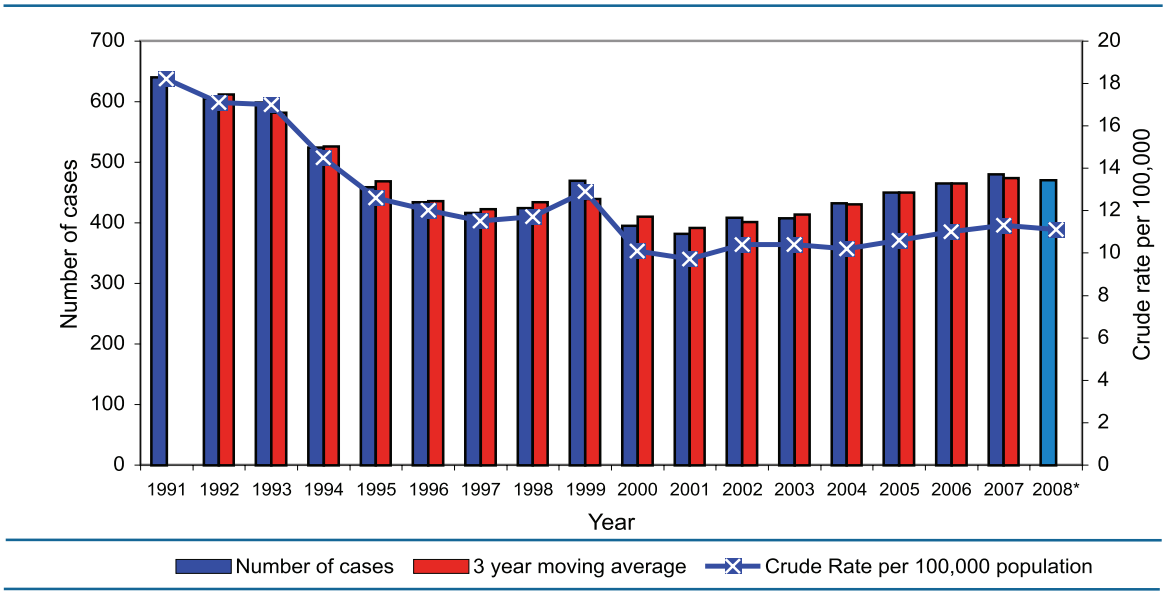

Figure 1: Notified cases of TB in Ireland with crude rates per 100,000 population, 1991 to 2008 and 3-year moving averages, 1992-2007*
** Provisional data which may change significantly following validation*

2003 and 2006 when the proportion of foreign born cases ranged from 21% to 34.6%.. The crude rate in the indigenous population was 8.0/100,000 while the crude rate in the foreign-born population was 31.3/100,000. There was a notable difference in age between those born in Ireland and those born outside Ireland, with a median age of 44 years and 31 years respectively. In 2007, among countries in the EU and Western Europe who reported data to the EuroTB network, 21% of notifications were in foreign-born patients.

Pulmonary TB was reported in 349 (72.7%) cases and 131 (27.3%) had exclusively extrapulmonary disease. Of the extrapulmonary cases reported in 2007, there were six cases of TB meningitis corresponding to a rate of 0.14/100,000 population (1.4/million population).

Of the 480 cases reported in 2007, 65.6% (315 cases) were culture confirmed. Species identification showed *M.tuberculosis* in 96.8% (305 cases), *M.bovis* in 1.9% (6 cases) and *M.Africanum* in 0.6% (2 cases) of the culture confirmed cases (two culture confirmed cases with unknown organism). Of the 349 cases with a pulmonary component, 246 (70.5%) were culture confirmed, and 153 (43.9%) were smear positive.

The proportion of drug resistant TB cases notified in 2007 was 5.0% (24 cases). The proportion of MDR-TB cases was 1.5% (7 cases). Mono-resistance to isoniazid was recorded in 12 cases, to rifampicin in three cases and to pyrazinamide in two cases. Twelve of the 24 (50.0%) drug resistant cases, including five (71.4%) of the MDR-TB cases, were born outside Ireland.

In 2007, information on treatment outcome was provided for 86.0% (413) of cases. Of the 413 cases, 332 (69.2%) completed treatment, 40 (8.4%) died, 18 (3.8%) were lost to follow up, 17 were still on treatment (3.5%) and 6 (1.3%) had treatment interrupted. Seven of the 40 deaths were attributable to TB. It is of critical importance to TB control in Ireland that surveillance of TB and reporting of outcome data be maintained at a high level especially with the global threat of resistant strains.

The Global Plan to Stop TB 2006-2015 was launched in January 2006 and aims to reduce the global prevalence of, and deaths due to TB by 50% in 2015 relative to 1990. In addition it proposes to eliminate TB as a public health problem (<1 case per million population) by 2050. This strategy calls on countries to strengthen health systems for TB treatment and control and to address MDR-TB, TB/HIV and other challenges e.g. high risk groups and areas where TB rates are high.

Table 1: Summary of the epidemiology of TB in Ireland, 2007

Parameter	2007
Total number of cases	480
Crude notification rate per 100,000	11.3
Cases in indigenous population**	283 (59%)
Cases in foreign-born persons**	192 (40%)
Culture positive cases	315 (65.6%)
Pulmonary cases	349 (72.7%)
Smear positive pulmonary cases	153 (31.9%)
Multi-drug resistant cases	7 (1.5%)
Mono-resistant to isoniazid	19 (4.0%)
Deaths attributable to TB	7 (1.5%)
Outcomes reported in cases	413 (86.0%)
TB meningitis cases	6 (1.4 per million)

***Country of birth not reported for 5 cases*

The importance of good surveillance data cannot be underestimated in this context as they will help guide where resources should be directed in order to ensure the effective prevention and control of TB in Ireland and in order to reach the elimination target by 2050.

More detailed surveillance reports can be found at www.hpsc.ie/hpsc/A-Z/VaccinePreventable/TuberculosisTB/

Provisional 2008 data

There were 470 cases of TB provisionally notified in 2008, corresponding to a crude rate of 11.1 per 100,000 population. It is important to note that these data are provisional and **may change significantly following validation**.

Of the 470 cases provisionally notified in 2008,

- Pulmonary TB was diagnosed in 297 cases (63.2%), extrapulmonary TB in 123 cases (26.2%) and pulmonary and extrapulmonary TB in 32 cases (6.8%).
- Of the 329 cases with a pulmonary disease component, 148 (45.0%) were culture positive and 159 (48.3%) were smear positive.
- There were five cases of TB meningitis provisionally notified corresponding to a rate of 0.12/100,000 population (1.2/million population).
- There were 265 (56.4%) cases born in Ireland and 186 (39.6%) were foreign-born. Country of birth was not reported for 19 cases.
- There were 288 cases (61.3%) notified in males, 182 cases (38.7%) in females and the median age of cases was 39 years (range 1 to 93 years).
- Resistance was reported in 10 cases, three were mono-resistant to isoniazid and three were MDR-TB. Six of the 10 resistant cases, including one of the MDR-TB cases, were born outside Ireland.

03

Infectious Intestinal Diseases

3.1 Campylobacter

Summary

Number of cases 2008: 1758
Number of cases 2007: 1891
Crude Incidence Rate: 41.4/100,000

Campylobacter became a notifiable disease in Ireland in 2004 under the Infectious Diseases regulations. Prior to this, data on laboratory-confirmed cases of Campylobacter infection in humans were collected nationally as part of the EU Zoonoses Regulations. It is an acute zoonotic bacterial disease and characterised by diarrhoea, abdominal pain, malaise, fever, nausea and vomiting. Symptoms generally last for only a few days. Undercooked meat especially poultry is often associated with illness as is unpasteurised milk and untreated water. Findings of the first national case control study conducted in Ireland investigating risk factors for sporadic *Campylobacter* infections show that consuming chicken, lettuce and eating takeaways were important risk factors for contracting the disease in Ireland. Contact with sheep, peptic ulcer, hiatus hernia, lower bowel problems were also independently associated with infection. However mains water supply showed protective effect from contracting the illness[1].

Campylobacteriosis is the commonest bacterial cause of gastroenteritis in Ireland and Europe. Despite there being 133 less notifications than in 2007 this dominant trend continued in 2008 with 1758 cases of *Campylobacter* notified. Of the cases notified 99.8% were laboratory confirmed.

Table 1: ASIR and CIR of Campylobacter by Region, 2008

HSE-Region	Age Standardised Incidence Rate (95% CI)	Crude Incidence Rate (95% CI)
East	36.8 [33.8 - 40.0]	37.7 [34.6 - 40.8]
Midlands	58.8 [49.4 - 68.3]	60.0 [50.4 - 69.6]
Midwest	48.8 [41.6 - 56.1]	48.8 [41.6 - 56.0]
Northeast	32.7 [27.2 - 38.3]	34.0 [28.3 - 39.8]
Northwest	40.9 [32.8 - 49.1]	41.3 [33.2 - 49.5]
Southeast	38.8 [33.1 - 44.5]	39.1 [33.4 - 44.8]
South	44.0 [38.7 - 49.2]	43.2 [38.0 - 48.3]
West	45.8 [39.2 - 52.4]	44.7 [38.2 - 51.1]
National	41.3 [39.3 - 43.2]	41.4 [39.5 - 43.4]

The national crude incidence rate (CIR) was 41.4/100,000. The most recent community summary report published by the European Food Safety Authority (EFSA) in January 2009 calculates a European CIR of 45.2/100,000 for 2007[2].

The CIR varied regionally ranging from 34.0/100,000 in the Northeast, to 60.0 /100,000 in the Midlands (Figure 1). Over the past three years a consistent increase in rates has been observed in the Mid and Midwest areas of the country. Conversely the East and the Northwest have both incurred year on year consistent decrease rates per 100,000.

Campylobcateriosis is seen in all age groups with the highest burden of illness experienced in the 0-4 age group. This group had the highest age specific incidence rate (ASIR) of 141.9/100,000 in 2008 (figure 2). The second highest ASIR observed was in the 20-24 age group (43.8/100,000). The least affected age group were the 10-14 year olds (ASIR of 21.2/100,000). This preponderance in younger children is a well known characteristic of the disease and is also observed at European level. The EFSA community summary report for 2007 calculates the ASIR of the 0-4 age group at 120.0/100,000. Table 1 presents both ASIR and CIR by region for 2008.

Campylobacter has a well documented seasonal distribution with a peak in early summer. During 2008 the occurrence of Campylobacter did not conform to this usual trend. July experienced the highest rate of occurrence during the summer months (n=204) but in October there was late second peak (n=230). The reason for this is not known. The number of cases remained elevated for the remaining months with 128 cases notified in December (figure 3).

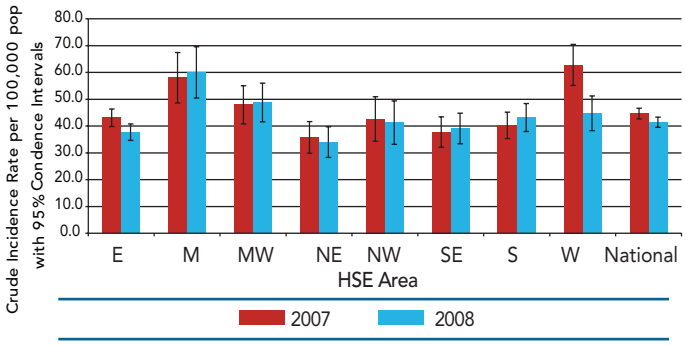

Figure 1: National CIR of Campylobacter by Region, 2007 and 2008.

Overall there was a slighltly elevated rate of male cases reported in 2008. This is evident when the ASIRs are examined by age-sex adjusted rates. The porportion varies between age groups, most notably in the 10-14 age group where the occurrence in male cases is almost three times greater than in their female counterparts.

There is currently no national referencing facility for routine typing of Campylobacter isolates. As a result information on species type is very poor. In 2008 67.5% of Campylobacter cases identified were not further speciated. Of those that were typed *C. jejuni* accounted for 88.1% (n=503) of cases, *C. coli* (n=67) for 11.7% and *C. lari* for 0.2% (n=1).

Table 2: ASIR of Campylobacteriosis by Age Group and Sex, 2008

Age Group	Rate per 100,000 - Females	Rate per 100,000 - Males
0-4	58.9	81.7
05-09	21.5	19.1
10-14	5.5	15.7
15-19	12.4	13.8
20-24	23.7	20.2
25-34	22.8	19.7
35-44	16.7	15.1
45-54	11.5	14.2
55-64	12.5	13
65+	18	19
Total	**19.7**	**21.4**

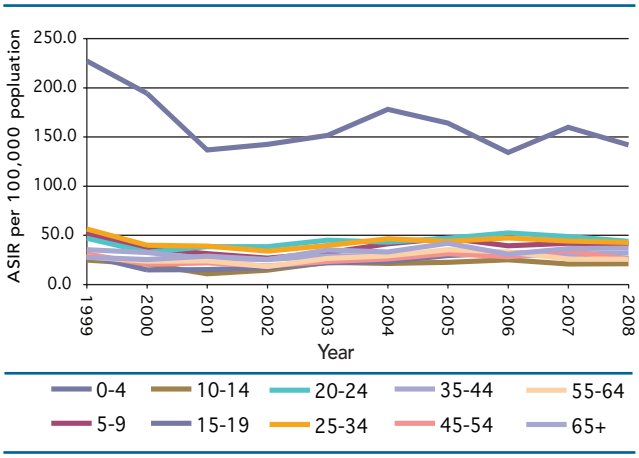

Figure 2: National ASIR of Campylobacter by Age Group, 1999 – 2008

Information on country of origin was recorded in 16.9% of all cases. This is a slight improvement on the rate of information provided in 2007 (14% of all cases). Of cases where country of origin was specified, indigenous cases accounted for 94.3%. There were 17 foreign travel cases associated with 16 different countries (two cases identified the UK in travel history).

During 2008 there were seven family outbreaks of *Campylobacter* notified on CIDR with 14 associated cases of illness. These were all small clusters of illness with no more than two people ill in any outbreak. Mode of transmission was described in five of the outbreaks with person to person spread being the most common route (n=3). Foodborne and animal route contact was suggested for the remaining two outbreaks however no further details were available to substantiate these hypothesised routes.

References:

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2. *Community Summary Report – Trends and Sources of Zoonoses and Zoonotic Agents in the European Union in 2007*; Published by the European Food Safety Authority and the European Centre for Disease Control, January 2009

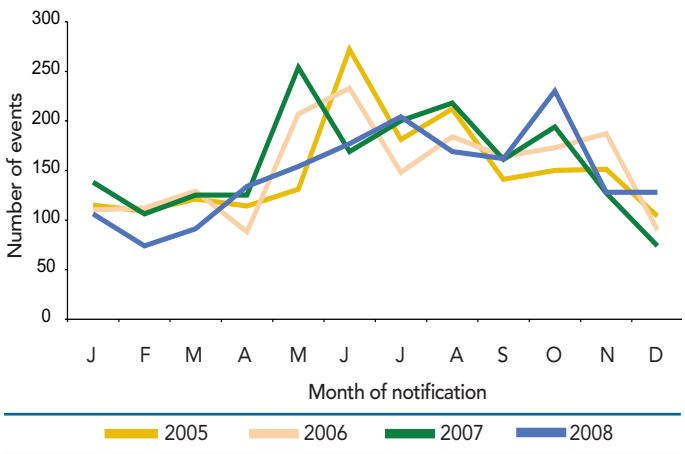

Figure 3: Camplobacter Notifacations in Ireland by Month, 2004-2008

3.2 Cryptosporidiosis

Summary

Number of cases, 2008: 416
Number of cases, 2007:609
Crude incidence rate, 2008: 9.8/100,000

In 2008, 416 cases of cryptosporidiosis were notified in Ireland, a crude incidence rate of 9.8 per 100,000 population (Table 1). This was a 32% decrease on the number of cases notified in 2007, being similar to the reported incidence rates of 2004 and 2006. In the two years for which data are available for the incidence of cryptosporidiosis across European Member States (2005 and 2006), Ireland has had the highest incidence in both years. On average in these two years, the European Union had incidence rates of 2.8 and 2.2 per 100,000 population, respectively.

The crude incidence (CIR) and age standardised incidence (ASIR) rates by HSE area for 2008 are reported in table 1. As before, there was a strong urban-rural divide, with the HSE-E having a much lower incidence rate than other HSE areas, and there was a peak in the reported number of cases in spring (Figure 1).

Typically, the highest reported incidence rates are in children under 5 years, and this year, the trend was similar, with almost 90 notifications per 100,000 children under the age of five. Overall, there were more males (n=239) than females (n=176) reported, particularly in younger age groups.

A crude indicator of disease severity can be obtained from reviewing rates of hospitalisation among cases. This information is available for cases reported in HSE-areas whose data was recorded live on CIDR during 2008. Using data from these 6 HSE-areas (258 notifications), 39% of cases were reported as hospital inpatients, 3% as hospital outpatients, 52% as GP patients, 1% as other, and this information was unknown or not specified for 5% of cases.

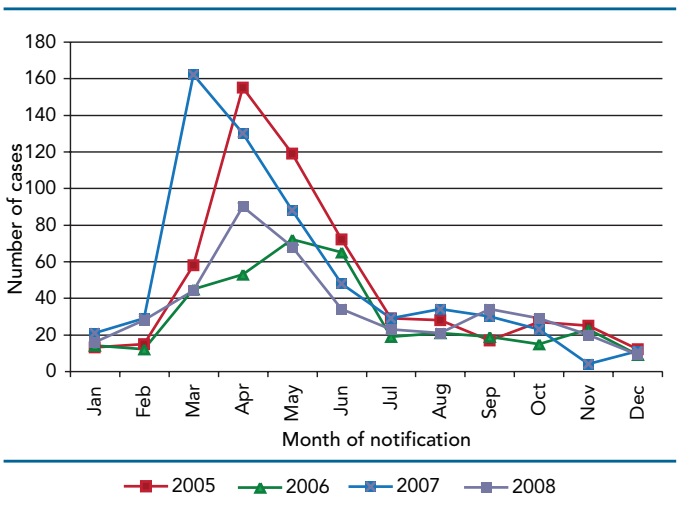

Figure 1. Seasonal distribution of cryptosporidiosis cases 2005-2008

Table 1. Number of notified cases, crude incidence rate and age-standardised incidence rate cryptosporidiosis by HSE area, 2008, and annual number of cryptosporidiosis notifications and crude incidence rate, Ireland 2004-2007

HSE area	Number of notifications	CIR (95% CI)*	ASIR (95% CI)*
E	12	0.8 (0.4-1.3)	0.8 (0.4-1.3)
M	32	12.7 (8.3-17.1)	11.6 (7.6-15.7)
MW	70	19.4 (14.9-23.9)	19.6 (15.0-24.2)
NE	33	8.4 (5.5-11.2)	7.4 (4.8-10.0)
NW	41	17.3 (12.0-22.6)	17.0 (11.8-22.2)
SE	66	14.3 (10.9-17.8)	14.1 (10.7-17.5)
S	74	11.9 (9.2-14.6)	12.2 (9.5-15.0)
W	88	21.2 (16.8-25.7)	21.9 (17.3-26.5)
Total 2008	**416**	**9.8 (8.9-10.8)**	-
Total 2007	**609**	**14.4 (13.2-15.5)**	-
Total 2006	**367**	**8.7 (7.8-9.5)**	-
Total 2005	**570**	**13.4 (12.3-14.5)**	-
Total 2004	**431**	**10.2 (9.2-11.1)**	-

*Rates calculations based on CSO census 2006, and may differ from rate published previously based on 2002 census

In 2008, around 35% of positive human *Cryptosporidium* specimens were referred for speciation to the UK *Cryptosporidium* Reference Unit in Swansea by a small number of hospital laboratories. The results of these studies provide evidence of the relative importance of different *Cryptosporidium* species here.

In 2008, information was available on species for 145 cases, largely from the HSE-SE, HSE-NW and HSE-W areas. There were 118 *C. parvum*, 22 *C. hominis*, two corvine, one felis, one rabbit, and one non-typeable infection reported, with the species not known/not reported for the remaining 271 cases. The seasonal distribution by species is presented in Figure 2. *C. parvum* was the most common species reported, in particular during the spring peak in incidence. In the United Kingdom, cases due to *C. parvum* have historically been more common in spring with those due to *C. hominis* more common in autumn months.

Eight outbreaks of cryptosporidiosis were reported in 2008: four general outbreaks and four family outbreaks (Table 2). All were small outbreaks, and between them accounted for 29 cases. Two small outbreaks occurred in crèches and were believed to be due to person-to-person spread, as was one of the family outbreaks. Water was suspected to have played a role in transmission for three of the family outbreaks. One of the two small general community outbreaks were reported as being due to person-to-person spread and animal contact, while the transmission route was not specified for the second community outbreak.

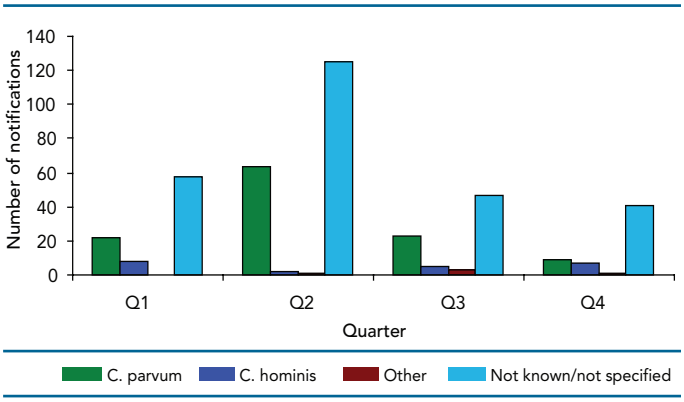

Figure 2: Seasonal distribution cryptosporidiosis by species, Ireland 2008

Table 2. Cryptosporidiosis outbreaks Ireland 2008

Month	HSE-area	Transmission route	Type	Location	No. ill
Jan	SE	Person-to-person	General	Crèche and household	3
Jan	W	Waterborne	Family	Private house	3
Feb	NE	Person-to-person	General	Crèche	5
Mar	MW	Not Specified	General	Community outbreak	3
Mar	S	P-P and WB	Family	Private house	2
Apr	SE	P-P and Animal	General	Community outbreak	7
Jul	SE	WB and Animal	Family	Private house	2
Sep	NW	Person-to-person	Family	Private house	4

P-P denoted person-to-person; WB denoted waterborne

3.3 Verotoxigenic *E. coli*

Summary

Number of cases, 2008: 226
Number of cases, 2007: 167
Crude incidence rate: 5.3/100,000

In 2008, 226 confirmed and probable cases of VTEC were notified to HPSC, a crude incidence rate (CIR) of 5.3 per 100,000 (table 1). This is the highest number of cases reported since data collection on VTEC cases began in 1999. If only confirmed VTEC cases are considered, the 213 confirmed cases (CIR=5.0 [4.4-5.0]) notified this year represent an 85% increase on the number of confirmed cases notified in 2007. Figure 1 shows the number of confirmed and probable VTEC O157 and non-O157 VTEC reported in Ireland since 1999.

Two additional (HUS) cases were reported as suspected VTEC cases. These cases are not notifiable but were reported voluntarily by clinicians.

In 2007, the last year for which data is available on an EU-wide basis, the highest CIRs for confirmed VTEC cases were reported by Sweden and Denmark, both of whom reported CIRs of 2.9/100,000[2]. These were the only Member States reported to have higher rates of VTEC infection than Ireland in 2007. Given the large increase in incidence here in 2008, it is likely that Ireland will have one of the highest incidence rates in Europe again in 2008.

The highest crude incidence rate for VTEC overall this year was reported in the HSE-M, where the rate was more than three times the national crude rate. As in previous years, the HSE-E reported the lowest overall crude incidence rate (Table 2), about half of the national rate this year.

The HSE-E, however, reported the highest numbers of non-O157 VTEC infections (table 2), in part because of a large VTEC O26 outbreak which occurred during quarter 2. Historically, the HSE-NW has also reported relatively high numbers of VTEC O26, and this year almost two-thirds of their VTEC cases were serogroup O26. While it is possible that there is a true geographical difference in risk for different serogroups, it is more likely that regional variation in the serogroup-specific incidence to some extent reflects regional differences in laboratory diagnostic practice for non-O157 infections.

Typically, VTEC cases are most commonly associated with late summer; overall this year, 43% of cases were reported in quarter 3, although this varied by HSE-area with the HSE-M reporting their highest incidence in

Table 1. Number and crude incidence rates confirmed and probable VTEC, Ireland 2004-2008

Year	Confirmed cases	Probable cases	Total VTEC	CIR VTEC[a] (95% CI)
2004	61	0	61	1.4 (1.1-1.8)
2005	125	0	125	3.0 (2.4-3.5)
2006	153	5	158	3.7 (3.2-4.3)
2007	115	52	167	3.9 (3.3-4.5)
2008[b]	213	13	226	5.3 (4.6-6.0)

[a] Data from the 2006 census were used to calculate rates

[b] Confirmed cases include VTEC O157 (n=162), VTEC O26 (n=35), with 16 additional cases of other serogroups. Three of the VTEC O157 cases were co-infected with VTEC O26 strains. Five probable cases were reported on the basis of being epidemiologically-linked to known cases, and eight probable cases were reported on the basis of detection of verotoxin genes without isolation of the implicated strain (six VTEC O26 and two Ungroupable VTEC).

quarter 1 and the HSE-E reporting their highest number of cases in quarter 2 (Table 2).

The reported disease incidence was highest among young children (median age =6 years), which is consistent with previous years, although there were more cases reported this year among females (n=135) than among males (n=91) at all age groups.

155 notified cases were reported as symptomatic, 71% of the cases for whom this information was available (n=217). Reported symptoms included bloody diarrhoea in 74 cases, and HUS in fifteen cases (6.9%). This is an increase on the number of VTEC-associated HUS cases reported compared to last year (n=5), but is similar to the number of HUS cases reported in 2006 and 2007 (n=17 each year).

HUS cases this year ranged in age from less than 1 year to 67 years (median age 3 years), with non-O157 VTEC infections contributing up to half of these. This was the highest reported annual number of HUS cases associated with non-O157 VTEC since the surveillance system in Ireland was extended to include all VTEC strains in 2003. For the additional two HUS cases reported as suspected VTEC cases, one was young child and one was an adult.

216 human VTEC isolates were referred to the HSE PHL Dublin Mid Leinster, Cherry Orchard Hospital from 213 confirmed VTEC cases (table 3). In addition, laboratory findings are included in Table 3 from eight probable VTEC cases identified on the basis of detection of verotoxin genes in the absence of obtaining an isolate. As in previous years, PT32 was the commonest phage type reported (n=75), accounting for 46% of the confirmed VTEC O157 reported. Other common phage types in 2008 were PT21/28 (n=19), PT8 (n=16) and PT14 (n=16) –Table 3.

Two sorbitol-fermenting VTEC O157 were reported, both of which were PT RDNC.

The verotoxin profiles of VTEC O157 strains were similar to those reported historically for human VTEC isolates in Ireland (Table 3). Eighty-three per cent of VTEC O157 strains carried the genes for VT2 only while 17% carried the genes for both VT1 and VT2. In contrast, 21.7% of non-O157 VTEC isolates carried the genes for VT1 only, 20% for VT2 only, and 58.3% VT1 and VT2.

Forty-two VTEC outbreaks were reported in 2008, which included 145 of the 213 confirmed cases notified. Nine outbreaks were described as general outbreaks and 33 as family outbreaks. Twenty-nine outbreaks were due to VTEC O157, seven due to VTEC O26, and six were caused by a mixture of VTEC strains. The suspected modes of transmission reported are listed in table 4.

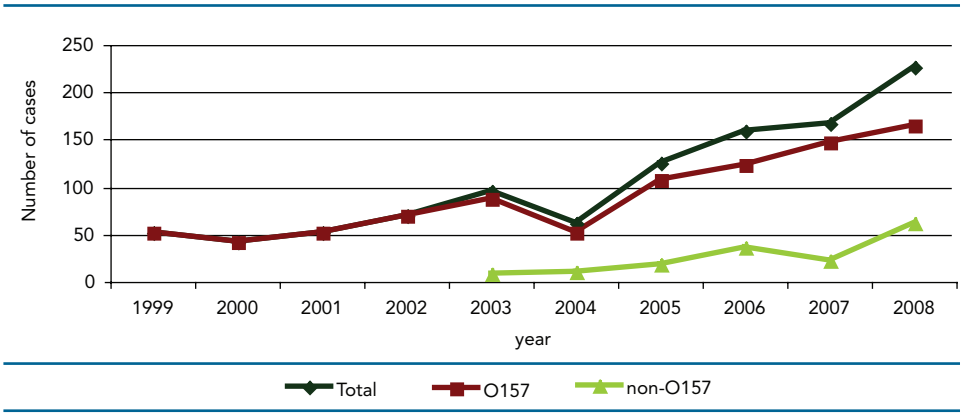

Figure 1. Annual number of confirmed and probable VTEC cases by serogroup, Ireland 1999-2008

Person-to-person spread is an important mode of VTEC transmission in households, child-care facilities and institutions, and was suspected to have played a role in 21 VTEC outbreaks in 2008 (Table 4). These included three outbreaks associated with crèches. For two additional crèche outbreaks, the transmission route was reported as unknown.

The second most common transmission route reported for outbreaks in 2008 was waterborne, with drinking water believed to have contributed to eight outbreaks (Table 4). For two family outbreaks, examination of water from the private wells of the affected households confirmed the presence of the same VTEC strain in the water as was identified in some or all of the associated patients. For two further outbreaks, although the VTEC strains identified in the household wells were not identical to the strains detected in the associated cases, the detection of VTEC in their drinking water was strongly suggestive that their private wells were responsible for their infections. For three of the remaining four waterborne outbreaks, evidence was circumstantial in that *E. coli* and/or coliforms were detected in the private wells of the affected households.

In addition for two sporadic VTEC cases, environmental investigations identified VTEC of the same type in private well samples as was found in the associated patients. And finally, a water sample from the private well of a suspected VTEC case was found to contain

Table 2. Number of confirmed and probable VTEC cases by quarter and HSE area, and crude incidence rate by HSE area, Ireland 2008

Quarter	E	M	MW	NE	NW	SE	S	W	Total
Q1	0	21	4	4	2	0	0	2	**33**
Q2	20	4	2	5	4	2	12	4	**53**
Q3	16	8	12	8	9	14	21	10	**98**
Q4	5	8	10	0	1	6	5	7	**42**
VTEC O157	15	35	21	13	6	22	36	14	**162**
VTEC O26	16	5	3	4	10	0	2	3	**43**
Other VTEC	9	0	4	0	0	0	0	5	**18**
Mixed infection	1	1	0	0	0	0	0	1	**3**
Total	**41**	**41**	**28**	**17**	**16**	**22**	**38**	**23**	**226**
CIR VTEC* (95% CI)	**2.7 (1.9-3.6)**	**16.3 (11.3-21.3)**	**7.8 (4.9-10.6)**	**4.3 (2.3-6.4)**	**6.6 (3.4-10.0)**	**4.8 (2.8-6.8)**	**6.1 (4.2-8.1)**	**5.6 (3.3-7.8)**	**5.3 (4.6-6.0)**

*Rates calculated using CSO census 2006

Table 3. Verotoxin and phage typing results for VTEC referred to the PHL HSE Dublin Mid Leinster, Cherry Orchard Hospital in 2008

Serogroup	PT	VT1 only	VT2 only	VT1 & VT2	VT not reported	Total
O157	**2**		2			**2**
	4		1			**1**
	8			16		**16**
	14		16			**16**
	31		11			**11**
	32		70	5		**75**
	34		1			**1**
	38		1			**1**
	51		5			**5**
	72		1			**1**
	21/28		19			**19**
	RDNC		4			**4**
	Untypable		1			**1**
	N/K		2	7		**9**
O26	-	10	8	26		**44**
O ungroupable	-	1	2	6	2	**11**
O103	-	1		1		**2**
O113	-			1		**1**
O153	-		1			**1**
O75	-			1		**1**
O76	-	1				**1**
O8	-		1			**1**
Total	-	13	146	63	**2**	**224**

Note that for five probable cases reported on the basis of epidemiological linkage, isolates were not available for typing. Includes all strains isolated from single and mixed confirmed VTEC infections, and in addition contains information on laboratory findings from 8 probable cases identified on the basis of detection of *vt* genes in the absence of obtaining an isolate.

VTEC O145, suggesting that VTEC in their drinking water may have been the source of their infection, although no VTEC isolate was obtained from the individual. In total, these known waterborne incidents gave rise to 35 cases (31 confirmed, three probable and one suspected), six of whom developed HUS.

Over the last number of years, considerable evidence has been accumulating demonstrating that drinking untreated water from private wells is a strong risk factor for VTEC in Ireland.[1,3,4]. VTEC case numbers were particularly high during August 2008; in the HSE-S, this rise in incidence was reported to be linked to drinking water from contaminated private wells following exceptional rainfall.[5] It appears that VTEC activity in Ireland may have been influenced by the particularly high levels of rainfall that occurred last summer.[5,6] Drinking water from untreated private water supplies remains a very important risk factor for VTEC infection in Ireland.

Of particular concern is the number of VTEC cases reported among small children from urban backgrounds after visiting friends/relatives in rural areas either with an untreated water supply or close to grazing animals. Cases such as these were reported from Irish urban areas, and among visitors from the United Kingdom and the United States. This underlines the ongoing risk to immunologically naïve young children from untreated drinking water and the faeces of grazing animals.

Moreover in Ireland, VTEC cases of all ages are more likely to report having exposure to a private well than would be expected based on private well ownership data published by the CSO. During periods of heavy rainfall, those with private wells may need to consider boiling their water or taking other appropriate measures particularly if vulnerable groups such as children, the elderly or immunocompromised persons use the well water, or in the event of a change in the character of the well water e.g. colour/taste/odour.

References

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Table 4. VTEC outbreaks in Ireland 2008 by suspected mode of transmission

Suspected mode of transmission	Number of outbreaks	Number confirmed cases	Number ill
Animal contact	1	3	1
Environmental/fomite	1	14	10
Foodborne	2	4	3
Foodborne/waterborne	1	3	3
Person-to-person	16	52	41
Person-to-person & waterborne	5	18	21
Waterborne	2	9	8
Other	2	9	3
Unknown/Not specified	12	33	28
Total	42	145	118

3.4 Hepatitis A

Summary

Number of cases, 2008: 42
Crude notification rate, 2008: 1/100,000 population
Number of cases, 2007: 32

Hepatitis A virus causes an acute, usually self-limiting disease of the liver. It is primarily transmitted from person to person via the faecal-oral route and is associated with poor hygiene and sanitation. Common source outbreaks due to contaminated food or water may also occur.

The incidence of hepatitis A in Ireland has been low in recent years and remained low in 2008, with 42 cases notified. This corresponds to a crude notification rate of 1/100,000 population and represents a 31% increase compared to 2007, when 32 cases were notified (figure 1). Case classification was reported for all cases. Forty one cases were laboratory confirmed and one was classified as probable.

Forty three percent of cases were male (n=18) and 57% were female (n=24). All age groups were affected (figure 2).

Thirteen cases were linked to travel outside of Ireland, three cases were contacts of cases infected outside of Ireland and a further seven cases had travelled outside of Ireland within the incubation period of the disease but could also have been infected in Ireland.

Of the remaining cases, eleven were infected in Ireland (five associated with family outbreaks) and information on country of infection was not available for eight.

Four hepatitis A outbreaks were reported in 2008. Two were associated with travel. The first involved two young adults, one of whom was infected in South Africa, and the second involved two children, one of whom had travelled to Pakistan. The other two outbreaks were family or extended-family outbreaks. One involved three children and the second involved one adult and one child.

There was a fatality in one person notified as an acute hepatitis A case.

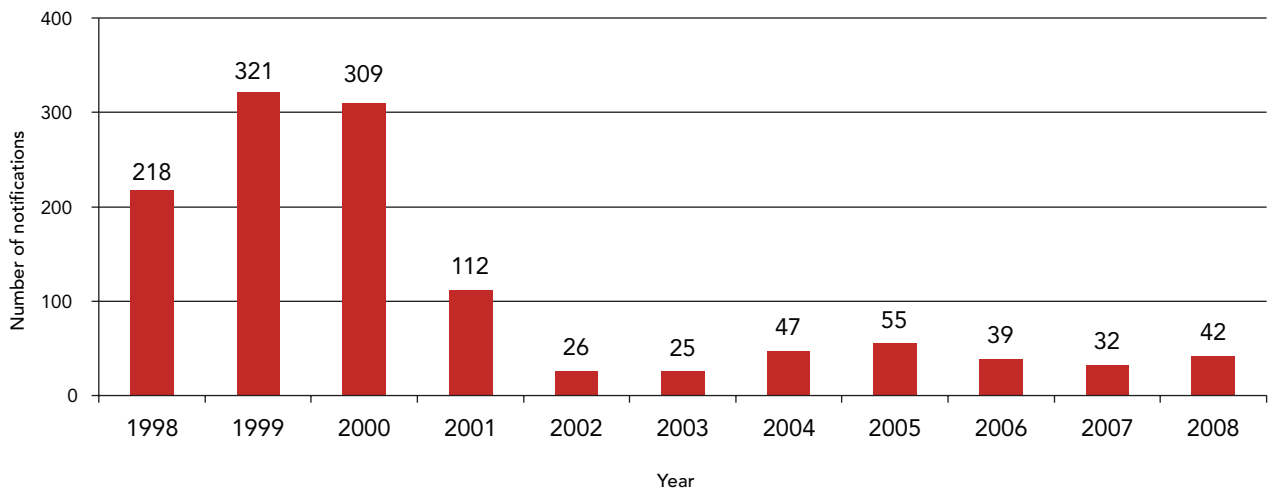

Figure 1. Number of hepatitis A notifications, 1998-2008

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 7th August 2009. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

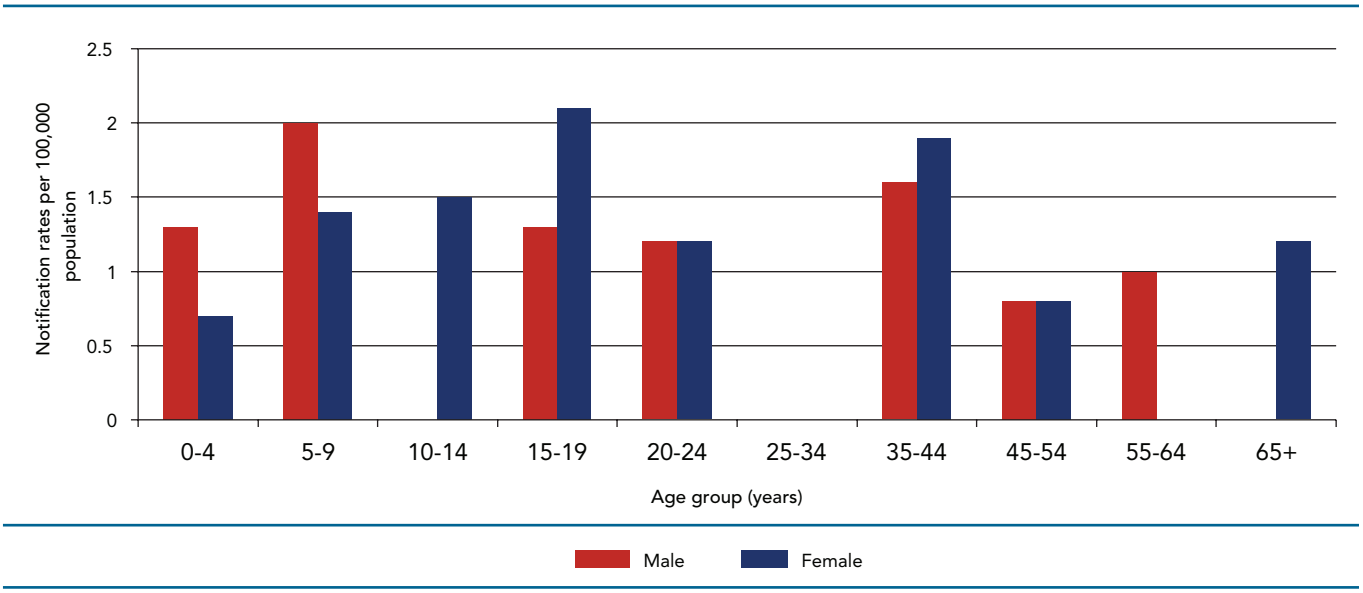

Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis A, 2008

3.5 Rotavirus

Summary

Number of cases 2008: 2342
Number of cases 2007: 2326
Number of cases 2006: 2112
Crude incidence rate: 55.2/100,000

Rotavirus is the the commonest cause of paediatric gastrointestinal infection and causes sporadic, seasonal, often severe gastroenteritis of infants and young children, characterised by vomiting, fever and watery diarrhoea. Transmission is usually person-to-person, mainly via the faecal-oral route. Children less than two years of age are most susceptible to infection, although cases are often seen in elderly and immunocompromised adults – particularly in institutional settings. Symptoms usually last for only a few days but in severe cases hospitalisation may be required due to dehydration. In developed countries, mortality due to rotavirus is low; however, the morbidity and economic costs associated with infection are significant.

Given the universal distribution of Rotavirus, the numbers of notifications will always represent an underestimate of the true incidence and are likely to be more reflective of habits of presentation to medical practitioners and of styles of investigation, notification and testing.

Since 2004 Rotavirus, although not specifically listed, has been a notifiable disease in Ireland under the Acute Infectious Gastroenteritis (AIG) disease category. Prior to 2004, only gastroenteritis cases in children under two years of age were notifiable. In April 2008 the case definition of AIG was amended specifying definitions for both Rotavirus and newly notifiable *Clostridium difficile* associated disease. On the 4th May 2008 these amended definitions formally replaced the outdated AIG case classification.

In 2008 there were 4204 cases of AIG notified in Ireland. This represents a 67% increase on the number of AIG notifications made in 2007. This increase is solely attributable to the addition of *C. difficile* associated disease to the AIG category. Rotavirus notification numbers remained similar to the previous year with 2342 rotavirus cases notified in 2008 (representing a 0.7% increase on 2007).

Updated Rotavirus Definition:
A case of rotavirus infection is a patient with acute onset of vomiting followed by watery diarrhoea with fever, which typically lasts between three and eight days, AND one of the following laboratory criteria for diagnosis:

- Detection of rotavirus by antigen assay
- Detection of rotavirus-specific RNA
- Detection of rotavirus by electron microscopy
- Isolation of rotavirus

The national crude incidence rate (CIR) reached 55.2 per 100,000 population (table 1). There was significant variation in CIR nationally with the Midland region incurring the highest rate of 125.2 cases per 100,000. The West region had the second highest rate of 85.2 per 100,000. This was similar to the previous year. The lowest rate of occurrence was observed in the East with a CIR of 34.9 per 100,000.

Rotaviral infection has a well documented seasonal pattern in Ireland with peaks in cases occurring each year in early spring. Analysis of the data by week of notification from 2004 to 2008 is shown in Figure 2. (There is a 'false' second peak seen in 2005 during week 33, 2005 which is attributable to bulk uploading of

Table 1. Number of cases, CIR of rotavirus infections in Ireland by HSE area, 2008 and total number with crude incidence rate for 2004-2008.

HSE Area	No. of cases	*CIR incl. 95% C.I.	*ASIR incl. 95% C.I.
E	524	34.9 [31.9 - 37.9]	35.7 [32.6 - 38.7]
M	315	125.2 [111.4 - 139.0]	113.0 [100.5 - 125.5]
MW	86	23.8 [18.8 - 28.9]	24.3 [19.1 - 29.4]
NE	165	41.9 [35.5 - 48.3]	36.7 [31.1 - 42.3]
NW	198	83.5 [71.9 - 95.1]	82.2 [70.8 - 93.6]
SE	327	71.0 [63.3 - 78.6]	69.0 [61.6 - 76.4]
S	374	60.2 [54.1 - 66.3]	62.6 [56.3 -68.9]
W	353	85.2 [76.3 - 94.1]	88.1 [79.0 - 97.3]
Total 2008	**2342**	**55.2 [53.0 - 57.5]**	**54.9 [52.7 - 57.2]**
Total 2007	**2326**	**54.9 [52.6 - 57.1]**	
Total 2006	**2112**	**50.0 [48.0 - 52.0]**	
Total 2005	**2251**	**53.1 [50.9 – 55.3]**	
Total 2004	**1600**	**37.8 [35.9 – 39.6]**	

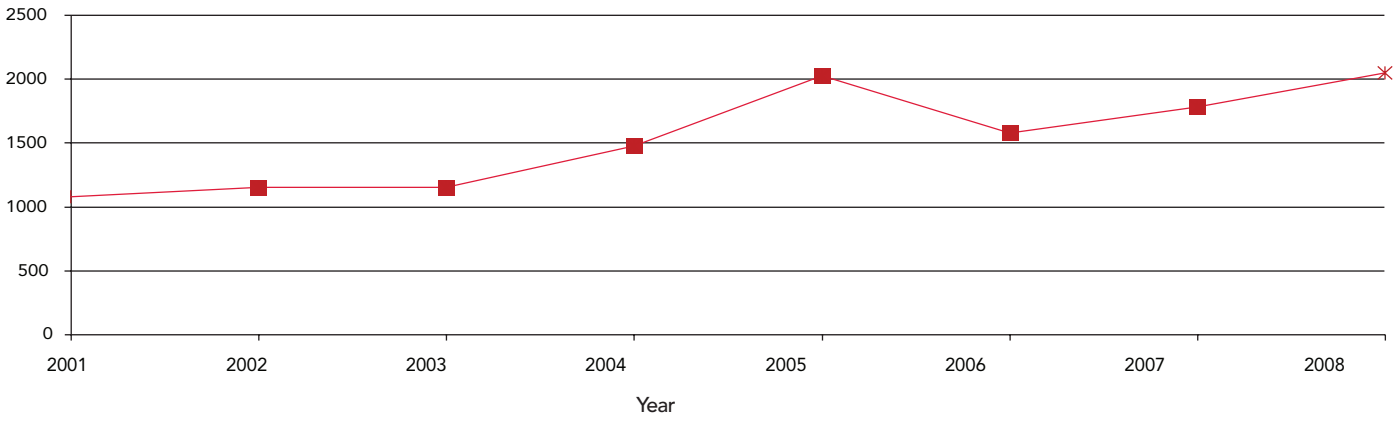

Figure 1: Number of cases of rotavirus in children less than two years of age by year, 2001 to 2008

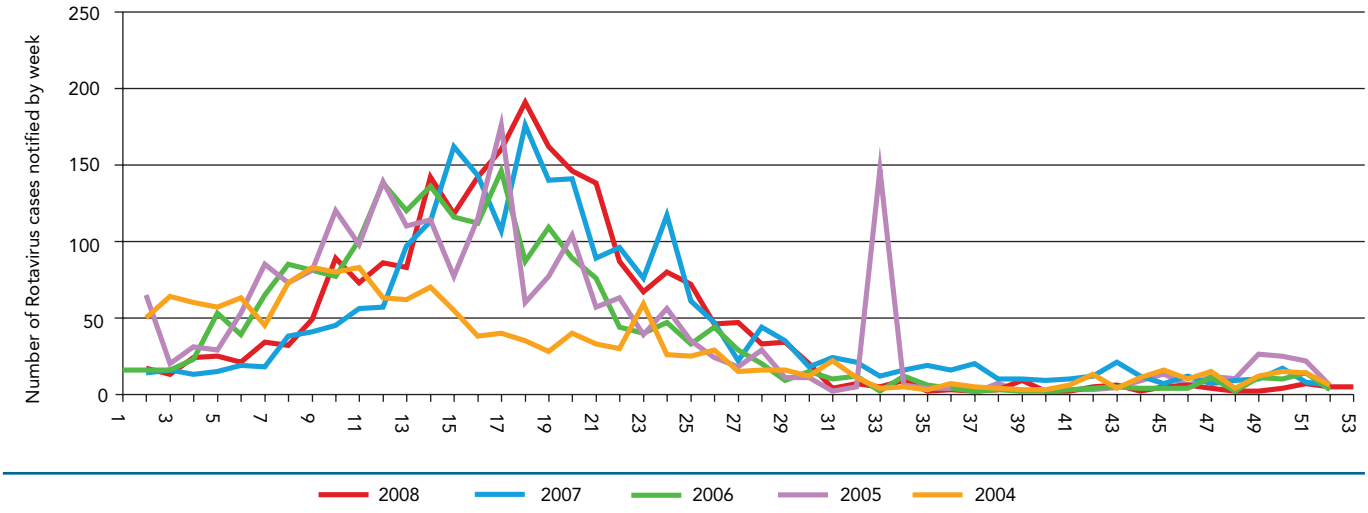

Figure 2: Seasonal distribution of rotavirus events by week, 2004-2008 (CIDR)

notifications for the HSE-W region). A change observed in this seasonal pattern in 2007 was not as apparent in 2008.

Rotavirus is the most common cause of acute gastroenteritis in children worldwide with children generally affected in the first 2-3 years of life. In 2008 87.4% (n=2047) of cases were aged two or under. Data from 2004 to 2008 show that the peak incidence of clinical disease occurred in the 6-24 month age group.

Table 2: Rotavirus Outbreaks Notified on CIDR, 2008.

Date	Location	Numbers ill	Mode of transmission
Feb	Crèche	4	Airborne
April	Crèche	28	Person-to-person
April	Crèche	8	Person-to-person
April	Crèche	6	Person-to-person
April	Comm. Hosp /Long-stay unit	45	Person-to-person
April	Private house	2	Person-to –person and airborne
May	Unknown	2	Person-to –person and airborne
October	Private house	2	Person-to –person and airborne

There has been a continuous increase in the number of cases affecting this age group over recent years. Figure 1 presents the number of cases of rotavirus in children less than two years of age by year, 2001 to 2008.

In 2008 males accounted for 1,213 cases (51.8%); females 1,114 (47.6%) and 15 (0.6%) cases where sex was not known. This represented a ratio of males: females of 1.1:1. This was similar to previous years.

There were eight outbreaks of rotavirus notified via CIDR during 2008 (table 2). These outbreaks accounted for 97 cases of illness. Four of the seven outbreaks occurred in crèches, two were private family outbreaks, the location of one was unknown and the final outbreak occurred in a long stay community hospital.

The largest outbreaks of rotavirus occurred in April in a community hospital/long stay unit. There were 45 persons ill with 40 cases aged 65+ (ages of the remaining cases were unknown). Person to person transmission was suspected. The second largest rotaviral occurred again in April in a crèche with 28 cases of illness. The majority of cases were under four years of age (75%).

3.6 Salmonella

Summary

Number of confirmed cases 2008 (CIDR): 449
Number of probable cases 2008 (CIDR): 1
Crude incidence rate: 10.6/100,000

Salmonellosis presents clinically 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 is almost invariably travel-associated.

There were 449 cases of salmonellosis species in 2008. Of these 448 were laboratory confirmed and there was one case classified as probable that was not laboratory confirmed. In addition to the cases of salmonellosis, there were five cases of *S.* Typhi and eight cases of *S.* Paratyphi notified on CIDR. The national salmonella reference laboratory (NSRL) based in Galway has been providing reference testing nationally since 2000. In 2008 the NSRL analysed 447 human specimens.

The national crude incidence rate (CIR) of salmonellosis in 2008 was 10.8/100,000 (table 1). This is similar to the CIR calculated for 2007. CIR's varied regionally. The Midlands region experienced the highest CIR of 17.5/100,000 (an increase of 8.4 /100,000 on the 2007 CIR). The Northwest region had the lowest incidence of 8.0/100,000. Of note the Northeast experienced an increase in CIR of 7.8/100,000 while the South experienced a decrease in CIR of 12.2/100,000. In 2007 HSE-S notified a large salmonella outbreak which would account for the difference in annual CIR's. CIR's for all other regions remained similar to their previous annual CIR's.

The male to female ratio for the year was 1.00:0.98. In terms of age distribution 26% of cases occurred in children under five. This is likely to be a reflection of clinicians seeking clinical samples in children under five. This is reflected in the age specific incidence (ASIR). The 0-4 age group has the highest ASIR nationally (46.0/100,000) and in all regions with the exception

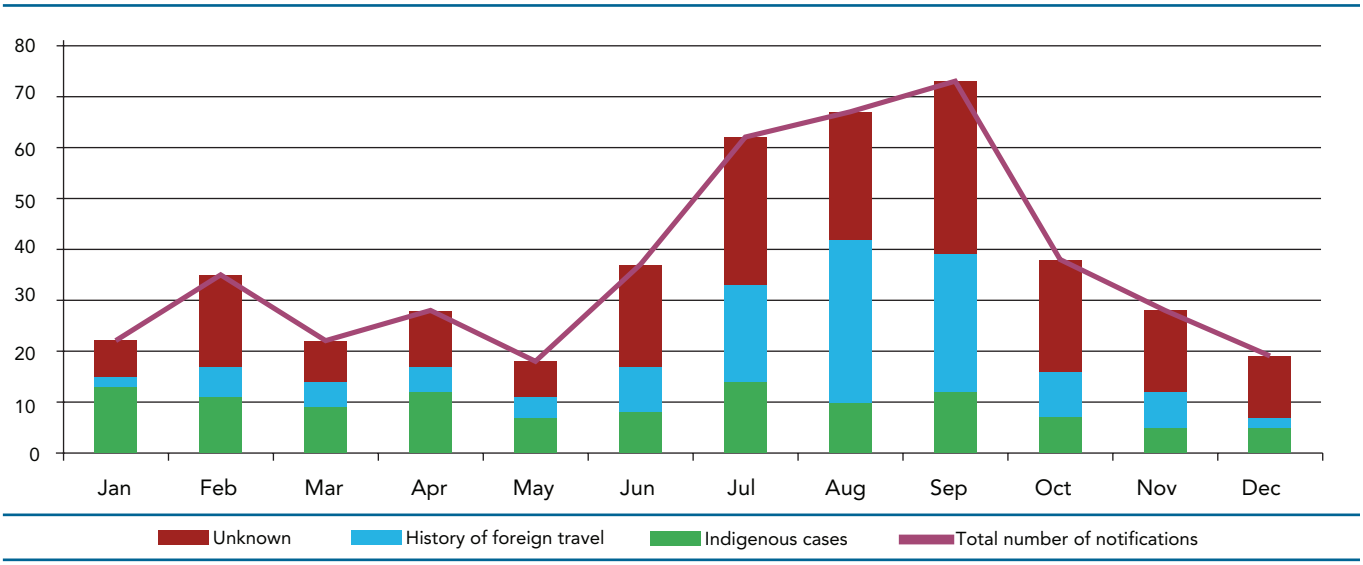

Figure 1: Seasonal Distribution of Salmonella Notifications by History of Foreign Travel, CIDR 2008

of the northwest. In this region the ASIR of the 20-24 age group was 31.2/100,000, compared to an ASIR of 23.5/100,000 in the 0-4 age group.

The seasonality of salmonellosis notifications in Ireland is shown in figure 1. It can be seen that the highest number of notifications occurred in the summer months (mid June to the start of October). These are expected seasonal increases that correlate with peak holiday periods and an increase of people travelling abroad.

Serotyping analysis is conducted at the NSRL. Review of information provided by the NSRL show serotyping was conducted on 435 isolates identifying 63 serotypes in 2008. Table 2 presents the most dominant serotypes recorded for the year. In 2008 *S.* Typhimurium (n=139) was the dominant serotype, followed by *S.* Enteritidis (n=122), *S.* Agona (n=13, please see outbreaks paragraph) and *S.* Virchow (n=10). There are 20 CIDR events which could not be definitively linked to a serotype result and are not present on the CIDR system. The 415 events which were updated with serotyping information are presented by age group in figure 2.

The NSRL conducted phage typing analysis on all *S.* Typhimurium and *S.* Enteritidis isolates. Of the 139 *S.* Typhimurium isolates phage types were assigned to 138 specimens. DT104 (20%), DT104b (20%) and DT193 (13%) were the commonest phage types observed.

All 122 *S.* Enteritidis isolated were typed. PT1 (19%), PT21 (18%), PT4 (18%) and PT8 (12%) were the dominant types.

Two hundred and fifty of the 447 human isolates analysed by the NSRL were fully sensitive to all antibiotics tested. The remaining 197 isolates exhibited some degree of antibiotic resistance. The commonest resistance pattern seen was of type Ampicillin, Chloramphenicol, Streptomycin, Sulphonamide and Tetracyclin (ACSSuT) (n=54). All isolates with this pattern were *S.* Typhimurium.

Twenty-nine *S.* Enteritidis isolates exhibited some degree of antibiotic resistance, which was mostly mild (79% were resistant to only one type of antibiotic tested). There was one S. Enteritidis isolate that was resistant to eight antibiotics tested. This case had a travel history to the Maldives and was PT1.

Please refer to the NSRLs Annual Report 2008 for more detailed analysis of results[1].

Travel history was provided on CIDR in 53% of cases in 2008. Future improvement in this data will be reflected in these analysis.

Using information provided via CIDR it is known that 25% of salmonellosis cases were indigenous to Ireland, 28% of cases had a recent history of travel and in 47% of cases the travel history was either unknown or not specified.

Figure 1 also illustrates the number of cases where a comprehensive answer to recent travel was entered on CIDR (base on event date). As expected the number of cases associated with foreign travel increases during the summer months. Where travel history was documented, people with a recent history of travel to Spain (n=21) had the greatest occurrence of salmonellosis. Portugal (n=11), Thailand (n=10) and Turkey (n=10) were countries with high rates of recent travel and subsequent development of salmonellosis (table 3). These results are likely to reflect the popularity of these countries as travel destinations.

When serotyping data are analysed by history of foreign travel, the most common serotype among indigenous cases was *S.* Typhimurium (table 4). The 2008 annual report published by the National Reference Laboratory *Salmonella* – Food, Feed and Animal Health, which is part of the Central Veterinary Research Laboratory (CVRL), show that of the 1251 *Salmonella* isolates received resulting from checks on food business operators, *S.* Kentucky (n=476) and *S.*Typhimurium (n=229) were the prevalent strains. *S.* Kentucky was

Table 1: Number of cases and CIR of human salmonellosis in Ireland, 2008 (CIDR)

HSE Area	No Cases (2008)	CIR incl. 95% CI 2008
HSE - E	149	9.9 [8.3-11.5]
HSE - M	44	17.5 [12.3-22.6]
HSE - MW	35	9.7 [6.5-12.9]
HSE - NE	60	15.2 [11.4-19.1]
HSE - NW	19	8 [4.4-11.6]
HSE - SE	43	9.3 [6.5-12.1]
HSE - S	55	8.9 [6.5-11.2]
HSE - W	44	10.6 [7.5-13.8]
Total	**449**	**10.6 [9.6-11.6]**

Table 2: Serotyping Information, NSRL2008.

Serotype	No. of Isolates
S. Typhimurium	139
S. Enteritidis	122
S. Agona	13
S. Virchow	10
S. Java	7
S. Worthington	7
S. Panama	7
S. Bredeney	6
S. Newport	6
S. Hadar	6
S. Kentucky	6
Other	87

found in 263 environmental poultry samples. *S.* Typhimurium was found in 139 porcine and 46 bovine raw meat samples/carcass swabs. These findings may account for the high indigenous rates of *S.*Typhimurium human isolates during 2008. Please refer to the CVRLs annual report for more detailed analysis[2].

Like 2007, the number of *S.* Typhi and *S.* Paratyphi's diagnosed in Ireland in 2008 remains elevated when compared to previous years. In 2008 there were five reported cases of *S.* Typhi, seven cases of Paratyphi A and one case of *S.* Paratyphi B. Three of the *S.* Typhi had known recent travel history to India, one had a recent travel history to Nigeria, and in the final case the travel history of the patient was unknown. In the *S.* Paratyphi A cases three had recent travel history to India, one case had travel history to Indonesia, one case had travel history to Pakistan and in the remaining two cases the travel history was not specified. Finally, the case of *S.* Paratyphi B had recent travel to South America

There were 22 outbreaks of Salmonella during the year resulting in 79 persons ill and an associated hospitalisation rate of 25%. This is an increase of 120% on the number of salmonellosis outbreaks reported in the previous year. Three of these outbreaks were travel related. Associated countries included Egypt, Barbados and Greece. Ten outbreaks were family outbreaks in private houses and the remaining 12 outbreaks occurred in a variety of locations. The general outbreaks, included the three travel related outbreaks (all foodborne), three were community based (all foodborne), four occurred in hospitals (n=3 person to person transmission, n=1 foodborne), one in a residential institution (person to person transmission) and one was unknown. Foodborne general outbreaks accounted for 53 persons ill.

In two of these general, foodborne, travel related outbreaks specialists at the HPSC liaised with international agencies and aided them with their investigations. As the three general community outbreaks occurred across several HSE areas, the HPSC acted as the co-ordinating body for the associated investigations.

The most significant outbreak during 2008 was that of serotype of *S.* Agona. In July 2008 the National Surveillance Reference Laboratory (NSRL) alerted the

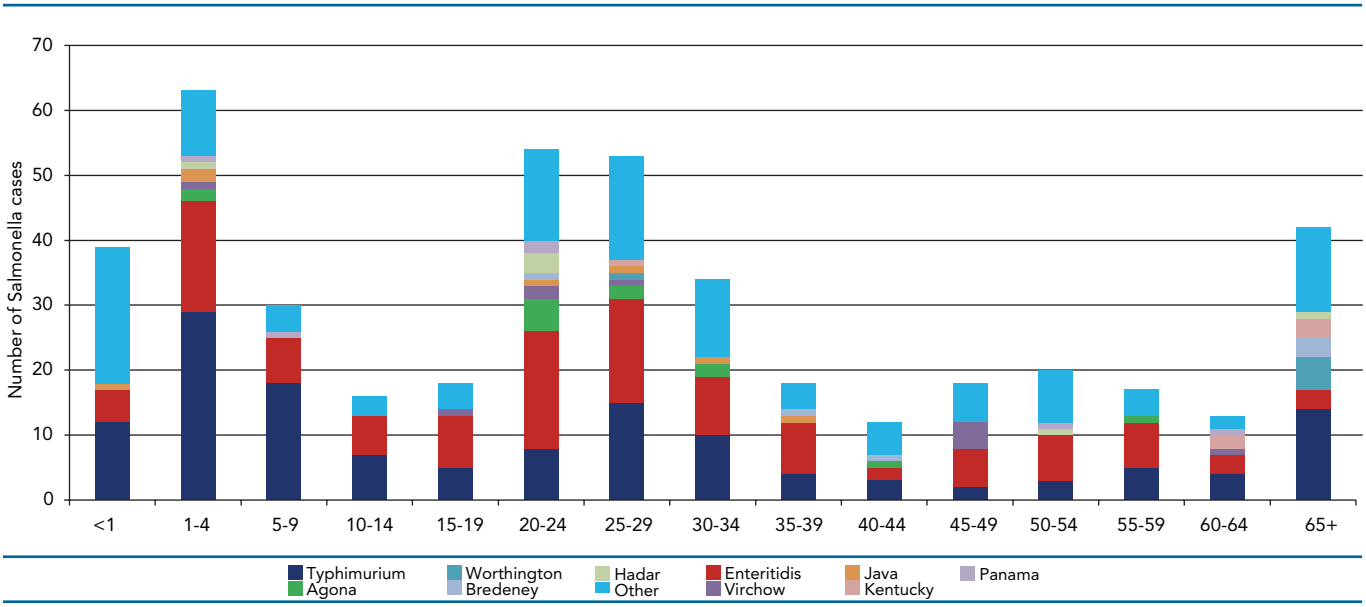

Figure 2: Salmonella Serotypes Reported on CIDR by Age Group, 2008

Table 3: Travel Associated Salmonellosis by Country, CIDR 2008

Country of Infection	% of Travel Associated Salmonella Cases
Spain	16.5% (n=21)
Portugal	8.7% (n=11)
Thailand	7.9% (n=10)
Turkey	7.9% (n=10)
Egypt	6.6% (n=8)
Greece	5.5% (n=7)
Italy	4.7% (n=6)
United states	3.9% (n=5)
Barbados	3.9% (n=5)
Tunisia	3.1% (n=4)
Other	31.5% (n=40)

Table 4: Median Age, and, Percent of S. Enteritidis, S. Typhimurium and All other Salmonella Serotypes by History of Foreign Travel Status, CIDR 2008.

	History of Foreign Travel (n=127)	Indigenous (n=113)	Not known (n=208)
Median Age (All serotypes)	27	22	25
% *S.* Enteritidis	41.31%	18.58%	22.12%
% *S.* Typhimurium	19.69%	39.82%	33.17%
% Other	37.01%	41.59%	44.71%

HPSC of a cluster of five S. Agona cases. Following contact with UK colleagues, a much larger cluster involving the UK was identified. Epidemiological investigations were conducted and alerts sent using the Food and Waterborne Diseases (FWD) network, the European Union's Early Warning and Response System (EWRS), and the European Unions' Rapid Alert System for Food and Feed (RASFF). These ultimately resulted in the identification of 11 Irish cases and 152 cases throughout England, Scotland, Wales and five other European countries. The outbreak strain was associated with two deaths. Epidemiological investigations, supported by microbiological evidence, identified meat product produced at an Irish food plant as the source of the outbreak. The company voluntarily temporarily closed the implicated section of the plant and recalled affected product.

In April four cases of *S.* Typhimurium (PTU320) were linked to a larger outbreak in the UK. Epidemiological information provided by public health departments and the HPSC contributed to a case control study conducted by the Health Protection Agency (HPA) in the UK. This study identified pre-packed egg sandwiches as the most likely source of the outbreak.

References:

1. National *Salmonella* Reference Laboratory of Ireland, Annual Report for 2008.
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3.7 Less common gastrointestinal infections

Listeriosis

Thirteen cases of human listeriosis were notified in 2008 compared to 21 in 2007 and 7 in 2006.

There were two pregnancy-related cases and two neonatal cases reported.

There were also nine adult cases, five of which were reported as elderly (>65 years) and three of which were reported as suffering from an underlying illness that predisposed them to listeriosis. No information was available on the ninth case. There were 5 males, four females, and ages ranged from 24 to 94 years of age.

One of the neonatal cases died as a result of their infection, while one pregnancy resulted in a miscarriage. There were no deaths among the adult cases.

Since 2007, the National Salmonella Reference Laboratory has offered a national service for typing of *Listeria* strains. In 2008, ten human isolates were received for typing at NSRL (77%). The serotype distribution of these strains is outlined in the table below.

Listeriosis remains a hazard for the elderly, persons with underlying illness, and other vulnerable groups such as pregnant women and neonates.

Listeriosis notifications by case type and serotype, Ireland 2008.
Typing data provided courtesy of Professor Martin Cormican and staff at the NSRL.

	Serotype 1/2	Serotype 4b	Not referred for serotyping	Total
Adult or juvenile	3	3	3	**9**
Pregnancy-related	1	1	0	**2**
Neonatal	0	2	0	**2**
Total	**4**	**6**	**3**	**13**

Giardiasis

In 2008, there were 71 cases of giardiasis notified, a slight increase on the number notified in 2007 (n=62) and in 2006 (n=64).

Cases ranged in age from 1-86 years (mean age=34 years, median age=33 years), with more males (n=39) affected than females (n=32).

Eight cases were reported associated with foreign travel: the countries of infection reported were India (n=3), Mexico (n=1), Nepal (n=1), Russian federation (n=1), Tunisia (n=1) and Turkey (n=1). Five cases were reported as being acquired in Ireland, and for the remaining 58 cases, country of infection was unknown or not specified.

In 2008, there were three small family outbreaks reported with six persons ill in total. Two outbreaks were related to foreign travel.

Yersiniosis

In 2008, there were three cases of yersiniosis, compared to six in 2007 and one in 2006.

All three cases were in the age group 45-64 years; two were female.

One case was reported as *Y. enterocolitica* and two as *Yersinia* species.

Foodborne Intoxication

Notifications of foodborne intoxications in Ireland are uncommon. In 2008, there was one case of *Clostridium perfringens* (type A) food-borne disease, one case of staphylococcal food poisoning and one case of foodborne botulism notified.

Six notifications of botulism notified in 2008 were wound botulism.[1]

[1]Barry et al. 2009. Botulism in Injecting Drug Users, Dublin, Ireland, 2008. http://www.hpsc.ie/hpsc/EPI-Insight/Volume102009/File,3376,en.pdf

3.8 Shigellosis

Summary

Number of cases 2008: 76
Number of cases 2007: 43
Crude incidence rate: 1.8/100,000

In the last decade, the number of cases of shigellosis in Ireland has been low in comparison to the number of cases notified in the early 1990s (Figure). Shigellosis, however, remains a common cause of gastrointestinal illness in developing countries, and many cases notified in Ireland are now identified as being travel-associated.

Moreover, risks also remain from food, with at least four general outbreaks having been reported in Scandanavia in 2009 associated with imported fresh produce.[1-5] The foods implicated included sugar peas and baby corn eaten raw.

Seventy-six cases of shigellosis were notified in Ireland in 2008, 63 of which were confirmed cases and 13 were probable cases reported on the basis of being epidemiologically-linked to one outbreak. This compares to 43 cases in 2007 and 54 in 2006 (Figure).

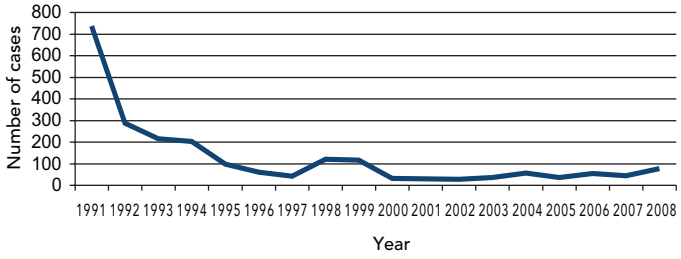

Figure: Annual number of notifications shigellosis, Ireland 1991-2008

The increase in numbers was primarily due to the occurrence of two indigenous general outbreaks in 2008.

Cases ranges in age from one to 61 years (mean age=26 years, median age=27 years), with more females (n=47) than males (n=27) notified; for two cases sex was not reported.

Information on travel history is very valuable when reviewing surveillance data for possible indigenous clusters, and data on country of infection in the national dataset is improving being available this year for almost two-thirds (49/76) of notifications. In 2008, twenty-three cases (30%) were reported associated with foreign travel (Table 1). The countries of infection reported were India (n=5), Egypt (n=3), Pakistan (n=2), Mexico (n=2), and there was one case associated with travel to each of Afghanistan, China, Ghana, Jordan, Liberia, Madagascar, Morocco, Namibia, Nigeria, Spain and Venezuela. Twenty-six cases were reported as being acquired in Ireland.

Among confirmed cases, *Shigella sonnei* was the most common species reported (n=33). There were also 22 *S. flexneri*, six *S. boydii*, and two confirmed cases

Table 1: Number of notifications shigellosis by species and country of infection, Ireland 2008

	Ireland	Africa	Asia	Other	Not known/ not reported	Total
S. boydii	1	0	3	0	2	**6**
S. flexneri	3	5	5	1	8	**22**
S. sonnei	9	4	2	2	16	**33**
Species not specified/not known	1	0	0	1	0	**2**
Probable cases	12	0	0	0	1	**13**
Total	26	9	10	4	27	**76**

for which the species was not reported. The species distribution of cases by country of infection is reported in Table 1.

More detailed typing of *Shigella* isolates can provide useful information on the relatedness of strains which can be used by public health personnel to outrule/provide evidence for links between cases during investigations of case clusters. The National Salmonella Reference Laboratory (NSRL) in University College Hospital, Galway can provide laboratory services for speciation, serotyping, antimicrobial resistance profiling, and where appropriate, Pulsed Field Gel Electrophoresis (PFGE) of *Shigella* isolates.

In 2008, 43 human *Shigella* isolates were referred to the NSRL, almost 70% of all confirmed cases. The species/serotype distribution of these cases is reported in Table 2.

There were four shigellosis outbreaks notified in 2008, details of which are provided in Table 3. Importantly, this included two general outbreaks. During investigation of the community outbreak of shigellosis in the HSE-MW, molecular typing (PFGE) of isolates was used at NSRL to compare the relatedness of strains and confirmed the likelihood that most of the cases were epidemiologically-linked.[6]

Shigella has been designated by the European Centre for Disease Control as one of six priority gastroenteric pathogens at European level (along with *Campylobacter*, *Salmonella*, VTEC, *Listeria* and *Yersinia*). The continuing potential for foodborne outbreaks means that surveillance for shigellosis remains important, both for the identification of indigenous outbreaks, and for the identification of cases/clusters that could be part of larger international outbreaks associated with internationally-distributed foodstuffs. The continued referral of *Shigella* isolates to NSRL by primary hospital laboratories has the potential to play a key role in this work, and is much appreciated.

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Table 2: Species/serotypes of isolates referred to NSRL in 2008 (Data courtesy of Prof. Martin Cormican and staff at NSRL)

Strain	Number of isolates
Shigella boydii	4
Shigella boydii 19	1
Shigella flexneri 1b	2
Shigella flexneri 2a	7
Shigella flexneri 2b	1
Shigella flexneri 3a	3
Shigella flexneri 3b	1
Shigella flexneri 4	2
Shigella sonnei	22
Total	**43**

Table 3: Shigellosis outbreaks, Ireland 2008

Month	HSE-area	Transmission Route	Location	Type	Number ill
Feb	MW	Person-person	Community	General	8
May	E	Not specified	Travel-related	Family	2
May	E	Person-person / Foodborne	Private house	Family	2
June	M	Person-person	Creche	General	24

04

Vectorborne and Zoonotic Diseases

4.1 Other Non-IID Zoonotic Diseases

Toxoplasmosis

During 2008, 49 cases of toxoplasmosis were notified compared to 49 in 2007 and 44 in 2006.

Two cases were reported as congenital cases, one of whom died.

The remaining 47 cases ranged in age from 3 years to 75 years (median, 30 years). Of the 47cases, 34 were female and 15 were male. The high number of cases reported among women of child-bearing age may reflect enhanced testing during pregnancy (see Table).

Brucellosis

During 2008, only three cases of brucellosis were notified compared to 28 in 2007 and 29 notifications in 2006.

All three cases were males in their forties and fifties. The age and sex distribution for brucellosis in recent years in Ireland suggests that occupational exposure is likely to be the main transmission route for this disease.

The case definition permits inclusion of acute and chronic cases. In 2008, two cases were reported as chronic cases; acute/chronic status was not reported for the third case.

Table: Toxoplasmosis notifications by age and sex, Ireland 2008

Age group	Male	Female	Total
<1 yr	0	2	2
1-4 yrs	0	1	1
5-14 yrs	1	1	2
15-24 yrs	7	7	14
25-44 yrs	4	18	22
45-64 yrs	3	4	7
65+ yrs	0	1	1
Total	15	34	49

Table: Brucellosis notifications by age and sex, Ireland 2008

Age group	Male	Female	Total
<5 yr	0	0	0
5-14 yrs	0	0	0
15-24 yrs	0	0	0
25-44 yrs	1	0	1
45-64 yrs	2	0	2
65+ yrs	0	0	0
Total	3	0	3

Q Fever

Thirteen cases of Q fever were notified during 2008 compared to 17 in 2007 and 12 in 2006.

Nine cases occurred in males and four in females. The cases ranged in age from two to 96 years (mean age, 50 years; median age, 48 years).

Ten cases were classified as confirmed and three as probable.

The disease is commonly acquired through occupational exposure to infected sheep and other small ruminants, e.g. by farmers, veterinarians, and abattoir workers.

Over the last three years, the south of the Netherlands has been experiencing large community outbreaks of Q fever during the summer months. Some clusters have been linked with Q fever outbreaks on goat farms. Further investigations and control measures are ongoing including the introduction of mandatory vaccination of small ruminants in the region. [1]

1. Schwimmer et al, B. 2009. Sustained intensive transmission of Q fever in the South of the Netherlands, 2009. http://www.eurosurveillance.org/images/dynamic/EE/V14N19/art19210.pdf

Echinococcosis

In 2008, there were two notifications of echinococcosis, one male and one female. Both were adults. These are the first cases of echinococcosis notified in Ireland since the disease became notifiable in 2004.

Because of the long incubation period for this disease, it is possible that infection occurred many years ago. As no enhanced information is collected on cases of this disease in Ireland, it is not possible to conjecture if their infections were acquired in Ireland or abroad.

Table: Q fever notifications by age and sex, Ireland 2008

Age group	Male	Female	Total
<5 yr	1	0	1
5-14 yrs	0	0	0
15-24 yrs	0	1	1
25-44 yrs	2	1	3
45-64 yrs	4	2	6
65+ yrs	2	0	2
Total	9	4	13

4.2 Malaria

Summary

Number of cases, 2008: 82
Number of cases, 2007: 71
Crude incidence rate, 2008: 1.9/100,000
International information on malaria is available at http://www.who.int/malaria/

In 2008, 82 cases of malaria were notified (Figure). This is an increase of 15% on the number reported in 2007, and equates to a crude annual incidence rate of 1.9 per 100,000 (95% C.I. 1.5-2.4).

Cases ranged in age from 0 to 56 years (mean 28 yrs, median 32 years), and male cases (n=48) were more common than female cases (n=34). Paediatric cases accounted for 16 cases (almost 20%), with an additional 70% of cases between the ages of 20 and 50.

Malaria, in particular that caused by *P falciparum*, can cause severe illness, and this year 49 malaria cases in Ireland were hospitalised as a result of their illness, This represents around 80% of the notifications where hospitalisation status was reported. A further seven cases were hospital out-patients, two were hospital day-patients, two were GP patients, with the hospitalisation status of the remainder not known or not reported. No deaths due to malaria were reported to HPSC in 2008.

The vast majority of infections reported in Ireland are due to recent exposure in a country endemic for malaria. As has been the case for the last few years, the vast majority of cases were exposed in sub-Saharan Africa, with a small number of cases associated with exposure in Asia and South America (Table 1). There were no cases of airport, congenital, induced or introduced malaria reported, although two *P. ovale* cases were reported as relapsed infections.

The most common species reported was *P. falciparum*, accounting for 83% of all cases notified (n=68). There were also two *P. vivax*, three *P. ovale*, two *P. malariae*, two mixed infections, and five cases where the species was not specified. *P. falciparum* has been the most common species among notifications in Ireland since species information was first collected in 2001. This reflects the fact that most infections in Ireland were acquired in Africa.

Based on information provided on the cases reason for travelling, the largest subgroup identified in 2008 was people who had travelled to visit family/friends in their country of origin –over 70% of those for whom the information was available (Table 2). This included nine children who were born in Ireland (age range 0-16

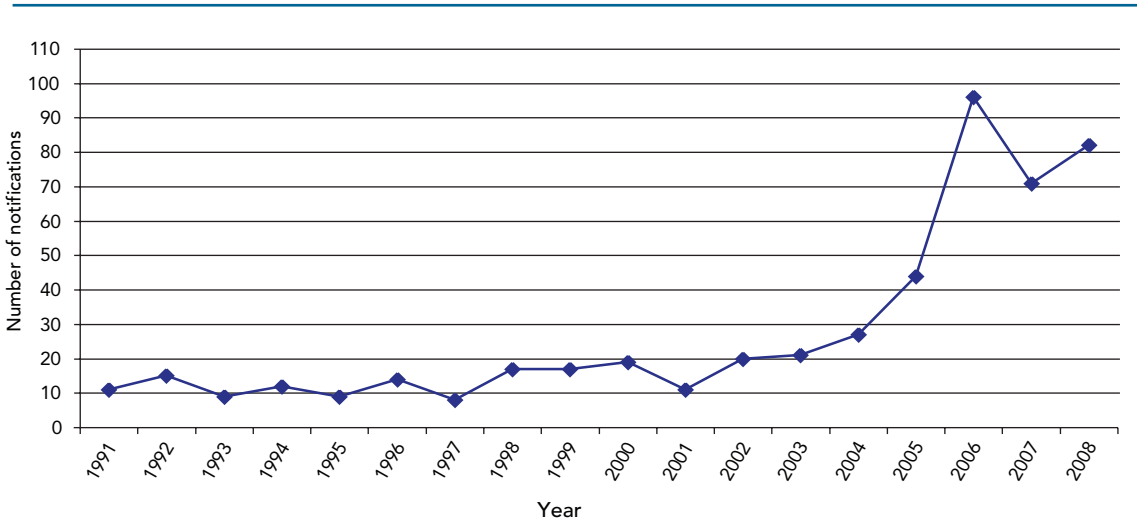


Figure. Number of malaria notifications, Ireland 1982-2008

years). Seven cases were exposed during holiday travel, two were Irish citizens living abroad, one was a visitor to Ireland from an endemic country, one was a new entrant and three reported their reason for travel as 'other' (Table 2).

Only five cases reported being fully compliant with advice received on prophylaxis. A further seven cases took prophlaxis but failed to complete the course, while 41 cases took no prophylaxis. No information was available for the remaining cases.

The epidemiology of malaria in Ireland bears many similarities with that in the United Kingdom, with the highest burden of illness being borne by people of African origin travelling to visit family in their country of origin. For more information see http://www.hpa.org.uk/hpr/archives/2009/hpr1609.pdf

Protection from biting mosquitoes and appropriate prophylaxis can minimise the risk of malaria during travel in malarious regions.

Table 1: Malaria notifications by country of exposure, Ireland 2008

Country of exposure	Number notifications	% notifications
Sub-saharan Africa	58	71%
Nigeria	*49*	*60%*
Other that Nigeria	*9*	*11%*
Asia	1	1%
South America	1	1%
Not reported	22	27%
Total	**82**	**100%**

Table 2: Malaria notifications by country of birth and reason for travel, Ireland 2008

Reason for travel	Country of birth					Total
	Nigeria	Other African country	Ireland	Other non-endemic country	Not specified	
Visiting family/friends in country of origin	25	2	9		5	**41**
Holiday travel	2	2		1	2	**7**
Irish citizen living abroad			2			**2**
New entrant	1					**1**
Foreign visitor ill while in Ireland					1	**1**
Business/professional travel					1	**1**
Other			2	1		**3**
Unknown/not specified	2	1			23	**26**
Total	**30**	**5**	**13**	**2**	**32**	**82**

4.3 Leptospirosis

Summary

Numbet of cases, 2008: 30
Number of cases, 2007: 22
Crude incidence rate, 2008: 0.71/100,000

Thirty cases of leptospirosis were notified in Ireland in 2008, compared to 22 in 2007 and 20 in 2006. Figure 1 shows the rise in the reported number of notifications in Ireland over the last number of years. The crude incidence rate for Ireland now stands at 0.71 per 100,000 (95% CI 0.45-0.96). The last year for which data is available across the EU is 2006. At that time, Ireland had the third highest incidence among those countries for whom data was available. The incidence in the EU as a whole was 0.18 per 100,000 (Figure 2).

The leptospirosis notification dataset is typically dominated by adult males, and this year is no exception. Ninety per cent of cases this year was male and the age range was 13-85 (mean age =45 years, median age=37 years). Figure 3 shows the age-sex distribution of notifications in 2008. This is consistent with the exposures most commonly associated with leptospirosis in temperate regions, e.g. occupational contact with farm animals and watersports.

Seventeen cases required hospitalization, two were reported as GP patients, and patient type was not available for the remaining 11 patients. One elderly patient died as a result of their illness.

Ten cases were believed to have acquired their illness occupationally –five of these were farmers. Nine cases reported recent watersports activity including six canoeists, two swimming outdoors and one triathlete. For three of these cases, these activities occurred outside of Ireland –two in Asia and one in the United Kingdom. For six cases, their infections were reported to have been possibly due to engaging in more common outdoor activities such as gardening, spending time by a river bank, or holidaying in a tropical destination. No risk factor information was available for the remaining five cases.

While a number of regional hospital laboratories offer a diagnostic service for leptospirosis, annually around two thirds of cases are diagnosed by the National Virus Reference Laboratory. Positive specimens are generally referred to the UK Leptospirosis Reference Unit for

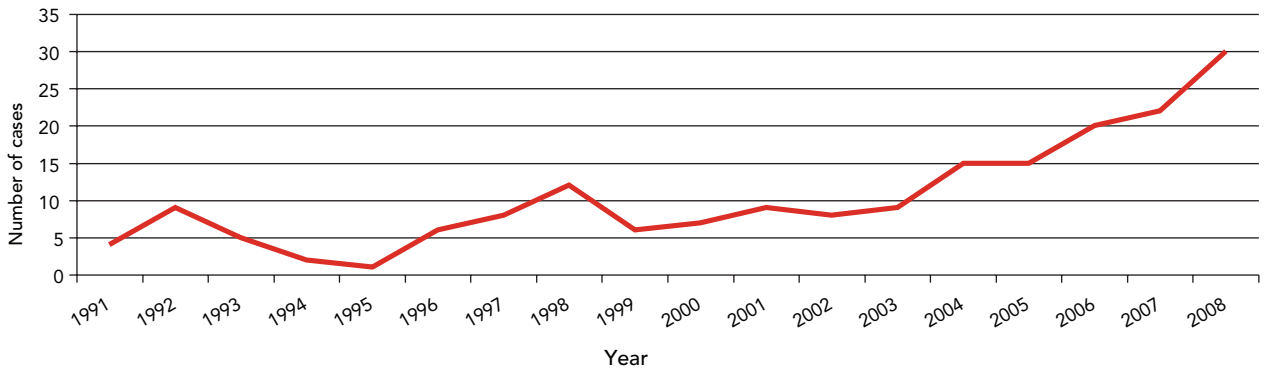


Figure 1 : Annual number of leptospirosis notifications, Ireland 1991-2008
(data source: CIDR)

confirmation and for typing where possible. Overall, species information was available for seven cases in 2008 –two cases were infected with *Leptospira interrogans hardjo*, both of which were farming-related cases. There were five cases reported as *Leptospira interrogans icterohaemorrhagiae*, three of whom reported river water contact. Species was not reported for the remaining 23 cases.

Activities that have been associated with leptospirosis risk include farming, occupations that involve contact with wet rodent-infested environments, recreational activities such as water sports, and flooding. In the last few years, travel to Asia has emerged as a risk factor for leptospirosis in Ireland. In general the incidence of leptospirosis is higher in tropical climates than in temperate areas like Ireland.

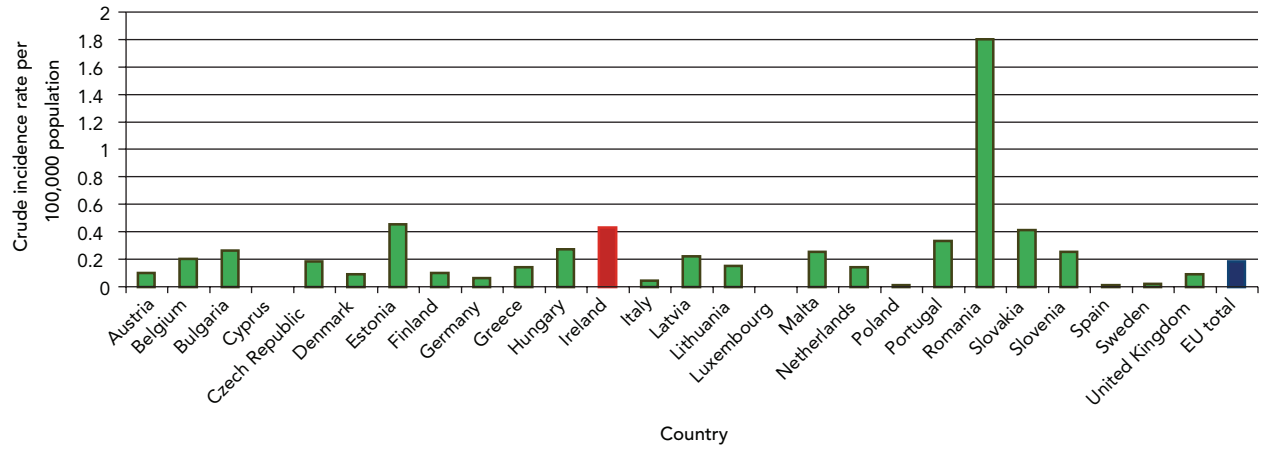


Figure 2: Crude incidence rate leptospirosis in EU member states, 2006
(Data source: ECDC - note excludes France which did not provide data to ECDC in 2006)

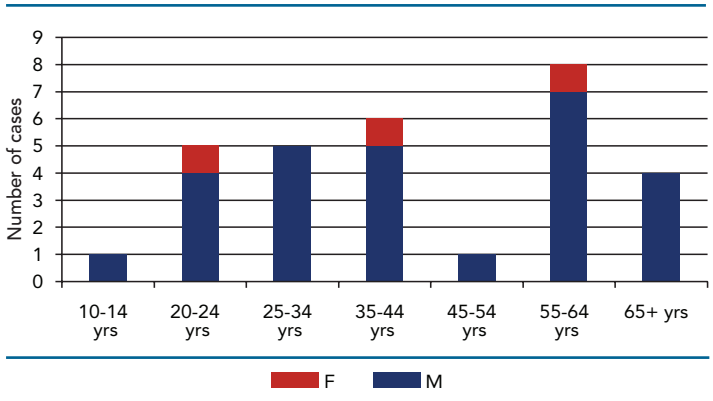


Figure 3. Age-sex distribution leptospirosis cases, Ireland 2008
(Data source: CIDR)

05

Blood-borne and Sexually Transmitted Infections

5.1 Hepatitis B

Summary

Number of cases, 2008: 949
Crude notification rate, 2008: 22.4/100,000 population
Number of cases, 2007:863

Hepatitis B is a vaccine preventable disease which is transmitted through percutaneous or mucocutaneous contact with the blood or body fluids of an infected person. The main routes of transmission are through sexual contact, from mother to baby and through injecting drug use.

Over 90% of people infected as adults clear the virus within a year of infection, but there is a high probability of developing chronic infection if hepatitis B is acquired in infancy (90%) or early childhood (25-50%). A proportion of people with chronic infection develop progressive fibrosis which can lead to cirrhosis, liver failure and hepatocellular carcinoma (liver cancer).

The prevalence of hepatitis B in the general population in Ireland is low (less than 1%) and most cases are in well defined risk groups such as people with multiple sexual partners, household or sexual partners of known cases, babies of positive mothers, injecting drug users and people who were born in hepatitis B endemic countries.

The number of hepatitis B cases reported in Ireland increased by 10% in 2008, with 949 cases (22.4/100,000 population) notified compared to 863 in 2007 (figure 1). Fifty seven percent (n=540) of notifications were from the HSE-E, corresponding to a notification rate of 36/100,000 population.

All cases were laboratory confirmed. Eighty nine percent contained information on acute/chronic status. Where status was known, 90% of cases were chronic (n=765) and 10% were acute (n=82).

Acute cases (recent infections)
Of the 82 acute cases notified in 2008, 84% (n=69) were male, 14% (n=12) were female and sex was not known for one case. The highest notification rates were in young to middle aged adults. Ninety percent (n=74) of acute cases were aged between 20 and 54 years (figure

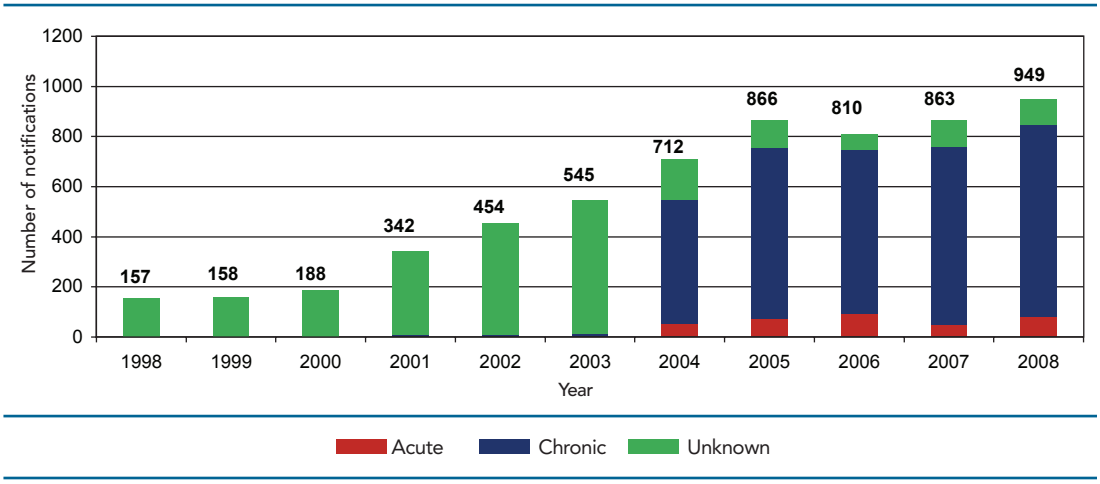


Figure 1. Number of hepatitis B notifications by acute/chronic status, 1998-2008

2). Female cases were younger than males overall, with a median age of 29.5 years compared to 33 years for males.

Information on risk factor was available for 89% (n=73) of acute cases. Of these, 66% (n=48) were likely to have been sexually acquired. Twenty nine were men who have sex with men, eighteen were heterosexual and sexual orientation was not known for one case. A further nine cases (12%) were born in a hepatitis B endemic country (hepatitis B surface antigen prevalence ≥ 2%). No risk factors were identified for eight cases (11%) despite follow up being carried out.

Country of birth was known for 85% of acute cases. Sixty six percent (n=56) were born in Ireland and 10% were born in Eastern or Central European countries. Where country of infection was known, 72% (n=38) of acute cases were infected in Ireland and 11% (n=6) were infected in Thailand. Information on reason for testing was available for 73 acute cases. Most were identified because they were symptomatic (69%, n=50) or through STI services (11%, n=8).

Chronic cases (long-term infections)

Of the 765 chronic cases notified in 2008, 51% (n=389) were male, 45% (n=343) were female and sex was not known for 4% (n=33). Ninety one percent of chronic cases were aged between 20 and 54 years when notified (figure 2). The median age for female cases was 29 years and the median age for males was 32 years. Some enhanced data were available for 56% (n=428) of chronic cases. Of these, 86% (n=369) were born in hepatitis B endemic countries or were identified as asylum seekers. Data on country of birth was available for 45% (n=345). The most common regions of birth were Eastern or Central Europe (30%, n=104), Sub-Saharan Africa (30%, n=102) and Asia (26%, n=89). Thirty seven chronic cases were known to have been born in Ireland.

Reason for testing was known for 60% (n=456) of chronic cases. Thirty three percent (n=149) were identified through antenatal screening programmes, 23% (n=103) were identified through asylum seeker screening programmes and 11% (n=51) were tested in STI settings.

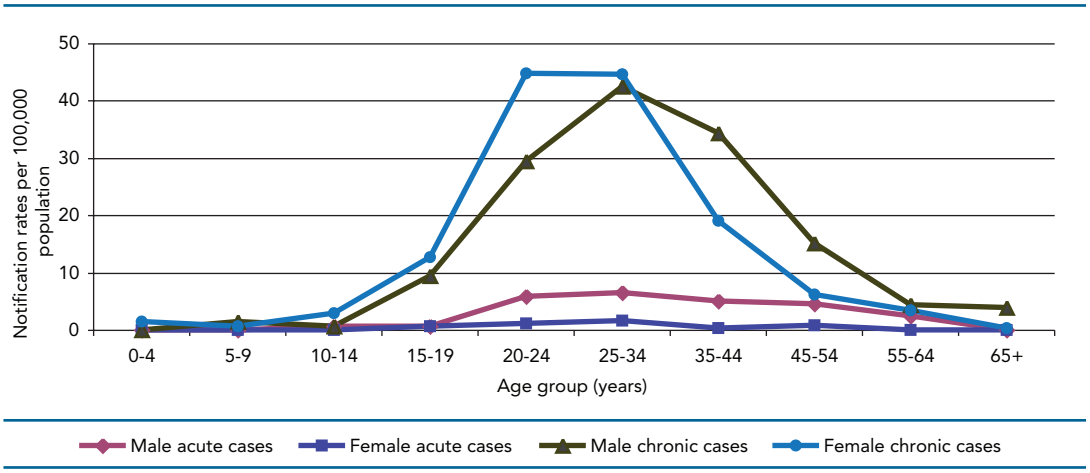


Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis B by acute/chronic status, 2008

A further 3% (n=13) of chronic cases were residents of intellectual disability institutions. Most were diagnosed as a result of routine screening and may have been infected for some time. Their ages ranged from 34 to 57 years and all were born in Ireland.

Notification rates for hepatitis B in Ireland have increased dramatically over the past decade. This is mostly due to increasing immigration from countries with intermediate or high hepatitis B endemicity and increases in sexually transmitted hepatitis B in Ireland.

Although the age at notification was similar for acute and chronic cases, this reflects age when tested and most of those who acquired their infection in endemic countries are likely to have been infected as infants or in early childhood and have now been infected for decades. This has implications for the likely future burden of disease due to hepatitis B in Ireland.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 7th August 2009. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

5.2 Hepatitis C

Summary

Number of cases, 2008: 1,537
Crude notification rate, 2008: 36/100,000 population
Number of cases in 2007: 1,556

The hepatitis C virus is primarily transmitted through sharing contaminated equipment when injecting drugs or through receipt of unscreened blood or blood products. Sexual, occupational and perinatal transmission can also occur but are less common.

Infection is initially asymptomatic in approximately 90% of cases, but between 60 and 85% of those infected fail to clear the virus and develop chronic infection. A proportion of people with chronic infection develop progressive fibrosis which can lead to cirrhosis, liver failure and hepatocellular carcinoma (liver cancer).

Hepatitis C became a notifiable disease in Ireland in 2004. The number of cases reported in 2008 was similar to 2007, with 1,537 notifications (36/100,000 population) compared to 1,556 in 2007 (figure 1).

The sex distribution of cases was very similar to previous years with a strong predominance of male cases (figure 1). In 2008, 63% (n=967) of cases were male, 35% (n=542) were female and sex was not known for 28 cases. The highest notification rates were in young to middle aged adults. Seventy two percent (n=1,101) of cases were aged between 25 and 44 years (figure 2). The median age for females was younger (32 years) than that for males (35 years).

The geographic distribution of cases was skewed, with the HSE-E reporting 77% of all cases (n=1,183) notified in 2008. Their age-standardised notification rate, of 79/100,000 population, was over 4 times that of the next highest area (figure 3).

Some information on most likely risk factor was available for 38% of cases (n=581) in 2008. The most likely risk factor for 77% (n=447) was injecting drug use. A further 3% (n=16) were either prison inmates or homeless. Although mode of transmission was not reported for these cases, both groups have high prevalences of injecting drug use.

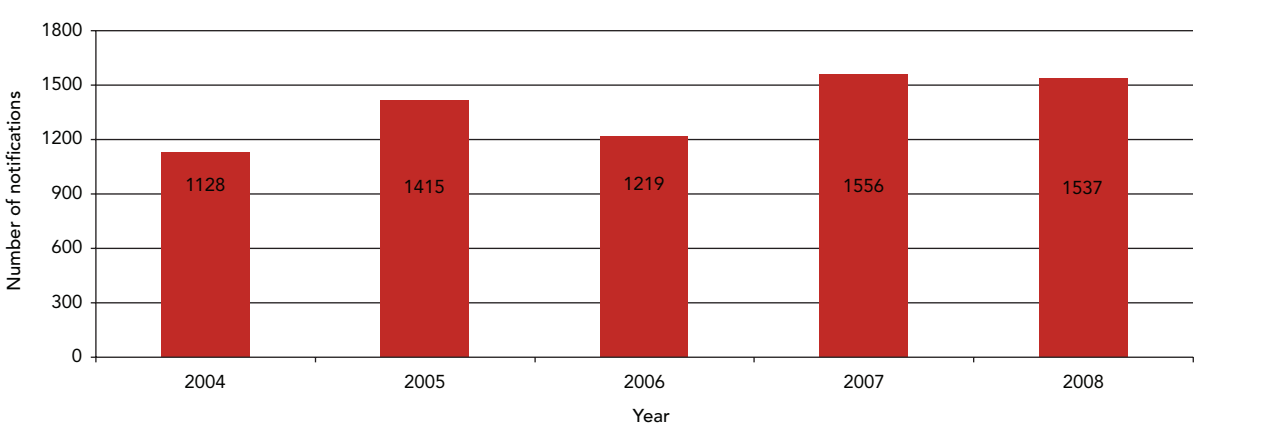


Figure 1. Number of hepatitis C notifications, 2004-2008

Twenty four cases (4%) were reported as infected through receipt of blood or blood products. Of these, twelve were infected in Ireland. No further information was available for one, but the remainder were all infected through anti-D or blood transfusions acquired many years in the past, but were notified for the first time in 2008. Nineteen cases (3%) were known to be asylum seekers and the most likely risk factor for fourteen cases (2%) was sexual exposure.

The number of cases of hepatitis C notified in 2008 remained high and, where risk factor data were available, injecting drug use remained the predominant mode of transmission. Although information on risk factor was not available for over 60% of cases, the age and sex profile of these cases did not differ significantly from those for whom information was available.

The prevalence of hepatitis C in the general population in Ireland is thought to be very low. Infection is mostly in defined risk groups such as injecting drug users and people who received unscreened blood or blood products in the past. In a report on blood-borne viral infections among injecting drug users in Ireland, the Health Research Board found that approximately 70% of injecting drug users, who attended drug treatment services between 1995 and 2005, had tested positive for hepatitis C antibodies (current or past infection).[1]

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 7th August 2009. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

1. Long J (2006). Blood-borne viral infections among injecting drug users in Ireland, 1995-2005. Overview 4. Dublin: Health Research Board

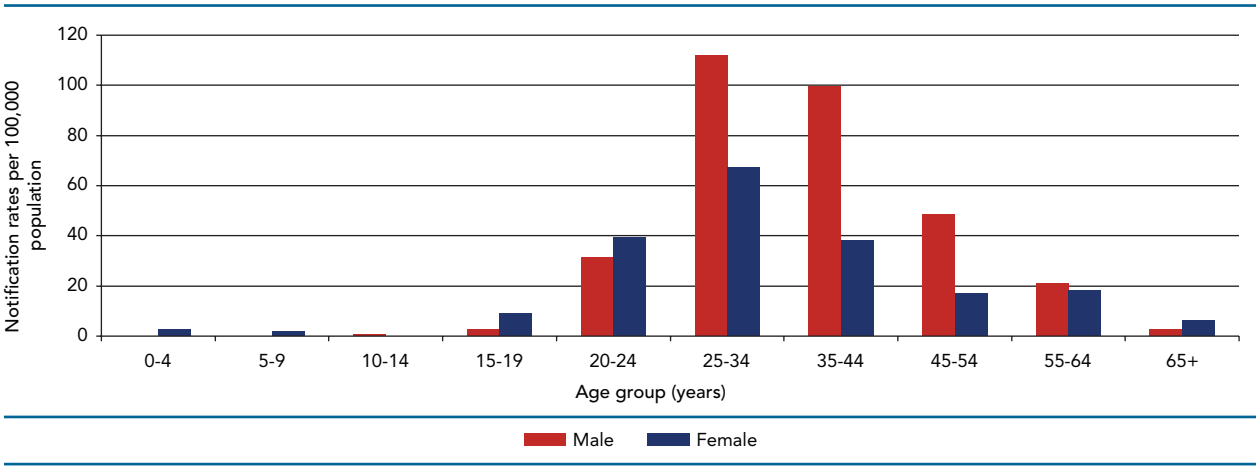


Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis C, 2008

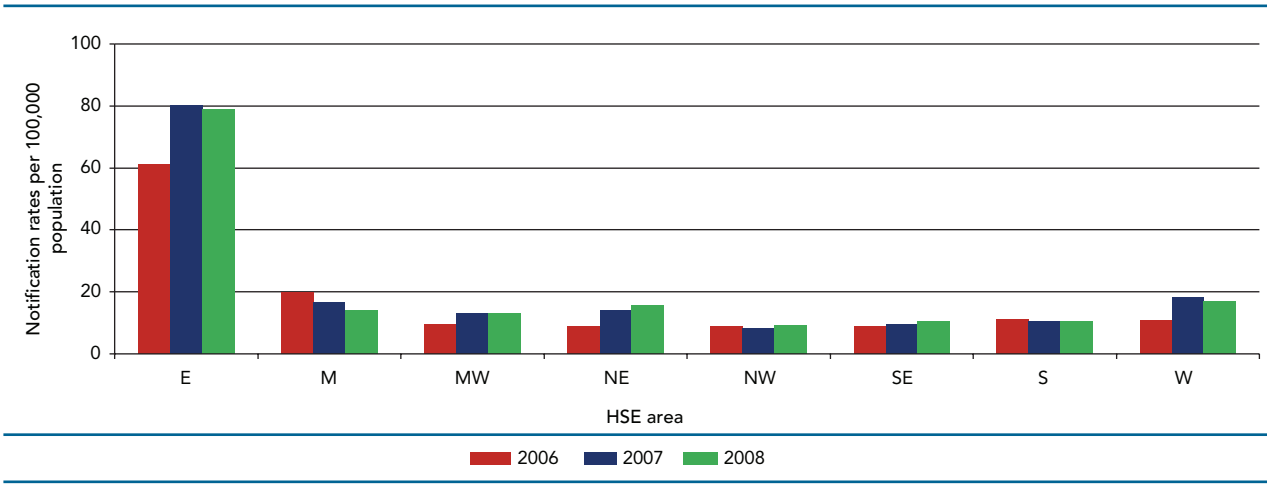


Figure 3. Notification rates/100,000 population for hepatitis C by HSE area, 2006-2008

5.3 HIV and AIDS

Summary

Number of HIV cases: 405
Crude HIV incidence rate: 9.6 per 100,000 population
Number of AIDS cases: 28
Number of deaths in AIDS cases: 3

A total of 405 new HIV diagnoses were reported to the HPSC during 2008. This compares to 391 in 2007 and represents a 3.6% increase. The rate of newly diagnosed HIV infection in Ireland in 2008 was 95.5 per million population. The cumulative total number of HIV infections reported in Ireland since surveillance began to the end of December 2008 is 5,243.

The total number of AIDS diagnoses reported to the end of 2008 is 999 with reports of 28 new AIDS diagnoses during 2008. The total number of deaths among AIDS cases reported to the end of 2008 is 411 with reports of three deaths among AIDS cases in 2008. It is important to note that there is both under-reporting and late reporting of both AIDS cases and deaths among AIDS cases.

Figure 1 shows the number of HIV and AIDS diagnoses annually in Ireland from 1990 to 2008. HIV data from 2003 to 2007 have been updated and a detailed analysis can be found in the HIV and AIDS surveillance tables on the HPSC website.

Table 1 below outlines some key findings from case based surveillance during 2008 and compares them with the most recent data from the European Centre for Disease Prevention and Control (ECDC). From these data, we can conclude that the HIV epidemic in WHO Europe, West is characterised mainly by heterosexual transmission

Figure 2 shows probable route of transmission for newly diagnosed cases among the three major risk groups, heterosexual contact, men who have sex with men (MSM) and injecting drug users (IDUs) between 2000 and 2008.

The 318 reported cases of HIV with information available on probable route of transmission indicate that

- the highest number of new HIV diagnoses (56%), was reported as due to heterosexual transmission

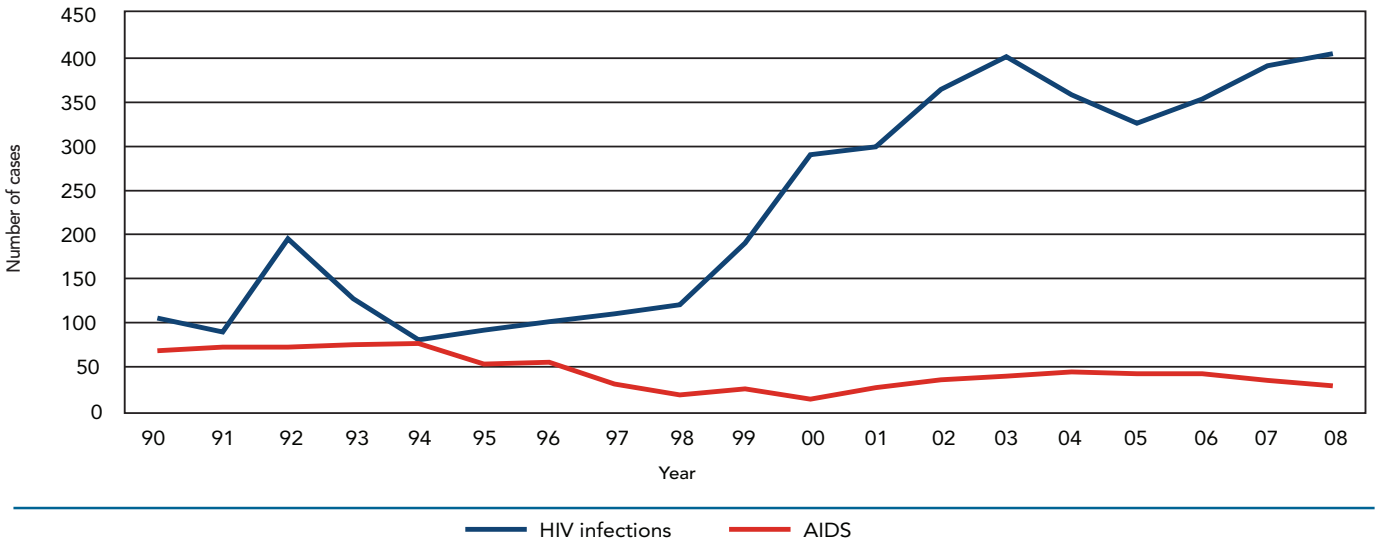


Figure 1: New HIV and AIDS diagnoses by year of diagnosis (1990 to 2008)

- thirty percent (97 cases) of new infections were among MSM
- eleven percent (36 cases) of new cases were among IDUs

HIV infection was newly diagnosed in seven children in 2008. The probable route of transmission was mother to child transmission (MCT) for all seven cases. In addition, there were 106 babies born to a HIV infected mother in Ireland during 2008: 86 are not infected, 18 remain of indeterminate status (i.e. do not meet the criteria for HIV infection and are <18 months at time of test) and two were infected.

Of the 405 cases, 36% (146 cases) were female and 64% (258 cases) were male. Gender was unknown for one case. Of the 146 female cases newly diagnosed in 2008, 21 (14.4%) were reported to be pregnant at HIV diagnosis. A breakdown of cases in 2008 by probable route of transmission and sex can be seen in Table 2.

Most of the newly diagnosed cases (67%) were aged between 20 and 39 years. The median age at HIV diagnosis among the three major risk groups was:

Heterosexual:	32 years (range 16-63 years)
IDUs:	33 years (range 21-61 years)
MSM:	34 years (range 19-67 years)

The 312 reported cases of HIV with information available on geographic origin indicate that:

- 39% (123 cases) were born in Ireland, 39% (121 cases) were born in sub-Saharan Africa, 9% (20 cases) were born in Western Europe and 5% (17 cases) were born in Central Europe.
- Of the 178 cases acquired through heterosexual contact, 63% (112 cases: 73 female, 38 male, 1 unknown) were born in sub-Saharan Africa and 21% (37 cases: 22 male, 15 female) were born in Ireland.

Information on stage of infection at time of HIV diagnosis was available for 305 of the 405 cases. Of the 305 cases, 240 were asymptomatic and 21 were diagnosed with AIDS at the time of HIV diagnosis.

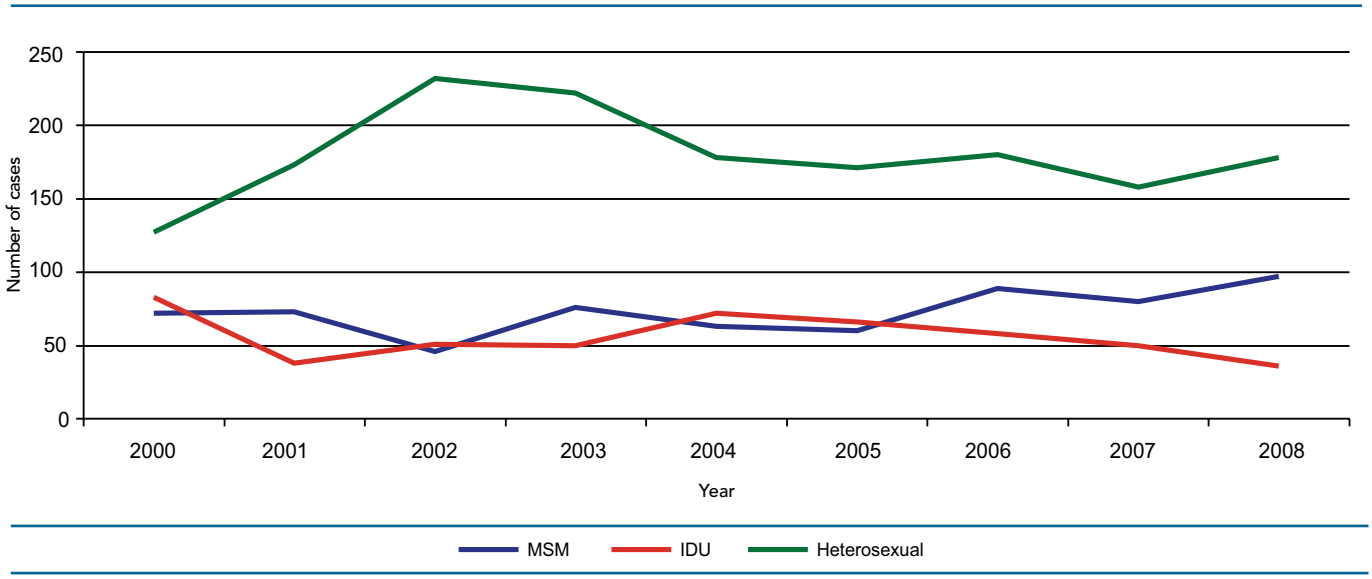


Figure 2: New HIV diagnoses in Ireland by probable route of transmission (2000 to 2008)

Table 1: Newly diagnosed cases of HIV infection reported in the WHO European Region and by geographical region

Indicator	WHO		Ireland	
	European Region 2007	European Region West 2007	2007	2008
Number of HIV cases	48,892	24,202	391	405
Rate per million	76.4	77.0	92.2	95.5
Percentage of cases				
Age 15-29 years	33%	26%	44%	39%
Female	33%	31%	38%	36%
Probable route of transmission (Unknowns excluded)				
Heterosexual	46%	51%	53%	56%
MSM	20%	40%	27%	31%
IDU	32%	8%	17%	11%

Source: ECDC 2007 report http://ecdc.europa.eu/

Discussion

Since 2002, the annual HIV total has been in excess of 320 infections. The data suggest that although the numbers are increasing, the epidemic is concentrated among a number of risk groups where the numbers may fluctuate from year to year. Due to the voluntary nature of the reporting system, it is likely that the number of case reports is an underestimate. In addition, each year 10-20% of case reports are incomplete.

Table 2: HIV diagnoses in Ireland by probable route of transmission and sex (2008)

Probable route of transmission	Sex	Number
MSM	Male	97
	Sub total	**97**
Heterosexual	Male	72
	Female	105
	Unknown	1
	Sub total	**178**
IDU	Male	27
	Female	9
	Sub total	**36**
MCT	Male	5
	Female	2
	Sub total	**7**
Unknown	Male	57
	Female	30
	Unknown	-
	Sub total	**87**
Total		**405**

More detailed information on the epidemiology of HIV and AIDS in Ireland in 2008 is available at www.hpsc.ie/hpsc/A-Z/HepatitisHIVAIDSandSTIs/HIVandAIDS/

5.4 Sexually Transmitted Infections (STIs), 2007

Summary

Total number of STI notifications in 2007: 11,915

Three most common STIs reported in 2007:

1. *Chlamydia trachomatis* infection (genital): 5,023 cases (118.5/100,000)
2. Ano-genital warts: 3,283 cases (77.4/100,000)
3. Non-specific urethritis: 1,870 cases (44.1/100,000)

Clinicians and laboratories notify their respective departments of public health of anonymised probable and confirmed cases of sexually transmitted infections (STIs). These notifications are then reported to HPSC in aggregated form on a quarterly basis. Because of delays in STI reporting, annual data are not always available nationally in a timely manner. Consequently, this report focuses on STIs notified to HPSC in 2007.

In 2007, 11,915 STIs were reported in Ireland, more than a 20% increase compared to 2006 when 9,892 STIs were reported (table 1). This increase is largely attributable to a rise in the number of chlamydia and genital herpes notifications reported between 2006 and 2007, particularly in the HSE-E Area where a significant new source of reporting emerged. Furthermore, the figures would be greater were it not for the fact that one STI clinic in the HSE-MW Area was unable to provide returns. Three infectious diseases accounted for 85.4% of all STI notifications in 2007: ano-genital warts, *Chlamydia trachomatis* and non-specific urethritis. Between 2006 and 2007, notifications for non-specific urethritis ano-genital warts, and gonorrhoea decreased by 13.5%, 6% and 3.2%, respectively. However, notifications of herpes simplex (genital), trichomoniasis, chlamydia, syphilis, and hepatitis B (acute or chronic) and chlamydia increased by 117.1%, 80.8%, 59.8%, 58.2% and 25%, respectively (table 1).

STIs in males accounted for 54% of all notifications; 44.9% were in females. Gender data were not reported for 1.2% of notifications (table 2). The number of notifications among males generally exceeded that of

Table 1. Notifiable sexually transmitted infections from 1999 to 2007

Sexually Transmitted Infection	1999	2000	2001	2002	2003	2004	2005	2006	2007
Ano-genital warts	3049	3735	3993	3932	3981	4174	3456	3494	3283
Chancroid	1	16	1	1	0	1	0	1	1
Chlamydia trachomatis infection (genital)	869	1343	1649	1922	2258	2803	3353	3144	5023
Gonorrhoea	175	290	349	214	186	270	342	431	417
Granuloma inguinale	1	0	0	0	0	1	0	0	0
Hepatitis B (acute or chronic)	2	15	39	57	112	85	80	20	25
Herpes simplex (genital)	275	269	331	358	375	411	441	455	988
Lymphogranuloma venereum	2	0	0	1	0	0	1	0	2
Non-specific urethritis	1265	1726	1634	2025	2332	2746	2106	2161	1870
Syphilis	6	46	279	303	235	144	282	134	212
Trichomoniasis	47	78	64	73	59	60	83	52	94
Total	**5692**	**7518**	**8339**	**8886**	**9538**	**10695**	**10144**	**9892**	**11915**

females for all STI diseases with the exception of *C. trachomatis*, herpes simplex (genital) and trichomoniasis (table 2). In 2007, the highest number of notifications was in the 20-29 year age group, accounting for 60.4% of all STIs notified (table 2). This age group also had the highest number of notifications for each of the STI diseases except syphilis, trichomoniasis and hepatitis B (acute or chronic) (table 2).

During 2007, over 51% (n=6,148) of all STI notifications were from the HSE-E. Four areas (HSE-E, HSE-SE, HSE-S and HSE-W) accounted for over 90% (n=10,793/11,915) of the STI notifications in 2007 (table 3). The breakdown of STI data by geographical area should, however, be interpreted with caution, as figures are largely a reflection of the area where cases availed of STI services rather than a reflection of the burden of STIs in the population in that area.

Summary Statistics on Selected STIs, 2007

Ano-genital warts

In 2007, 3,283 cases of ano-genital warts were notified (77.4/100,000 population) which accounted for 27.6% of all STI notifications reported. This number represents a decrease of 6% since 2006. More cases were notified among males than females (1,811 versus 1,470) and in the 20-29 year old age group which had 66.9% (n=2,195) of all such cases reported.

Chlamydia trachomatis infection (genital)

The crude incidence rate in 2007 for *C. trachomatis* infection was 118.5/100,000 (5,023 notifications). Chlamydia notifications constituted 42.2% of all STI notifications reported in 2007 and represent an increase of 59.8% since 2006. More cases were notified among females than males (2,877 versus 2,042) and 60% (n=3,015) of cases were reported in the 20-29 year old age group.

Non-specific urethritis

In 2007, 1,870 cases of non-specific urethritis were notified (44.1/100,000), a decrease of 13.5% since 2006. These notifications constituted 15.7% of all STI notifications reported. Considerably more cases were notified among males than females (1,698 versus 172). Sixty-three percent of cases (n=1,179) were reported in the 20-29 year old age group.

Table 2. Notified sexually transmitted infections by gender and age group, 2007

Sexually Transmitted Infection	Male	Female	Gender Unknown	0-19	20-29	30-39	40+	Age Unknown	Total
Ano-genital warts	1811	1470	2	338	2195	561	184	5	3283
Chancroid	0	1	0	0	1	0	0	0	1
Chlamydia trachomatis infection (genital)	2042	2877	104	589	3015	650	148	621	5023
Gonorrhoea	355	56	6	28	225	86	52	26	417
Granuloma inguinale	0	0	0	0	0	0	0	0	0
Hepatitis B (acute or chronic)	21	4	0	1	9	11	4	0	25
Herpes simplex (genital)	356	619	13	124	478	215	140	31	988
Lymphogranuloma venereum	2	0	0	0	0	0	2	0	2
Non-specific urethritis	1698	172	0	108	1179	426	155	2	1870
Syphilis	145	60	7	3	67	81	42	19	212
Trichomoniasis	1	87	6	2	28	32	22	10	94
Total	**6431**	**5346**	**138**	**1193**	**7197**	**2062**	**749**	**714**	**11915**
(% of Total)	**54.0%**	**44.9%**	**1.2%**	**10.0%**	**60.4%**	**17.3%**	**6.3%**	**6.0%**	**100**

Herpes simplex (genital)

The crude incidence rate for genital herpes in 2007 was 23.3/100,000 (988 notifications). The notifications constituted 8.3% of all STI notifications reported in 2007 and represent an increase of 117.1% since 2006. More cases were notified among females than males (619 versus 356) and in the 20-29 year old age group (48.3% of all such cases notified; n=478).

Gonorrhoea

In 2007, 417 cases of gonorrhoea were notified (9.8/100,000), a decrease of 3.2% since 2006. These notifications constituted 3.5% of all STI notifications reported in 2007. More cases were notified among males than females (355 versus 56) and most frequently in the 20-29 year old age group (54% of all such cases reported; n=225).

Hepatitis B

The data presented here reflect only those cases notified through STI services. Further information on the epidemiology can be found in the hepatitis B chapter of this report.

Note: Crude incidence rates calculated for the year 2007 based on census 2006 denominator data.

Table 3. Notified sexually transmitted infections by HSE Area, 2007

Sexually Transmitted Infection	HSE-E	HSE-M	HSE-MW*	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Total
Ano-genital warts	1255	1	0	3	296	464	577	687	3283
Chancroid	0	0	0	0	0	0	1	0	1
Chlamydia trachomatis infection (genital)	2741	142	215	86	80	955	413	391	5023
Gonorrhoea	273	6	11	7	4	45	29	42	417
Granuloma inguinale	0	0	0	0	0	0	0	0	0
Hepatitis B (acute or chronic)	0	0	0	0	0	4	17	4	25
Herpes simplex (genital)	761	3	0	1	2	58	71	92	988
Lymphogranuloma venereum	0	0	0	0	0	0	0	2	2
Non-specific urethritis	945	0	0	0	241	197	303	184	1870
Syphilis	122	9	0	2	4	27	24	24	212
Trichomoniasis	51	7	2	0	0	17	12	5	94
Total	**6148**	**168**	**228**	**99**	**627**	**1767**	**1447**	**1431**	**11915**
(% of Total)	**51.6%**	**1.4%**	**1.9%**	**0.8%**	**5.3%**	**14.8%**	**12.1%**	**12.0%**	**90**

* Data not available from STI Clinic in HSE-MW. Above data based on lab-confirmed reports provided by the laboratory to public health

5.5 Syphilis, 2007

Summary

Number of case-based syphilis reports with enhanced surveillance data, 2007: 146
Number of early syphilis cases, 2007: 83
Crude incidence rate of early syphilis, 2007: 2.0/100,000

Since 2000, case-based records are available nationally on syphilis cases. An enhanced surveillance system is in place whereby enhanced forms are completed by Departments of Public Health in conjunction with the clinician and are then forwarded to HPSC. The data presented in this chapter are on the case-based reports received on syphilis (some with enhanced details) which are held on a national database at HPSC. The syphilis figures presented here are not comparable with the aggregate counts of syphilis notifications provided by HSE areas as part of the routine quarterly reporting of sexually transmitted infections (See STI chapter for more details). This difference arises because case-based reports are not received for all syphilis cases notified.

The first section of this report focuses on 2007 data and the second part on the main syphilis trends between 2000 and 2007.

Syphilis 2007

In 2007, case-based reports with enhanced surveillance data were received on 146 syphilis notifications. Eighty-three (2.0/100,000 population) cases were diagnosed with early, infectious syphilis (i.e. primary, secondary and early latent stages) and the remaining 63 cases were either latent, late, tertiary, other or unknown.

The 83 cases of early syphilis were analysed in more detail since the disease is infectious at this stage and therefore has the greatest public health implications. Cases ranged in age from 18 to 60 years of age (median 31 years). The majority of cases were diagnosed in the HSE-E (89%, n=74) and the majority of the cases were also resident in HSE-E (76%, n=63). Most cases were acquired by those who were born in Ireland (66%, n=55).

Seventy-one percent of early syphilis cases (n=59/83) were men who had sex with men (MSM). These cases ranged in age between 18 and 60 years (median 33 years), with the 25-34 years age group having the highest number of cases (n=23). Primary and secondary syphilis accounted for 47% (n=28) and 41% (n=24) of these 59 MSM cases, respectively. Early latent syphilis accounted for 12% (n=7/59).

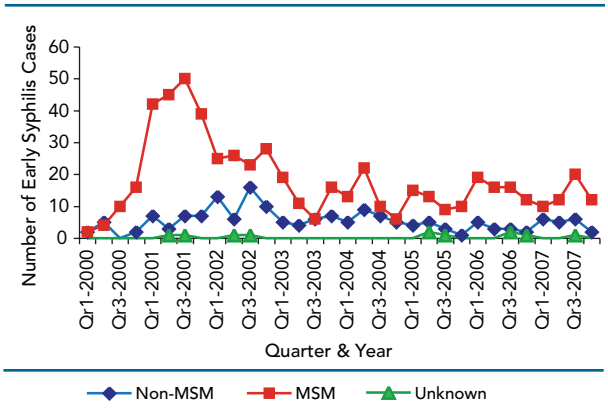


Figure 1. Quarterly number of early syphilis cases diagnosed in Ireland by sexual orientation, 2000-2007, based on completed enhanced forms (excluding nine cases without quarterly year details)

'Oral sex only' was the type of sexual behaviour reported by 32.2% (n=19/59) of these early syphilis MSM cases. The annual number of male sexual contacts among early syphilis MSM cases ranged between 0 and 300. The most common range was 1-9 partners in 66% (n=39/59) of cases overall.

Syphilis trends 2000-2007

Between 2000 and 2007, a total of 1,774 case-based reports were received on syphilis. Most syphilis cases were among males (72%; n=1,280) while females accounted for 27% of cases (n=483). Cases ranged in age from 0 to 95 years, with a median age of 33 years. The majority of cases occurred in the 25-34 year old age group (40%; n=709). Forty-nine percent (n=866) were classified as early, infectious syphilis. The other stages reported were: congenital (0.2%; n=4), latent (6%; n=99), late (20%; n=357) and other/unknown (25%; n=448).

Enhanced surveillance forms were completed for 61% (n=1,091/1,774) of individual case-based reports and 768 (70%) of these 1,091 cases were reported as early syphilis. The majority of these 768 cases were male (89%; n=690) and most male cases occurred in the 25-44 years age group (41%; n=280/690). Of the 768 early syphilis cases with enhanced data, 119 (15%) were HIV positive.

Early syphilis is far more common in the MSM population in Ireland compared to the non-MSM population (figure 1, table 1). There were 669 MSM cases reported with enhanced data between 2000 and 2007, 87% (n=582) of which were early syphilis cases.

'Oral sex only' was the type of sexual behaviour reported by 31% (n=183) of these 582 early syphilis MSM cases. The annual number of male sexual contacts ranged between 0 and 300. Overall, the most common range was 1-9 partners in 58% (n=340/582) of cases.

Nine percent (n=55/582) of early syphilis MSM cases reported were the result of re-infections. The most frequent reason for attendance for STI services was self-referral (37%; n=218/582), followed by contact referral (13%; n=73), Gay Men's Health Clinic (12%; n=70) general practice (10%; n=60) and routine visit (10%; n=58) attendance.

A total of 103 early syphilis MSM cases (18%) were reported to be HIV positive between 2000 and 2007. Concurrent STIs were relatively common with 21% of MSM with early syphilis (n=121/582) having an STI other than HIV. Past STIs were also quite common with 42% (n=244/582) of MSM with early syphilis reporting a previous history. In addition, 51 of these 244 cases with a past history of STIs were HIV positive, ten of which were reported being infected more than once with syphilis.

Table 1. A breakdown of early syphilis cases by sexual orientation in Ireland, 2000-2007, based on completed enhanced forms

Diagnosis	Heterosexual Male	Heterosexual Female*	Heterosexual Unknown	MSM**	Unknown	Total
Primary	40	12	0	224	5	281
Secondary	29	27	1	217	0	274
Early Latent	28	35	0	132	5	200
Other	0	2	0	9	2	13
Total	97	76	1	582	12	768

**includes one female bisexual, primary case*
*** includes 48 male, bisexual cases*

06

Other infections

6.1 Viral Encephalitis

Summary

Number of cases, 2008:5
Number of cases, 2007:8
Number of cases, 2006:16
Crude incidence rate, 2008: 0.12/100,000

Not all viral infections are notifiable, but some can and do cause encephalitis. In this chapter, the focus is on those viral pathogens that cause encephalitis, but are not notifable in their own right.

In 2008, five cases of viral encephalitis (caused by non-notifiable organisms) were notified in Ireland, which is a crude incidence rate of 0.12 per 100,000 total population. The number of viral encephalitis notifications in 2008 is just over half that which was reported in 2007, and a third of cases notified in 2006. The decrease in viral encephalitis in 2007, compared to 2006 was particularly related to a decrease in varicella zoster virus associated encephalitis notifications.

Of the five cases notified in 2008, three cases occurred in males and two in females giving a ratio of 1.5:1.0.

Cases ranged in age from two weeks to 61 years. Three of the five cases occurred in children <=5 years of age and the remainder occurred in adults >=15 years of age (table 1). The highest incidence rates were in infants aged <1 years (3.27.100,000) and also in children aged 5-9 years (0.35/100,000) (table 1).

The causative agent was identified in all five cases of viral encephalitis notified; herpes simplex virus (n=3) and enterovirus (n=2). Three of the cases due to herpes simplex occurred in children <10 months of age and in two adults aged >=15 years. Another two cases were caused by enterovirus and occurred in children <=5 years of age. No deaths from viral encephalitis were notified between 1997 and 2008.

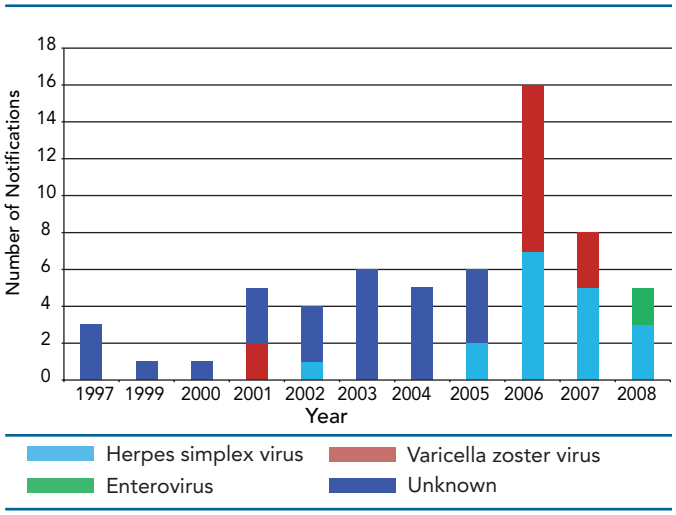


Figure 1. Number of invasive meningococcal disease (IMD) notifications in Ireland by serogroup, 1999-2008

6.2 Viral Meningitis

Summary

Number of cases, 2008:97
Number of cases, 2007:45
Number of cases, 2006:148
Crude incidence rate, 2008: 2.3/100,000

Not all viral infections are notifiable, but many can and do cause meningitis. In this chapter, the focus is on those viral pathogens that cause meningitis, but are not notifable in their own right.

In 2008, 97 cases (2.3/100,000 total population) of viral meningitis were notified in Ireland. Most of the cases were classified as confirmed (89%, n=86), 10 (10%) as probable and one (1%) where the case classification was not specified. The numbers of cases in both sexes were similar with 49 cases in males and 47 in females, giving a ratio of 1.04:1.0. Gender was not reported for one case.

Cases ranged in age from two weeks to 79 years with a median age of 12 years. Two cases in 2008 had no age details. Eighty one percent (n=79) of all cases were <35 years of age. Children <1 year of age had the highest incidence rate: 44.2 per 100,000, followed by those in the 1-4, year group, 3.3/100,000 (table 1).

In 2008 the overall incidence of viral meningitis in Ireland was highest in the HSE-NE area (4.1/100,000) followed by the HSE-E area (3.2/100,000) (table 2).

Of the 97 cases notified in 2008 the causative agent was reported as enterovirus (n=60; 62%), herpes simplex virus (n=8; 8%), varicella zoster virus (n=7; 7%), echovirus (n=1; 1%), and unknown (n=21; 21%) (table 1).

In Ireland, viral meningitis activity tends to be highest in the second half of the year. In 2008 the numbers of cases peaked in July (n=24), August (n=14), October (n=15) and November (n=12), with an average of 12 cases per month (total n=75) between July and December. In contrast, viral meningitis was low d uring the first six months of the year with a monthly average of four cases (total n=22).

Although the number of viral meningitis cases fluctuates from year to year, the number of cases notified in 2008 (n=97) exceeded the yearly average (n=66) between 1997 and 2008 (range 23-161) (figure 1).

High numbers of cases occurred in 2000 (n=98), 2001 (n=161) and 2006 (n=148). These upsurges in notifications coincided with an increase in reports by the National Virus Reference Laboratory (NVRL) of

Table 1. Number and age specific incidence rates of viral meningitis notifications by causative organism, 2008

Age Group	Entero-virus	Herpes simplex virus	Varicella zoster virus	Echo-virus	Unknown	Total	ASIR
<1	21	1	0	1	4	27	44.2
1-4	5	0	0	0	3	8	3.3
5-9	6	0	0	0	1	7	2.4
10-14	5	0	1	0	1	7	2.6
15-19	3	2	1	0	1	7	2.4
20-24	5	1	1	0	4	11	3.2
25-34	8	2	0	0	2	12	1.7
35-44	4	0	1	0	0	5	0.8
45-54	0	1	1	0	1	3	0.6
55-64	1	0	1	0	0	2	0.5
65+	2	1	0	0	3	6	1.3
Total	**60**	**8**	**7**	**1**	**21**	**97**	**2.3**

ASIR, age specific incidence rate

laboratory confirmed non-polio enterovirus isolates. Towards the end of 2005 NVRL introduced PCR testing of CSF samples for enteroviral nucleic acid. This was in addition to the routine method of viral isolation from stool samples.

Based on data obtained from NVRL, it is evident that there was some under-reporting of viral meningitis cases in 2008, when 157 cases were diagnosed (excluding three cases caused by the mumps virus): 78 (49.7%) were attributable to enterovirus, 46 (29.3%) to herpes simplex virus, 28 (17.8%) to varicella zoster virus, four (2.5%) to Epstein-Barr virus and one (0.6%) to cytomegalovirus.

No deaths due to viral meningitis were reported in 2008. Only one death from viral meningitis (a probable case) has ever been notified since 1997, the causative organism of which was not reported.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 6th July 2009.

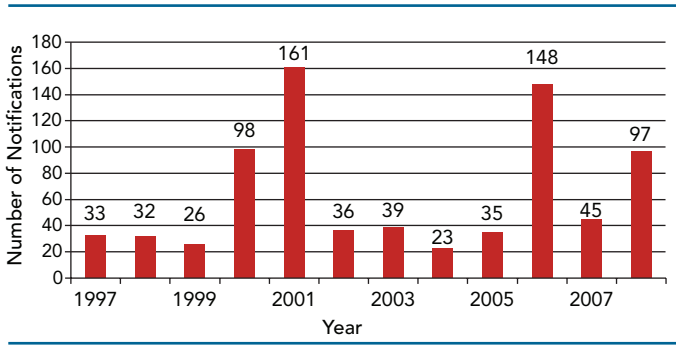


Figure 1. Annual number of viral meningitis notifications, 1997-2008

Table 2. Age specific incidence rates of viral meningitis notifications by HSE area, 2008

HSE Area	<1	1-4	5-9	10-14	15-19	20-24	25+	Total
E	107.6	6.0	2.1	2.3	1.0	1.4	1.2	3.2
M	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.4
MW	0.0	0.0	0.0	4.2	7.8	3.5	0.0	1.1
NE	31.5	11.8	6.7	3.7	3.7	7.1	1.6	4.1
NW	29.7	0.0	5.8	0.0	0.0	0.0	0.7	1.3
SE	14.8	0.0	3.0	3.1	0.0	3.1	1.7	2.0
S	0.0	0.0	0.0	5.0	2.4	4.2	0.7	1.3
W	0.0	0.0	3.6	0.0	6.8	6.2	1.1	1.9
Ireland	**44.2**	**3.3**	**2.4**	**2.6**	**2.4**	**3.2**	**1.0**	**2.3**

6.3 Creutzfeldt-Jakob disease

Summary

Number of cases, 2008: 2
Number of cases, 2007: 3

Two cases of Creutzfeldt-Jakob disease (CJD) were notified in 2008 compared to three cases in 2007. Both cases in 2008 were aged greater than 64 years and were sporadic CJD cases.

In total, 43 cases of CJD were notified since CJD was first specified as a notifiable disease in December 1996. Figure 1 shows the 43 CJD notifications by age group. Over 80% (n=36) of the cases were aged greater than 54 years. Of the 43 cases, 23 were male and 20 were female. Forty cases were sporadic CJD, two were familial CJD and one was iatrogenic CJD.

Variant CJD (vCJD) is specified as a separate notifiable disease. No cases of vCJD were notified in 2008. Four cases of vCJD were notified since vCJD became notifiable in December 1996. A summary of these four cases was provided in the 2006 HPSC annual report.

Data presented in this summary are based on notifications from HSE Areas and from the Irish National Creutzfeldt-Jakob Disease Surveillance Unit. The figures were extracted from the Computerised Infectious Disease Reporting (CIDR) system on the 17th August 2009 and may differ slightly from those published previously due to ongoing updating of notification data on CIDR. Annual figures published here are based on the year the notification was entered on CIDR and consequently may differ from annual figures published by the Irish National Creutzfeldt-Jakob Disease Surveillance Unit.

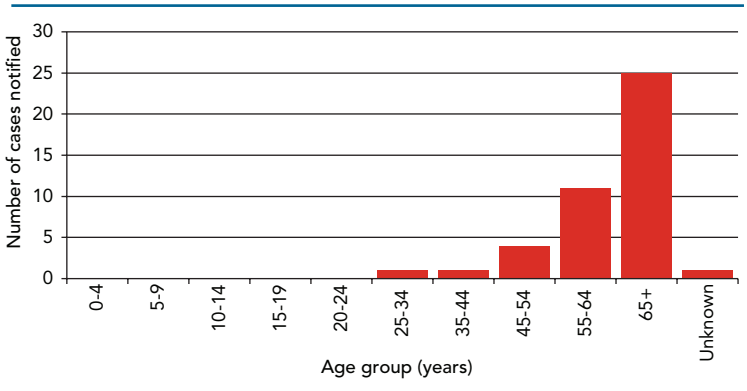


Figure 1. Number of CJD notifications (n=43) from December 1996 to 2008 by age group

07

Infectious Disease Outbreaks

7. Outbreaks

Summary

Number of outbreaks, 2008: 380
Number of IID outbreaks: 281
Number of non-IID outbreaks: 99

During 2008 there was a significant increase in outbreak activity throughout the country. Outbreaks of infectious disease are notifiable under the Infectious Diseases Regulations (amended 2003). These regulations define an outbreak as two or more linked cases of the same illness or the situation where the observed number of cases exceeds the expected number, or a single case of disease caused by a significant pathogen. Outbreaks are classified as infectious intestinal disease (IID) or non-infectious intestinal disease (non-IID).

Table 1 summarises national outbreak data reported via CIDR for the year. A total of 380 outbreaks meeting the outbreak definition were notified in 2008. This represents a 47% increase on the number of outbreak notifications in 2007. These outbreaks were responsible 4517 cases of illness, a 4% decrease on the previous year's rate of outbreak associated illness. General outbreaks had 4282 associated cases of illness. Family outbreaks had 235 associated cases of illness.

Table 2 presents outbreaks by outbreak type and pathogen type. In 2008 there were 99 non-IID outbreaks reported, representing a three-fold increase in non-IID outbreak notifications since 2007 and accounting for the overall increase in outbreak notifications observed.

The increase in non-IID outbreaks is reflected in the national outbreak crude incidence rate (CIR) of 9.0/100,000 in 2008 (compared to a CIR of 6.1/100,000 in 2007). Seven of the eight health regions experienced a rise in CIR. The north-west region experienced not only the highest regional CIR rate for the year but also the largest increase in CIR from 9.3/100,000 in 2007 to 23.6/100,000 in 2008 (figure 1).

Norovirus and mumps were responsible for the two largest outbreaks where numbers ill exceeded 100 persons. In 2007 there were seven outbreaks that caused this level of infection, 86% of which were caused by norovirus. The largest mumps outbreak started in October 2008 in a university/college with 143 cases of mumps cases reported. The largest norovirus outbreak

Table 1: All outbreaks of Infectious Disease, number of IID and non-IID outbreaks, and total numbers ill in all outbreaks reported by health region (2008)

HSE Region	No of Outbreaks	Outbreak Rate	Total number ill	No of IID Outbreaks	Total number ill IID Outbreak	No of non-IID outbreaks	Total number ill non-IID Outbreak
East	107	7.2	1384	66	1044	41	340
Midland	20	7.9	144	18	125	2	19
Midwest	20	5.5	153	18	102	2	51
HPSC	6	~	55	6	55	0	0
Northeast	32	8.1	516	27	417	5	99
NWHB	56	23.6	865	41	672	15	193
SEHB	38	8.2	393	32	370	6	23
SHB	57	9.2	765	53	721	4	44
WHB	44	10.6	242	20	163	24	79
Total	**380**	**9.0**	**4517**	**281**	**3669**	**99**	**848**

occurred in May in a factory location. There were 291 cases of illness in this outbreak.

Private homes, hospitals and community hospitals/ long stay units were locations where most outbreaks occured in 2008 (Table 3). While private homes experienced the greatest number of outbreaks, they only account for 5% of outbreak cases. Healthcare facilities such as hospitals, long-stay units/community hospitals and residential institutions all had high numbers of outbreaks and high levels of illness associated.

During 2008 universities/colleges experienced a significant upsurge in outbreaks mainly due to mumps. There were 19 outbreaks nationally of mumps in these institutions (including one university/community outbreak) with 429 reported cases. There was one reported outbreak of norovirus in a university/college with 43 cases.

Significantly the number of outbreaks occurring within crèches (n=28) doubled compared to 2007. When examined by causative pathogen the largest outbreaks were caused by acute infectious gasteroenteritis (AIG) (n=7 and 107 cases of illness), norovirus (n=3 and 47 cases of illness) and EHEC (n=5 and 22 cases of illness). Shigellosis, cryptosporidiosis, mumps individually caused one outbreak each. Varicella/ chickenpox (confirmed and suspected), hand foot and mouth (confirmed and suspected) and tinea/ringworm, cumulatively caused ten outbreaks and 86 cases of illness in crèches. Varicella (n=5) was the most common cause of these ten outbreaks, accounted for 71% of cases.

IID-Outbreaks

There were 281 IID outbreaks (table 4). Norovirus (including suspected Norovirus and mixed outbreaks with Norovirus listed as an agent) remained the largest cause of IID outbreaks in Ireland. In 2008 164 of these outbreaks caused 2873 cases of illness (compared to 1644 cases of illness associated with all other outbreaks during the year).

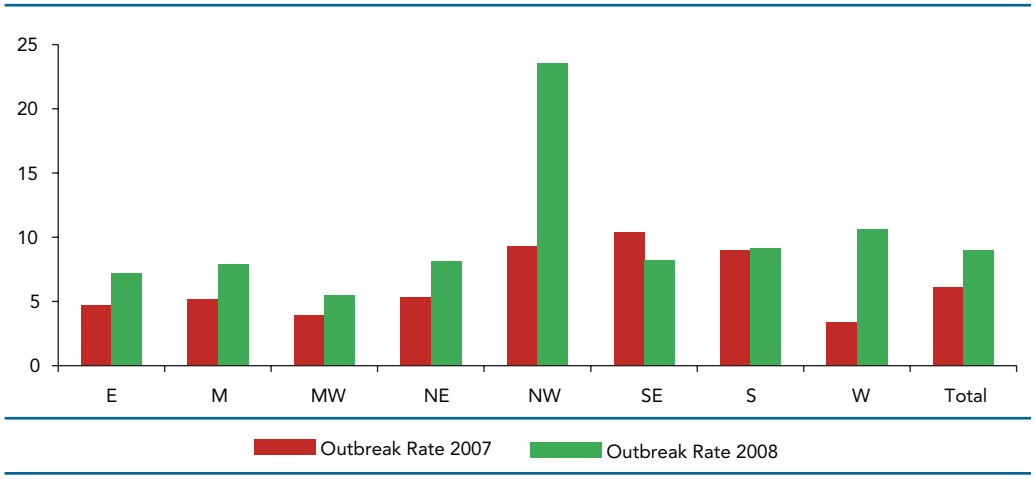


Figure 1: Outbreak CIR by region, 2007 and 2008.

Table 2: Number of outbreaks and persons ill by pathogen type and outbreak type, 2008.

Outbreak Pathogen Type	General		Family		Total ill
	No. of Outbreaks	Number ill	No. of Outbreaks	Number ill	
IID	215	3502	66	167	3669
Non IID	74	780	25	68	848
Total	**289**	**4282**	**91**	**235**	**4517**

After norovirus (n=164), the next most commonly reported IID outbreak pathogens were EHEC (n=42), salmonellosis (n=22), AIG (n=14), rotavirus (n=8), cryptosporidiosis (n=8) and campylobacter (n=7) (table 5). The number of outbreaks due to EHEC reported in 2008 (n=42) was double the number reported in 2007 (n=21) and resulted in a 14% increase in numbers ill.

Person to person contact was reported as the most frequent mode of transmission for IID outbreaks, foodborne was the second most common. Mixed person to person and waterborne mode of transmission (which was not documented in 2007) was specified in six outbreaks (EHEC n=5, cryptosporidiosis n=1). All six outbreaks were family outbreaks in private homes. In four of the five EHEC outbreaks, the households' private wells tested positive for EHEC. In the fifth case, a private well was the suspected source. No further information was available on the cryptosporidium outbreak.

There was a 73% increase on the number of outbreaks where the mode of transmission was listed as mixed person to person and airborne. These were caused primarily by norovirus (92%, including one mixed norovirus and *C. difficile* outbreak). All but three of these outbreaks were general outbreaks and occurred mainly in the healthcare facilities.

Hospitals (n=70), private homes (n=62), community hospitals/long stay units (n=48) and residential institutions (n=42) were the commonest place of occurrence of IID outbreaks. In hospitals 86% of outbreaks were attributable to norovirus, 6% to *C. difficile* and 3% due to salmonellosis.

There were 22 outbreaks of *Salmonella* during the year (four travel related) resulting in 79 persons ill (hospitalisation rate of 25%). This is an increase of 120% on the number of salmonellosis outbreaks reported in the previous year. Ten outbreaks were family outbreaks in private houses. In eight of the 12 general outbreaks the suspected mode of transmission was foodborne (three being related travel related).

Eight outbreaks of cryptosporidiosis were reported in 2008: four general outbreaks and four family outbreaks. All were small outbreaks, and between them accounted for 29 cases. Two small outbreaks occurred in crèches and were believed to be due to person-to-person spread, as was one of the family outbreaks.

Forty-two VTEC outbreaks were reported in 2008. Nine outbreaks were described as general outbreaks and 33 as family outbreaks. Twenty-nine outbreaks were due to VTEC O157, seven due to VTEC O26, and six were caused by a mixture of VTEC strains. Person-to-person spread was suspected to have played a role in 21 VTEC outbreaks. The second most common transmission route reported for EHEC outbreaks in 2008 was waterborne (n=8).

In July 2008 the National Surveillance Reference Laboratory (NSRL) alerted colleagues in the HPSC of a cluster of five *S.* Agona cases. Following contact with UK colleagues, a much larger cluster involving the UK was identified. A joint outbreak investigation involving HPSC, NSRL, the HSE, the Food Safety of Authority of Ireland, the Department of Agriculture and Food and sister agencies in the UK was conducted. Alerts were sent using the Food and Waterborne Diseases (FWD) network, the European Union's Early Warning and Response System (EWRS) and the European Unions' Rapid Alert System for Food and Feed (RASFF). These ultimately resulted in the identification of 11 Irish cases and 152 cases throughout England, Scotland, Wales and five other European countries. The outbreak strain was associated with two deaths. Epidemiological investigations, supported by microbiological evidence, identified meat product produced at an Irish food plant

Table 3: Location of All Outbreaks, 2008

Outbreak Location	% of Outbreaks	% ill
Private house	23.2% (n=88)	5% (n=227)
Hospital	19.5% (n=74)	25.9% (n=1168)
Comm. Hosp/Long-stay unit	13.4% (n=51)	17.2% (n=775)
Residential institution	12.1% (n=46)	15.1% (n=681)
Other	8.7% (n=33)	14.6% (n=658)
Creche	7.4% (n=28)	6.5% (n=294)
University/College	5% (n=19)	9.6% (n=431)
Community outbreak	3.7% (n=14)	1.8% (n=79)
School	2.9% (n=11)	1.5% (n=68)
Hotel	1.6% (n=6)	2.1% (n=96)
Travel related	1.6% (n=5)	0.4% (n=20)
Unknown	1% (n=3)	0.1% (n=6)
Not Specified	0% (n=1)	0.0% (n=2)
Restaurant / Cafe	0% (n=1)	0.0% (n=2)

as the source of the outbreak. The company voluntarily closed the implicated section of the plant temporarily and recalled affected product.

During 2008 there were seven family outbreaks of *Campylobacter* notified on CIDR with 14 associated cases of illness. These were all small clusters of illness with no more than two people ill in any outbreak.

There were eight outbreaks of rotavirus notified in 2008 accounting for 97 cases of illness. Four of the seven outbreaks occurred in crèches, two were private family outbreaks, an outbreak occurred in a long stay community hospital with 45 cases of illness. The location of the final outbreak is unknown.

Non-IID Outbreaks

Non-IID outbreaks occurred mostly in educational and childcare settings (n=40), and, private houses (n=26). Table 5 presents all outbreaks occurring during 2008 due to non-IID agents.

In 2008, there were five outbreaks of hand, foot and mouth disease notified, only one of which was laboratory confirmed. Four occured in crechés and one within a school. In total there were 24 ill. These are the first outbreaks of (suspected) hand, foot and mouth disease outbreaks notified since 2006.

In 2008, mumps emerged as the leading cause of non-IID outbreaks (table 5). As mentioned previously the number of reported non-IID outbreaks in Ireland increased three fold during 2008. The number of mumps outbreaks increased from only three in 2007 (with ten cases of illness) to a total of 57 in 2008 causing 580 cases of illness. Of the mumps outbreaks, 49% (n=28) occurred in educational institutions (including schools, summer schools and university/colleges), 30% (n=17) in private houses and 11% (n=6) in the community. Of the 580 cases of illness due to mumps, 480 were linked to educational settings. The second largest reported outbreak in 2008 was due to mumps in a university/college with 143 cases of mumps illness. One mumps outbreak involved a mixed location, occurring within a university and a community, causing 41 cases of illness. As some of the mumps outbreaks continued into 2009 the final number of cases associated with these outbreaks may change.

In 2008 an outbreak of wound botulism due *Clostridium botulinum* type b occurred in intravenous drug users in the Dublin area. There were six cases of illness, five of which were hospitalised and one patient died. Three cases were laboratory confirmed. Patients were aged between 23-42 years of age and presented to four different hospitals across the city. A contaminated batch of heroin was thought to be the most likely source of the outbreak but this was not confirmed. Botulism in Ireland (both foodborne and wound) is extremely rare in Ireland and had not been seen in injecting drug users since 2002.

Table 4: Pathogens associated with IID outbreaks notified on CIDR in 2008

Disease	No. Family Outbreaks	No. General Outbreaks	Total No. Outbreaks 2008	No ill 2008
AIG-Unknown	0	14	14	297
Adenovirus	2	0	2	5
Campylobacter	7	0	7	14
Clostridium difficile	0	5	5	84
Clostridium difficile and Norovirus	0	1	1	12
Cryptosporidiosis	4	4	8	29
EHEC	33	9	42	119
Giardiasis	3	0	3	6
Norovirus/Suspected Norovirus infection	2	161	163	2861
Rotavirus	3	5	8	97
Salmonellosis	10	12	22	79
Shigellosis	2	2	4	36
Suspected Rotavirus	0	2	2	30
Total	66	215	281	3669

Table 5: Non–IID outbreaks notified on CIDR in 2008

Disease	Total No Outbreaks	No ill
Botulism	1	5
ESBL *E. coli*	2	6
Group A strep	1	10
Hand Foot & Mouth Disease (including suspected)	5	24
Hepatitis A (acute)	4	9
Hepatitis B (acute and chronic)	1	2
Influenza	4	62
Legionellosis	1	3
Measles	2	6
Meningococcal disease	1	2
MRSA	1	5
Mumps	57	580
Mycobacterium tuberculosis	1	1
Pertussis	2	6
Scabies	1	7
Tinea/Ringworm	2	17
Tuberculosis	1	6
Unknown	2	12
Varicella (including suspected)	9	83
Viral meningitis	1	2
Total	**99**	**848**

08

Immunisation Uptake

8. Immunisation Uptake

Summary

At 12 months uptake of:
D_3, T_3, P_3, Hib_3, $Polio_3$ and $MenC_3$ was 88%

At 24 months uptake of:
D_3, T_3, P_3, Hib_3 and $Polio_3$ was 93%
$MenC_3$ was 92%
Hib_b was 82%
MMR_1 was 89%

In 2008, each HSE Area provided HPSC with quarterly immunisation uptake data for their Area and for each of the Local Health Offices (LHOs) in their Area. HPSC collated these data and quarterly reports were produced which are available on the HPSC website. The annual immunisation uptake rates presented here represent the collation of the 2008 quarterly data. The proportion of children who completed the recommended childhood immunisation schedule by 12 months (born between 01/01/2007 and 31/12/2007) or 24 months (born between 01/01/2006 & 31/12/2006) of age in 2008 are reported.

The Irish childhood immunisation schedule recommended that babies born during 2006 and 2007 should receive one dose of vaccine against tuberculosis (BCG vaccine) at birth or by one month of age and three doses of vaccines against diphtheria (D_3), tetanus (T_3), pertussis (P_3), *Haemophilus influenzae* type b (Hib_3), polio ($Polio_3$) and meningococcal group C ($MenC_3$) with one dose of each given at two, four and six months of age. Between 12 and 15 months of age these children were recommended to receive the first dose of the measles-mumps-rubella vaccine (MMR_1). From September 18th 2006 a Hib booster (Hib_b) was recommended at the same time as MMR_1, this followed the national Hib campaign from November 2005 to May 2006 among children less than four years of age. Children born between September 2nd 2006 and June 30th 2008 were recommended pneumococcal conjugate vaccine (PCV) as part of a catchup campaign introduced in September 2008, however, PCV catch-up data are not reported here.Further vaccinations are recommended for older children, please see www.immunisation.ie for complete information on the Irish childhood immunisation schedule and changes to the schedule introduced in September 2008.

The immunisation uptake rates are reported here by HSE Area and LHO. While there are 32 LHOs the immunisation uptake rates for the LHOs of North Lee and South Lee are reported as a combined figure.

Immunisation uptake rates at 12 months

In 2008, national immunisation uptake rates, in children 12 months of age, were 88% for D_3, T_3, P_3, Hib_3, $Polio_3$

Table 1. Annual immunisation uptake rates by HSE Area for children 12 and 24 months of age in 2008

HSE Area	% Uptake at 12 months Cohort born 01/01/2007 - 31/12/2007						% Uptake at 24 months Cohort born 01/01/2006 - 31/12/2006						
	D_3	P_3	Hib_3	$Polio_3$	$MenC_3$	BCG	D_3	P_3	Hib_3	Hib_b	$Polio_3$	$MenC_3$	MMR_1
HSE-E	87	87	87	87	87*	na	92	92	92	76	92	91*	87
HSE-M	93	93	93	93	93	93	96	96	96	90	96	96	94
HSE-MW	90	90	90	90	90*	96	93	93	93	82§	93	93*	90
HSE-NE	90	90	90	90	88	na	94	94	94	89	94	94	90
HSE-NW	92	92	92	92	91	94	96	96	95	94	96	93	92
HSE-SE	88	88	88	88	88	93	91	91	91	87§	91	90	87
HSE-S	85	85	85	85	85	90†	93	93	93	83	93	93	89
HSE-W	88	88	88	88	88	na	93	93	93	82	93	94	88
Ireland	**88**	**88**	**88**	**88**	**88***	**94‡**	**93**	**93**	**93**	**82§**	**93**	**92***	**89**

na=not available
Since T_3 uptake identical to D_3 uptake only D_3 uptake figures presented
**The HSE-E and HSE-MW $MenC_3$ data for Quarter 3 2008 were not available*
†HSE-S part coverage of neonatal BCG (i.e. Kerry only)
‡Based on data from five of the eight HSE Areas, these five areas represent approximately a third of the national birth cohort
§The HSE-MW data for Quarter 3 2008 and the HSE-SE data for Quarter 2 2008 were not available

and $MenC_3$. (The national $MenC_3$ figure is incomplete as the HSE-E and HSE-MW $MenC_3$ data were not available in Quarter 3 2008.) Compared to 2007, these uptake rates increased by one percent in 2008.

Uptake rates for D_3, T_3, P_3, Hib_3, $Polio_3$ and $MenC_3$ ranged from 85% in the HSE-S to 93% in the HSE-M (table 1). Four HSE Areas had uptake rates of ≥90% for D_3, T_3, P_3, Hib_3 and $Polio_3$ while three had uptake rates of ≥90% for $MenC_3$ (table 1).

Among the LHOs, uptake rates for D_3, T_3, P_3, Hib_3 and $Polio_3$ ranged from 81% to 96% and uptake rates for $MenC_3$ ranged from 80% to 96% (appendix 2.1). Twelve of the LHOs had uptake rates of ≥90% for D_3, T_3, P_3, Hib_3 and $Polio_3$ with the target uptake of 95% reached or exceeded in three of these LHOs (appendix 2.1). Eleven of the LHOs had uptake rates of ≥90% for $MenC_3$ with uptake of ≥95% in three of these LHOs (appendix 2.1).

BCG uptake data were available from five of the eight HSE Areas (table 1). These five areas represent approximately a third of the national birth cohort. Where data were available national BCG uptake was 94% in 2008, an increase of one percent compared to 2007. Among the 12 LHOs that reported BCG data, uptake rates ranged from 90% to 98% (appendix 2.1). The target uptake of 95% was reached or exceeded in four of the 12 LHOs (appendix 2.1).

Immunisation uptake rates at 24 months

National immunisation uptake rates, in children 24 months of age in 2008, were 93% for D_3, T_3, P_3, Hib_3 and $Polio_3$ and 92% for $MenC_3$. (The national $MenC_3$ figure is incomplete as the HSE-E and HSE-MW $MenC_3$ data were not available in Quarter 3 2008). Compared with 2007, the uptake rates for these vaccines increased by one percent in 2008 (figure 1).

Uptake rates for D_3, T_3, P_3, Hib_3, $Polio_3$ and $MenC_3$ ranged from 90-91% in the HSE-SE to 96% in the HSE-M

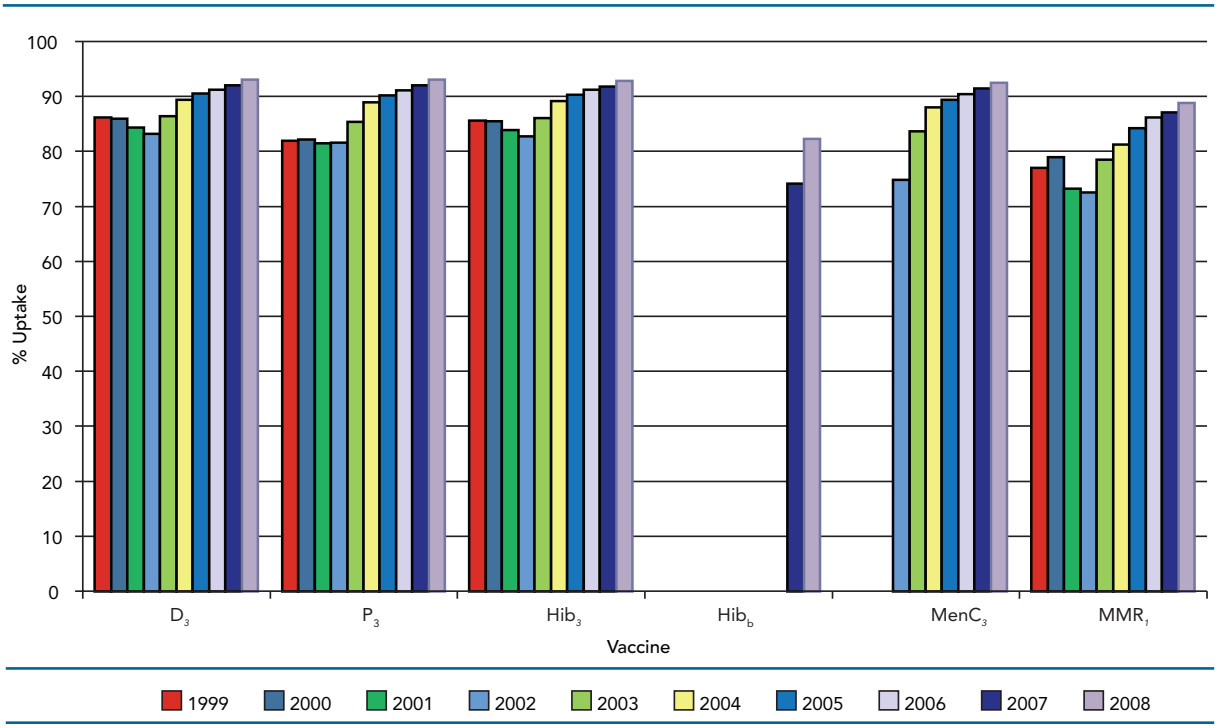


Figure 1. National annual immunisation uptake rates at 24 months, 1999-2008

Since T_3 and $Polio_3$ uptake identical to D_3 uptake only D_3 uptake figures presented.
The 2005 MMR_1 uptake figure is incomplete as the HSE-E was unable to provide MMR data for Quarter-4 2005, due to technical problems with extraction of MMR_1 data from the HSE-E database. The 2006 MMR_1 figure includes the Quarter-1 2006 HSE-E figure, which is an estimate only due to technical problems with extraction of MMR_1 data from the HSE-E database. The 2007 national Hib_b figure is incomplete, as the HSE-W data for Quarter 1 2007 and the HSE-NW data for Quarter 3 2007 were not available. The 2007 national Hib_b figure also includes the HSE-SE data which are an underestimate due to data extraction methods. The 2008 Hib_b figure is incomplete as the HSE-SE data for Q2 2008 and the HSE-MW data for Quarter 3 2008 were not available. The 2008 national $MenC_3$ figure is incomplete as the HSE-E and HSE-MW $MenC_3$ data for Quarter 3 2008 were not available.

(table 1). The target uptake of 95% was reached or exceeded for D_3, T_3, P_3 Hib_3, $Polio_3$ and $MenC_3$ in the HSE-M and for D_3, T_3, P_3, Hib_3 and $Polio_3$ in the HSE-NW during 2008 (table 1).

Uptake rates for D_3, T_3, P_3, Hib_3, $Polio_3$ and $MenC_3$ ranged from 86% to 97-98% among the LHOs, with 29 LHOs reporting uptake rates of ≥90% (appendix 2.2). The target uptake of 95% was reached or exceeded for D_3 (figure 2a), P_3, T_3 and $Polio_3$ in nine LHOs, for Hib_3 in eight LHOs and for $MenC_3$ in six LHOs (appendix 2.2).

During 2008 MMR_1 uptake was 89% nationally; an increase of two percent when compared to 2007 (figure 1). In 2008, uptake rates for MMR_1 ranged from 87% in the HSE-E and HSE-SE to 94% in the HSE-M, with four HSE Areas reporting uptake of ≥90% (table 1). Uptake rates for MMR_1 ranged from 81% to 94% among the LHOs, with 14 LHOs reporting uptake of ≥90% (figure 2b, appendix 2.2).

Hib_b figures relate to children who received a dose of Hib after 12 months of age. National uptake of Hib_b in 2008, in those 24 months of age, was 82% (table 1 and figure 1). However, the Hib_b figure is incomplete, as the HSE-SE data for Quarter 2 2008 and the HSE-MW data for Quarter 3 2008 were not available.

Hib_b national uptake statistics were reported for the first time in 2007, when uptake of Hib_b was 74% (figure 1). However, the 2007 Hib_b figure is incomplete, as the HSE-W data for Quarter 1 2007 and the HSE-NW data for Quarter 3 2007 were not available. The 2007 figure also includes the HSE-SE data which were an underestimate due to data extraction methods.

In 2008, uptake of Hib_b ranged from 76% in the HSE-E to 94% in the HSE-NW (table 1). Two HSE Areas had uptake rates of ≥90% (table 1). Among the LHOs, uptake of Hib_b ranged from 68% to 95%, with seven of the LHOs reporting uptake of ≥90% and one reporting uptake of ≥95% (appendix 2.2).

National immunisation uptake rates have continually increased since 2003 (figure 1); however, further improvements in uptake are necessary so that the 95% target rate is achieved nationally for all vaccines. In 2008, national uptake rates at 24 months for D_3, T_3, P_3, Hib_3, $Polio_3$ and $MenC_3$ were two to three percent below the target rate, MMR_1 was six percent below the target rate and Hib_b was 13% below the target rate.

A new routine childhood immunisation programme is effective since September 1st 2008 for children born on or after July 1st 2008. Changes include the addition of pneumococcal vaccine and hepatitis B vaccine and a change in the recommended age of Hib booster and MenC vaccine.

The 2008 immunisation uptake rates for each LHO are presented in appendix 2. The immunisation reports for Quarters 1 to 4 2008 are available on the HPSC website in *Topics A-Z* under the heading *vaccination*.

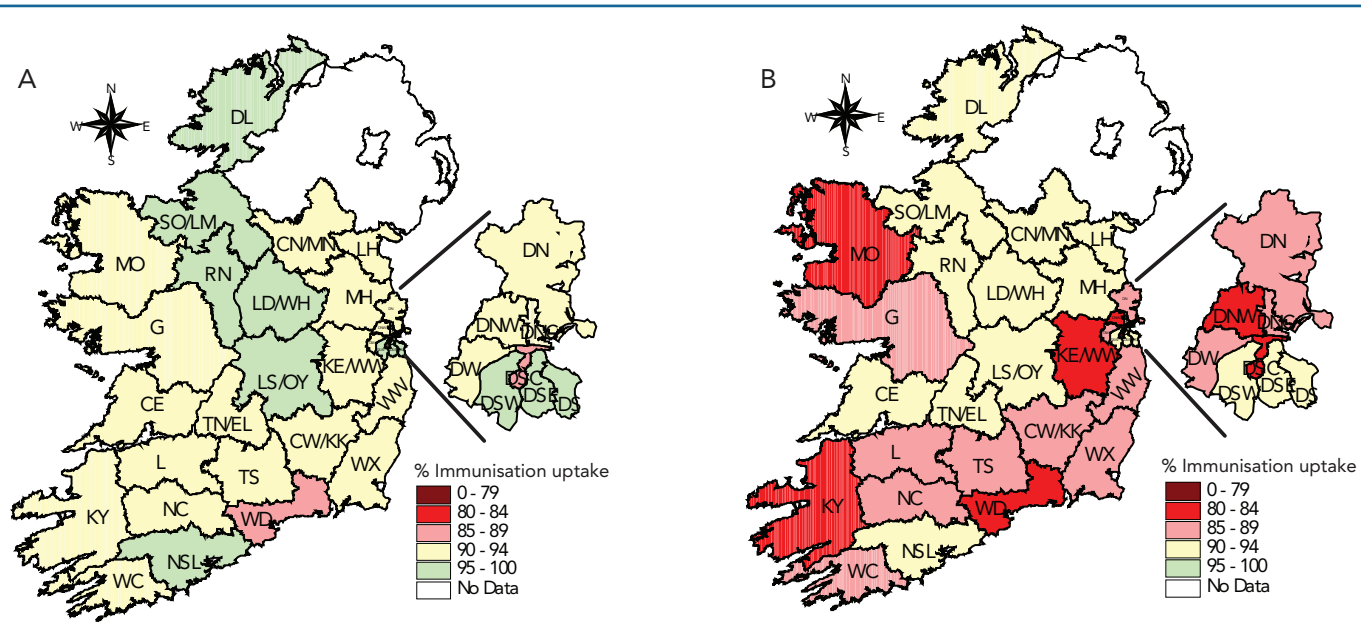


Figure 2. D_3 (A) and MMR_1 (B) immunisation uptake rates (%) in those 24 months of age in 2008 by Local Health Office (LHO)
LHOs in Dublin are highlighted separately for ease of viewing
North Lee and South Lee are separate LHOs, however, their combined (labelled NSL on the map) immunisation uptake rates are reported here
Please see appendix 2.3 to translate LHO abbreviations

09

Antimicrobial Consumption and Resistance

9.1 Antimicrobial Consumption

Summary

Outpatient antibiotic consumption, 2008: 21.5 DID
Outpatient antibiotic consumption, 2007: 22.4 DID
Median hospital antibiotic consumption, 2008: 76.4 DBD
Median hospital antibiotic consumption, 2007: 80.1 DBD
EU Network: ESAC www.esac.ua.ac.be

Ireland participates in the European Surveillance of Antimicrobial Consumption (ESAC) which aims to collect systemic antibiotic usage data from the outpatient (ambulatory, community or primary care) setting and from the hospital (inpatient) setting. Consumption is measured in Defined Daily Dose (DDD), which is the assumed average maintenance dose per day for a drug used for its main indication in adults. Rates are calculated in DDD per 1000 inhabitants per day (DID) for outpatients and DDD per 1000 bed-days used (DBD) for inpatients.

Outpatient Antibiotic Consumption

The overall outpatient antibiotic consumption for Ireland in 2008 was 21.5 DID, a fall from the previous year's rate of 22.4 DID, the first time this trend has decreased since 2000. In an ESAC report of outpatient antibiotic consumption from 29 EU countries with reliable data for 2005, the range of outpatient antibiotic usage was 9.2 DID (Russian Federation) to 34.7 DID (Greece). The median for all countries was 18.1 DID. Outpatient antibiotic usage in Ireland has been around 19 - 23 DID over the last five years. Thus the overall rate in Ireland is mid-to-high in Europe.

In Ireland in 2008, outpatient consumption of penicillins accounted for the largest class used (51% of total at 10.9 DID), followed by macrolides (18%, 3.9 DID), tetracyclines (14%, 3.1 DID), cephalosporins (7%, 1.5 DID), quinolones (5%, 1.0 DID) and sulphonamides (4%, 1.0 DID). Other antibiotic classes accounted for about 1% of total use.

Penicillin in combination with beta-lactamase inhibitor (such as co-amoxiclav) accounted for the largest proportion of penicillins and continues to show a dramatic rise over the last eight years (3.2 DID in 2000 to 5.6 DID in 2008). Broad-spectrum penicillin (such as ampicillin and amoxicillin) usage was stable but high (3.4 DID).

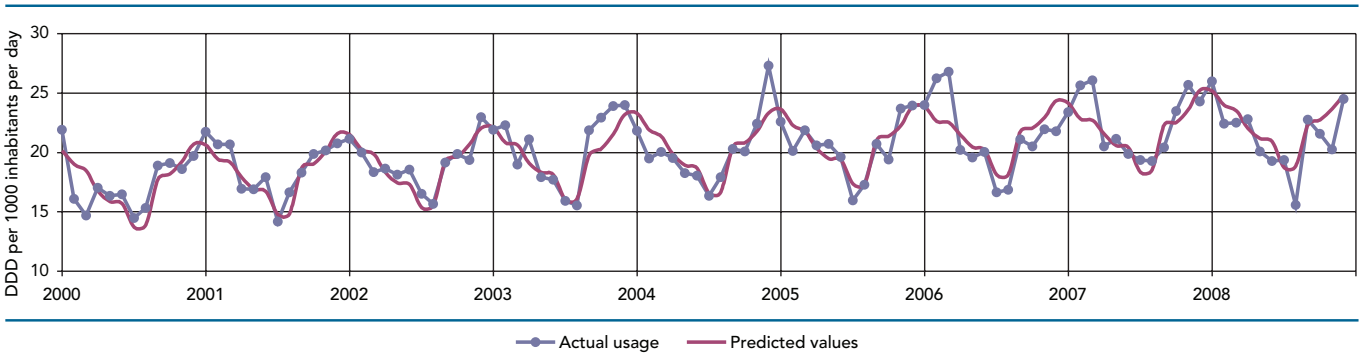


Figure 1. Outpatient antibiotic consumption in Ireland by month, 2000-2008.

Seasonal fluctuation (26% rise in DID from summer to winter, figure 1) has been seen every year in outpatient antibiotic consumption and is probably related to over-prescribing of antibiotics for respiratory tract infections in winter months. In August and November of 2008, there was significantly less usage than the predicted values.

There was considerable variability in the overall outpatient antibiotic usage at county level (17.4 to 27.9 DID) as shown in figure 2.

The first-ever European Antibiotic Awareness Day took place across Europe on Tuesday 18 November 2008. To mark the day, a seminar was held in Dublin to highlight initiatives being taken to combat over-use of antibiotics in Ireland, which included a media campaign, an educational programme for General Practitioners, development of antibiotic prescribing guidelines and distribution of educational material through health centres, community pharmacies and elsewhere.
It is likely that these initiatives accounted for the significant decrease in the expected level of antibiotic consumption seen in November 2008.

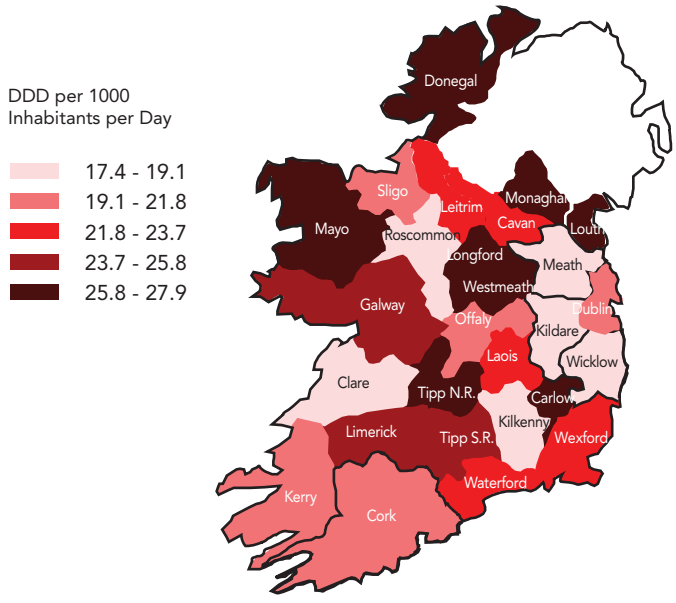


Figure 2. Outpatient antibiotic consumption in Ireland by county, in DDD per 100 inhabitants per day for 2008.

Hospital Antibiotic Consumption
Forty-two public acute hospitals provided valid antibiotic usage data for 2008. The median rate of antibiotic consumption usage was 76.4 DBD (range 22.2 – 117.4 DBD). This was a drop from the previous year's revised rate of 80.1 DBD. These levels are again mid-to-high in Europe.

Hospital function was the main driver for the differences in the rates of antibiotic consumption between hospitals. The rates for regional/tertiary and general hospitals (medians 79.0 and 78.5 DBD) centred just above the median for Ireland, while the rate for single specialist facilities (maternity, orthopaedic or paediatric) was much lower (median 45.0 DBD). The lower median consumption in single speciality hospitals probably reflects differences in case mix, compared to other hospitals, but may also reflect the fact that DDDs are based on adult dosing and may therefore underestimate antibiotic consumption in paediatric settings.

There was also a small reduction in the proportionate use of intravenously administered specific antibiotics (those with good oral bioavailability) over total use,

from a median of 10.3% in 2007 to 9.4% in 2008. This measure reflects patient acuity and also the category of hospital.

As shown in table 1, there was an increase in the usage of penicillins with beta-lactamase inhibitors of 4% (0.88 DBD), and a corresponding decrease in consumption of other penicillins of about 5% (0.84 DBD). There were, however, significant reductions in other key antibiotic groups, particularly fluoroquinolones (2.37 DBD, 23%). These reductions in hospital antibiotic consumption are probably related to antibiotic stewardship iniatives, which have been put in place by medical microbiologists and antimicrobial pharmacists in many hospitals.

More detailed analyses of antibiotic usage data can be found at www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/EuropeanSurveillanceofAntimicrobialConsumptionESAC/

Detailed breakdown of antibiotic consumption for 2007 and 2008 by individual hospital may be found at www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/EuropeanSurveillanceofAntimicrobialConsumptionESAC/SurveillanceReports/. The figures presented in this report may vary from previously published levels owing to methodological changes

Table 1. Key antibiotics and antibiotic groups, and the average consumption rate among all hospitals in DDD per 100 bed-days used for 2008 compared with the revised figures for 2007. Also shown is the percentage change in consumption.

Antibiotic	2007	2008	Change
Penicillin with beta-lactamase inhibitor	20.11	20.99	4%
Other Penicillins	17.13	16.29	-5%
First-generation cephalosporins	0.33	0.24	-27%
Second-generation cephalosporins	2.53	2.50	-1%
Third-generation cephalosporins	1.82	1.59	-13%
Macrolides	10.46	10.24	-2%
Fluoroquinolones	10.30	7.93	-23%
Injectable Vancomycin & Teicoplanin	2.86	2.58	-10%

9.2 Antimicrobial Resistance

Summary

- There were 1,289 reports of *S. aureus* bacteraemia submitted to the European Antimicrobial Resistance Surveillance System (EARSS), of which 435 (33.7%) were meticillin-resistant *S. aureus* (MRSA). This represents a significant decrease from 38.5% reported in 2007. Overall, the number of MRSA reports was down by 18.8% from 536 in 2007

  For acute public hospitals only, the rate (and corresponding proportion) of MRSA bacteraemia was 0.11 per 1,000 patient bed days used (33.8%), a decrease from 0.14 per 1,000 patient bed days used (39.3%) in 2007

- There were 447 reports of invasive *S. pneumoniae* infection compared to 438 in 2007. The national rate of invasive infection was 10.8 per 100,000 population compared to 10.5 in 2007

  The proportion of penicillin-non-susceptible *S. pneumoniae* (PNSP) has increased significantly over the past 4 years from 10.3% in 2004 to 23.1% in 2008; the proportion of isolates with high-level resistance to penicillin increased marginally from 5.7% in 2007 to 6.1% in 2008 while intermediate level resistance increased significantly from 11.0% to 16.7%

  Serotype data were available on 371 of 447 isolates (83%) and results indicate good coverage for both the 23-valent polysaccharide (PPV23) and 7-valent conjugate (PCV7) vaccines in their target populations: 83% (adults ≥65 years) and 60% (children <2 years), respectively

- There were 406 reports of *E. faecium* bacteraemia, an increase of 22% from 332 in 2007. The proportion that was vancomycin-resistant *E. faecium* (VREfm) increased marginally from 33.5% in 2007 to 35.7% in 2008, however, the number of VREfm isolates increased by over 30% from 111 to 145 over the same period. Multi-drug resistant (MDR) *E. faecium* decreased from 22.3% to 16.2%

- There were 1,923 reports of invasive *E. coli* infection, an increase of almost 8% from 1,783 reports in 2007. Resistance to third-generation cephalosporins (3GCs) and extended-spectrum beta-lactamase (ESBL)-production increased from 6.7% and 4.1% in 2007 to 7.5% and 5.0%, respectively, in 2008. Ciprofloxacin resistance increased marginally from 22.1% to 23.4% and the overall trend is still upwards. MDR *E. coli* increased marginally from 11.4% in 2007 to 12.1% in 2008

- There were 311 and 199 reports of invasive *K. pneumoniae* and *P. aeruginosa* infections, respectively. Of note, resistance to 3GCs and ESBL-production in *K. pneumoniae* increased from 9.9% and 3.7% in 2007 to 11.3% and 7.7%, respectively, in 2008 while ciprofloxacin resistance decreased from 18.1% to 12.7%. Resistance to all "indicator" classes of antibiotics in *P. aeruginosa* decreased. MDR isolates accounted for 9.9% and 11.1%, respectively, of the total for both pathogens

- See http://www.hpsc.ie for further details of EARSS and antimicrobial resistance in Ireland

- European data are available at http://www.rivm.nl/earss/database/

Introduction

The European Antimicrobial Resistance Surveillance System (EARSS) in Ireland collects routinely-generated antimicrobial susceptibility testing data on seven important bacterial pathogens using the EARSS case definition. Participating laboratories submit data on the "primary" or first isolate from blood or CSF per patient per quarter. EARSS does not distinguish clinically significant isolates from contaminants and primarily serves as a surveillance system to measure national levels of antimicrobial resistance (AMR). By the end of 2008, two of the 44 microbiology laboratories in Ireland had suspended their participation in EARSS, thus resulting in the reduction of the estimated coverage of the Irish population by EARSS from 100% in 2007 to 98% in 2008.

Staphylococcus aureus

There were 1,289 reports of *S. aureus* bacteraemia from 1,242 patients, of which 435 (33.7%) were meticillin-resistant *S. aureus* (MRSA) (table 1). This represents the lowest annual proportion since surveillance began in 1999. In 2007, the proportion was 38.5%. The decrease observed in 2008 was significant (Chi^2=6.7, P=0.01). This is the second successive year in which a decrease has been observed and this downward trend is highly significant (Chi^2_{trend}=19.0, P<0.0001) (figure 1). Overall, there was an 18.8% decrease in the number of MRSA bacteraemia reports compared with 2007 (435 vs. 536), or 15.7% for the 42 laboratories that submitted data for both years (515 in 2007 vs. 434 in 2008). Overall, the total overall number of meticillin-susceptible *S. aureus* (MSSA) bacteraemia reports remained at the same level (857 in 2007 vs. 854 in 2008, although there was an increase from 828 to 847 when only the 42 laboratories that submitted data for both years are included) highlighting that different factors are at play beyond those required for the control of MRSA. Despite the decrease in numbers and proportion of MRSA, Ireland still had one of the highest proportions of MRSA in Europe in 2008 (see http://www.rivm.nl/earss/database/ for European data, including EARSS maps).

One MRSA isolate with reduced susceptibility to vancomycin was detected at the National MRSA Reference Laboratory by the Etest® macromethod with a value of 16mg/L. This isolate also had a vancomycin minimum inhibitory concentration (MIC) of 2mg/L, by which it was classified as vancomycin-susceptible *S. aureus* according to the latest CLSI guidelines. The

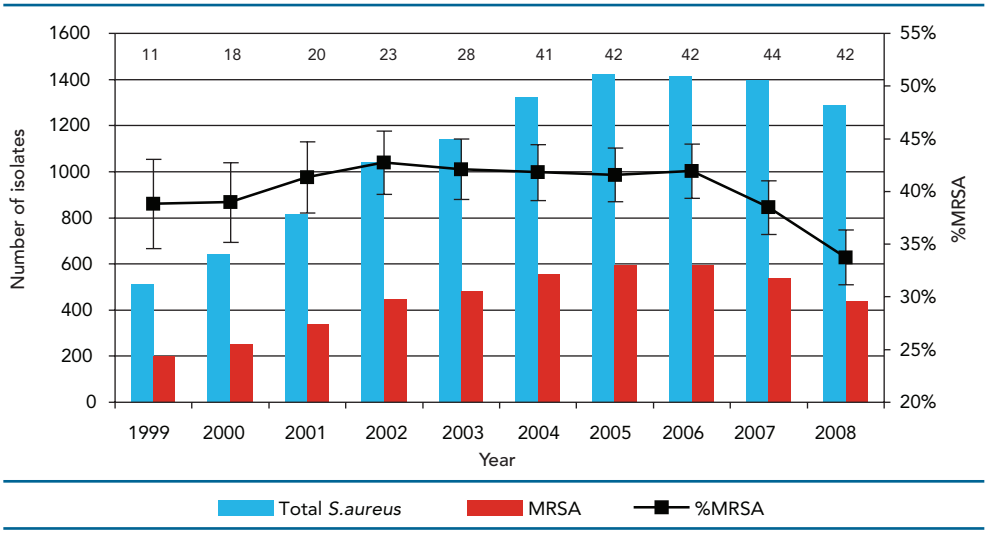


Figure 1. Trends for S. aureus – total numbers of S. aureus/MRSA and percentage MRSA with 95% confidence intervals.
The numbers of participating laboratories by year-end are indicated above the bars

Table 1. Summary of EARSS data by pathogen and year

Pathogen	Year									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Number laboratories by year-end	**12**	**19**	**20**	**23**	**28**	**41**	**42**	**42**	**44**	**42**
S. aureus										
Number of isolates	510	639	815	1042	1140	1323	1424	1412	1393	1289
Number Meticillin-R (or MRSA)	198	249	337	445	480	553	592	592	536	435
Meticillin-R (or MRSA)	38.8%	39.0%	41.3%	42.7%	42.1%	41.8%	41.6%	41.9%	38.5%	33.7%
Number VISA	0	0	0	0	0	0	0	2	1	0
VISA*	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%
S. pneumoniae										
Number of isolates	157	201	245	278	364	400	401	407	438	447
Penicillin-NS*	19.1%	13.4%	12.2%	11.5%	11.8%	10.3%	11.7%	15.7%	17.4%	23.1%
of which: HLR	0.0%	3.5%	1.6%	1.4%	2.2%	1.8%	3.0%	2.9%	5.7%	6.1%
Int	16.6%	8.5%	10.6%	9.7%	8.8%	7.0%	8.7%	12.5%	11.0%	16.9%
Erythromycin-R*	14.0%	12.0%	12.5%	12.7%	11.6%	14.4%	12.1%	16.1%	16.4%	16.7%
Number laboratories by year-end				**21**	**27**	**40**	**41**	**42**	**44**	**42**
E. faecalis										
Number of isolates	No data	No data	No data	168	218	242	290	294	281	301
Ampicillin-R*				8.1%	5.1%	0.8%	3.5%	4.5%	2.2%	0.7%
Vancomycin-R				2.4%	1.4%	1.3%	2.5%	3.7%	2.8%	3.7%
HLG-R*				38.5%	33.9%	41.3%	43.1%	42.4%	37.2%	30.5%
E. faecium										
Number of isolates	No data	No data	No data	85	135	187	224	265	332	406
Ampicillin-R*				88.9%	91.0%	95.7%	92.3%	93.9%	93.1%	95.1%
Vancomycin-R				11.1%	19.4%	23.2%	31.7%	37.1%	33.5%	35.7%
HLG-R*				16.7%	53.8%	58.0%	51.4%	44.3%	34.9%	28.1%
MDR*				3.7%	11.4%	18.5%	25.6%	25.6%	22.3%	16.2%
E. coli										
Number of isolates	No data	No data	No data	741	991	1256	1445	1656	1784	1923
Ampicillin-R*				62.2%	61.9%	65.0%	67.6%	70.7%	68.3%	70.3%
3GC-R*				3.0%	2.4%	2.4%	4.1%	4.1%	6.7%	7.5%
Ciprofloxacin-R*				5.4%	9.5%	12.6%	17.3%	21.5%	22.1%	23.4%
Gentamicin-R*				2.7%	3.9%	5.7%	8.5%	7.7%	9.9%	10.2%
ESBL-producers*				1.2%	1.3%	1.1%	2.4%	2.5%	4.1%	5.0%
MDR*				2.4%	3.8%	5.6%	7.7%	9.0%	11.4%	12.1%
Number laboratories by year-end								**36**	**39**	**41**
K. pneumoniae										
Number of isolates	No data	No data	No data	No data	No data	No data	No data	217	244	311
Ampicillin-R*								97.7%	99.2%	99.7%
3GC-R*								10.2%	9.9%	11.3%
Ciprofloxacin-R*								15.3%	18.1%	12.7%
Gentamicin-R*								7.8%	9.9%	10.6%
Imipenem/meropenem-R*								0.0%	0.6%	0.0%
ESBL-producers*								8.6%	3.7%	7.7%
MDR*								11.2%	11.9%	9.9%
P. aeruginosa										
Number of isolates	No data	No data	No data	No data	No data	No data	No data	128	177	199
Pipericillin/tazobactam-R*								10.2%	13.2%	10.8%
Ceftazidime-R*								10.6%	11.8%	8.7%
Imipenem/meropenem-R*								11.8%	12.2%	9.3%
Ciprofloxacin-R*								18.0%	22.9%	21.8%
Gentamicin-R*								10.2%	13.3%	9.0%
MDR*								9.5%	12.5%	11.1%

R, Resistant; NS, Non-Susceptible [includes isolates with intermediate (Int) and high-level resistance (HLR)]
MRSA, Meticillin-Resistant *S. aureus*; VISA, Vancomycin-Intermediate *S. aureus*
HLG, High-Level Gentamicin; 3GC, 3rd-Generation Cephalosporin (includes cefotaxime, ceftriaxone, ceftazidime and cefpodoxime); ESBL, Extended-Spectrum Beta-Lactamase; MDR, Multi-Drug Resistant
* Not all isolates tested

isolate was shown to be hetero-VISA by Population Analysis Profiling.

The MRSA rate for acute public hospitals only was 0.11 per 1,000 patient bed days used (calculated using acute public hospital activity data from the National Hospitals Office at the Health Services Executive). The corresponding MRSA proportion was 33.8% (419 of 1,239 isolates). Both the MRSA rate and proportion for acute public hospitals decreased from 0.14 per 1,000 patient days and 39.3% observed in 2007.

In patients with laboratory-confirmed *S. aureus* bacteraemia, the probability that the infecting organism was MRSA as compared to MSSA was over 2-times greater in patients aged ≥65years than in those aged <65 years (RR=2.12, Chi^2=85.9, P<0.0001).

Males were approximately 1.6-times more likely to get an invasive *S. aureus* infection (1.5-times for MRSA, z=4.2, P<0.0001; 1.7-times for MSSA, z=7.7, P<0.0001) than females (z=8.7, P<0.0001). The frequency of invasive *S. aureus* infection increased with age, with the majority of infections (n=742; 58%) occurring in adults over 60 years. The median age for patients with an MRSA infection was 72 years (95%CI, 70-74) while the median age for patients with MSSA was 59 years (95%CI, 57-61). This was considered to be a significant difference as the confidence intervals did not overlap.

Streptococcus pneumoniae

There were 447 reports of invasive *S. pneumoniae* infection (426 from blood and 21 from CSF) from 443 patients. See table 1 for the annual proportions of *S. pneumoniae* isolates non-susceptible/resistant to penicillin and erythromycin by year since 1999 when surveillance began. Penicillin-non-susceptible *S. pneumoniae* (PNSP) accounted for 23.1% (n=103) of all isolates tested against penicillin (n=445) in 2008 (table 1). The proportion of PNSP in Ireland has increased significantly over the past four years from 10.3% in 2004 (Chi^2_{trend}=31.5, P<0.0001) (figure 2). The proportion of isolates with high-level resistance (HLR) to penicillin increased marginally from 5.7% in 2007 to 6.1% in 2008, which was not significant (Chi^2=0.82, P=0.05). Sixty-nine (16.7%) of 343 isolates were resistant to erythromycin, which compares with 16.4% in 2007. In 2008, moderately high levels of PNSP and erythromycin resistance were seen in Ireland, similar to the situation observed in much of Southern and Central Europe. More notably, Ireland had one of the highest proportions of HLR to penicillin (6.1%) in Europe, after Hungary (7.8%), Spain (7.1%) and France (6.6%).

Of the 103 PNSP isolates, 75 were intermediately-resistant (Int; MIC=0.1-1.0mg/L) and 27 were HLR (MIC >1.0mg/L) to penicillin. No penicillin MICs was available for one non-susceptible (NS) isolate.

Of isolates tested against both penicillin and erythromycin (n=411), 42 (10.2%) were simultaneously PNSP (35 Int, 7 HLR) and erythromycin-resistant in 2008 compared with 7.9% in 2007.

Prior to the introduction of the 7-valent pneumococcal conjugate vaccine (PCV7) into the childhood immunisation schedule in September 2008, a national pilot project was established early in 2007 as a result of a collaborative initiative between RCSI/Beaumont Hospital, Children's University Hospital, Temple St and HPSC with the aim of providing baseline serotyping data on invasive *S. pneumoniae* isolates. Serotype data were available on 371 pneumococcal isolates from 31 laboratories (of 35 that reported pneumococcal isolates to EARSS in 2008) representing 83% of all pneumococcal isolates reported in 2008. Overall, 314 (85%) and 179 (48%) isolates belonged to serotypes covered by the pneumococcal polysaccharide (PPV23; target population: adults ≥65 years and at risk groups) and conjugate (PCV7; target population: children <2 years) vaccines, respectively. From adults ≥65 years, 125 of 151 (83%) isolates were covered by PPV23, while from children <2 years, 34 of 48 (60%) isolates were covered by PCV7. Of the 88 PNSP isolates for which serotyping data were available, 30 of 38 (79%) from adults ≥65 years were covered by PPV23 while 11 of 13 (85%) were from children <2 years were covered by PCV7.

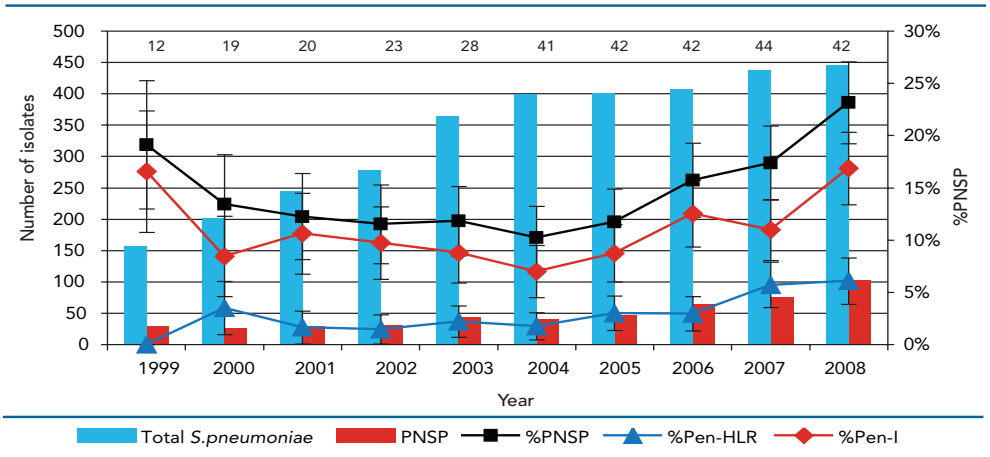


Figure 2. Trends for S. pneumoniae – total numbers of S. pneumoniae/PNSP and percentage PNSP with 95% confidence intervals.
HLR, High-level resistant; I, Intermediately resistant
The numbers of participating laboratories by year-end are indicated above the bars

The rate of invasive pneumococcal disease (IPD) in Ireland in 2008 was estimated to be 10.8 per 100,000 population compared with 10.5 in 2007 (note: both calculated using the 2006 census data and adjusted for the estimated population coverage by EARSS for that year). The highest rates of IPD were observed in children <1 year (57.3 per 100,000) and adults aged 75-79 years (45.4), 80-84 years (47.8) and ≥85 years (75.0).

Males were approximately 1.5-times more likely to have an invasive *S. pneumoniae* infection [1.2-times for PNSP, z=1.1, P=0.28; 1.5-times for penicillin-susceptible *S. pneumoniae* (PSP), z=3.9, P<0.0001] than females (z=4.0, P<0.0001). Although these findings were significant for PSP and *S. pneumoniae* overall, they were not significant for PNSP. The frequency of invasive *S. pneumoniae* infection was highest in children aged <1 year (n=35; 8% of all reported isolates) and 1-4 years (n=40; 9%) and in adults aged ≥65 years (n=214; 49%). The median age was 58 years (95%CI, 53-61).

Enterococcus faecalis

There were 301 reports of *E. faecalis* bacteraemia from 295 patients, an increase of 7% from 281 reports in 2007. See table 1 for the annual proportions of *E. faecalis* isolates resistant to the three "indicator" antibiotics (ampicillin, vancomycin and high-level gentamicin) by year since 2002 when surveillance began. Vancomycin-resistant *E. faecalis* (VREfa) accounted for 3.7% of isolates. Although this proportion was low, Ireland still had one of the highest proportions of VREfa in Europe in 2008.

Two isolates were ampicillin-resistant, which suggests that these isolates were either misidentified as *E. faecalis* or misclassified as ampicillin-resistant, as resistance to ampicillin is rare in *E. faecalis*.

Males were approximately 1.6-times more likely to have an invasive *E. faecalis* infection than females (z=4.3, P<0.0001). The frequency of invasive *E. faecalis* infection increased with age with the majority of infections (n=210; 70%) occurring in adults over 55 years. The median age was 65 years (95%CI, 62-70).

Enterococcus faecium

There were 406 reports of *E. faecium* bacteraemia from 390 patients, an increase of 22.2% from 332 reports in 2007. See table 1 for the annual proportions of *E. faecium* isolates resistant to the three "indicator" antibiotics (as for *E. faecalis* above) by year since 2002. Vancomycin-resistant *E. faecium* (VREfm) accounted for 35.7% of isolates. This represents an increase from 33.5% in 2007, however, the number of VREfm isolates increased by over 30% from 111 to 145 over the same period. Between 2002 and 2006, the proportion of isolates that was VREfm increased significantly (Chi^2_{trend}=30.0; P<0.0001) (figure 3). In 2008, Ireland had the highest proportion of VREfm in Europe, followed by Greece (30.7%) and the UK (29.5%).

Resistance to high-level gentamicin decreased from 34.9% in 2007 to 28.1% in 2008, which was only bordering on significance (Chi^2=3.70; P=0.054). However, the downward trend since 2004 is highly significant (Chi^2_{trend}=62.1; P<0.0001) (figure 3).

Of 377 isolates tested against all three "indicator" antibiotics, 61 (16.2%) were resistant to all three and therefore classed as multi-drug resistant (MDR). This represents a borderline significant decrease from 22.3% in 2007 (Chi^2=4.04; P=0.044).

Males were approximately 1.3-times more likely to have an invasive *E. faecium* infection than females (z=2.6, P=0.009). The frequency of invasive *E. faecium* infection increased with age with the majority of infections (n=331; 82%) occurring in adults over 45 years. The median age was 64 years (95%CI, 62-65).

Escherichia coli

There were 1,923 reports of invasive *E. coli* infection (1,919 from blood and four from CSF) from 1,875 patients, an increase of 7.8% from 1,784 reports in 2007. See table 1 for the proportion of *E. coli* isolates resistant to the four "indicator" antibiotics/antibiotic classes [ampicillin, third-generation cephalosporins (3GCs; cefotaxime, ceftriaxone, ceftazidime or cefpodoxime), fluoroquinolones (ciprofloxacin or ofloxacin) and

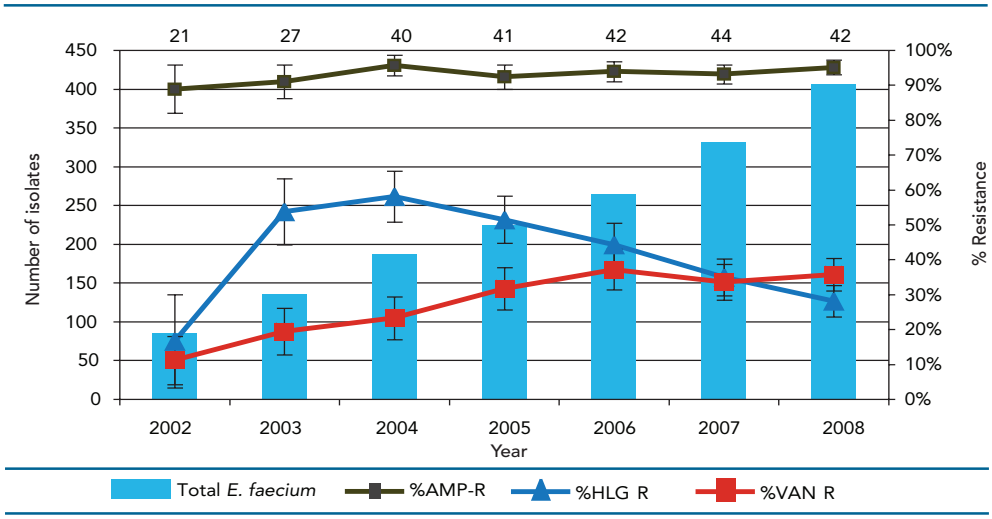


Figure 3. Trends for E. faecium – total numbers of E. faecium and percentage resistance to high-level gentamicin (HLG) and vancomycin (VAN) with 95% confidence intervals.
The numbers of participating laboratories by year-end are indicated above the bars

aminoglycosides (gentamicin or tobramycin)] by year since 2002. Ciprofloxacin resistance increased marginally from 22.1% in 2007 to 23.4% in 2008 (non-significant; Chi^2=0.92, P=0.34). Looking at the overall trend, the proportion of ciprofloxacin resistant isolates has increased significantly since 2002 (Chi^2_{trend}=209.5, P<0.0001) (figure 4), although the rate of increase has slowed down since 2006. The proportions of isolates with resistance to 3GCs and gentamicin increased from 6.7% and 9.9% in 2007 to 7.5% and 10.2%, respectively, in 2008 but these findings were not significant (Chi^2=0.87, P=0.35 and Chi^2=0.08, P=0.78, respectively). Looking at the recent trends, the proportions of isolates with resistance to 3GCs increased from 4.2% in 2006 to 7.5% in 2008 (highly significant; Chi^2_{trend}=15.8, P<0.0001), while resistance to gentamicin increased from 7.7% to 10.2% over the same period (significant; Chi^2_{trend}=6.2, P=0.01). Resistance to 3GCs, ciprofloxacin and gentamicin in *E. coli* isolates have been increasing throughout most of Europe in recent years. In 2008, ciprofloxacin resistance was at moderately high levels in Ireland compared to other European countries while resistance to 3GCs and gentamicin were both moderately low.

Extended spectrum beta-lactamases (ESBLs) were detected in 91 (5.0%) of 1,815 isolates tested. There was a significant increase in ESBLs from 2.5% in 2007 and 4.1% in 2007 (Chi^2=5.7, P=0.02), however the increase observed in 2008 was not significant (Chi^2=1.8, P=0.18). ESBLs are enzymes that confer resistance to most penicillins and cephalosporins (including 3GCs). ESBL-producing bacteria (including *K. pneumoniae* and, increasingly, *E. coli*) are often resistant to other classes of antibiotics and have emerged as important causes of infections in hospitals.

Of 1,877 isolates tested against all four "indicator" antibiotics, 227 (12.1%) were identified as MDR (defined as resistance to three or more of these), including 53 with resistance to all four. The proportion of isolates that are MDR has increased significantly (Chi^2_{trend}=125.3, P<0.0001) from 2.4% in 2002 when surveillance began.

Females were approximately 1.2-times more likely to have an invasive *E. coli* infection than males (z=3.6, P<0.0001), however males were 1.3-times more likely to get an infection with ciprofloxacin-resistant *E. coli* (z=2.5, P=0.013) and 1.6-times more likely to get an infection with MDR *E. coli* (z=3.7, P=0.0002). The frequency of invasive *E. coli* infection increased with age with the majority of infections (n=1,485; 77%) occurring in adults over 55 years. The median age was 72 years (95%CI, 70-75).

Klebsiella pneumoniae

There were 311 reports of invasive *K. pneumoniae* infection (all from blood) from 307 patients (with 41 of 44 laboratories participating in the surveillance of this pathogen). See table 1 for the proportion of *K. pneumoniae* isolates resistant to the four "indicator" antibiotics (as for *E. coli* above), plus imipenem/meropenems, since 2006. Ciprofloxacin resistance decreased from 18.1% in 2007 to 12.7% in 2008, while resistance to both 3GCs and gentamicin both increased from 9.9% to 11.3% and 10.6%, respectively, however none of the differences was found to be significant.

One isolate was ampicillin-susceptible, which either represents an isolate that was misidentified as *K. pneumoniae* or misclassified as ampicillin-susceptible, as all klebsiellae are inherently resistant to this antibiotic.

ESBLs were detected in 22 (7.7%) of 286 isolates tested. This represents an increase from 3.7% (8 of 214 isolates) in 2007 (borderline approaching significance; Chi^2=3.39, P=0.065).

Thirty, or 9.9%, of 302 isolates tested against all four "indicator" antibiotics were identified as MDR, including 14 with resistance to all four. This compares with 11.9% in 2007.

Males were approximately 1.4-times more likely to have an invasive *K. pneumoniae* infection than females (z=3.3, P=0.001). The frequency of invasive *K. pneumoniae* infection increased with age with the

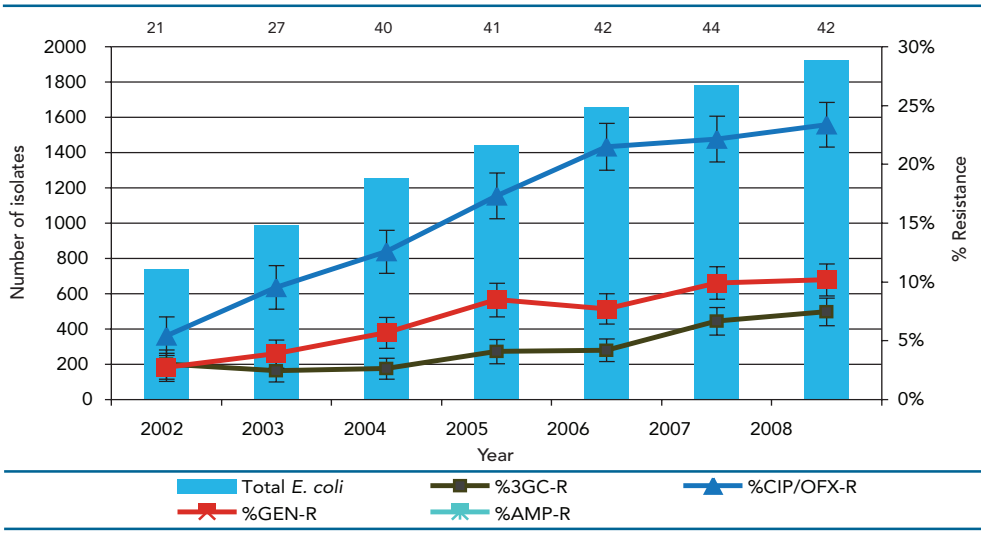


Figure 4. Trends for E. coli – total numbers of E. coli and percentage resistance to 3GCs, ciprofloxacin/ofloxacin (CIP/OFX) and gentamicin (GEN) with 95% confidence intervals.
The numbers of participating laboratories by year-end are indicated above the bars

majority of infections (n=215; 69%) occurring in adults over 55 years. The median age was 65 years (95%CI, 62-67).

Pseudomonas aeruginosa
There were 199 reports of invasive *P. aeruginosa* infection (197 from blood and two from CSF) from 191 patients (with 41 of 44 laboratories participating in the surveillance of this pathogen). See table 1 for the proportion of *P. aeruginosa* isolates resistant to the five "indicator" antibiotics/antibiotic classes [piperacillin-tazobactam, ceftazidime, carbapenems (meropenem or imipenem), fluoroquinolones (ciprofloxacin or ofloxacin) and gentamicin] since 2006. The resistance proportions observed in 2008 were all lower compared with the data for 2007, however, none of the differences was significant.

Twenty (11.1%) of 180 isolates tested against all five "indicator" antibiotics were MDR, including two (from two laboratories) with resistance to all five. This compares with 12.5% in 2007.

Males were approximately 1.7-times more likely to have an invasive *P. aeruginosa* infection than females (z=3.7, P=0.0002). The frequency of invasive *P. aeruginosa* infection increased with age with the majority of infections (n=159; 80%) occurring in adults over 50 years. The median age was 65 years (95%CI, 64-66).

Conclusion
The reduction in the numbers and proportion of MRSA first observed in 2007 has continued into 2008. Since 2006, there has been a 26.5% reduction in the numbers of MRSA bacteraemia reports. The proportion of MRSA has decreased from 41.2% to 33.5% over the same period, while the MRSA rate has decreased from 0.16 per 1,000 bed days used to 0.11. It is important to note that the total overall numbers of MSSA bacteraemia reports have remained at approximately the same level over the last couple of years. This may be related to infection prevention and control interventions selectively targeted at MRSA. Greater participation of laboratories in enhanced bacteraemia surveillance would go some way to elucidate the key risk factors for acquisition and infection by MSSA strains, thereby allowing appropriate measures to be implemented to help reduce the burden of infection associated with these organisms. One key factor at play is that MRSA is clonal (i.e. one or two strains may be responsible for the majority of infections in a healthcare setting) while MSSA is much more heterogeneous in nature (i.e. many different strains are present) and often acquisition is from the patient's own normal bacterial flora.

Despite the continuing downward trend in MRSA, AMR remains a major problem in other EARSS pathogens in this country. PNSP has been increasing for the past four years and in 2008 the proportion of isolates with HLR to penicillin increased again to over 6% with the result that Ireland now has one of the highest proportions of HLR to penicillin in *S. pneumoniae* in countries reporting to EARSS. The introduction of the 7-valent pneumococcal conjugate vaccine, PCV7, into the childhood immunisation program in September 2008 may go some way to reduce the burden of invasive pneumococcal disease in children less than two years and also the general population as a whole as children are known to act as reservoirs for pneumococci. However, on-going surveillance of the predominant serotypes is required as strains with serotypes other than those in the vaccine have been reported to increase in prevalence following introduction of PCV7 in other countries, hence the need for a fully resourced reference facility.

E. faecium is another important Gram-positive pathogen that is increasingly a cause of bloodstream infections in this country. The number of *E. faecium* isolates reported to EARSS rose by 22% between 2007 and 2008. Over this period the proportion of isolates that were VREfm increased slightly from 33.5% to 35.7%, however in contrast to this the total number of VREfm isolates actually increased by over 30% from 111 to 145. Resistance in *E. coli* and other Gram-negative pathogens is also problematic. Although the data for 2008 indicate that the rate of increase in ciprofloxacin resistance slowed down since 2006, the overall trend was still upwards. Gentamicin and 3GC resistance plus ESBL-production also increased and consequently the proportion of MDR isolates now stands at 12.1% (up from 2.4% in 2002). Resistance to 3GCs and ESBL-production also increased in *K. pneumoniae*.

On a more positive note, resistance to ciprofloxacin in *K. pneumoniae* decreased from 18.1% to 12.7%, resistance to all of the "indicator" antibiotics decreased in *P. aeruginosa*; and the proportion of MDR isolates for both of these pathogens decreased slightly compared to the previous year.

Recent improvements in infection prevention and control structures may have contributed to reducing the burden of MRSA bacteraemia in Ireland in 2007 and 2008. However, the data for the other pathogens again highlight the on-going commitment and resources that are necessary to reduce the burden of AMR and HCAI in this country, as outlined in the Strategy for the control of Antimicrobial Resistance in Ireland (SARI) in 2001, and in particular measures to promote more prudent antibiotic use in both hospital and community settings.

HPSC thanks all the microbiology laboratories for their continued participation and enthusiasm for the EARSS project.

The data presented in this report were taken from the EARSS database on 1st September 2009.

For further details of EARSS and antimicrobial resistance in Ireland see www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/EuropeanAntimicrobialResistanceSurveillanceSystemEARSS/

European data are available at http://www.rivm.nl/earss/database/

9.3 Enhanced EARSS Surveillance

The European Antimicrobial Resistance Surveillance System (EARSS) in Ireland has been enhanced to collect demographic, risk factor and clinical data since 2004. The enhanced programme involves voluntary participation by hospitals that provide data on invasive pathogens causing bloodstream infections (BSI).

There were 1618 individual records (cases or isolates under the EARSS definition) submitted from 13 laboratories. This figure is up from the 2007 finalised figure of 1395 due to an increase in participation. The total number of records thus far for 2008 represents 33% of the total core EARSS dataset.

Demographic and other basic data for the major resistance profiles of EARSS pathogens are shown in table 1. These and clinical features of the BSI are detailed in the rest of this chapter. Note that each patient may have more than one risk factor reported. Malignancies were noted in 27% and immunosuppression in 13% of all BSI, and these two risk factors are not mentioned again in relation to specific pathogens here.

Staphylococcus aureus

There were 409 records for *Staphylococcus aureus*, 160 (39%) of which were meticillin-resistance *S. aureus* (MRSA) and 249 were meticillin-sensitive *S. aureus* (MSSA). The majority of MRSA isolates (72%) were in those aged 65 or older. Common sources of MRSA BSI were central venous catheter (CVC, 24%), skin/soft tissue (13%) and respiratory tract infections (8%). Recent surgery (13%) and stay in intensive care unit (ICU stay, 9%) were risk factors specific to MRSA. The common origins of MSSA BSI were CVC (19%), and skin/soft tissue infections (15%). The most common risk factor specific to MSSA was recent surgery (8%).

Results for *S. aureus* and MRSA BSI for hospitals with consistent data

Four of the participating hospitals provided good quality consistent data for every quarter since 2006. This section is an analysis of the Enhanced EARSS data from these hospitals to determine the possible reasons for changes in MRSA and MSSA BSI rates taking place over time.

The rate of MRSA infections acquired in the reporting hospital decreased from 0.145 in 2006 to 0.097 per 1000 bed-days used in 2008 (33% reduction), with a smaller reduction in the corresponding rate for MSSA (7% reduction). This implies a greater impact from control measures targeted towards MRSA specifically (e.g. improvements in laboratory methods, screening and isolation), compared to more general control measures (e.g. hand and environmental hygiene).

There was a decrease in patients with MRSA BSI who had no known risk factors. This decrease was not seen in those patients with one or more known risk factors to the same extent. This implies that strategies targeted at MRSA BSI rate reduction, had a particular benefit

Table 1. Age and gender breakdown by organisms with their major resistance profiles. Proportion of isolates detected <48 hours and >5 days post-admission is also shown. See text for abbreviations.

	Total for 2008	Percent female	Mean age in years	Percent <5 years	Percent 65 years or older	Detected <48 hours after admission	Detected >5 days after admission
MRSA	**160**	45%	68.3	4%	72%	34%	47%
MSSA	**249**	37%	55.6	8%	43%	51%	27%
PNSP	**30**	40%	47.1	27%	33%	83%	7%
PSSP	**114**	39%	51.6	13%	38%	89%	4%
FQREC	**144**	44%	68.7	0%	58%	49%	42%
FQSEC	**490**	57%	64.1	3%	58%	63%	23%
VRE	**61**	51%	64.8	0%	56%	8%	77%
VSE	**199**	41%	63.5	1%	51%	28%	56%
KPN	**103**	40%	63.3	0%	51%	40%	46%
PAE	**68**	31%	70.7	0%	71%	41%	46%

for low-risk patients. Reduction in hospital antibiotic usage, particularly fluoroquinolones, which is known to have occurred, is also likely to have had an effect on the reduction of MRSA infections.

Reductions in MRSA in patients with risk factors such as stay in ICU and recent surgery, as well more general targeted reduction of CVC use, took effect in the final year of this dataset, 2008, implying that different approaches were effective during the three years.

Other organisms

Of the 144 records for *Streptococcus pneumoniae* BSI, 88% were isolated <48 hours after admission showing that these infections were mainly community-acquired. They tended to occur in younger patients (mean age 51 years, compared to a mean age of 63 years for all of the pathogens), reflecting the bimodal age distribution of *S. pneumoniae* BSI (see table 1). The majority (72%) originated from respiratory tract infections. Thirty records (21%) were for penicillin non-susceptible *S. pneumoniae* (PNSP) BSI as compared to 114 for penicillin susceptible *S. pneumoniae* (PSSP).

There were 634 records for *Escherichia coli*, 144 (23%) of which were fluoroquinolone-resistant *E. coli* (FQREC) and 490 were fluoroquinolone-sensitive *E. coli* (FQSEC). Over half of the patients (58%) were 65 years or over. Urinary tract infections (31% FQREC and 39% FQSEC) and gastrointestinal tract infections (19% FQREC and 20% FQSEC) were common sources for these BSI. Urinary catheter was also a common source for FQREC BSI (11%), but only in 5% of FQSEC BSI.

There were 260 enterococcal BSI records, 111 *Enterococcus faecalis* and 149 *E. faecium*. Of the enterococci BSI, 61 (23%) were vancomycin-resistant enterococci (VRE) and 199 vancomycin-sensitive enterococci (VSE). VRE BSI were associated with longer stay in hospital (77% detected >5 days after admission). CVC were a common source for these BSI (23% VRE and 15% VSE), as well as gastro-intestinal tract (28% VRE and 27% VSE). Common pathogen-specific risk factors were ICU stay (15% VRE and 19% VSE) and recent surgery (21% VRE and 18% VSE).

There were 103 records for *Klebsiella pneumoniae* (KPN) BSI, originating mainly from gastro-intestinal tract sources (29%), CVC (14%), respiratory tract (10%) and urinary tract infections (15%). Common risk factors specific for KPN BSI were recent surgery (16%) and ICU stay (5%).

There were 68 records for *Pseudomonas aeruginosa* (PNE) BSI, originating mainly from respiratory tract (15%) urinary tract catheter (22%), CVC (7%) and gastro-intestinal (13%). Common risk factors specific for PNE BSI were recent surgery (15%) and ICU stay (16%).

Conclusion

Analysis of enhanced data for MRSA and MSSA BSI from consistent sources has helped to explain changes seen in the epidemiology of *S. aureus* BSI in recent years. Increased hospital participation in enhanced EARSS surveillance would help to improve our understanding of these changes. Improvements to the reporting and analysis of enhanced EARSS data are planned, which should allow participating hospitals to analyse and act on their own data in a timely fashion.

CVCs remain a common, and potentially preventable, source of BSI for many of the EARSS pathogens. This underlines the importance of the national guidelines on prevention of intravascular catheter-associated infections, which have been developed by the Strategy for the Control of Antimicrobial Resistance in Ireland (SARI).

Further analyses of other organisms, particularly for FQREC and FQSEC, are planned.

More information can be found at www.hpsc.ie/hpsc/A-Z/Microbiology AntimicrobialResistance/European Antimicrobial ResistanceSurveillanceSystemEARSS/Enhanced BacteraemiaSurveillance/MainBody,1889,en.html

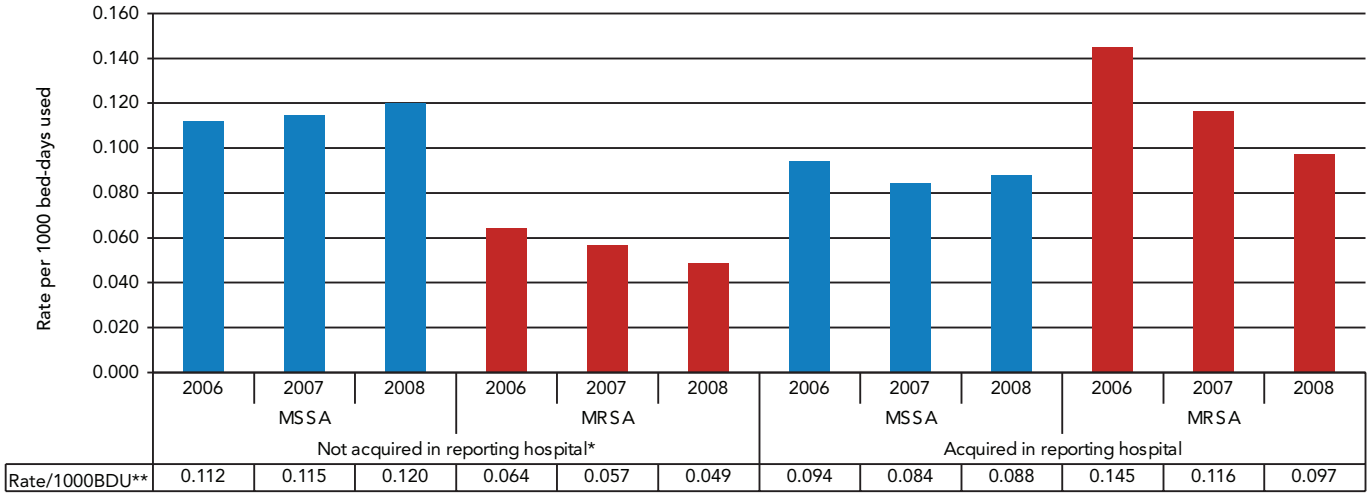


*Figure 1 shows rates of MRSA and MSSA BSI most likely to have acquired compared with rates not likely to have acquired in the reporting hospital. * Based on length of stay <48hrs, although infections may be healthcare-associated. ** These are true rates and thus only appropriate for infections acquired in the reporting hospital.*

9.4 Healthcare-associated infection surveillance

Healthcare-associated infection (HCAI) is increasingly recognised as an important cause of patient morbidity and mortality and contributes significantly to healthcare costs. The establishment of HCAI surveillance programs reduces HCAI, however, for surveillance to be effective, it needs to be standardised, timely and relevant to the institution providing the data.

Surgical site infection surveillance

The 2006 UK and Ireland HCAI prevalence survey revealed that in the Republic of Ireland, surgical site infection and urinary tract infection were the most common HCAI at the time of the survey. The HPSC established a multidisciplinary expert group in 2007 under the auspices of the Strategy for the Control of Antimicrobial Resistance in Ireland (SARI) to evaluate and recommend standardised internationally comparable methods for surgical site infection surveillance. Following the publications of national recommendations for surveillance infrastructure and a national surveillance protocol for general surgery in 2007, the group produced a national protocol for surveillance of SSI in Caesarean section in 2008. These protocols are available at: http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/SurgicalSiteInfectionSurveillance/SurgicalSiteInfectionSurveillance-Protocols/

MRSA in ICU prevalence

The meticillin-resistant Staphylococcus aureus (MRSA) in intensive care unit (ICU) prevalence study commenced in April 2008 following a nine month pilot study. The project is overseen by a multidisciplinary steering committee. The primary objective of the study is to provide a weekly snapshot of MRSA in the critical care setting that requires minimal if any additional resources. Data is fedback to participants on a quarterly basis to enable ICUs to monitor trends over time.

The 2008 report represents weekly prevalence data collected from 1st April to 31st December 2008 inclusive. ICUs were stratified by ICU type;

- Level 2/3 ICU: An ICU containing a combination of true ICU patients and coronary care unit (CCU) or high dependency unit (HDU) patients or a variable combination of these groups.
- Level 3 ICU: An ICU containing patients classified as ICU patients only.

32 Irish ICUs participated in 2008, 18 level 2/3 ICUs and 14 level 3 ICUs. ICU bed occupancy and isolation room occupancy rates were high in both level 2/3 (88% and 75%, respectively) and level 3 ICU groups (90% and 90%, respectively). However, this is an underestimate of the true occupancy of ICUs as this project only accounts for patients within the ICU and not those receiving

Table 1: Number of isolation rooms by ICU type and hospital bed capacity

ICU type	Number of Isolation Rooms	Hospital Bed Capacity			
		<150	151-300	301-450	>450
Level 2/3 (n=23)	0	3	1		
	1		4	5	
	2	1	1	1	
	4		1	1	
Level 3 (n=38)	1		4	1	1
	2				2
	3				1
	4	1			1
	5				1
	6				2

intensive care 'off-site', e.g., in a theatre recovery or hospital ward area, the level of which is substantial.

Large differences in isolation room resources were identified, with four of the 32 participating ICUs having no isolation room facilities (table 1). Of the remaining 28 ICUs, there are a total of 61 isolation rooms ranging from 1 to 6 per ICU. The majority (62%, n=38) of isolation rooms are found within level 3 ICUs (table 1). Seventy-one percent of ICUs with isolation rooms have one to two isolation rooms. All ICUs with five or more isolation rooms are level 3 ICUs.

The majority of isolation rooms were found to be equipped with hand sinks (98%) but only 20% were found to have anterooms, (table 2). Only two of the ICUs could successfully isolate all of their MRSA patients when surveyed. There are several reasons for this including lack of isolation rooms availability, isolation room occupancy for other reasons, e.g., security, a risk assessment prioritises other patients with infectious disease for a room, (e.g., 'open' tuberculosis) or insufficient staff available to care for a patient in an isolation room. The data showed that on average 21.9% of all ICU patients were isolated; another 3.8% required isolation but could not be isolated due to a lack of facilities.

As recommended in national MRSA guidelines, all ICUs screen for MRSA colonisation on admission to ICU. However, there are differences in screening protocols between hospitals. The problem of tackling MRSA in ICUs is multifaceted. It is difficult to control MRSA acquisition within a unit when the population of patients admitted have a high prevalence of MRSA on admission. While all patients are being screened upon admission, there is still a large delay in the diagnosis of MRSA using culture alone, which can take up to 48 hours or longer. Once the results are available there are often no isolation rooms available to accommodate MRSA patients therefore making the problem of containing MRSA a difficult one. An improvement in the time to diagnose patients along with an improvement in isolation room resources would enhance efforts to minimise ICU acquisition of MRSA.

The mean MRSA prevalence ranged from 2.9% to 21.2%, with a median of 7.8%. This reflects mostly patients colonised with MRSA upon admission to the ICU. No direct information on MRSA infection was collected. MRSA prevalence varies widely depending on the type of ICU. The level 2/3 ICU group had a median MRSA prevalence of 5.9% with the level 3 group having a significantly higher median prevalence of 13%, ($p < 0.001$). The weekly proportion of ICU-acquired MRSA varied nationally from 0 to 3.3% with 84% of ICUs showing a proportion of <1.5%. Level 2/3 ICUs had an average proportion of 0.5% compared to level 3 units with 0.9% ($p=0.3$).

The aim of this point prevalence surveillance project is to provide some estimate of MRSA prevalence and acquisition in Irish ICUs within the limited resources available for surveillance. Since the prevalence and transmission of MRSA increases in high-risk patient groups, ICU data should ideally be stratified by ICU acuity (i.e., APACHE score) to allow robust comparison and avoid misinterpretation of the parameters

Table 2: Number of isolation rooms and their available facilities

Facilities available	# of rooms	% of total
Presence of a hand sink	55	98
Anteroom	11	20
Negative pressure	21	38
Positive pressure	15	27

measured. The association between intensity of care and risk for MRSA acquisition is well described. ICUs with more 'at-risk' patient populations are more prone to higher rates of MRSA acquisition for a number of reasons including more staff to patient contact, higher use of medical devices compared to units with less acute patients and more selective pressures induced by antibiotic therapy. This type of risk stratification is not possible with the current protocol as it was designed so that the burden of data collection was kept to a minimum. It is therefore important to emphasise, the limitations of using a simple surveillance tool such as this point prevalence survey. A point prevalence survey only captures ICU data at a particular point in time on a single day each week. This is in contrast to a period prevalence which captures data every day in the ICU over a particular period of time, (e.g., a year) or incidence data, the collection of which would be even more time consuming. Therefore, the purpose of this tool is for ICUs to compare their own rates over time at a local level. It is unsuitable to compare individual ICUs.

HPSC plan to continue to improve this project to allow more robust stratification of ICUs by level of acuity and to allow hospitals capture other aspects of infection prevention and control such as the staff to patient ratio as a predictor of cross-infection, and the ability to staff isolation rooms. Such improvements will enhance the ability of this tool to more accurately identify the underlying issues surrounding differences in MRSA prevalence and acquisition within the ICU setting.

Alcohol-based hand rub surveillance

Alcohol-based hand rubs have been shown to be an effective and rapid method of hand hygiene in healthcare settings, and are recommended as the primary means of hand hygiene in Irish national guidelines. Measurement of hospital-level consumption of alcohol-based hand rub, expressed as volume used per 1,000 bed-days, has been shown to correlate with overall hand hygiene activity in hospitals. It is a recommended process measure of hand hygiene activity by both the World Health Organisation (WHO) and the US Centers for Disease Control (CDC).

HPSC have collated data on alcohol hand rub consumption in acute public hospitals in Ireland since 2006. The data collected represents the total volume of alcohol-based hand rub delivered or dispensed to wards, clinics and other hospital areas per quarter, excluding that used for pre-operative surgical 'scrub'. The rate of usage per hospital was calculated as the total volume of hand rub consumed (in litres) per 1,000 bed-days used (table 3).

In 2008 the median rate of alcohol hand rub consumption increased to 19.5 litres per 1,000 bed-days used, from 10.5 and 15.0 in 2006 and 2007, respectively. This represents a 30% increase in national consumption since 2007. This increase between 2006 and 2008 could be explained in part by the increased importance placed on hand hygiene since the publication of the national guidelines by the SARI Infection Control Subcommittee in 2005 and local hospital initiatives. The overall level of alcohol-based hand rub consumption is comparable to other successful hand hygiene campaigns internationally. The wide variation in levels of alcohol-based hand rub consumption between hospitals

Table 3: National data on alcohol hand rub consumption in acute public hospitals in Ireland, 2006 – 2008.

	2006*	2007**	2008
Minimum Value	0.5	5.2	5.9
National Median	**10.5**	**15**	**19.5**
Maximum Value	29	47.1	52.5

**No data received from one hospital*

***No data received from two hospitals*

(table 3) may be largely explained by differences in methodologies for collecting and reporting the data, and differences in the types and range of hand hygiene agents used.

The main limitations to be noted when examining the data in table 3 is that the data only refers to the use of alcohol-based hand rub, and does not take account of other hand hygiene agents (e.g. medicated liquid soap) that may also be in use in hospitals. In addition, the data does not give an indication of the frequency with which hand decontamination is carried out at a given hospital nor distinguish between who has used the hand rub (visitor, patient and healthcare worker). There is clearly a need for better standardisation of data collection and reporting. However, even with better standardisation, the volume of alcohol-based hand rub consumed remains a crude measure of hand hygiene activity and additional outcome measures are required. In 2009, the HPSC are planning to develop a standardized audit tool for measuring healthcare worker hand hygiene compliance in healthcare settings.

9.5 *Clostridium difficile*-associated disease in Ireland

New cases of *Clostridium difficile*-associated disease (CDAD) have been notifiable in Ireland since the 4th May 2008 under the category 'acute infectious gastroenteritis' (AIG). A new CDAD case is defined as a patient two years or older, to whom one or more of the following criteria applies:

- Diarrhoeal stools or toxic megacolon, with either a positive laboratory assay for *C. difficile* toxin A (TcdA) and/or toxin B (TcdB) in stools or a toxin-producing *C. difficile* organism detected in stool via culture or other means.
- Pseudomembranous colitis (PMC) revealed by lower gastrointestinal endoscopy.
- Colonic histopathology characteristic of *C. difficile* infection (with or without diarrhoea) on a specimen obtained during endoscopy, colectomy or autopsy)

Recurrent CDAD cases are not notifiable.

There were 2829 notifications of AIG in 2008 of which 1607 (57%) were CDAD cases, giving a national crude incidence rate (CIR) of 37.9 cases per 100,000 population (table 1).

CDAD data from 2008 represents notifications made from the 04th May 2008 (week 19) until the 03rd January 2009 (week 53). The estimated CIR over a 52 week period is also shown in table 1. All cases were laboratory confirmed. Additional information as specified in the CDAD definitions are not currently captured on CIDR.

CDAD predominated in older patients and in females (61%) (figure 1). The over 65 age category has the highest calculated age specific incidence rate (ASIR) of 245 per 100,000.

Patients classified as 'hospital inpatient' had the highest occurrence of cases, accounting for 52.7% of all cases notified. Of the remaining cases, 6% were classified as GP patients, 2.7% hospital outpatient, 1.2% 'other', 0.3% hospital day patient and 27% as either "not specified" or "unknown".

The seasonal trend is indistinguishable at present as the data does not represent a complete annual data set. In addition, identification of seasonal patterns is hindered by late and batch notifications from institutions.

Table 1. CDAD in Ireland by HSE area 2008

HSE Region	No. Cases	CIR* incl. 95% CI	Estimated No. Cases**	Estimated CIR incl. 95% CI**
East	758	50.5 [46.9 - 54.1]	1126	75.1 [70.7-79.5]
Midlands	37	14.7 [10.0 - 19.4]	55	21.9 [16.1-27.6]
Mid West	80	22.2 [17.3 - 27.0]	119	33.0 [27.0-39.0]
North east	36	9.1 [6.2 - 12.1]	53	13.5 [9.8-17.1]
North West	95	40.1 [32.0 - 48.1]	141	59.5 [50.0-69.3]
South East	122	26.5 [21.8 - 31.2]	181	39.3 [33.6-45.0]
South	256	41.2 [36.2 - 46.3]	380	61.2 [55.0-67.3]
West	223	53.8 [46.8 - 60.9]	331	80.0 [71.3-88.5]
Total	**1607**	**37.9 [36.0 - 39.8]**	**2388**	**56.32 [54.1-58.6]**

*Rates calculated using 2006 census data
**Using the number of notifications over this 35 week period, the estimated CIR for a 52 week period has been calculated

Five *Clostridium difficile* outbreaks and one mixed *C. difficile* and Norovirus outbreak were notified in 2008. (table 2)

Conclusion

- There were 1607 notifications of CDAD in 2008 (35 weeks data). Regional CIR for this period varies greatly in range. This may be due to differences in testing criteria and/or available testing facilities.

- The incidence of CDAD in Ireland is prominent in older age groups. In the over 65 age category (n=1147) ages range from 65 (n=15) to 103 (n=1). Cases aged 82 had the highest number of cases (n=69).

- Healthcare institutions reported the most cases of CDAD (53%). This figure represents the location of patient at diagnosis only. Enhanced information is required to determine the onset and origin of infection.

- All notified CDAD outbreaks were health-care associated.

- The seasonal trend is indistinguishable at present.

National guidelines for the surveillance, diagnosis, management, and prevention and control of CDAD in Ireland are available for download (http://www.hpsc.ie/hpsc/A-Z/Gastroenteric/Clostridiumdifficile/). All healthcare professionals must promote practices known to reduce the incidence of CDAD including antibiotic stewardship and compliance with infection prevention and control measures. These measures are outlined in the National guidelines.

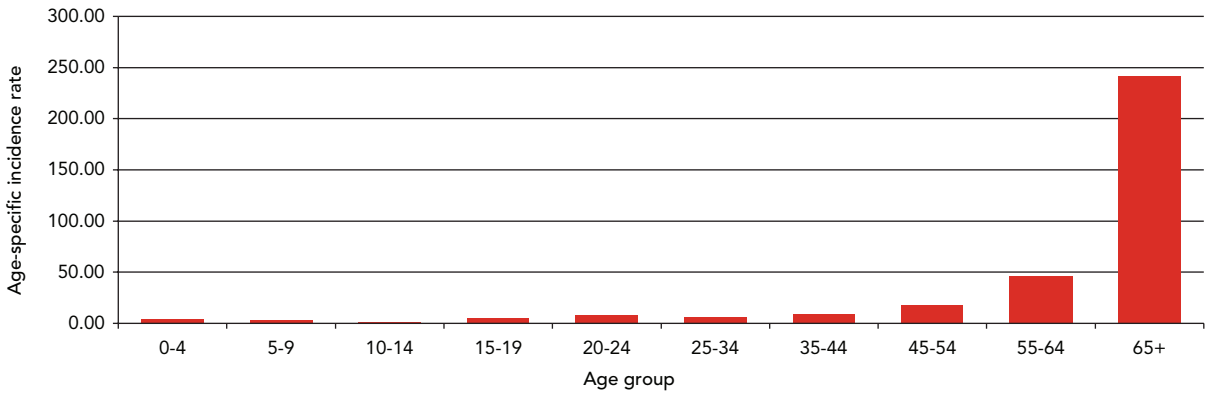


Figure 1: Age-specific incidence rate of CDAD in Ireland, Weeks 19-53 2008, per 100,000 populations

Table 2: C. difficile associated outbreaks, Weeks 01 – 53, 2008

HSE Region	Organism/Pathogen	Type	Transmission mode	Location	Number ill
East	*C difficile*	General	P-P	Hospital	**42**
South	*C difficile*	General	Not Specified	Comm. Hosp/Long-stay	**8**
South	*C difficile*	General	P-P	Hospital	**5**
South	*C difficile*	General	Unknown	Hospital	**11**
South	*C difficile* and Norovirus	General	P-P and Airborne	Residential institution	**12**
West	*C difficile*	General	Unknown	Hospital	**18**

10

Computerised Infectious Disease Reporting System (CIDR)

10. Computerised Infectious Disease Reporting (CIDR)

Summary

- New CIDR hardware and updated software deployed after rigorous application and performance testing
- Additional clinical microbiology laboratories implemented
- Updated version of CIDR National Business approved
- *Clostridium difficile* notifications and reporting supported by CIDR
- Pilot implementation of disaggregate STI notifications initiated using CIDR

2008 represented a significant milestone in the development of CIDR with the deployment of new hardware and updated operating system (Windows 2000 Server to Windows 2003 Server), database software (SQL Server 2000 to SQL Server 2005) and reporting software (Business Objects version 5 to Business Objects XI r2, effectively version 11). This replaced the system originally built in 2003/4. The deployment of CIDR2 was preceded by extensive testing to ensure that the CIDR application continued to work as required and that the large number of CIDR reports were migrated from the previous version of the reporting software.

The biggest change was in the version of the reporting software used in CIDR. This means that CIDR users now access CIDR reporting entirely through their web browser, both to run existing reports but also to edit and create new reports. This latter functionality previously required Business Objects software to be installed on a user's PC which was difficult to manage with a widely dispersed user base and also represented a possible security risk to local networks because it required users to have administrative privileges over their PC. Another major change associated with the use of the new reporting software was that local reports that had previously been stored on users' local networks (in the regions and separately in HPSC) were now stored on the CIDR reporting server.

To ensure that CIDR2, and particularly the new reporting software, were capable of delivering the service required by large number (now greater than 200) of CIDR users utilising the system, the system was extensively tested by a specialist third party software

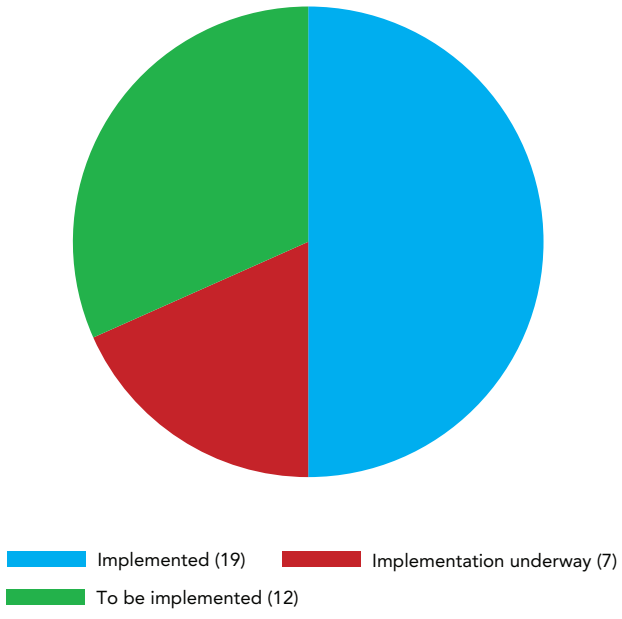


Figure 1. The numbers of laboratories using CIDR.

testing company. The results of this testing provided reassurance that the core CIDR system was more than capable of meeting the anticipated load.

Although implementation of CIDR in the two remaining Public Health regions remained constrained through 2008, CIDR was implemented in three new microbiology laboratories. The laboratory in the Mater Hospital went live in February whilst the two laboratories in HSE Northwest – Sligo General Hospital and Letterkenny General Hospital – went live in May and August respectively. This brought the total number of laboratories utilising CIDR for online infectious disease notifications up to 19.

Infectious disease notifications from laboratories represent the majority of notifications through CIDR Figure 2) and this is expected to increase further as CIDR is implemented in the remaining laboratories.

The operation and use of CIDR over the past four years continued to be underpinned through 2008 by the CIDR Business Rules initially developed from the pilot implementation in 2004. It had become increasingly clear in the light of operation and further implementations since that time that these rules needed to be updated. Consequently a new national CIDR Business Rules Committee was formed in 2007 to review the existing document. This committee met three times through 2008 to continue to update and clarify these rules, including roles and responsibilities, to ensure that CIDR continued to be used appropriately and that the security of the system was maximised. A new version (version 2) of the CIDR Business Rules was finalised by the CIDR National Business Rules Committee and approved by the CIDR National Steering Group in November.

Clostridium difficile became notifiable in May under the heading 'acute infectious gastroenteritis (AIG)' and CIDR was updated to reflect this. The fact that *C. difficile* was not explicitly notifiable in its own right meant that valuable additional information cannot yet be captured in CIDR – we will be able to capture this enhanced surveillance information once *C. difficile* is explicitly notifiablein its own right. In the meantime a series of reports were developed to identify the number of *C.difficile* notifications under the 'AIG' category.

Historically notifications of sexually transmitted infections (STI's) have been made quarterly on an aggregate basis. This limits the degree of analysis that can be carried out. Disaggregate timelier reporting of STI's using CIDR was initiated as a pilot programme

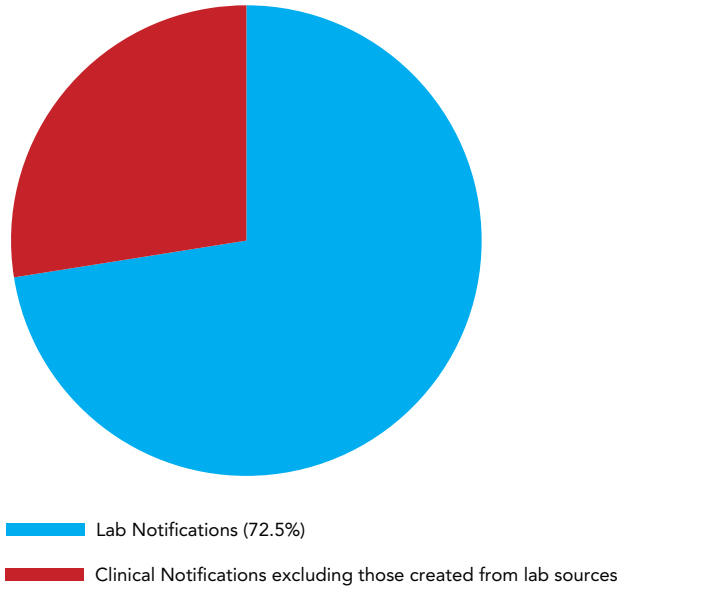


Figure 2. Proportion of notifications originating from laboratories in 2008.

involving St James's Hospital, Dublin and the Department of Public Health in HSE – East in January. They were joined by Waterford Regional Hospital and the Department of Public Health in HSE – South East in April. This appears to be operating satisfactorily although a formal evaluation is still awaited.

The CIDR helpdesk provided ongoing support to CIDR users in relation to business and technical support calls with the number of calls similar to those received in 2007 (795 in 2008 compared with 769 in 2007).

CIDR training for CIDR users was delivered through 2008 with 5 courses delivered to 26 trainees. The courses delivered included introductory courses for public health and for laboratory users, and an advanced course for public health users. Unfortunately training had to postponed in the latter half of the year because of the effort involved in ensuring that CIDR2 was fully tested prior to deployment.

The CIDR User Group met four times in 2008 and as in previous years remained a valuable channel of communication with the CIDR team. It also allowed CIDR users to continue to share expertise and best practice amongst themselves. A subject that that extensively discussed was the notification of *C. difficile* infections in CIDR and how best to do this on an ongoing interim basis under the heading of acute infectious gastroenteritis.

The CIDR National Steering Group continued to provide overall governance of the CIDR system and met on 3 occasions in 2008. Dr Suzanne Cotter stood down during the year as CIDR team leader and John Brazil took over this responsibility.

Appendix 1
Notifiable Infectious Diseases in Ireland

Notes:

Figures presented in this appendix were extracted from the Computerised Infectious Disease Reporting (CIDR) system on the 14th August 2009. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

Figures on EARSS pathogens, tuberculosis and sexually transmitted infections are not presented here. Separate databases are used to collate data on these diseases. Details on the epidemiology of these diseases can be found in separate chapters in this document.

Table A1.1*. List of notifiable infectious diseases and their respective causative pathogens under Infectious Diseases (Amendment) (No. 3) Regulations 2003 (S.I. No. 707 of 2003)*

Infectious Disease	Causative Pathogen(s)
Acute anterior poliomyelitis	Polio virus
Acute infectious gastroenteritis	
Ano-genital warts	
Anthrax	*Bacillus anthracis*
***Bacillus cereus* food-borne infection/intoxication**	*Bacillus cereus*
Bacterial meningitis (not otherwise specified)	
Botulism	*Clostridium botulinum*
Brucellosis	*Brucella* species
Campylobacter infection	*Campylobacter* species
Chancroid	*Haemophilus ducreyi*
***Chlamydia trachomatis* infection (genital)**	*Chlamydia trachomatis*
Cholera	*Vibrio cholerae*
***Clostridium perfringens* (type A) food-borne disease**	*Clostridium perfringens*
Creutzfeldt Jakob disease	
Creutzfeldt Jakob disease (new variant)	
Cryptosporidiosis	*Cryptosporidium parvum*
Diphtheria	*Corynebacterium diphtheriae*
Echinococcosis	*Echinococcus* species
Enterococcal bacteraemia	*Enterococcus* species (blood)
Enterohaemorrhagic *Escherichia coli*	*Escherichia coli* of serogroup known to be toxin-producing
***Escherichia coli* infection (invasive)**	*Escherichia coli* (blood, CSF)
Giardiasis	*Giardia lamblia*
Gonorrhoea	*Neisseria gonorrhoeae*
Granuloma inguinale	
***Haemophilus influenzae* disease (invasive)**	*Haemophilus influenzae* (blood, CSF or other normally sterile site)
Hepatitis A (acute)	Hepatitis A virus
Hepatitis B (acute and chronic)	Hepatitis B virus
Hepatitis C	Hepatitis C virus
Herpes simplex (genital)	Herpes simplex virus
Influenza	Influenza A and B virus
Legionellosis	*Legionella* species
Leptospirosis	*Leptospira* species
Listeriosis	*Listeria monocytogenes*
Lymphogranuloma venereum	
Malaria	*Plasmodium falciparum, P. vivax, P. ovale, P. malariae*
Measles	Measles virus
Meningococcal disease	*Neisseria meningitidis*
Mumps	Mumps virus
Non-specific urethritis	
Noroviral infection	Norovirus
Paratyphoid	*Salmonella paratyphi*
Pertussis	*Bordetella pertussis*
Plague	*Yersinia pestis*
Q fever	*Coxiella burnetii*
Rabies	Rabies virus
Rubella	Rubella virus
Salmonellosis	*Salmonella enterica*
Severe Acute Respiratory Syndrome (SARS)	SARS-associated coronavirus
Shigellosis	*Shigella* species

Infectious Disease	Causative Pathogen(s)
Smallpox	Variola virus
Staphylococcal food poisoning	Enterotoxigenic *Staphylococcus aureus*
***Staphylococcus aureus* bacteraemia**	*Staphylococcus aureus* (blood)
Streptococcus group A infection (invasive)	*Streptococcus pyogenes* (blood, CSF or other normally sterile site)
***Streptococcus pneumoniae* infection (invasive)**	*Streptococcus pneumoniae* (blood, CSF or other normally sterile site)
Syphilis	*Treponema pallidum*
Tetanus	*Clostridium tetani*
Toxoplasmosis	*Toxoplasma gondii*
Trichinosis	*Trichinella* species
Trichomoniasis	*Trichomonas vaginalis*
Tuberculosis	*Mycobacterium tuberculosis* complex
Tularemia	*Francisella tularensis*
Typhoid	*Salmonella typhi*
Typhus	*Rickettsia prowazekii*
Viral encephalitis	
Viral haemorrhagic fevers	Lassa virus, Marburg virus, Ebola virus, Crimean-Congo haemorrhagic fever virus
Viral meningitis	
Yellow fever	Yellow fever virus
Yersiniosis	*Yersinia enterocolitica, Yersinia pseudotuberculosis*

Table A1.2 *Number of notifiable infectious diseases, 2006-2008 and crude incidence rates of diseases, 2008*

Infectious Disease	2006	2007	2008	CIR* 2008
Acute anterior poliomyelitis	0	0	0	0.00
Acute infectious gastroenteritis	2306	2521	4203	99.13
Anthrax	0	0	0	0.00
Bacillus cereus food-borne infection or intoxication	0	0	0	0.00
Bacterial meningitis (not otherwise specified)	46	33	40	0.94
Botulism	1	0	7	0.17
Brucellosis	29	28	3	0.07
Campylobacter infection	1812	1890	1757	41.44
Cholera	0	0	0	0.00
Clostridium perfringens (type A) food-borne disease	0	0	1	0.02
Creutzfeldt Jakob disease	6	3	2	0.05
Creutzfeldt Jakob disease (new variant)	1	0	0	0.00
Cryptosporidiosis	369	609	416	9.81
Diphtheria	0	0	0	0.00
Echinococcosis	0	0	2	0.05
Enterohaemorrhagic Escherichia coli	174	192	238	5.61
Giardiasis	64	62	71	1.67
Haemophilus influenzae disease (invasive)	38	31	22	0.52
Hepatitis A (acute)	39	32	42	0.99
Hepatitis B (acute and chronic)	810	863	949	22.38
Hepatitis C	1219	1556	1537	36.25
Influenza	275	280	475	11.20
Legionellosis	13	16	12	0.28
Leptospirosis	20	22	30	0.71
Listeriosis	7	21	13	0.31
Malaria	96	71	82	1.93
Measles	83	53	55	1.30
Meningococcal disease	209	179	168	3.96

Infectious Disease	2006	2007	2008	CIR* 2008
Mumps	427	142	1385	32.66
Noroviral infection	1636	1316	1777	41.91
Paratyphoid	1	4	8	0.19
Pertussis	62	77	104	2.45
Plague	0	0	0	0.00
Q fever	12	17	13	0.31
Rabies	0	0	0	0.00
Rubella	14	19	40	0.94
Salmonellosis	422	456	449	10.59
Severe Acute Respiratory Syndrome (SARS)	0	0	0	0.00
Shigellosis	54	43	76	1.79
Smallpox	0	0	0	0.00
Staphylococcal food poisoning	0	0	1	0.02
Streptococcus group A infection (invasive)	61	57	68	1.60
Streptococcus pneumoniae infection (invasive)	293	361	465	10.97
Tetanus	0	1	2	0.05
Toxoplasmosis	44	49	49	1.16
Trichinosis	0	2	0	0.00
Tularemia	0	0	0	0.00
Typhoid	9	9	5	0.12
Typhus	0	0	0	0.00
Viral encephalitis	16	8	5	0.12
Viral haemorrhagic fevers	0	0	0	0.00
Viral meningitis	148	45	97	2.29
Yellow fever	0	0	0	0.00
Yersiniosis	1	6	3	0.07
Total	**10817**	**11074**	**14672**	**346.05**

See explanatory note on first page of Appendix 1.
*Crude incidence rate per 100,000 total population.

Table A1.3 *Number of notifiable infectious diseases by HSE area, 2008*

Infectious Disease	HSE-E	HSE-M	HSE-MW	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Total
Acute infectious gastroenteritis	1455	352	192	202	293	478	633	598	4203
Bacterial meningitis (not otherwise specified)	7	1	2	2	5	3	8	12	40
Botulism	6	0	0	0	0	0	1	0	7
Brucellosis	*	*	*	*	*	*	*	*	3
Campylobacter infection	565	151	176	134	98	180	268	185	1757
Clostridium perfringens (type A) food-borne disease	*	*	*	*	*	*	*	*	1
Creutzfeldt Jakob disease	*	*	*	*	*	*	*	*	2
Cryptosporidiosis	12	32	70	33	41	66	74	88	416
Echinococcosis	*	*	*	*	*	*	*	*	2
Enterohaemorrhagic Escherichia coli	47	41	28	17	19	23	38	25	238
Giardiasis	37	1	2	2	3	9	9	8	71
Haemophilus influenzae disease (invasive)	8	2	3	0	0	3	4	2	22
Hepatitis A (acute)	15	1	2	3	1	7	10	3	42
Hepatitis B (acute and chronic)	540	28	74	66	26	55	90	70	949
Hepatitis C	1183	36	47	63	22	49	66	71	1537
Influenza	198	24	113	42	19	30	30	19	475
Legionellosis	6	2	0	1	0	0	2	1	12

Infectious Disease	HSE-E	HSE-M	HSE-MW	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Total
Leptospirosis	11	1	3	0	2	2	7	4	30
Listeriosis	4	0	4	1	1	0	3	0	13
Malaria	32	4	7	13	3	10	8	5	82
Measles	27	2	1	3	2	7	5	8	55
Meningococcal disease	41	13	12	24	7	27	33	11	168
Mumps	422	58	105	53	181	88	183	295	1385
Noroviral infection	641	122	146	217	174	76	252	149	1777
Paratyphoid	5	0	0	0	0	0	1	2	8
Pertussis	43	3	10	12	3	4	12	17	104
Q fever	1	0	3	0	0	0	9	0	13
Rubella	23	1	0	6	0	6	4	0	40
Salmonellosis	149	44	35	60	19	43	55	44	449
Shigellosis	24	21	10	4	3	4	7	3	76
Staphylococcal food poisoning	*	*	*	*	*	*	*	*	1
Streptococcus group A infection (invasive)	31	0	1	10	3	8	5	10	68
Streptococcus pneumoniae infection (invasive)	162	14	40	27	28	94	51	49	465
Tetanus	*	*	*	*	*	*	*	*	2
Toxoplasmosis	18	3	4	1	2	4	13	4	49
Typhoid	1	0	0	2	0	1	0	1	5
Viral encephalitis	3	0	0	1	0	0	0	1	5
Viral meningitis	48	1	4	16	3	9	8	8	97
Yersiniosis	*	*	*	*	*	*	*	*	3
Total	**5770**	**959**	**1097**	**1016**	**959**	**1287**	**1890**	**1694**	**14672**

See explanatory note on first page of Appendix 1.
*Data not reported to HSE area level when total number in Ireland <5 cases

Table A1.4 *Number of notifiable infectious diseases by age group (years), 2008*

Infectious Disease	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Un-known	Total
Acute infectious gastroenteritis	2348	86	21	22	41	67	79	111	201	1202	25	4203
Bacterial meningitis (not otherwise specified)	24	0	0	3	1	5	1	0	3	3	0	40
Botulism	0	0	0	0	1	4	2	0	0	0	0	7
Brucellosis	0	0	0	0	0	0	1	1	1	0	0	3
Campylobacter infection	429	118	58	76	150	309	199	134	104	173	7	1757
Clostridium perfringens (type A) food-borne disease	0	0	1	0	0	0	0	0	0	0	0	1
Creutzfeldt Jakob disease	0	0	0	0	0	0	0	0	0	2	0	2
Cryptosporidiosis	270	74	24	8	11	11	6	1	4	6	1	416
Echinococcosis	0	0	0	0	0	0	1	1	0	0	0	2
Enterohaemorrhagic Escherichia coli	101	39	5	2	7	15	32	12	6	18	1	238
Giardiasis	9	7	0	0	5	16	9	13	8	4	0	71
Haemophilus influenzae disease (invasive)	7	2	0	0	1	0	0	2	2	8	0	22
Hepatitis A (acute)	3	5	2	5	4	11	4	2	3	3	0	42
Hepatitis B (acute and chronic)	3	3	6	41	161	406	214	83	21	11	0	949
Hepatitis C	4	3	1	18	126	665	436	173	80	23	8	1537
Influenza	54	14	13	19	29	96	107	60	42	36	5	475
Legionellosis	0	0	0	0	0	0	0	3	4	5	0	12
Leptospirosis	0	0	1	0	5	5	6	1	8	4	0	30
Listeriosis	2	0	0	0	1	2	1	1	1	5	0	13
Malaria	6	9	1	5	3	24	28	5	1	0	0	82

Infectious Disease	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Un-known	Total
Measles	39	9	2	0	1	2	2	0	0	0	0	55
Meningococcal disease	100	12	9	17	13	5	2	2	6	2	0	168
Mumps	47	39	99	402	455	213	65	24	16	8	17	1385
Noroviral infection	276	15	10	24	26	68	66	69	148	1052	23	1777
Paratyphoid	0	0	0	0	0	4	2	1	1	0	0	8
Pertussis	71	13	9	3	1	2	3	1	0	0	1	104
Q fever	1	0	0	0	1	0	3	2	4	2	0	13
Rubella	32	5	0	0	0	2	1	0	0	0	0	40
Salmonellosis	102	30	17	17	54	87	30	38	30	42	2	449
Shigellosis	21	3	3	2	4	16	9	13	4	0	1	76
Staphylococcal food poisoning	1	0	0	0	0	0	0	0	0	0	0	1
Streptococcus group A infection (invasive)	5	7	3	1	1	8	7	6	11	18	1	68
Streptococcus pneumoniae infection (invasive)	73	2	5	7	7	25	57	36	58	195	0	465
Tetanus	0	0	0	0	1	0	0	0	0	1	0	2
Toxoplasmosis	3	1	1	10	4	12	10	6	1	1	0	49
Typhoid	0	1	1	0	1	1	0	1	0	0	0	5
Viral encephalitis	2	1	0	1	0	0	0	0	1	0	0	5
Viral meningitis	35	7	7	7	11	12	5	3	2	6	2	97
Yersiniosis	0	0	0	0	0	0	1	1	1	0	0	3
Total	**4068**	**505**	**299**	**690**	**1126**	**2093**	**1389**	**806**	**772**	**2830**	**94**	**14672**

See explanatory note on first page of Appendix 1.

Table A1.5 *Number of notifiable infectious diseases by gender, 2008*

Infectious Disease	Male	Female	Unknown	Total
Acute infectious gastroenteritis	1947	2226	30	4203
Bacterial meningitis (not otherwise specified)	22	17	1	40
Botulism	4	3	0	7
Brucellosis	3	0	0	3
Campylobacter infection	911	838	8	1757
Clostridium perfringens (type A) food-borne disease	1	0	0	1
Creutzfeldt Jakob disease	1	1	0	2
Cryptosporidiosis	239	176	1	416
Echinococcosis	1	1	0	2
Enterohaemorrhagic Escherichia coli	96	142	0	238
Giardiasis	39	32	0	71
Haemophilus influenzae disease (invasive)	14	8	0	22
Hepatitis A (acute)	18	24	0	42
Hepatitis B (acute and chronic)	514	386	49	949
Hepatitis C	967	542	28	1537
Influenza	236	232	7	475
Legionellosis	7	5	0	12
Leptospirosis	27	3	0	30
Listeriosis	6	7	0	13
Malaria	48	34	0	82
Measles	25	30	0	55
Meningococcal disease	100	68	0	168
Mumps	785	596	4	1385
Noroviral infection	741	1030	6	1777
Paratyphoid	7	1	0	8
Pertussis	36	65	3	104

Infectious Disease	Male	Female	Unknown	Total
Q fever	9	4	0	13
Rubella	26	14	0	40
Salmonellosis	226	221	2	449
Shigellosis	27	47	2	76
Staphylococcal food poisoning	0	1	0	1
Streptococcus group A infection (invasive)	32	36	0	68
Streptococcus pneumoniae infection (invasive)	265	200	0	465
Tetanus	2	0	0	2
Toxoplasmosis	15	34	0	49
Typhoid	4	1	0	5
Viral encephalitis	3	2	0	5
Viral meningitis	47	49	1	97
Yersiniosis	1	2	0	3
Total	**7452**	**7078**	**142**	**14672**

See explanatory note on first page of Appendix 1.

Table A1.6 *Number of notifiable infectious diseases by case classification, 2008*

Infectious Disease	Confirmed	Probable	Possible	Not Specified	Total
Acute infectious gastroenteritis	3966	231	0	6	4203
Bacterial meningitis (not otherwise specified)	22	12	6	0	40
Botulism	5	2	0	0	7
Brucellosis	2	1	0	0	3
Campylobacter infection	1754	0	0	3	1757
Clostridium perfringens (type A) food-borne disease	1	0	0	0	1
Creutzfeldt Jakob disease	2	0	0	0	2
Cryptosporidiosis	414	0	0	2	416
Echinococcosis	2	0	0	0	2
Enterohaemorrhagic Escherichia coli	226	12	0	0	238
Giardiasis	71	0	0	0	71
Haemophilus influenzae disease (invasive)	22	0	0	0	22
Hepatitis A (acute)	41	1	0	0	42
Hepatitis B (acute and chronic)	949	0	0	0	949
Hepatitis C	1537	0	0	0	1537
Influenza	369	0	106	0	475
Legionellosis	11	1	0	0	12
Leptospirosis	30	0	0	0	30
Listeriosis	13	0	0	0	13
Malaria	82	0	0	0	82
Measles	13	0	42	0	55
Meningococcal disease	157	0	11	0	168
Mumps	705	231	446	3	1385
Noroviral infection	1676	101	0	0	1777
Paratyphoid	8	0	0	0	8
Pertussis	71	2	31	0	104
Q fever	10	3	0	0	13
Rubella	2	1	37	0	40
Salmonellosis	448	1	0	0	449
Shigellosis	63	13	0	0	76
Staphylococcal food poisoning	1	0	0	0	1
Streptococcus group A infection (invasive)	66	1	0	1	68
Streptococcus pneumoniae infection (invasive)	405	59	1	0	465

Infectious Disease	Confirmed	Probable	Possible	Not Specified	Total
Tetanus	2	0	0	0	2
Toxoplasmosis	49	0	0	0	49
Typhoid	5	0	0	0	5
Viral encephalitis	5	0	0	0	5
Viral meningitis	86	10	0	1	97
Yersiniosis	3	0	0	0	3
Total	**13294**	**682**	**680**	**16**	**14672**

See explanatory note on first page of Appendix 1.

Case classifications are assigned to notifications as per the Case Definitions for Notifiable Diseases booklet, available at http://www.hpsc.ie

*As per the case definitions, meningococcal disease notifications are classified as definite, presumed and possible. For convenience they are reported in this table as confirmed, probable and possible, respectively.

Appendix 2
Immunisation Uptake in Ireland

Table A2.1 *Immunisation uptake (%) at 12 months of age in 2008 (i.e. cohort born 01/01/2007-31/12/2007)*

HSE Area	Local Health Office/HSE Area	Number in cohort for BCG	Number in cohort for other vaccines*	Immunisation Uptake (%)						
				BCG†	D_3	P_3	T_3	Hib_3	$Polio_3$	$MenC_3$‡
HSE-E	Dublin South	na	1596	na	92	92	92	92	92	91
	Dublin South East	na	1439	na	96	96	96	96	96	96
	Dublin South City	na	1694	na	81	81	81	81	81	80
	Dublin South West	na	2508	na	91	91	91	91	91	90
	Dublin West	na	2795	na	88	88	88	88	88	86
	Dublin North West	na	3740	na	85	85	85	85	85	86
	Dublin North Central	na	1695	na	86	86	86	86	86	83
	Dublin North	na	4223	na	89	89	89	89	89	89
	Kildare/West Wicklow	na	4312	na	83	83	83	83	83	82
	Wicklow	na	2052	na	88	88	88	88	88	88
	HSE-E Total	**na**	**26054***	**na**	**87**	**87**	**87**	**87**	**87**	**87‡**
HSE-M	Laois/Offaly	2726	2726	92	91	91	91	91	91	91
	Longford/Westmeath	2031	2031	93	95	95	95	95	95	95
	HSE-M Total	**4757**	**4757**	**93**	**93**	**93**	**93**	**93**	**93**	**93**
HSE-MW	Clare	1798	1873	98	90	90	90	90	90	90
	Limerick	2061	2020	97	89	89	89	89	89	88
	Tipperary NR/East Limerick	1934	2045	95	91	91	91	91	91	91
	HSE-MW Total	**5793**	**5938***	**96**	**90**	**90**	**90**	**90**	**90**	**90‡**
HSE-NE	Cavan/Monaghan	na	2082	na	91	91	91	91	91	90
	Louth	na	2107	na	88	88	88	88	88	86
	Meath	na	3600	na	90	90	90	90	90	89
	HSE-NE Total	**na**	**7789**	**na**	**90**	**90**	**90**	**90**	**90**	**88**
HSE-NW	Donegal	2344	2344	93	91	91	91	91	91	91
	Sligo/Leitrim	1443	1443	96	93	93	93	93	93	91
	HSE-NW Total	**3787**	**3787**	**94**	**92**	**92**	**92**	**92**	**92**	**91**
HSE-SE	Carlow/Kilkenny	2020	2020	93	87	87	87	87	87	86
	South Tipperary	1423	1423	94	89	89	89	89	89	89
	Waterford	2082	2082	92	87	87	87	87	87	86
	Wexford	2333	2333	92	89	89	89	89	89	89
	HSE-SE Total	**7858**	**7858**	**93**	**88**	**88**	**88**	**88**	**88**	**88**
HSE-S	North Cork	na	1254	na	84	84	84	84	84	84
	North South Lee	na	5846	na	86	86	86	86	86	86
	West Cork	na	997	na	83	83	83	83	83	83
	Kerry	2129	2126	90	84	84	84	84	84	85
	HSE-S Total	**2129**	**10223**	**90§**	**85**	**85**	**85**	**85**	**85**	**85**
HSE-W	Galway	na	3924	na	87	87	87	87	87	86
	Mayo	na	1892	na	88	88	88	88	88	88
	Roscommon	na	885	na	95	95	95	95	95	95
	HSE-W Total	**na**	**6701**	**na**	**88**	**88**	**88**	**88**	**88**	**88**
Ireland		**24324**	**73107***	**94†**	**88**	**88**	**88**	**88**	**88**	**88‡**

na=not available

* As the denominator/number in cohort may vary slightly according to vaccine, most commonly used number is presented here. The HSE-E and HSE-MW $MenC_3$ data were not available for Quarter 3 2008. Number in HSE-E $MenC_3$ cohort is 19,032. Number in HSE-MW $MenC_3$ cohort is 4,332. Number in national $MenC_3$ cohort is 64,455.

† BCG uptake data were available for five of the eight HSE-Areas only (data from HSE-Southern Area relates to Kerry only)

‡ The HSE-E and HSE-MW $MenC_3$ data were not available for Quarter 3 2008

§ HSE-Southern Area - part coverage of neonatal BCG (i.e. Kerry only)

Please note while North Lee and South Lee are two separate Local Health Offices their combined immunisation uptake data are reported here

Table A2.2 *Immunisation uptake (%) at 24 months of age in 2008 (i.e. cohort born 01/01/2006-31/12/2006)*

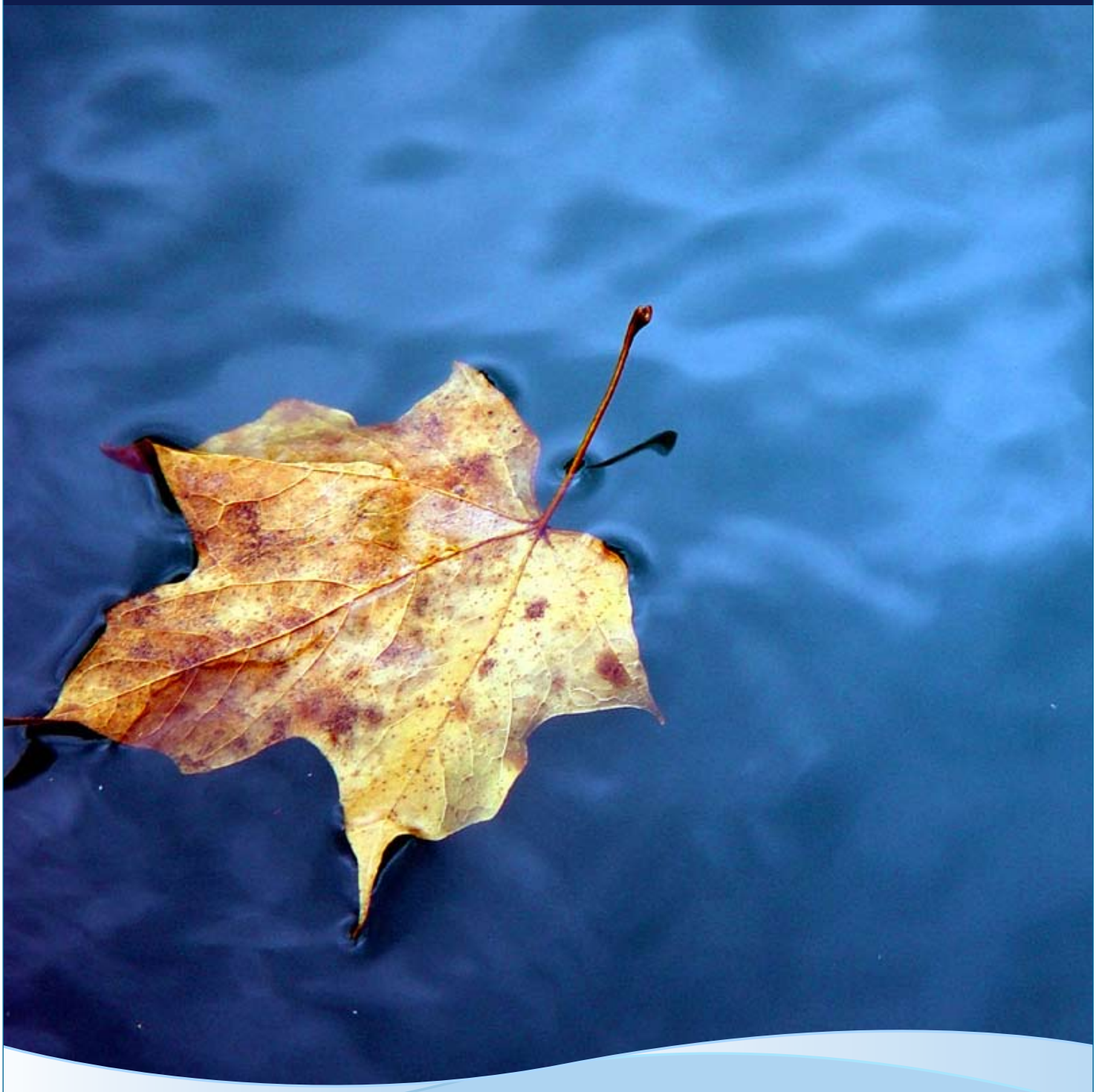
HSE Area	Local Health Office/HSE Area	Number in cohort for Hib_b	Number in cohort for other vaccines*	Immunisation Uptake (%)							
				D_3	P_3	T_3	Hib_3	Hib_b†	$Polio_3$	$MenC_3$‡	MMR_1
HSE-E	Dublin South	1473	1473	95	95	95	95	80	95	94	93
	Dublin South East	1260	1259	97	97	97	97	77	97	97	93
	Dublin South City	1469	1471	86	86	86	86	68	86	86	81
	Dublin South West	2339	2338	96	96	96	95	81	96	93	93
	Dublin West	2552	2552	93	93	93	92	76	92	92	87
	Dublin North West	3302	3303	91	91	91	91	77	91	91	84
	Dublin North Central	1402	1402	90	90	90	90	71	90	89	85
	Dublin North	3745	3744	93	93	93	93	78	93	92	89
	Kildare/West Wicklow	3953	3953	90	90	90	89	75	90	89	84
	Wicklow	1923	1924	92	92	92	92	72	92	92	86
	HSE-E Total	**23418**	**23419***	**92**	**92**	**92**	**92**	**76**	**92**	**91‡**	**87**
HSE-M	Laois/Offaly	2450	2463	96	96	96	96	90	96	96	93
	Longford/Westmeath	1967	2003	97	97	97	97	91	97	97	94
	HSE-M Total	**4417**	**4466**	**96**	**96**	**96**	**96**	**90**	**96**	**96**	**94**
HSE-MW	Clare	1292	1786	94	94	94	94	83	94	94	92
	Limerick	1405	1936	92	92	92	92	79	92	92	88
	Tipperary NR/East Limerick	1350	1784	94	94	94	94	83	94	93	92
	HSE-MW Total	**4047**	**5506***	**93**	**93**	**93**	**93**	**82†**	**93**	**93‡**	**90**
HSE-NE	Cavan/Monaghan	1925	1925	94	94	94	94	88	94	94	91
	Louth	2053	2053	94	94	94	94	87	94	94	90
	Meath	3138	3138	93	93	93	93	90	93	93	90
	HSE-NE Total	**7116**	**7116**	**94**	**94**	**94**	**94**	**89**	**94**	**94**	**90**
HSE-NW	Donegal	2199	2199	97	97	97	96	94	97	95	91
	Sligo/Leitrim	1313	1313	96	96	96	94	95	96	91	94
	HSE-NW Total	**3512**	**3512**	**96**	**96**	**96**	**95**	**94**	**96**	**93**	**92**
HSE-SE	Carlow/Kilkenny	1467	1940	91	91	91	91	91	91	90	89
	South Tipperary	1003	1335	92	92	92	91	84	92	90	88
	Waterford	1555	2073	89	89	89	89	82	89	88	84
	Wexford	1724	2267	92	92	92	92	88	92	91	88
	HSE-SE Total	**5749**	**7615**	**91**	**91**	**91**	**91**	**87†**	**91**	**90**	**87**
HSE-S	North Cork	1122	1079	92	92	92	92	83	92	92	87
	North South Lee	5332	5369	95	95	95	95	85	95	95	91
	West Cork	953	941	91	91	91	91	81	91	91	85
	Kerry	1900	1879	90	90	90	90	78	90	90	84
	HSE-S Total	**9307**	**9268**	**93**	**93**	**93**	**93**	**83**	**93**	**93**	**89**
HSE-W	Galway	3525	3522	93	93	93	93	84	93	93	89
	Mayo	1728	1728	92	92	92	92	72	92	92	82
	Roscommon	869	869	97	97	97	97	94	97	98	93
	HSE-W Total	**6122**	**6119**	**93**	**93**	**93**	**93**	**82**	**93**	**94**	**88**
Ireland		**63688**	**67021***	**93**	**93**	**93**	**93**	**82†**	**93**	**92‡**	**89**

*As the denominator/number in cohort may vary slightly according to vaccine, most commonly used number is presented here. The HSE-E and HSE-MW $MenC_3$ data were not available for Quarter 3 2008. Number in HSE-E $MenC_3$ cohort is 17,233. Number in HSE-MW $MenC_3$ cohort is 4,047. Number in national $MenC_3$ cohort is 59,334.
†The HSE-SE Hib_b data for Quarter 2 2008 and the HSE-MW Hib_b data for Quarter 3 2008 were not available
‡ The HSE-E and HSE-MW $MenC_3$ data for Quarter 3 2008 were not available
Please note while North Lee and South Lee are two separate Local Health Offices their combined immunisation uptake data are reported here

Table A2.3 Local Health Office (LHO) abbreviations used in the immunisation uptake chapter of this document

Local Health Office Abbreviations	Local Health Office
CE	Clare
CN/MN	Cavan/Monaghan
CW/KK	Carlow/Kilkenny
DL	Donegal
DN	Dublin North
DNC	Dublin North Central
DNW	Dublin North West
DS	Dublin South
DSC	Dublin South City
DSE	Dublin South East
DSW	Dublin South West
DW	Dublin West
G	Galway
KE/WW	Kildare/West Wicklow
KY	Kerry
L	Limerick
LD/WD	Longford/Westmeath
LH	Louth
LS/OY	Laois/Offaly
MH	Meath
MO	Mayo
NC	North Cork
NSL*	North South Lee*
RN	Roscommon
SO/LM	Sligo/Leitrim
TN/EL	Tipperary North /East Limerick
TS	South Tipperary
WC	West Cork
WD	Waterford
WX	Wexford
WW	Wicklow

*Please note while North Lee and South Lee are two separate LHOs their combined immunisation uptake data are reported



Explanatory Notes
Glossary of Terms

Explanatory Notes

Notifiable Infectious Diseases

Computerised Infectious Disease Reporting (CIDR) system

For the majority of the notifiable infectious diseases (see Appendix 1), data were collated using the Computerised Infectious Disease Reporting (CIDR) system. Notification data were inputted directly by areas using the system. For areas not yet on CIDR, data were forwarded weekly to HPSC for input to CIDR. Enhanced surveillance was undertaken for certain diseases and these data collated on CIDR. Outbreak data were also collated on CIDR using the same process outlined above. Since 4th May 2008, new cases of *Clostridium difficile*-associated disease (CDAD) were notified on CIDR under the category 'acute infectious gastroenteritis' (AIG). Weekly Reports on infectious disease notifications (including a separate report for AIG with the emphasis on *C. difficile*) and outbreaks were produced by HPSC. Throughout the year data were cleaned and validated on an ongoing basis and final data checks and cleaning were undertaken following year end by HPSC and the Departments of Public Health. Data analysis was performed using Business Objects Reporting and MS Excel. Figures for the relevant chapters within this report were extracted from CIDR between July and September 2009. These figures may differ from those previously published due to ongoing updating of data on CIDR.
Data on the notifiable infectious diseases not yet on CIDR were collated as follows:

National Tuberculosis Surveillance System (NTBSS)

TB notification data (including enhanced information) for 2007 were collated in the regional Departments of Public Health, where data were entered on the Epi2000 NTBSS database. Each HSE Area provided finalised 2007 data with outcome information to HPSC in mid 2009. Data were validated and cleaned with each area and the national data were collated. Provisional 2008 data were obtained from each area in August 2009.

European Antimicrobial Resistance Surveillance System

Data were collected by participating EARSS laboratories in 2008 on the first invasive isolate per patient per quarter on *Staphylococcus aureus* and *Enterococcus faecalis* from blood only and on *Streptococcus pneumoniae*, *Escherichia coli*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* from blood and cerebrospinal fluid (CSF). Data were reported quarterly to HPSC and collated in the WHONET database. Quarterly and annual reports were produced.
Note: In general, invasive infections due to *K. pneumoniae* and *P. aeruginosa* are not notifiable but these pathogens are now included for surveillance under the EARSS project.

Sexually Transmitted Infections (STIs)

Clinicians and laboratories notified their respective Departments of Public Health of probable and confirmed cases of STIs in 2007. Notifications were anonymised prior to notification. Data were collated and analysed by Departments of Public Health and aggregated data were reported quarterly to HPSC. National data were collated on an MS Access database, analysis preformed and reports produced by HPSC.

An enhanced surveillance system is in place for syphilis since 2000. Enhanced forms were completed by clinicians and forwarded to the appropriate Department of Public Health from where they were sent to HPSC. An MS Access database was used at HPSC for collation and analysis of the national syphilis case-based data.

Other Surveillance Systems

Influenza Surveillance

A sentinel surveillance system is used in Ireland for the surveillance of influenza activity. For the 2008/2009 influenza season (October to May), 54 geographically distributed general practices participated (representing 4.9% of the population) in collaboration with the ICGP, NVRL, DoHC and HPSC. Each week the participating GPs reported electronically to the ICGP the number of patients who consulted with influenza-like illness (ILI). The NVRL reported to HPSC on a weekly basis the number of influenza positive specimens tested (from sentinel and non-sentinel sources). The Departments of Public Health notified HPSC weekly of all cases of influenza and all influenza/ILI outbreaks. Other indicators of influenza activity reported by the Departments of Public Health to HPSC included a regional influenza activity index, sentinel hospital admission levels, sentinel school absenteeism and enhanced surveillance data on hospitalised cases of influenza in 0-14 year olds. HPSC was notified of all registered deaths on a weekly basis from the General Register Office. At HPSC data were collated from the various sources and weekly influenza reports were produced. Clinical and virological data were reported weekly to EISS. Following the end of the influenza season, annual data were analysed and reports

produced. During the summer of 2008 the surveillance of influenza activity continued involving the ICGP, NVRL and HPSC. Data were reported to EISS biweekly and monthly influenza reports were produced by HPSC.

HIV
HIV and AIDS surveillance in Ireland is voluntary and anonymised and operates in co-operation with laboratories, clinicians and Departments of Public Health. In 2008, clinicians completed surveillance forms on newly diagnosed HIV cases, AIDS cases and AIDS related deaths and forwarded these to the appropriate Department of Public Health who in turn forwarded them to HPSC where national data were collated on an MS Access database. Bi annual analysis of these data were performed at HPSC and reports produced.

Immunisation Uptake
Each HSE Area maintains a childhood immunisation database. In 2008, each HSE Area provided HPSC with immunisation uptake data for their area and for each of the Local Health Offices in their area on a quarterly basis. National data were collated and analysed at HPSC using a MS Excel database. Quarterly reports were produced and are available on the HPSC website. For further details on methods used, please see the immunisation uptake chapter within this report.

Antimicrobial consumption
Community (outpatient) consumption data were obtained from IMS Health and represent wholesaler to retail pharmacy sales figures for Ireland. Hospital (inpatient) consumption data were obtained directly from clinical pharmacies and validated with the support of the Irish Antimicrobial Pharmacists Association. Quarterly and annual consumption trends by named public acute hospitals are published on the HPSC website. All data were stored at the HSPC in an MS Access database, and interpreted using the WHO Anatomical Therapeutic Chemicals index (www.whocc.no/atcddd/) in line with European Surveillance of Antimicrobial Consumption (ESAC) methodology. See relevant section for notes on the denominator data.

Healthcare associated infections
In 2008 data were collected by participating general ICUs on MRSA colonisation/infection in the critical care setting. Data were reported monthly to the HPSC and stored in an MS Access database. Quarterly and annual reports were produced. Data were also collected on the total volume of alcohol-based hand rub used per hospital per year/quarter, excluding that used for pre-operative surgical "scrub". Hospital activity data, bed days used, obtained from the HSE Performance Monitoring Unit (PMU), was used to calculate the rate of alcohol-based hand rub usage per hospital. See relevant section for notes on the denominator data. The rate of usage per hospital was calculated as the total volume of hand rub consumed (in litres) per 1000 bed days used. Data were reported quarterly to the HPSC and stored in an MS Access database. Quarterly and annual reports were produced.

Denominator Data
To calculate disease incidence rates, Census of Population data were used as the denominator (available from the Central Statistics Office, http://www.cso.ie). Population figures were applied as follows: Census 2006 for analysis of 2004-2008 data, Census 2002 for 2000-2003 data and Census 1996 for 1999 data.
Monthly population changes were estimated between 1993 and 2008 using a curve interpolation method for the calculation of outpatient antibiotic consumption rates. These are based on April 2009 update of the mid-year population estimates published by the CSO. Bed-days used and other activity data for public acute hospitals were provided by the Performance Monitoring Unit of the HSE and used to calculate rates of MRSA and hospital antibiotic consumption.

HSE Areas
Although organisational changes have taken place in the Health Services, the term HSE Areas are used in this report when analysing and presenting data by geographical area (equating to the eight former health board regions/areas). This is because operationally the surveillance, prevention and control of infectious diseases are still managed by eight Departments of Public Health, one in each HSE Area.

Glossary of Terms

CIDR	Computerised Infectious Diseases Reporting
DoHC	Department of Health and Children
EARSS	European Antimicrobial Surveillance System
EISS	European Influenza Surveillance System
FSAI	Food Safety Authority of Ireland
FSPB	Food Safety Promotion Board
ICGP	Irish College of General Practitioners
IDU	Injecting Drug User
IMMRL	Irish Meningococcal and Meningitis Reference Laboratory
HPSC	Health Protection Surveillance Centre
HSE	Health Services Executive
HSE-E	HSE Eastern Region
HSE-M	HSE Midland Area
HSE-MW	HSE Mid-Western Area
HSE-NE	HSE North Eastern Area
HSE-NW	HSE North Western Area
HSE-SE	HSE South Eastern Area
HSE-S	HSE Southern Area
HSE-W	HSE Western Area
MRSA	Methicillin Resistant *Staphylococcus aureus*
MSM	Men who have Sex with Men
NSRL	National Salmonella Reference Laboratory
NVRL	National Virus Reference Laboratory
STIs	Sexually Transmitted Infections
TB	Tuberculosis

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This report is also available to download on the HPSC website at www.hpsc.ie