Annual Report 2009
Health Protection Surveillance Centre

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

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Introduction

It is with great pleasure that I present the annual report of the Health Protection Surveillance Centre for 2009. It proved to be an extremely busy year and was dominated of course by the appearance of the first influenza pandemic of the twenty first century. Great credit is due to all those in public health departments around the country and at HPSC for making this report possible through their timely and comprehensive analysis and reporting on trends and developments, despite the huge workload caused by the pandemic.

At HPSC we have been working on influenza surveillance for over ten years now, and had no doubt that we were witnessing the emergence of a new pandemic virus in May last year. The pandemic was finally declared by the World Health Organization on June 11th 2009.

For many, pandemic (H1N1) 2009 proved to be a mild illness, but for a substantial number of people the illness was severe and necessitated hospital admission. Thankfully, many of the elderly population had previous immunity to the new virus and were protected from the usual mortality seen with seasonal influenza in their age group.

It was the first time since influenza surveillance began in Ireland that we saw influenza circulating in the summer. School age children were involved in the spread of the virus with a number of outbreaks in Irish and other language colleges in the summer, followed by school outbreaks on return to class in September. Although this age group had the highest incidence of attending general practice with flu-like illness it was younger children who were most likely to be hospitalised with pandemic influenza.

The Irish surveillance system showed that people attended GP practices in record numbers with influenza-like illness. This was almost double the previous peak of seasonal influenza seen in 2001. People with severe obesity, chronic neurological disability and pregnancy were particularly vulnerable, along with those with the usual risk factors of chronic lung, heart, liver and kidney disease and diabetes.

Twenty seven deaths were reported with confirmed pandemic influenza.

Over 1000 people were hospitalised, a little under half of whom had underlying medical conditions. One hundred people were admitted into intensive care units (ICU), many of whom required prolonged periods of intensive care. Nearly 20% of those admitted to ICU were previously healthy individuals with no underlying conditions and eight pregnant women were also admitted.

The health service responded very effectively given the significant pressures it faced, caring for those who were ill and vaccinating almost a quarter of the population when the vaccine became available from late October onwards. The National Virus Reference Laboratory did great work providing a pandemic (H1N1) 2009 diagnostic service, in collaboration with hospital laboratories in Galway, Cork and Dublin.

2009 also saw the re-emergence of measles, particularly in disadvantaged groups such as the Traveller and Roma communities and in those who choose not to have their children vaccinated against vaccine preventable diseases. A large resurgence of mumps which had begun in late 2008 was controlled by a catch-up vaccination campaign in 4th, 5th and 6th year secondary school pupils during the summer term of 2009. Reported complications in the mumps outbreak included 75 hospitalisations, 88 cases of orchitis, 19 cases of pancreatitis, 10 cases of meningitis, seven cases of deafness and six cases of encephalitis.

The Health Protection Surveillance Centre provides epidemiological information to the National Immunisation Advisory Committee (NIAC) of the Royal College of Physicians of Ireland to aid the decision making process in relation to the Irish vaccination schedule. The introduction of the 7 valent pneumococcal vaccine into the childhood immunisation schedule in September 2008 began to show some early results in 2009 with an 84% reduction in invasive pneumococcal disease (IPD) in the under two year old target group and an impressive 19% reduction in the burden of IPD in all age groups and all serotypes. On the advice of NIAC the Health Service Executive will shortly begin using a new 13 valent pneumococcal conjugate vaccine in the childhood schedule, which will hopefully lead to an even greater reduction in IPD.

There were difficulties during 2009 in receiving complete data from all HSE areas on immunisation coverage. Immunisation is one of the most cost effective interventions for any health service and it is crucial that priority is given to making sure that our immunisation service works effectively. In terms of immunisation uptake, those working and living in Roscommon paved the way, reaching all targets with over 95% of children vaccinated appropriately at the ages of 12 and 24 months.

In 2008 and 2009 we saw a slight reduction in the number of cases of tuberculosis reported, with 468 cases and 472 cases respectively. This compares to 480 cases in 2007. The rate of tuberculosis continues to fall slowly in the indigenous Irish population. However, we must ensure that the falling incidence does not lead to a situation where patients and doctors may be less likely to consider tuberculosis as a cause of a prolonged cough. Health professionals must be reminded to consider the diagnosis of tuberculosis and to ensure timely diagnostic testing for those ill in such circumstances.

The incidence of verotoxigenic *E. coli* (VTEC) infections continues to increase and to cause concern. The latest European data shows that Ireland now has the highest rate of VTEC in Europe. Out of the 241 cases notified in 2009, 24 associated haemolytic uraemic syndrome (HUS) cases were reported. Twenty of these HUS cases were reported in children and one adult male died due to VTEC infection in 2009. The diagnostic laboratory in Cherry Orchard is undertaking more definitive molecular typing in 2010. This service will help detect linked cases which will allow public health services to identify any common sources. As usual, many of cases of VTEC were thought to be linked to private wells and group water schemes. These water sources are particularly vulnerable to animal faecal contamination after periods of heavy rainfall.

The number of new HIV diagnoses remained stable at 395 cases in 2009. This is almost certainly an underestimate and cases associated with men having sex with men continue to increase. This rise is associated with increases in other sexually transmitted diseases such as syphilis and gonorrhoea. New cases of chlamydia are now also at an all time high. We must continue to remind young people of the importance of taking precautions against the spread of sexually transmitted infections and the importance of having a regular sexual health check to ensure early diagnosis and prompt treatment of these infections.

Antimicrobial consumption showed a decrease in both in-patients and out-patients in 2009. This was accompanied by a 19% decrease in the number of MRSA notifications compared with 2008. Despite these successes, there were worrying increases in the proportions of other resistant organisms causing serious infections in hospitals. New mechanisms of resistance continue to emerge both in Ireland and abroad highlighting the need for ongoing commitment and resources to reduce the burden of antimicrobial resistance and healthcare associated infection in Ireland.

I'd like to thank the Scientific Advisory Committee, along with the HPSC sub committees for all their hard work throughout 2009. Special thanks also to all at HPSC whose professionalism and commitment in an exceptionally busy year made this report possible.

Finally thanks are due to all those who assisted in the response to the 2009 influenza pandemic. We were fortunate that the outcomes were not more severe. There was a tremendous effort across many parts of the Irish health service to mitigate the effects of the new virus. Personally, I would like to thank all the staff here at HPSC who put in long hours and went to huge effort to make sure that the best possible guidance and advice was always available.

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01

Vaccine Preventable Diseases

1.1 *Haemophilus influenzae* (invasive)

Summary

Number of cases, 2009: 43
Number of cases, 2008: 22
Number of cases, 2007: 31
Crude incidence rate, 2009: 1.0/100,000

In 2009, 43 cases of invasive *Haemophilus influenzae* disease were notified in Ireland (1.0/100,000 total population). This is a marked increase compared to the previous years when 22 and 31 cases were notified in 2008 and 2007, respectively (Figure 1).

The main changes in 2009, when compared to 2008, are the doubling in the overall number of cases due to non-typeable/non-capsular cases from 12 to 25, the increase in type e strains (four in 2009 compared to none in 2008), but also the continuing decline in the number of type b cases from five to one (Figure 1). No other noteworthy change in the number of cases due to other serotypes has been observed in recent years.

Non-typeable/non-capsular cases accounted for the majority of the invasive *H. influenzae* cases notified in 2009 (58%, n=25/43). The remaining cases were due to *H. influenza* type b (2.3%, n=1), type e (9.3%; n=4), type f (7.0%; n=3) and isolates that were not typed (20.9%; n=9). The cases ranged in age from one week to 88 years. The incidence rates were highest in infants <1 year (6.6/100,000) and those aged 65+ years (3.4/100,000) (Table 1).

Cases occurring in children <10 years of age (n=13) and elderly adults >=65 years (n=16) accounted for 67% of all invasive *H. influenzae* notifications in 2009 (Table 1).

The clinical manifestations of invasive *H. influenzae* disease in the 13 children <10 years of age in 2009 were two cases of meningitis, two cases of pneumonia and one case each of meningitis/septicaemia and septicaemia. Clinical diagnosis was not reported for seven cases. A breakdown by clinical diagnosis for all age groups by year between 2004 and 2009 is presented in Table 2.

Two invasive *H. influenzae* related deaths were reported in 2009, both of which occurred in unvaccinated adults over 60 years of age. One had a non-typeable infection and was not the primary cause of death. The second death was associated with an untyped *H. influenzae* strain.

In 2009 one case of *H. influenzae* type b (Hib) occurred in an incompletely vaccinated four year-old child, who had received three doses of the 5 in 1 vaccine but not the Hib booster dose. In contrast, in 2008, five Hib cases were notified, three of which occurred in children <=3

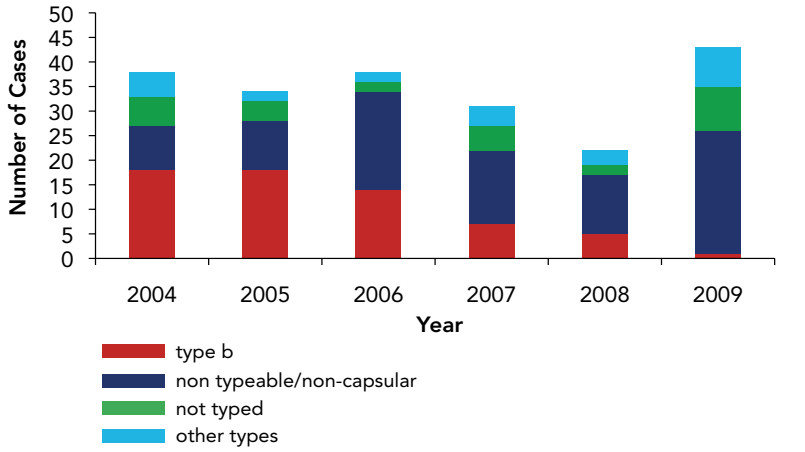

Figure 1. Annual number of invasive Haemophilus influenzae cases notified in Ireland, 2004-2009

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 vaccinated and one had received one dose of the Hib vaccine.

In 2009, no true Hib vaccine failures were reported, thus highlighting the positive impact the Hib booster catch up campaign has had in Ireland. This was also the case in 2008. 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.

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 7th July 2010. 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, 2009

Age Group	Type b	Type e	Type f	Non-typeable/ non-capsular	Not Typed	Total	ASIR of Hib	ASIR of all *H. influenzae*	TVFs
<1	0	0	0	2	2	4	0.00	6.6	0
1-4	1	0	1	2	0	4	0.41	1.7	0
5-9	0	1	1	3	0	5	0.00	1.7	0
10-19	0	1	0	1	0	2	0.00	0.4	0
20-34	0	0	0	1	1	3	0.00	0.3	0
35-54	0	0	1	2	0	3	0.00	0.3	0
55-64	0	1	0	5	0	6	0.00	1.8	0
65+	0	1	0	9	6	16	0.00	3.4	0
All Ages	1	4	3	25	9	43	0.02	1.0	0
CIR	**0.02**	**0.09**	**0.07**	**0.59**	**0.21**	**1.01**	-	-	-

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- 2009

Clinical Diagnosis	2004	2005	2006	2007	2008	2009	2004-2009	% of Total
Septicaemia	8	14	13	6	3	9	53	25.7%
Pneumonia	5	0	3	6	3	8	25	12.1%
Meningitis	3	9	3	2	2	2	21	10.2%
Epiglottitis	1	3	3	1	1	0	9	4.4%
Cellulitis	1	1	2	1	1	0	6	2.9%
Meningitis & septicaemia	1	0	1	0	1	1	4	1.9%
Osteomyelitis	1	0	0	0	0	0	1	0.5%
Septic arthritis	0	1	0	0	1	0	2	1.0%
Unknown	18	6	13	15	10	23	85	41.3%
Total	**38**	**34**	**38**	**31**	**22**	**43**	**206**	**100%**

Table 3. Incidence rates of invasive Haemophilus influenzae by HSE area, 2004-2009

HSE Area	2004	2005	2006	2007	2008	2009
E	1.1	1.0	0.9	0.8	0.5	0.8
M	0.5	0.5	0.2	0.5	0.3	0.5
MW	0.8	0.3	0.8	0.6	0.8	2.2
NE	0.2	1.1	0.2	0.0	0.0	0.2
NW	0.4	0.0	2.0	0.4	0.0	0.4
SE	1.3	0.5	1.0	1.3	0.8	1.3
S	3.0	0.8	3.4	0.8	1.7	3.4
W	0.5	1.4	0.7	1.4	0.5	1.2
Ireland	0.9	0.8	0.9	0.7	0.5	1.0

1.2 Measles

Summary

Number of cases, 2009: 162
Number of confirmed cases, 2009: 103
Crude incidence rate, 2009: 3.8/100,000
Crude confirmed incidence rate, 2009: 2.4/100,000

In 2009, there were 162 measles cases (3.8/100,000) notified in Ireland. This is nearly a three-fold increase compared to 2008 when 55 cases were notified. This increase is a result of a measles outbreak that was first identified in August 2009.

In Week 31 2009 (week ending 8th August 2009), a confirmed measles case, in an adult who worked in a general practice, was notified in the HSE-S. In Week 33 2009, a measles case in a Roma child was notified in the same Area, this case's general practitioner worked in the same building as the previous case. In Week 37, 2009, two measles cases, one in a child from the Irish Traveller community and one in a hospital contact of this case, were notified in the HSE-S. During Weeks 38 and 39, six cases in Irish Travellers were notified in the HSE-S. From then on measles continued to circulate and spread to other HSE Areas. The measles outbreak continued into the early part of 2010.

Measles cases by week of notification are shown in figure 1. During Weeks 1-30 2009 42 measles cases were notified. In contrast, 120 measles cases were notified between Weeks 31 and 52.

At the start of the outbreak, a national outbreak control team was convened, which included health professionals from the departments of public health in the HSE Areas, HSE-Health Protection Surveillance Centre, HSE-National Immunisation Office, HSE Population Health, HSE Social Inclusion, the Institute of Obstetricians and Gynaecologists, the National Virus Reference Laboratory and the field of Paediatric Infectious Disease. This group agreed public health strategies (vaccination and management of cases and close contacts, awareness-raising among clinicians and in the community) to control the outbreak at national and local level.

Of the 162 measles cases notifed in 2009, one had no case classification specified, 58 cases (36%) were classified as possible while 103 (64%) were classified as confirmed, giving a crude confirmed incidence rate of 2.4 per 100,000 population. Eighty-two of the confirmed cases were laboratory confirmed while 21 were epidemiologically linked to a laboratory confirmed case.

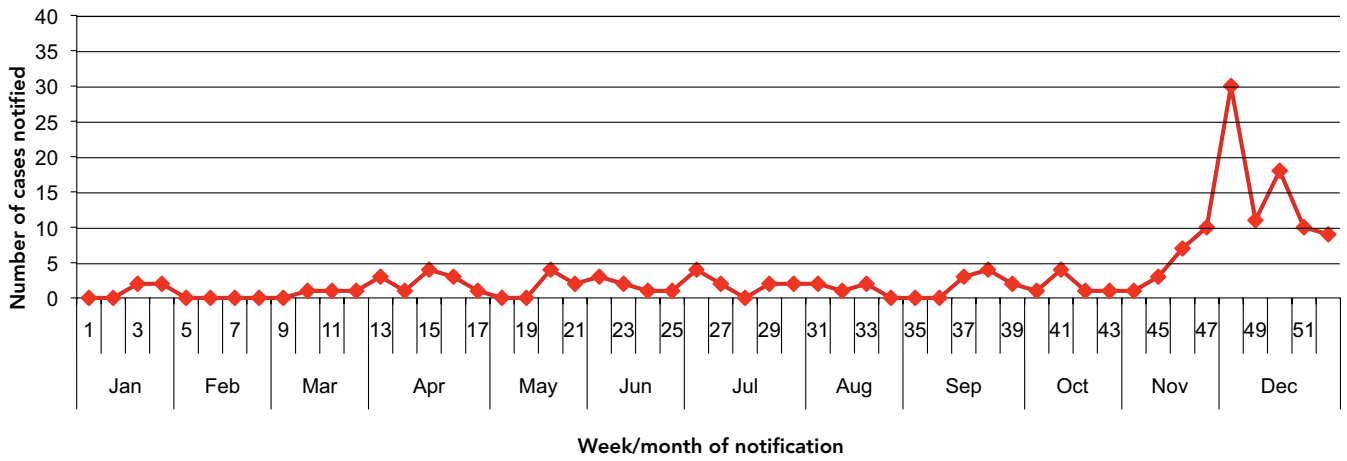

Figure 1. Number of measles cases notified by week and month in 2009

The largest number of cases notified in 2009 was in the HSE-S (table 1).

In 2009, measles cases ranged in age from four months to 34 years. The largest number of cases (n=41) was in the age group one to two years (figure 2) while the highest age specific incidence rate (37.7/100,000) was in those aged <1 year (figure 3). Of the 162 measles cases 87 (54%) were male, 74 (46%) were female while sex was not specified for one case.

Laboratory results were provided for 115 (71%) cases in 2009. Eighty-two cases were laboratory positive for measles. The laboratory results for five cases were inconclusive. Twenty-eight cases were laboratory negative for measles, however, for 10 of these the 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 following disease onset for collecting oral fluid specimens for measles IgM testing is greater than seven days to two months and the optimal time for collecting serum specimens for measles IgM testing is greater than four days to two-three months). All 18 cases that were laboratory negative for measles and were known to have a specimen collected at the optimal time were classified as possible cases.

Table 1. Number of measles cases notified and the crude incidence rate per 100,000 population (CIR) by HSE Area in 2009

HSE Area	Number	CIR
HSE-E	30	2.0
HSE-M	3	1.2
HSE-MW	3	0.8
HSE-NE	3	0.8
HSE-NW	0	0.0
HSE-SE	37	8.0
HSE-S	52	8.4
HSE-W	34	8.2
Total	**162**	**3.8**

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 136 (84%) measles cases in 2009. Ninety-six cases (n=96/162, 59%) were unvaccinated; only 20 (n=20/96, 21%) of these were less than 12 months of age.

Thirty-two cases (n=32/162, 20%) had one dose of MMR vaccine; 25 (78%) of these were less than six years of age. Only six (19%) of these 32 cases were classified as confirmed. Four of the 32 cases (13%) were known to

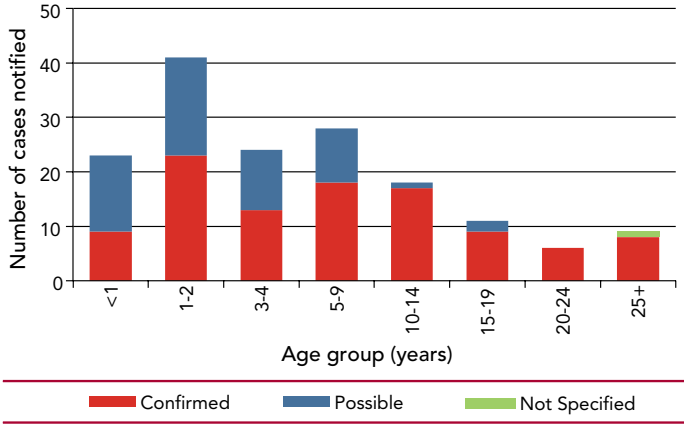

Figure 2. Number of notified measles cases in 2009 by age group and case classification

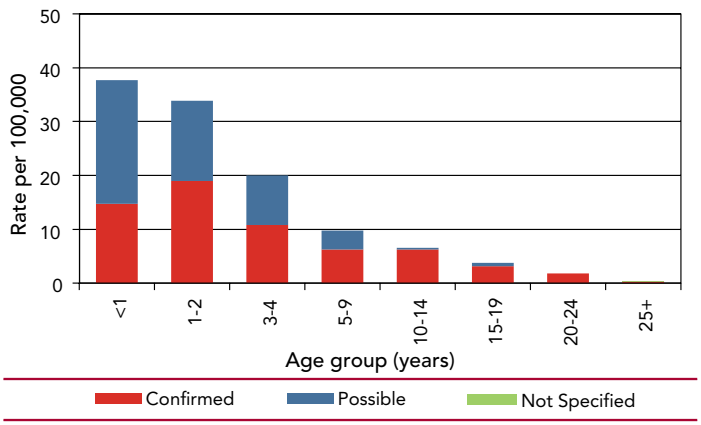

Figure 3. The age specific incidence rate (per 100,000) of notified measles cases in 2009 by case classification

be vaccinated less than nine days before onset of illness and were probably incubating measles at the time of vaccination while four cases (13%) had no vaccination date reported.

Eight cases were reported as having received two doses of MMR. Only two of these cases were classified as confirmed and neither of these cases had any vaccination dates or other vaccination details reported.

Although ethnicity is not routinely collected as part of notification data and may be difficult to establish and report on, it was evident in the early stages of the outbreak that a substantial number of cases were linked to the Irish Traveller community. Based on available data, over a third (n=41/120, 34%) of the cases notified from Week 31 to Week 52 2009 were recorded as Irish Travellers while two cases (n=2/120, 1.7%) belonged to the Roma community. In contrast, only 0.5% of the population of Ireland are Irish Travellers and approximately 0.1% belongs to the Roma community. By December 2009, verbal reports from the HSE-S highlighted transmission was also among children whose parents objected to vaccination, either for perceived safety reasons or for philosophical reasons. During the course of the outbreak a small number of cases were also reported in other citizens from Eastern Europe.

Sixty-eight cases were reported as hospitalised representing 42 percent (n=68/162) of all cases. The hospitalised cases ranged in age from four months to 34 years with 63 (93%) classified as confirmed cases and five (7%) classified as possible cases. Length of hospitalisation was reported for 39 cases (n=39/68, 57%) with a median duration of stay of two days (range one to eight days); fourteen cases were reported as hospitalised for one day. Of the 68 hospitalised cases, 12 (18%) had no MMR details reported while 51 (75%) were unvaccinated. Three cases (4%) were reported to have one dose of MMR; however, two of these were vaccinated less than three days prior to onset. The remaining two hospitalised cases (3%) were reported to have had two doses of MMR although neither case had any vaccination dates or other vaccination details reported.

There was probable nosocomial transmission of measles in two GP practices; two adults working in separate GP practices developed measles. Measles cases in children were associated with both practices. There was also probable nosocomial transmission of measles to a child in hospital.

Information on measles associated complications was reported for 93 (n=93/162, 57%) cases. Pneumonia was reported for seven cases, ear infection/otitis media was reported for four cases, pneumothorax was reported for one and dehydration was reported for one case. Two of the cases with pneumonia were reported to have required ventilation. The remaining 80 cases had no complications.

Three cases were reported as being infected outside Ireland. The countries of infection were reported as France (n=1), Poland (n=1) and the United Kingdom (n=1).

Eight localised measles outbreaks were notified during 2009, with 105 associated cases of illness. The outbreak locations included four private houses (with 11 ill), three community outbreaks (with 48 ill) and one outbreak occurring among an extended family (with 46 ill).

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 27th September 2010. 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, 2009: 147
Number of cases, 2008: 168
Number of cases, 2007: 179
Crude incidence rate, 2009: 3.5/100,000

In 2009, 147 cases (3.5/100,000) cases of invasive meningococcal disease (IMD) were notified in Ireland. This continues the downward trend from the previous two years when 168 cases (4.0/100,000) and 179 cases (4.2/100,000), were reported in 2008 and 2007, 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, 130 of the 147 cases (88.4%) notified in 2009 were case classified as definite, four (2.7%) as presumed and 13 (8.8%) as possible. The vast majority of the cases (90.4%; n=133/147) were laboratory confirmed by means of blood or CSF culture or PCR testing, blood serology, detection of gram negative diplococci in skin lesions and skin culture or in CSF specimens, and by screening of nasal, throat and eye swabs. Most cases were confirmed by PCR alone (52.6%, 70/133). Confirmation of the remaining 63 cases was by blood or CSF culture only (n=11; 17.5%), by blood or CSF PCR and/or culture (n=60; 95.5%). Two were confirmed by detection of Gram negative diplococci in skin lesion microscopy exclusively. None were confirmed by serology exclusively.

Table 1. Number of cases, deaths, age-group specific incidence rates per 1000,000 population and case fatality ratios of IMD in Ireland, 2009

Age Group	No. Cases	ASIR	No. Deaths	CFR (%)
<1	41	67.1	0	0.0%
1-4	40	16.6	2	5.0%
5-9	11	3.8	1	9.1%
10-14	6	2.2	0	0.0%
15-19	21	7.2	2	9.5%
20-24	9	2.6	0	0.0%
25+	19	0.7	1	5.3%
All ages	**147**	**3.5**	**6**	**4.1%**

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

In 2009, male cases (n=82) exceeded female cases (n=64), resulting in a male to female ratio of 1.31:1.0. Cases ranged in age from one month to 89 years (median age of three 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 (67.1/100,000), followed by children in the 1-4 year age group (16.6/100,000), and the 15-19 year age group (7.2/100,000) (table 1).

In 2009 the overall incidence of IMD in Ireland was highest in the HSE-MW area (4.4/100,000) with the lowest in the HSE-W area (2.7/100,000) (table 2).

Neisseria meningitidis serogroup B was the pathogen most commonly associated with IMD in 2009 and accounted for 119 (81%) of the 147 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 seven years with no more than five cases occurring annually. In 2009, five (0.11/100,000) serogroup C cases arose (figure 1). All five cases occurred in individuals aged 20 years or less (age range

8 months-20 years), three of whom were completely vaccinated and all recovered. One MenC vaccine failure also occurred in 2008, 2007, 2006 and again in 2005, while no failures arising in either 2004 or 2003.

The recent increase in the number of MenC vaccine failures is a reminder of the need for vigilance and monitoring of IMD due to serogroup C following the introduction of the MenC conjugate vaccine back in October 2000 (figure 1). Prior to the introduction of this vaccine, the serogroup C incidence rate in 1999 was 3.7 per 100,000 total population. The National Immunisation Advisory Committee (NIAC) has recently recommended a booster dose of the MenC vaccine for close contacts of cases who have completed a course more than one year before, details of which are available at http://www.ndsc.ie/hpsc/A-Z/VaccinePreventable/Vaccination/Guidance/

There were six IMD related notified deaths in 2009 (case fatality ratio of 4.1%) compared to an average of 5.5 deaths between 2005 and 2008. In 2009, the case fatality ratio (CFR) was highest amongst cases 15-19 years of age (9.5%) as a result of two deaths among 21 cases (table 1). The next highest CFR occurred in children aged 5-9 years (9.1%) and adults aged 25 years or more (5.3%) (table 1).

All six of the IMD deaths in 2009 were due to serogroup B disease (age range two years to 71 years). This is in marked contrast to the 25 deaths reported in 2000 due to serogroup B. In the same year, 11 deaths were due to serogroup C disease (out of a total of 139 cases). 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. One death from serogroup C disease occurred in 2003, 2004 and again in 2008, all in adults over 45 year of age. Since 2001 however, 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 in this age group 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.

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 meningococcal serogroup B vaccine, suitable

Table 2. Number of cases and age specific incidence rates per 100,000 population of IMD by HSE area, 2009

HSE area	<1	1-4	5-9	10-14	15-19	20-24	25+	Total
E	74.8	16.9	5.3	1.1	4.0	3.6	0.4	3.3
M	105.7	6.3	0.0	5.6	5.7	5.5	0.0	3.2
MW	117.6	19.9	4.0	0.0	3.9	0.0	1.7	4.4
NE	62.9	31.6	6.7	3.7	0.0	3.6	0.4	4.3
NW	29.7	21.9	5.8	0.0	5.8	0.0	1.3	3.4
SE	59.3	18.5	0.0	0.0	12.4	0.0	0.7	3.3
S	69.9	8.9	4.8	5.0	11.9	2.1	1.0	3.7
W	0.0	8.8	0.0	3.7	17.0	3.1	0.7	2.7
Ireland	**67.1**	**16.6**	**3.8**	**2.2**	**7.2**	**2.6**	**0.7**	**3.5**

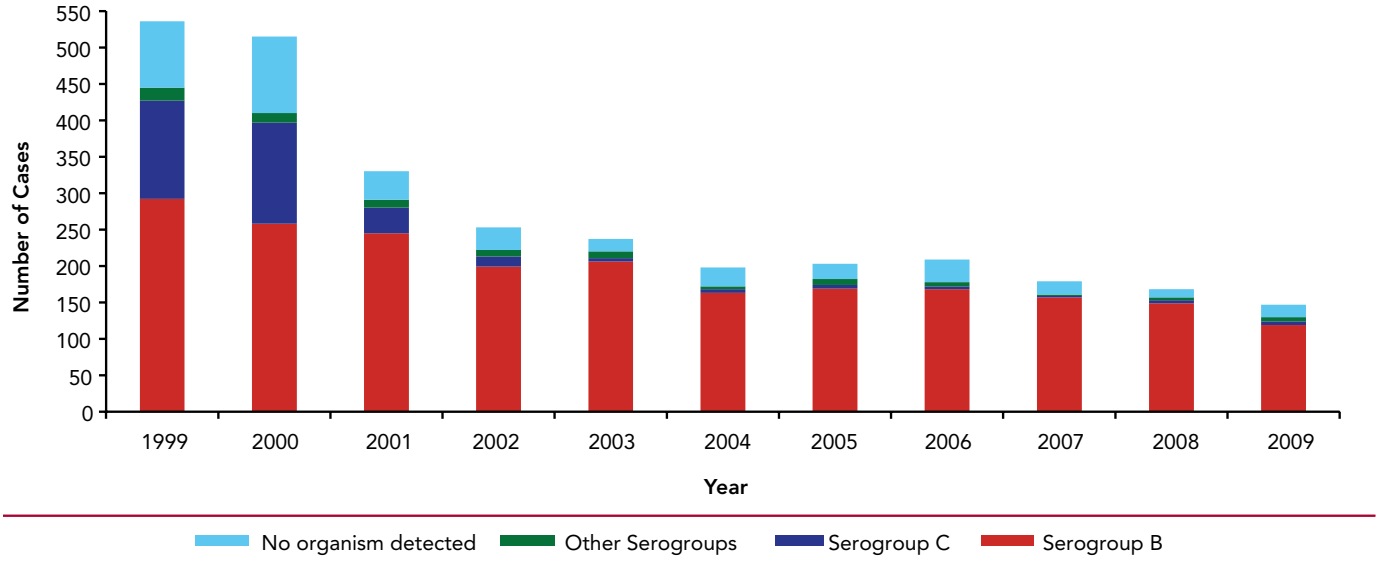

Figure 1. Number of invasive meningococcal disease (IMD) notifications in Ireland by serogroup, 1999-2009

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 7th July 2010. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

Table 3. Number of cases, deaths and case fatality ratios by year of meningococcal serogroups B and C disease in Ireland, 1999-2009

	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	0.0%
2003	206	11	5.3%	5	1	20.0%
2004	163	7	4.3%	5	1	20.0%
2005	169	5	3.0%	5	0	0.0%
2006	168	5	3.0%	4	0	0.0%
2007	157	6	3.8%	2	0	0.0%
2008	149	6	4.0%	4	1	25.0%
2009	119	6	5.0%	5	0	0.0%

1.4 Mumps

Summary

Number of cases, 2009: 3,629
Number of cases, 2008: 1,380
Number of cases, 2007: 142
Crude incidence rate, 2009: 85.6/100,000

Mumps notifications had declined in 2007 following a national mumps outbreak that began at the end of 2004, however, mumps notifications increased in the later part of 2008 and increased dramatically in the first half of 2009. In total, there were 142 cases (3.3/100,000) notified in 2007, 1,380 cases (32.5/100,000) notified in 2008 and 3,629 cases (85.6/100,000) notified in 2009 (figure 1). Sixty percent (n=826/1,380) of cases in 2008 were notified between late September and the end of December and 83% (n=3,016/3,629) of cases in 2009 were notified between January and May 2009.

A national outbreak control team was convened in 2009 to address the issue of ongoing transmission of mumps virus. Control measures implemented included an MMR vaccination campaign for students in fourth, fifth and sixth year in all second level schools during the final term of the 2008/2009 academic year concluding in September 2009. The decision was based on the fact that efforts to control mumps outbreaks among students in third level colleges had failed and that students in senior cycle of second level schools were the cohort most susceptible to mumps. The uptake of MMR, based on school/clinic session reports, among this cohort was 70.8% (source HSE-National Immunisation Office).

Near the end of March 2009, the mumps outbreak control team recognised that due to the large number of cases (180 cases were notified on average each week in March) it may not be possible to collect enhanced data and laboratory specimens on all cases. Enhanced data was collected on approximately 30% of cases during January to March and approximately 12% of cases during April to December. However, the percentage of cases classified as confirmed was 38% both during January to March (n=593/1,546) and during April to December (n=782/2,083).

In 2009, of the 3,629 mumps cases notified 38% (n=1,375) were classified as confirmed, 11% (n=417) were classified as probable, 50% (n=1,803) were classified as possible and one percent (n=34) had no case classification specified.

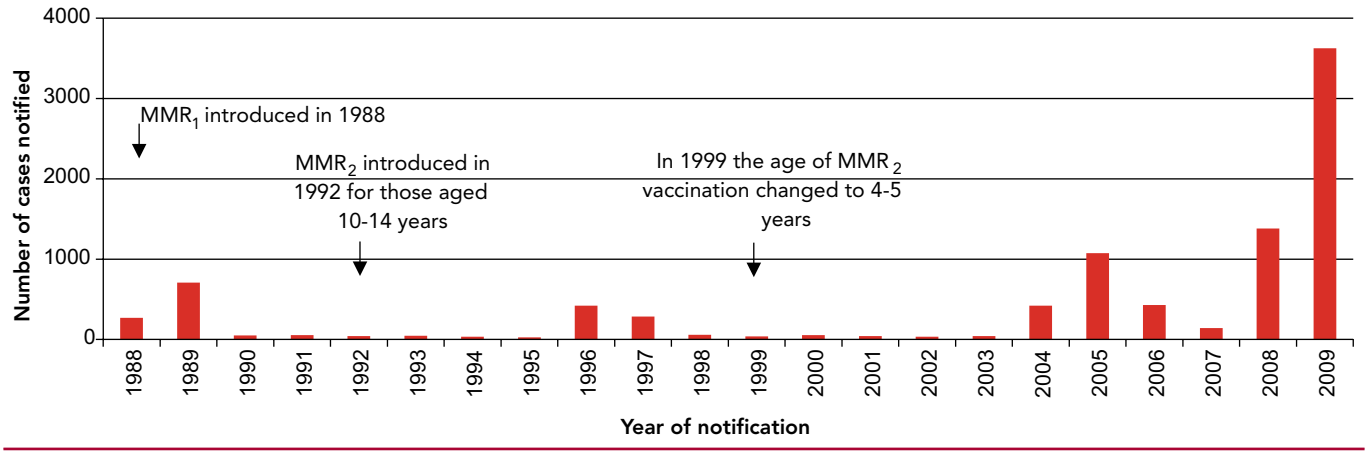

Figure 1. Number of mumps notifications by year and year of introduction of the measles-mumps-rubella (MMR) vaccine in Ireland
MMR_1- first dose of MMR
MMR_2- second dose of MMR
1988-June 2000 data collated by DoHC
July 2000-2009 data collated by HPSC

The largest number of cases was notified in the HSE-E followed by the HSE-W, while the highest crude incidence rate was in the HSE-W (table 1).

In 2009, cases ranged in age from seven months to 96 years; with a mean age of 22 years and a median age of 21 years (age was unknown for 34 cases). The largest number of cases and the highest age specific incidence rates (figures 2 and 3) were in those aged 15-19 years and 20-24 years. Of the 3,629 mumps cases, 54% (n=1,964) were male and 45% (n=1,649) were female (gender was unreported for 16 cases).

Of the 3,629 mumps cases, seven percent (n=257) were unvaccinated, 10% (n=381) had one dose of the measles-mumps-rubella vaccine (MMR), 15% (n=562) were reported to have received two doses of MMR while for 67% (n=2,429) of cases the number of doses of MMR were not reported. The vaccination date was reported for 37% (n=141/381) of cases reported to have received one dose of MMR. Both vaccination dates were reported for 25% (n=140/562) of cases vaccinated with two doses of MMR. Twenty-one percent (n=116/562) of the cases reported to have received two doses of MMR were classified as confirmed.

Seventy-five cases were reported to have been hospitalised, representing two percent (n=75/3,629) of all cases and 10% (n=75/771) of cases where hospitalisation data were provided. The number of days hospitalised was reported for 40% (n=30/75) of these hospitalised cases. The number of days the cases were hospitalised ranged from one to 12 with a median and a mean of three days.

Reported complications of mumps included orchitis (21%, n=88/412), pancreatitis (2.9%, n=19/656), meningitis (1.5%, n=10/671), deafness (1.1%, n=7/652), encephalitis (0.9%, n=6/663) and mastitis (0.6%, n=4/655).

The setting where the case most likely acquired mumps was reported for 20% (n=711/3,629) of cases. University/college was reported as the setting where the case most likely acquired mumps for 59% (n=418/711) of cases where this information was provided and social setting was reported for 20% (n=139/711) of these cases.

Thirty-two localised outbreaks of mumps were notified during 2009 with 280 associated cases of illness. The majority of these cases were associated with outbreaks in educational settings. The outbreak locations included 13 private houses (with 37 ill), nine universities/colleges (with 181 ill), six schools (with 46 ill), one crèche (with two ill), an outbreak associated with a public house (with four ill), an outbreak associated with a residential institution (with four ill) and an outbreak associated with a sports team (with six ill). As there was a national mumps outbreak in 2009 with widespread mumps activity many outbreaks, including community outbreaks, were not specifically notified.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 09th September 2010. 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.

Table 1. Number of mumps cases notified and the crude incidence rate per 100,000 population (CIR) by HSE Area in 2009

HSE Area	Number	CIR
HSE-E	974	64.9
HSE-M	142	56.4
HSE-MW	341	94.5
HSE-NE	333	84.5
HSE-NW	156	65.8
HSE-SE	300	65.1
HSE-S	559	90.0
HSE-W	824	198.9
Total	**3,629**	**85.6**

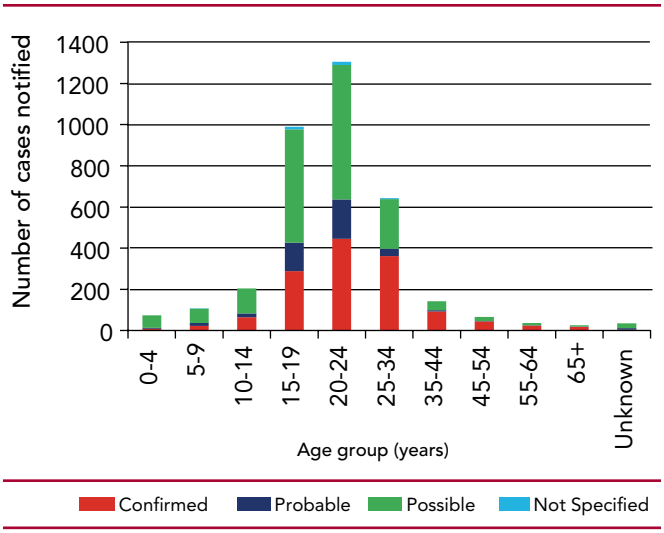

Figure 2. Number of notified mumps cases in 2009 by age group and case classification

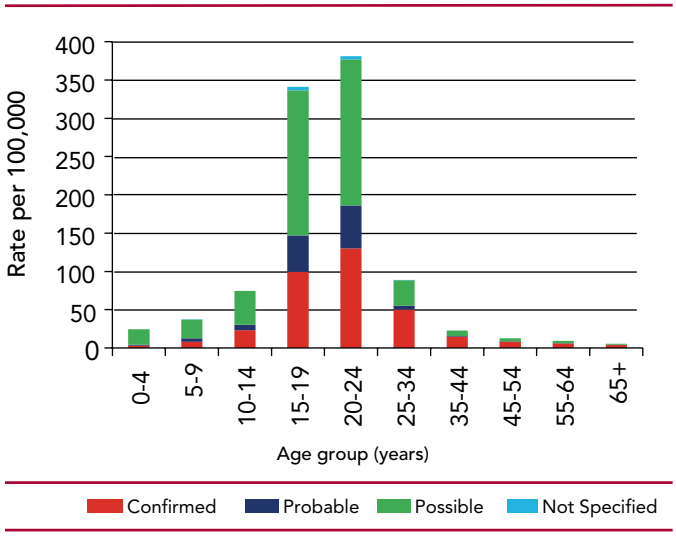

Figure 3. The age specific incidence rates (per 100,000) of notified mumps cases in 2009 (age is unknown for 34 cases)

1.5 Other forms of Bacterial Meningitis

Summary

Bacterial meningitis, Not Otherwise Specified
Number of cases, 2009:39
Number of cases, 2008:40
Number of cases, 2007:33
Crude incidence rate, 2009: 0.9/100,000

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 7th July 2010. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

Haemophilus influenzae
In 2009, three cases of meningitis due to *H. influenzae* were notified, two of whom were under one year of age, with the remaining case aged between 5-9 years. One of the cases was attributable to a type e infection, the second was not typeable and the third was not typed. 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 2009 in a young adult female, a canoeist aged 25-29 years. 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
One case of listeriosis meningitis was notified in a 45-49 year old in 2009. See a separate chapter on listeriosis disease for further details.

Streptococcus pneumoniae
In 2009, 28 cases of pneumococcal meningitis were notified, compared to 32 in 2008 and 35 in 2007. Cases in 2009 ranged in age from one month to 81 years. There were three pneumococcal meningitis related deaths reported aged between five and 18 years. See a separate chapter on invasive pneumococcal disease for further details.

***Streptococcus pyogenes* (Streptococcus group A infection (invasive) (iGAS))**
There were no reported cases of iGAS causing meningitis in 2009. See a separate chapter on iGAS infection for further details.

Bacterial meningitis by other specified notifiable diseases
One fatal case of *Salmonella enterica enteritidis* related meningitis in a 45-49 year old was reported in 2009.

Mycobacterium species
In 2009, eight tuberculosis meningitis cases were notified (provisional). Cases ranged in age from four months to 76 years. No tuberculosis meningitis deaths were reported. See a separate chapter on tuberculosis for further details.

Bacterial meningitis (not otherwise specified)
In total, 39 cases of meningitis under this disease category were notified in 2009, among whom one patient died. The causative pathogens were identified in 15 of these. No causative pathogen was identified in the remaining 24 (61.5%) cases in 2009, an increase compared to 2008 when 17 cases had no organism identified (42.5%; n=17/40).

Among the bacterial meningitis (not otherwise specified) cases notified in 2009 were three cases of *Escherichia coli* meningitis, one of whom was a four month old infant and another (an adult aged 35-39 years) that died. Seven cases of Group B streptococci meningitis were also notified in 2009, with all but one being under four months of age, and with no deaths reported. In addition, two cases of meningitis caused by *Staphylococcus aureus* were reported in 2009, neither of whom died. Other meningitis notifications include one each caused by the following pathogens: *Streptococcus bovis* in a one month old infant, *Streptococcus Group D infection* in a two month old infant and *Enterococcus Faecalis* in a 25-29 year old adult, all of whom recovered.

Table 1. Annual notifications of bacterial meningitis other than meningococcal disease, 2007-2009

Notified under	Causative organism	2007	2008	2009	2007-2009
Haemophilus influenzae disease (invasive)	*Haemophilus influenzae*	2	3	3	8
Leptospirosis	*Leptospira* species	1	1	1	3
Listerosis	*Listeria* species	1	2	1	4
Salmonellosis	*Salmonella enteritidis*	0	0	1	1
Streptococcus pneumoniae infection (invasive)	*Streptococcus pneumoniae*	35	32	28	95
Streptococcus Group A infection (invasive)	Streptococcus Group A *(S. pyogenes)*	0	2	0	3
Tuberculosis*	*Mycobacterium* species	6	6*	8*	20
	Beta Haemolytic Streptococcus Group B	9	6	7	22
	Escherichia coli	0	11	3	14
	Staphylococcus aureus	0	3	2	5
	Enterococcus faecalis	0	1	1	2
Bacterial meningitis, NOS	*Citrobacter koseri*	0	1	0	1
(not otherwise specified)	*Gemella species*	1	0	0	1
	Proteus mirabilis	1	0	0	1
	Serratia liquefaciens	0	1	0	1
	Streptococcus bovis	0	0	1	1
	Streptococcus Group D	0	0	1	1
	Unknown	22	17	24	63
	Total Bacterial Meningitis, NOS	33	40	39	112
Total		**78**	**86**	**81**	**245**

Notes
* Tuberculosis meningitis figures for 2008 and 2009 are provisional

1.6 Pertussis

Summary

Number of cases, 2009: 78
Number of cases, 2008: 104
Crude incidence rate, 2009: 1.8/100,000

Seventy eight cases (1.8/100,000) of pertussis were notified in 2009 compared to 104 cases in 2008. Of the 78 cases in 2009 61 (78%) were classified as confirmed, 15 (19%) as possible while two (3%) had no case classification specified.

In 2009, the majority of cases (n=55, 71%) and the highest age-specific incidence rate (90.0/100,000) were in children aged less than one year with two thirds (n=52) of all cases aged less than six months (figures 1 and 2). Thirty-nine cases (50%) were female, 37 (47%) were male, while gender was not reported for two 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 for those aged 11-14 years. 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 2009, the vaccination status was reported for 42 (54%) pertussis cases. Twenty-one (n=21/78, 27%) cases were unvaccinated; these cases ranged in age from one month to 12 years, with 20 cases aged less than six months. Eleven unvaccinated cases (n=11/21, 52%) were less than two months of age and were therefore not eligible for pertussis vaccine in the Irish schedule. Twelve (n=12/78, 15%) cases were reported as incompletely vaccinated, but this included seven cases (n=7/12, 58%) 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=9/78, 12%) cases were reported as completely vaccinated for their age; four of these were reported to have had three doses of pertussis vaccine, one was reported to have four doses while the number of doses was not specified for four. Three of the nine cases reported as completely vaccinated for their age were classified as confirmed.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 8th September 2010. 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.

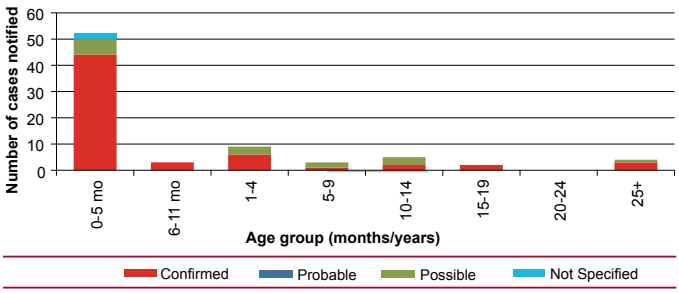

Figure 1. Number of notified pertussis cases in 2009 by age group and case classification. "Mo" in graph indicates months i.e. 0-5 months and 6-11 months, the remaining age groups are in years.

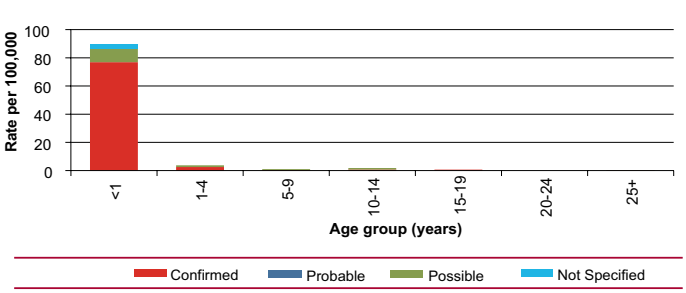

Figure 2. The age specific incidence rate (per 100,000 population) of notified pertussis cases in 2009 by case classification.

1.7 Rubella

Summary

Number of cases, 2009: 19
Number of confirmed cases, 2009: 1
Crude incidence rate, 2009: 0.4/100,000
Crude confirmed incidence rate: 2009 0.02/100,000

In 2009, 19 cases (0.4/100,000) of rubella were notified in Ireland compared to 40 cases in 2008.

One of the cases in 2009 was classified as confirmed giving a crude confirmed incidence rate of 0.02 per 100,000 total population. The confirmed case was in the age group 25-34 years (figure 1). Eighteen cases in 2009 were classified as possible; the majority (=14, 78%) of these were less than three years of age (figure 1). The age specific incidence rates by case classification are shown in figure 2.

Of the 19 rubella cases 11 (58%) were male and eight (42%) were female. The confirmed case was male.

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 16 (84%) of the rubella cases in 2009. Seven cases (n=7/19, 37%) were unvaccinated and one case (n=1/19, 5%) was reported as incompletely vaccinated. Eight cases (n=8/19, 42%) were reported as completely vaccinated for their age, only one (n=1/19, 5%) of these were reported to have two doses of MMR. All 16 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 31st August 2010. 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/.

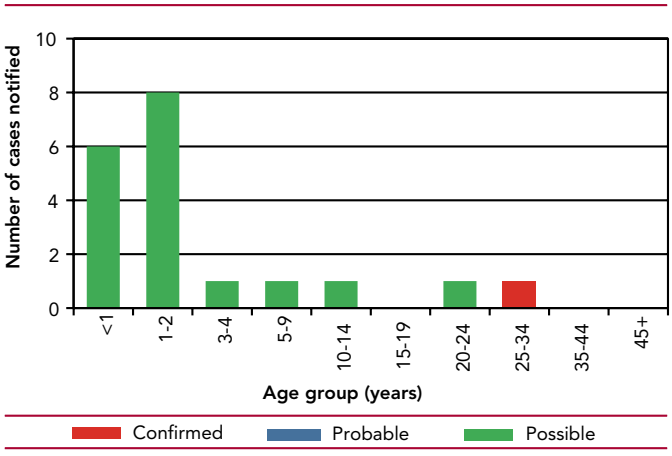

Figure 1. Number of notified rubella cases in 2009 by age group and case classification

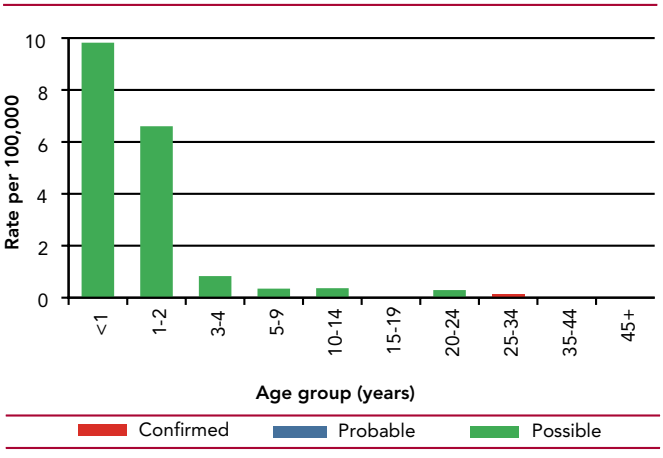

Figure 2. The age specific incidence rate (per 100,000 population) of notified rubella cases in 2009 by case classification

1.8 *Streptococcus pneumoniae* (invasive)

Summary

Number of cases in 2009: 433
Number of cases in 2008: 465
Number of deaths in 2009: 18
Number of deaths in 2008: 17
Crude incidence rate, 2009: 10.2/100,000

Notifications

Notification by clinicians and laboratories of invasive *Streptococcus pneumoniae* infection is mandatory since January 2004. 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 2009, 433 cases of IPD (10.2/100,000) were notified in Ireland. Eighty two percent (n=356) of notifications were classified as confirmed, 16% (n=69) as probable and 2% as possible (n=8). Compared with 2008 there was a 12% decrease in confirmed cases in 2009 (405 and 356 cases, respectively).

Of the 433 cases notified in 2009, clinical diagnosis was reported for 158 cases (36%), which included invasive pneumonia (n=82), septicaemia (n=45), meningitis (n=23) and meningitis & septicaemia (n=5). Peritonitis, soft tissue infection and abscess accounted for one case each.

More cases occurred in males (55%; n=240) than in females (45%; n=193). Cases ranged in age from 4 weeks to 101 years, with a median age of 61 years. The elderly i.e. those aged 65 years and older accounted for the greatest proportion of cases (45%, n=196), followed by children <5 years of age (12%, n=52) (figure1).

As in previous years, the incidence of IPD in 2009 was high in the very young and very old and was relatively low in the age groups in between (figure 1). In children, the incidence was highest in infants <1 year of age (29.5/100,000), followed by the 1 year old children (23.5/100,000). 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 (≥ 65 years) the incidence increased considerably and

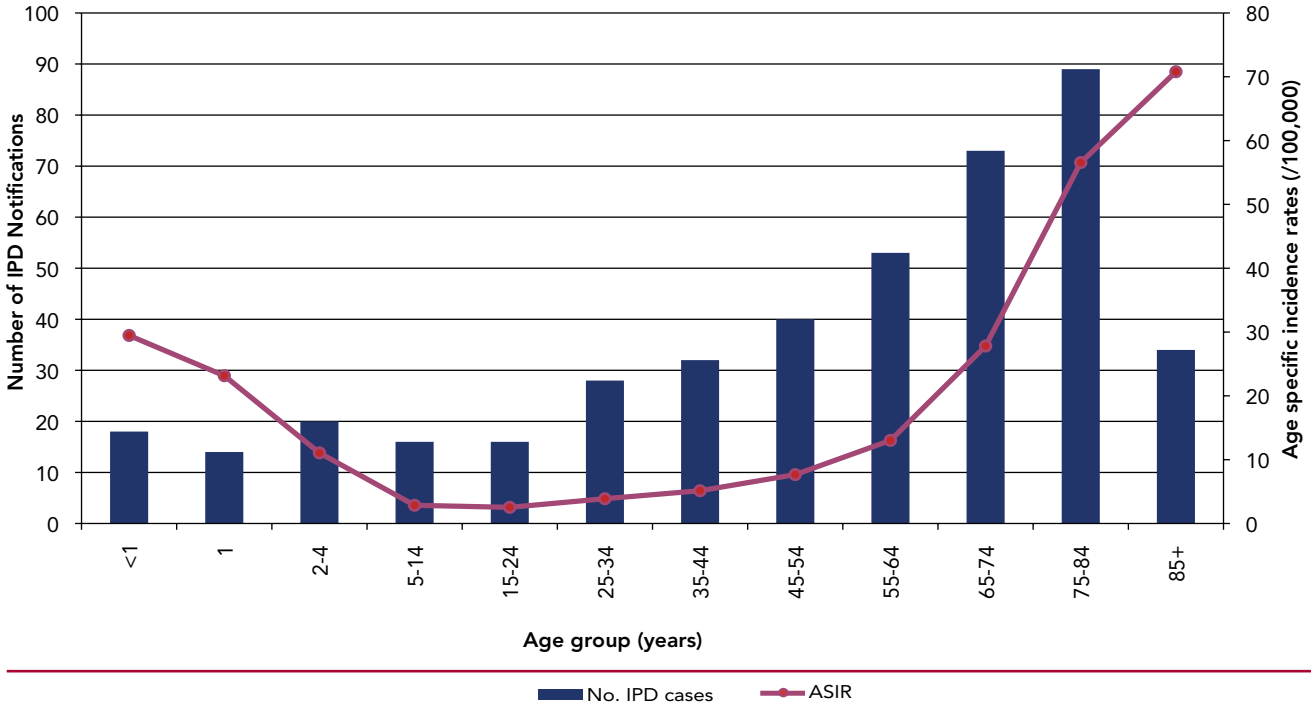

Figure 1. Number and age specific incidence rates (ASIR) of invasive pneumococcal disease notifications by age group, 2009

was highest in elderly adults 85 years of age and older (70.8/100,000), (figure 1).

Comparing the 2008 and 2009 age specific incidence rates, there was a notable decline in IPD in infants < 1 year of age (42%), in 1 year olds (33%) and in elderly adults 85 years of age and greater (21%) (figure 2). The introduction of the 7-valent pneumococcal vaccine (PCV7) to the childhood immunisation programme in September 2008 would explain the reduction in burden of IPD seen in young children in 2009.

Outcome was reported on just 24% (n=106) of the IPD notifications in 2009. Therefore, figures presented may underestimate IPD mortality in Ireland. Based on the data available, 18 deaths potentially due to IPD infection were reported in 2009. Four deaths occurred in children (< 5 years of age) and the remainder (n=14) were in adults, age range 18-89 years. Clinical presentation was reported for 13 of the 18 deaths; 10 had meningitis and/or septicaemia and three had pneumonia.

IPD notification data was extracted from CIDR on 16th August 2010. These figures may differ slightly from those previously published due to ongoing updating of notification data on CIDR.

Typing data

Of the 356 confirmed IPD cases notified in 2009, 279 (78%) had an isolate submitted for typing; 37 different serotypes were identified. The predominant serotypes associated with IPD infection in the overall population were 14, 7F, 19A and 3 (figure 3). In children < 2 years of age 7F, 14 and 6B were the most common serotypes (figure 3).

Since April 2007, the National Pneumococcal Typing Project has been offering a typing service to Irish laboratories for all invasive *S. pneumoniae* isolates submitted. Data from this project are used here to access the impact of introducing PCV7. Comparing the cumulative number of IPD cases between April 2007 – June 2008 and April 2009 – June 2010, there has been an 84% reduction in the burden of IPD associated with PCV7 serotypes, in children <2 years of age (figure 4, table 1) and a 44% reduction when all age groups are included (table 1). Overall there has been a 19% reduction in the burden of IPD when all age groups and all serotypes are included (table 1).

PCV7 vaccine failures

Based on data received through the IPD enhanced surveillance undertaken by the Departments of Public Health, two PCV7 vaccine failures were reported in

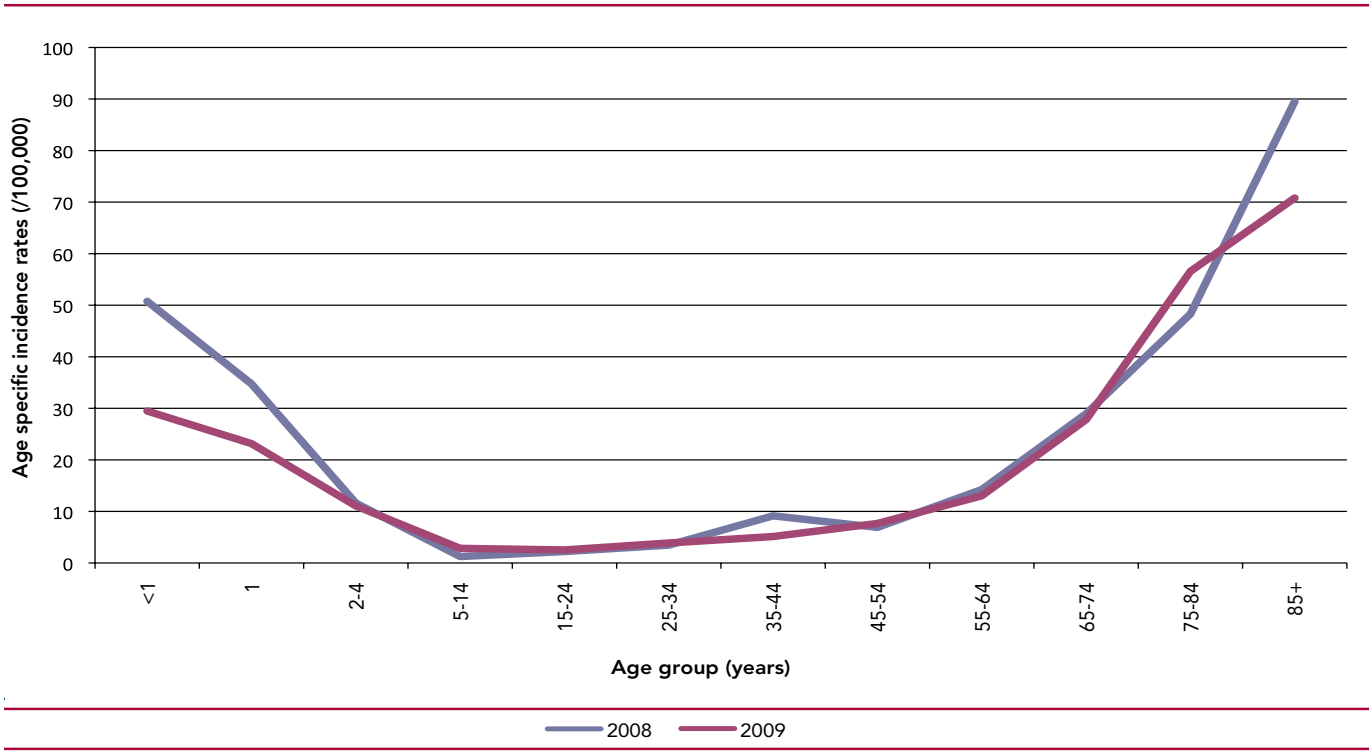

Figure 2. Age specific incidence rates of invasive pneumococcal disease by age group in 2008 and 2009

Table 1. Number of IPD cases pre-PCV7 (April 2007-June 2008) and post-PCV7 (April 2009–June 2010) introduction

	PCV7 serotypes			Non-PCV7 serotypes			All IPD serotypes		
	<2 yrs	≥2 yrs	All ages	<2 yrs	≥2 yrs	All ages	<2 yrs	≥2 yrs	All ages
Apr 07 – Jun 08	45	163	208	14	216	230	59	379	438
Apr 09 – Jun 10	7	110	117	19	217	236	26	327	353
% change	**-84.4**	**-32.5**	**-43.8**	**+35.7**	**+0.5**	**+2.6**	**-55.9**	**-13.7**	**-19.4**

Date source: National IPD Typing Project

2009. One was in an 18 month old child and the other in a 3 year old child, due to serotype 19F and 14, respectively. Both children survived.

Penicillin non-susceptible *S. pneumoniae* (PNSP)
In 2009, 20.2% of *S. pneumoniae* isolates were PNSP, compared to 23.1% in 2008 (Data source: EARS-Net). For details on the antimicrobial resistance patterns of *S. pneumoniae*, please see the chapter on Antimicrobial Resistance within this report.

Reinforcing IPD Surveillance
To build on and improve the current IPD surveillance systems/initiatives in Ireland it is important that:

- All laboratories and clinicians notify all cases of IPD diagnosed to the relevant Department of Public Health
- All laboratories send invasive *S. pneumoniae* isolates for typing to the National IPD Typing Project based at Beaumont Hospital
- All laboratories report details of *S. pneumoniae* isolates from blood and CSF to EARS-Net
- All Departments of Public Health undertake enhanced surveillance of IPD cases

The ongoing collection of good quality surveillance data is vital to accurately monitor: the burden of illness due to IPD, the antimicrobial resistance profiles, the impact of introducing PCV7 and also to estimate the impact of introducing new vaccines.

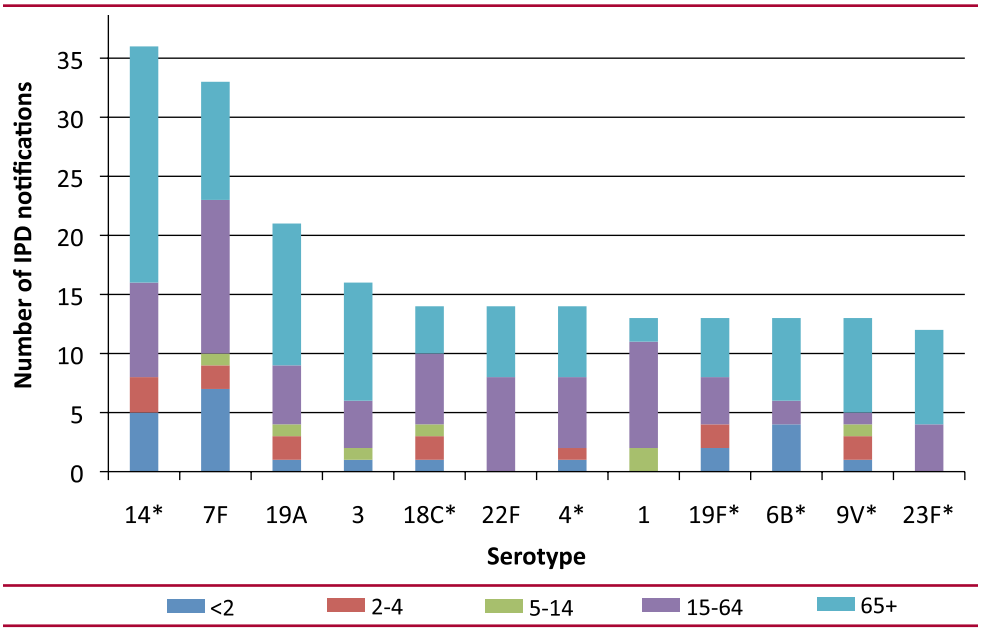

Figure 3. Most common S. pneumoniae serotypes associated with IPD infection by age group, 2009
*Denotes serotypes covered by PCV7

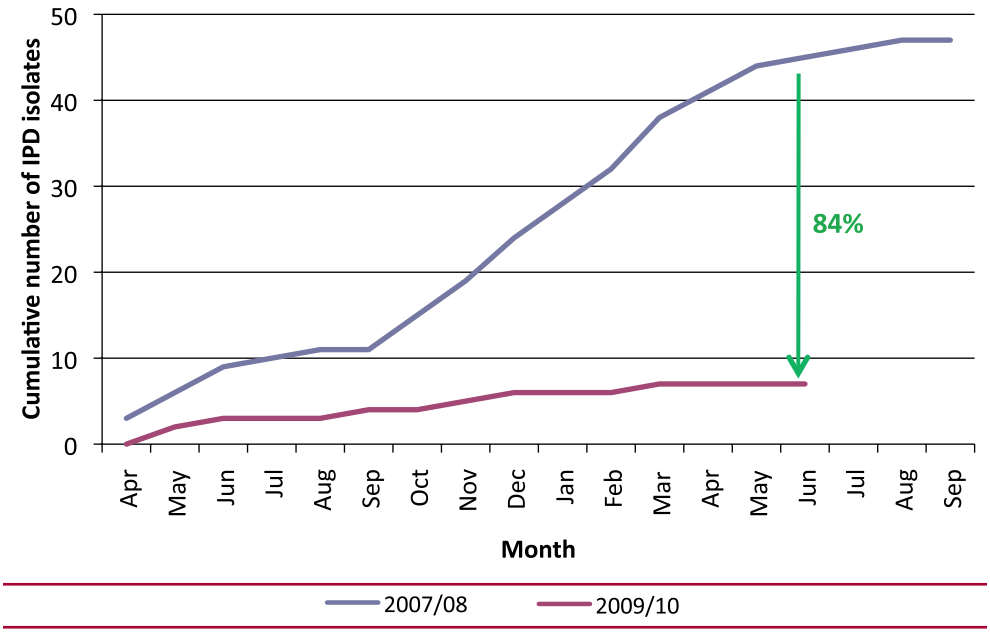

Figure 4. Cumulative number of IPD cases due to PCV7 serotypes in children <2 years of age, April 2007 - June 2008 and April 2009 – June 2010

02

Respiratory and Direct Contact Diseases

2.1 Influenza

Summary

The 2009 influenza A (H1N1) pandemic summary:

Peak influenza-like illness rate: 201.3 /100,000 population (week 43 2009)

Total confirmed pandemic cases hospitalised: 1059

Total confirmed pandemic cases admitted to ICU: 100

Total deaths associated with pandemic: 27

European data available at:

http://ecdc.europa.eu/en/Activities/Surveillance/EISN/

On 25th April 2009, a public health emergency of international concern was declared by the World Health Organization (WHO) due to an outbreak of 2009 pandemic influenza A (H1N1) infection in Mexico and the USA. On 11th June 2009, WHO raised the pandemic alert level to phase six, announcing the first influenza pandemic of the 21st century. WHO classified the severity of the disease as "moderate" based on scientific evidence available to them as well as the impact of the pandemic on member states' health systems and social and economic functioning. On July 16th 2009, the Department of Health and Children announced that Ireland would change the national approach to managing the pandemic from one of containment (or limiting the entrance and initial spread of the pandemic virus into the country) to one of mitigation (or minimising the impact of the pandemic virus as its circulation increased).

The vaccination campaign against 2009 pandemic influenza A (H1N1) started on 2nd November 2009. Individuals at highest risk of influenza disease and its complications were provided with the vaccine in the early stages, with those at less risk of severe disease vaccinated later on. The mass vaccine programme concluded on 31st March 2010 as the numbers contracting pandemic influenza declined significantly. However, pandemic vaccine continued to be provided over the summer to those individuals at highest risk of influenza complications.

On 10th August 2010, the WHO declared the end of the 2009 influenza A (H1N1) pandemic.

Since 2000, HPSC has worked in collaboration with the National Virus Reference Laboratory (NVRL), the Irish College of General Practitioners (ICGP) and the Departments of Public Health on the influenza sentinel surveillance project. During the pandemic period, 60 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 to the NVRL on at least five ILI patients per week. Other indicators of influenza activity included a network of sentinel hospitals reporting admission levels and sentinel schools reporting absenteeism.

Once the public health emergency was declared, routine seasonal influenza surveillance was augmented as follows:

- Two additional regional laboratories, Cork University Hospital (CUH) and Galway University Hospitals (GUH), started testing for 2009 pandemic influenza A (H1N1), in addition to the NVRL.
- Enhanced surveillance of the first 200 laboratory confirmed 2009 pandemic influenza A (H1N1) cases was implemented, thereafter enhanced surveillance data were collated on hospitalised cases only.
- Critical care/ICU surveillance of probable and confirmed adult and paediatric pandemic influenza A (H1N1) cases commenced in October 2009.
- Data on all calls to GP out-of-hours centres were monitored for self reported influenza by HSE-NE.
- Additional surveillance projects included monitoring mortality data from the General Register Office and an influenza vaccine effectiveness study (IMOVE project).

Data in this report covers the entire pandemic period from April 2009 (week 17 2009) to August 2010 (week 32 2010). During the 2009 pandemic, ILI activity peaked during week 43 2009, at 201.3 per 100,000 population (figure 1). This is the highest rate recorded since sentinel influenza surveillance commenced in 2000. The previous highest peaks occurred in week 2 2009 (120.6 per 100,000 population) and week 8 2001 (122.9 per 100,000 population). In mid-July 2009 (week 30), the ILI rate was above the baseline threshold of 17.8 per 100,000. This level of influenza activity during the inter-seasonal period had never been experienced

in Ireland. The peak age specific ILI rates during the pandemic were in 5-14 year olds, followed by 0-4 year olds. ILI rates in the 0-4, 5-14 and 15-64 year olds were the highest age specific rates recorded since sentinel influenza surveillance began. ILI rates in those aged 65 years or older were lower than the 2008/2009 season and were comparable to other seasons.

The percentage of influenza-related calls to GP out-of-hours services in Ireland, peaked during week 45 2009 at 10.6%. During the peak of the pandemic, the highest number of calls relating to influenza received by each service was on average three per hour.

The NVRL, CUH and GUH tested a total of 23,142 specimens for influenza virus during the pandemic period. Twenty one percent (n=4797; 20.7%) were positive for influenza virus. Over 99% (n=4759; 99.2%) of positive influenza specimens were confirmed (n=4464) or probable (n=295) 2009 pandemic influenza A (H1N1). Thirty-eight (0.8%) specimens were positive for seasonal influenza: 1 influenza A (unsubtyped), 5 A (H1), 27 A (H3) and 5 B. The NVRL performed neuraminidase sequencing on 36 non-sentinel 2009 pandemic influenza A (H1N1) isolates, all of which were susceptible to oseltamivir and zanamivir. The NVRL also sequenced and phylogenetically characterised the haemagglutinin gene from 18 2009 pandemic influenza A (H1N1) isolates, all of which form a monophyletic group with A/California/07/2009, demonstrating a very good match between the circulating and vaccine strains.

A total of 1,059 confirmed cases of 2009 pandemic influenza A (H1N1) were admitted to hospital. Of these, 100 (9.4%) were admitted to ICU (76 adults and 24 paediatric cases). For hospitalised and ICU patients, the highest age-specific rates were in the 0-4 year age group. Of the 1,059 confirmed cases hospitalised, 507 (47.9%) had pre-existing clinical conditions.[1] The most frequently reported underlying medical conditions included: asthma (n=127, 12.0%), chronic respiratory disease[2] (n=114, 10.8%), immunosuppression (n=79, 7.5%) and chronic heart disease (n=62, 5.9%). Seventy-three (6.9%) of all hospitalised confirmed cases were in pregnant women, eight of whom were admitted to ICU.

Twenty-seven patients with confirmed 2009 pandemic influenza A (H1N1) died (pandemic (H1N1) 2009 was a contributing cause on the death certificate); 12 males and 15 females. Twenty (74.1%) deaths occurred in adults 35 years of age and older. The age range was 8-83 years, with a median age of 52 years. Underlying medical conditions[1] (including pregnancy) were reported for 25 of the 27 deaths (92.6%), with two deaths having no reported underlying medical conditions. Underlying conditions included chronic respiratory disease [2] (n=11), chronic neurological disease (n=9), immunosuppression (n=7), chronic heart disease (n=3), chronic liver disease (n=2), asthma (n=2), chronic renal disease (n=1) and severe obesity i.e. BMI ≥40 (n=1). One death (3.7%) occurred in a pregnant woman. Twenty five of the deaths (92.6%) occurred in hospitalised cases and 15 (55.6%) deaths were in cases admitted to ICU. A summary of pandemic severity indicators is shown in table 1.

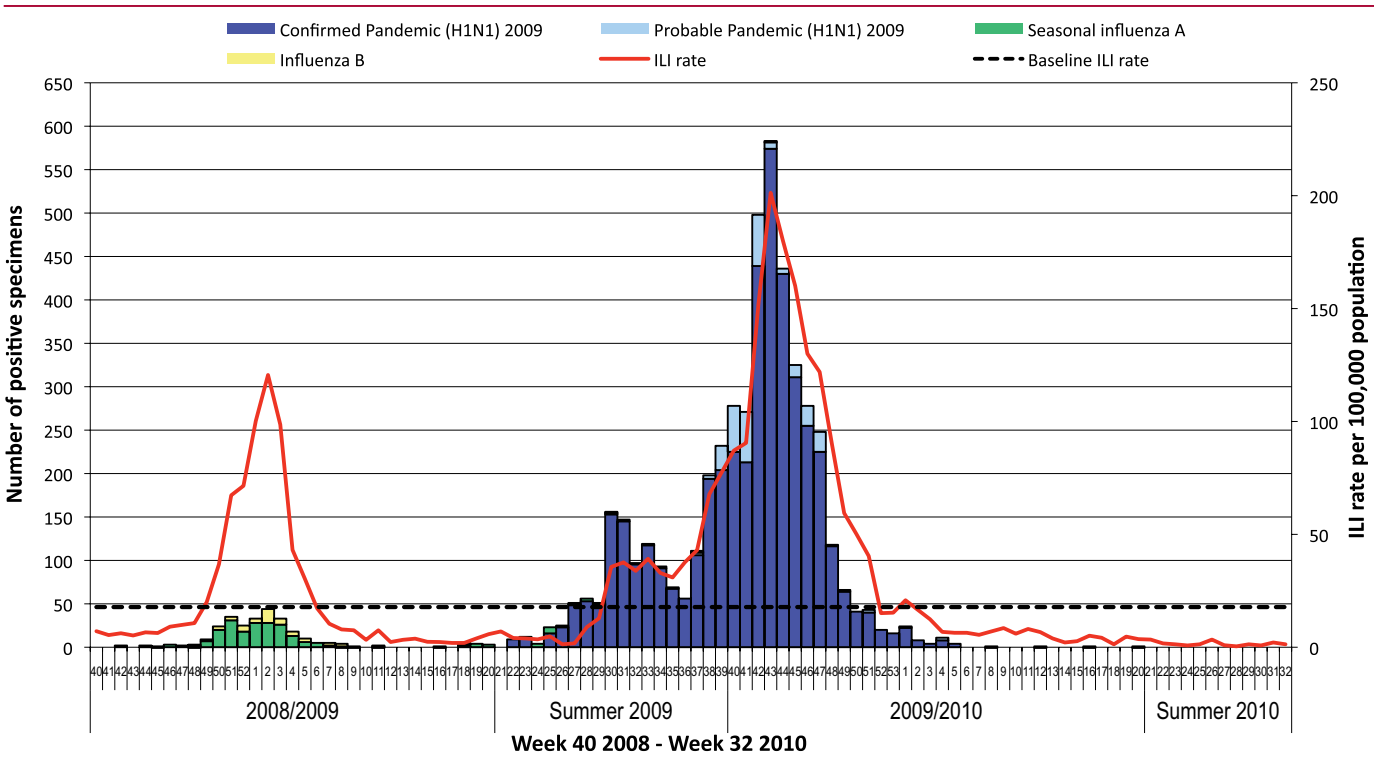

Figure 1: GP ILI consultation rate per 100,000 population, baseline ILI threshold rate, and number of positive influenza specimens, by influenza week and season, week 40 2008-week 32 2010. Source: ICGP clinical ILI data and NVRL, CUH and GUH laboratory data. Virological data for the NVRL includes sentinel and non-sentinel data for all weeks. Virological data from GUH and CUH includes non-sentinel data from weeks 29 and 31 2009, respectively.

1. Some cases had more than one underlying medical condition.
2. It cannot be established if chronic respiratory disease was in addition to, or included asthma.

One hundred and nine general outbreaks of ILI and 2009 pandemic influenza were reported in Ireland during the pandemic period. These outbreaks involved 2,578 people in total, of which 204 (7.9%) were reported as laboratory confirmed cases of 2009 pandemic influenza. Regional variation in ILI/pandemic activity was observed during the pandemic period. The majority of outbreaks were reported from HSE-E (n=29; 26.6%) and HSE-S (n=27; 24.8%). With the exception of HSE-M, all HSE-Areas reported general outbreaks of 2009 pandemic influenza and ILI during the pandemic period.

A total of 955,118 individuals were recorded as vaccinated with the pandemic vaccine, representing 23% of the population of Ireland eligible for vaccination. It should be noted that pandemic vaccination data are provisional.

In the post-pandemic period, based on knowledge about past pandemics the 2009 pandemic influenza virus is expected to continue to circulate as seasonal virus for some years to come. Therefore, cases and local outbreaks due to 2009 pandemic influenza will continue to occur and such outbreaks could have a substantial impact on communities. WHO advises that national health authorities remain vigilant in the immediate post-pandemic period as the behaviour of the virus as a seasonal virus cannot be reliably predicted.

In addition, it is most likely that, compared with seasonal influenza, younger age groups will continue to be affected disproportionately by the virus. Groups identified during the pandemic as being at higher risk of severe or fatal disease will remain at increased risk though the number of such cases should diminish.

In August 2010, WHO issued guidance on recommended activities during the post-pandemic period including advice on epidemiological and virological surveillance, vaccination and the clinical management of cases. WHO recommends: (1) the monitoring of clusters of severe respiratory illness or death; (2) investigation of severe or unusual cases clusters or outbreaks to facilitate rapid identification of important changes in the epidemiology and severity of influenza; and (3) maintaining routine ILI surveillance and surveillance of severe cases of influenza and respiratory illness.

For the 2010/2011 influenza season, existing surveillance systems have been strengthened and maintained. Data from these surveillance systems will assist in guiding the prevention, control and management of ILI/influenza.

Further information on influenza is available on the HPSC website www.hpsc.ie

Table 1: Summary table of severity indicators for laboratory confirmed 2009 pandemic influenza A (H1N1) cases - hospitalised cases, ICU cases and deaths.

	Hospitalised confirmed 2009 pandemic influenza A (H1N1) cases	ICU confirmed 2009 pandemic influenza A (H1N1) cases	Deaths in confirmed 2009 pandemic influenza A (H1N1) cases
Total cases	1059	100	27
Crude rate per 100,000 population	25.0	2.4	0.6
Age range (years)	0-84	0-79	8-83
Median age (years)	17	34	52
Females	533	50	15
	50.3%	50.0%	55.6%
Cases with risk factor[1]	507	81	25
	47.9%	81.0%	92.6%

1. Some cases had more than one underlying medical condition.

2.2 Legionellosis

Summary

Number of cases in 2009: 7
Crude incidence rate: 1.7 per million

In 2009, seven cases of legionnaires' disease were notified in Ireland, a rate of 1.7 per million population. This was a significant drop compared to the rate recorded in the previous two years but the numbers are small (Table 1). Two deaths were recorded in 2009, but neither death was directly attributed to legionnaires' disease.

Three cases were notified from HSE East, two from HSE North West and one each from HSE Midlands and HSE Mid-West.

The majority of cases (57.1%) were male. The median age of cases was 63 years with a range from 50 to 85 years.

All seven cases were confirmed by urinary antigen testing. The organism involved was *Legionella pneumophila* serogroup 1.

Of the seven cases, three were travel-associated, one was hospital-associated and three were community-associated. Countries of travel included Turkey (1), United Arab Emirates (1) and Latvia (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 2009, there were two cases of pontiac fever reported. One case was probable and was linked to a travel-associated case of legionnaires' disease. The other case was laboratory confirmed by urinary antigen testing.

Pontiac fever is a self-limiting flu-like illness. The incubation period is 24-48 hours and patients recover spontaneously.

Table 1. Number of legionnaires' disease cases per million population notified in Ireland, 2002-2009

Age group (years)	2002	2003	2004	2005	2006	2007	2008	2009
<30	0	1	0	0	0	1	0	0
30-39	2	0	0	2	0	4	0	0
40-49	3	0	1	4	8	4	2	0
50-59	0	1	1	1	2	2	3	2
60-69	1	2	1	1	1	3	4	3
70+	0	3	1	1	2	2	2	2
Total	**6**	**7**	**4**	**9**	**13**	**16**	**11**	**7**
CIR	**1.5**	**1.8**	**0.9**	**2.1**	**3.1**	**3.8**	**2.6**	**1.7**

2.3 Invasive Group A Streptococcal Disease

Summary

Number of cases, 2009: 60

Crude incidence rate, 2009: 1.42 per 100,000 population

Notifications

Sixty cases of invasive Group A streptococcal (iGAS) disease were notified in 2009. This corresponds to 1.42 iGAS cases per 100,000 population [95% confidence interval (CI), 1.08 to 1.82 per 100,000] and represents a decrease since 2008 when the iGAS rate was 1.65 per 100,000 population (95% CI, 1.29 to 2.09 per 100,000). All 60 cases were confirmed, defined as patients with group A Streptococcus (GAS), or *Streptococcus pyogenes*, isolated from a sterile site.

Patient demographics

Of the 60 cases, 34 (60%) were males and 26 (40%) were females, with ages ranging from 11 months–95 years (mean, 47 years; median, 47 years). iGAS was more common in young children and older adults (Figure 1).

Geographic spread and seasonal variation

Table 1 outlines the numbers and crude incidence rates (CIRs) of iGAS disease by HSE area from 2004 to 2009. Of note, the highest number of cases and CIR in 2009 occurred in the HSE-E (n=32; CIR, 2.13 per 100,000 population).

In 2009, almost half of all cases (n=29) occurred between April and July, with another peak in January (n=7).

Enhanced surveillance data

Enhanced data fields were entered by 13 laboratories for 50 (83%) iGAS cases, which represents an increase in completion of enhanced surveillance data from 2008 (69%, 48 of 70 cases). The source laboratory could not be ascertained for six of the cases. A wide variation in completed fields was observed.

Isolate details

GAS was isolated from a sterile site in 48 of 50 cases, primarily from blood cultures (n=44 isolates, or 94%) but also abscesses (n=1), deep tissue (n=2) and pleural fluid (n=1).

Serological typing data, based on the detection of M and T-proteins, were available on five isolates only from two laboratories: *emm*/M1 (n=2), M5 (n=1), M12 (n=1) and M28 (n=1). Enhanced data were available

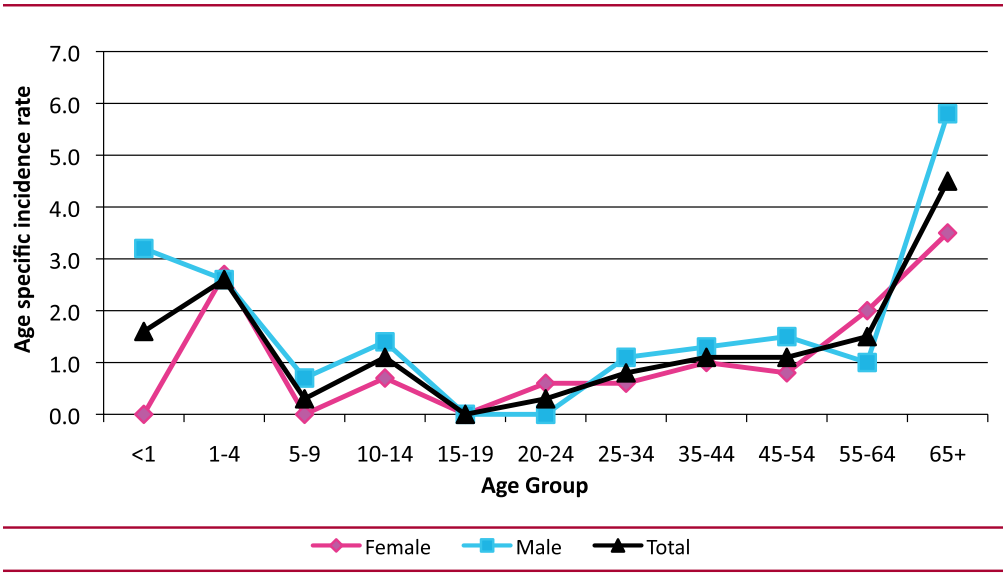

Figure 1. Age and sex specific rates of iGAS disease in 2009

on three patients with iGAS (emm/M1, M12 and M28), all of whom presented with streptococcal toxic shock syndrome (STSS).

Clinical details
As in 2008 and previous years, bacteraemia (n=45 cases, including cases where bacteraemia was not specifically stated but GAS was isolated from blood) and cellulitis (n=13) were the most common clinical presentations, followed by necrotising fasciitis (n=5), STSS (n=7; 3 of which were implied based on the clinical presentation given), myositis (n=2), pneumonia (n=2), septic arthritis (n=2), erysipelas (n=1) and puerperal sepsis (n=1). Note that cases could have more than one clinical presentation.

Risk factors
Risk factors associated with iGAS disease included age over 65 years (n=18), skin and wound lesions (n=16), diabetes (n=3), steroid use (n=1), malignancy (n=6), intravenous drug use (IVDU) (n=3), and varicella infection (n=2). Note that cases could have one or more associated risk factors: 21 cases had one risk factor, 11 had two risk factors and two had three risk factors. No risk factors were identified for 22 cases. Among the seven cases with STSS, age over 65 years was identified as a risk factor in four cases, skin lesions in four cases and IVDU in one case. All STSS cases had at least one risk factor.

Clinical management
Surgical intervention was required for eight patients ranging in age from 2 to 74 years, who presented with a variety of clinical presentations including necrotising fasciitis (n=2), cellulitis (n=3), and abscesses or deep tissue infection (n=3).

Admission to the intensive care unit was required for 16 patients (compared to seven in 2008), ranging in age from 2 to 79 years, with the following clinical presentations:
- bacteraemia +/- cellulitis (n=8)
- bacteraemia, STSS and necrotising fasciitis +/- myositis (n=4)
- bacteraemia, cellulitis, puerperal fever, erysipelas and STSS (n=1)
- STSS (n=1)
- bacteraemia and pneumonia (n=1)
- enlarged neck glands (n=1)

Table 1. Numbers (n) and Crude Incidence Rates (CIRs) per 100,000 population of iGAS disease by HSE Area, 2004-2009

HSE Area	2004		2005		2006		2007		2008		2009	
	n	CIR	n	CIR	n	CIR	n	CIR	n	CIR	n	CIR
HSE-E	25	1.67	19	1.27	37	2.47	28	1.87	31	2.07	32	2.13
HSE-M	0	0.00	1	0.40	2	0.79	0	0.00	0	0.00	2	0.79
HSE-MW	1	0.28	3	0.83	2	0.55	2	0.55	3	0.83	5	1.38
HSE-NE	1	0.25	3	0.76	5	1.27	3	0.76	10	2.54	3	0.76
HSE-NW	0	0.00	3	1.27	1	0.42	3	1.27	3	1.27	1	0.42
HSE-SE	7	1.52	1	0.22	4	0.87	10	2.17	8	1.74	8	1.74
HSE-S	1	0.16	1	0.16	3	0.48	4	0.64	5	0.80	5	0.80
HSE-W	0	0.00	18	4.34	7	1.69	7	1.69	10	2.41	4	0.97
IRELAND	35	0.83	49	1.16	61	1.44	57	1.34	70	1.65	60	1.42

Risk factors included age over 65 years (n=7), skin and wound lesions (n=6), malignancy (n=2), IVDU (n=2), diabetes (n=1) and varicella infection (n=1). Seven patients had one risk factor and six had two risk factors. No risk factors were identified for three patients. Length of ICU stay was provided for 12 cases ranging from one to 44 days (mean, 8.4 days; median/mode, 7 days). Surgical intervention was required for two of four patients with necrotising fasciitis.

Other epidemiological information
Three cases (all bacteraemia, including one with cellulitis) were reported as hospital-acquired compared to one case in 2008. As in 2008, no outbreaks of iGAS were notified in 2009.

Outcome
Outcome at seven-days following GAS isolation was reported for 30 cases:
- 27 were still alive
- three patients died: GAS was the main or contributory cause of death in two (both of whom were IVD users and aged 20-25 years)

The seven-day case fatality rate (CFR) for iGAS disease was 10% in 2009, an increase from 4% (one death) in 2008.

In addition to the above, the overall outcome was stated for a further eight cases:
- three (all aged over 75 years) were reported to have died but it was not stated if these deaths were directly attributable to iGAS
- four patients were recovering
- one patient recovered

Of the seven STSS cases, one patient died resulting in a case fatality rate (CFR) of 17% (with outcome provided for six of the seven cases).

Antimicrobial susceptibility
Antimicrobial susceptibility data were reported on 48 iGAS isolates (46 from blood, one from tissue and one from a wound) by 12 laboratories in 2009. All isolates were susceptible to penicillin (n=47) and vancomycin (n=40). Resistance to erythromycin was reported in three (6%) of 48 isolates, to clindamycin in one (4.5%) of 22 isolates and to tetracycline in one (4%) of 25 isolates.

While enhanced data were available for over 80% 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 EARS-Net quarterly returns.

The enhanced surveillance form can be downloaded from the HPSC web site at:http://www.hpsc.ie/hpsc/A-Z/Other/GroupAStreptococcalDiseaseGAS/SurveillanceForms/

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

The figures presented in this summary are based on data extracted from the Computerised Infectious Diseases Reporting (CIDR) System on 14th September 2010.

2.4 Tuberculosis, 2008

Summary

Number of cases in 2008: 468
Number of culture confirmed cases: 294
Crude incidence rate in 2008: 11.0/100,000
Number of TB deaths in 2008: 9
Number of cases in 2009*: 472
Crude incidence rate in 2009*: 11.1

In 2008, 468 cases of tuberculosis (TB) were notified in Ireland, corresponding to a crude notification rate of 11.0 per 100,000 population, which remains stable in comparison to 2007 (11.3/100,000) and 2006 (11.0/100,000). A summary of the epidemiology of TB in Ireland during 2008 is shown in table 1 while the number of cases and crude incidence rates from 1991 to 2009* with three-year moving averages are shown in figure 1.

The highest crude incidence rates were reported by HSE-E (15.8/100,000) and HSE-S (14.2/100,000) while the lowest rates were reported by HSE-NE (4.6/100,000) and HSE-NW (5.9/100,000). Rates reported in HSE-SE (6.5/100,000), -MW (7.2/100,000) and-W (7.5/100,000) were also significantly lower than the national incidence rate. Differences in age-standardised TB incidence rates were also found between HSE areas with the highest rates reported by HSE-E (15.3/100,000) and HSE-S (14.0/100,000) and the lowest rate reported by HSE-NE (4.7/100,000). The remaining HSE areas had rates ranging from 6.0 (HSE-NW) to 10.0 (HSE-M) per 100,000 population.

The highest age-specific rate in 2008 occurred among those aged 25-34 years (19.0/100,000) followed by those aged 65 years and over (17.7/100,000). The rate among males (13.2/100,000) was higher than the rate among females (8.7/100,000). Rates among males were higher than females for all age groups except in the 0-14 year age group where the rate in males was lower (1.1 compared to 2.4/100,000). The highest rate among males (24.6/100,000) was in the group aged 65 years and older while the highest rate in females (18.8/100,000 population) was in the 25-34 year age group. The male to female ratio (1.5:1) reported in 2008 was consistent with the rate reported in previous years.

During 2008, 43.6% (204 cases) of TB cases were born outside Ireland. This is a slight increase compared to the proportion of foreign-born cases reported during

Table 1: Summary of the epidemiology of TB in Ireland, 2008

Parameter	2008
Total number of cases	468
Crude notification rate per 100,000	11.0
Cases in indigenous population†	263 (56.2%)
Cases in foreign-born persons†	204 (43.6%)
Culture positive cases	294 (62.8%)
Pulmonary cases	336 (71.9%)
Smear positive pulmonary cases	158 (33.8%)
Multi-drug resistant cases (MDR)	2 (0.4%)
Mono-resistant to isoniazid	12 (2.6%)
Deaths attributable to TB	9 (1.9%)
Outcomes reported in cases	414 (88.5%)
TB meningitis cases	6 (1.3 per million)

*Data for 2009 are provisional data which may change significantly following validation

†Country of birth not reported for 1 case

2007 (40.0%) and higher than those reported between 2003 and 2006 (range: 21%-34.6%). The crude rate in the indigenous population was 7.4 per 100,000 similar to that reported in 2007 (8.0 per 100,000 population) while the crude rate in the foreign-born population was 33.3 per 100,000 which is slightly higher than that reported in 2007 (31.3 per 100,000). There was a notable difference in age between those born in Ireland and those born outside Ireland, with a median age of 52 years and 29 years respectively. In 2008, among countries in the EU and Western Europe who reported data to the European Centre for Disease Prevention and Control (ECDC), 22.4% of notifications were in foreign-born cases. In the United Kingdom, France and Belgium, where crude incidence rates are similar to those reported in Ireland, the percentage of cases of foreign origin in 2008 ranged from 46 to 65%.[1]

Pulmonary TB was reported in 336 (71.9%) cases, 131 (28.0%) had exclusively extrapulmonary disease and diagnostic type was not reported in one case. Of the extrapulmonary cases reported in 2008, there were six cases of TB meningitis corresponding to a rate of 0.13/100,000 population (1.3/million population).

Of the 468 cases reported in 2008, 62.8% (294 cases) were culture confirmed. Species identification showed *M. tuberculosis* in 93.9% (276 cases) and *M. bovis* in 3.7% (11 cases) of the culture confirmed cases (organism was not reported for seven culture confirmed cases). Of the 336 cases with a pulmonary component, 229 (68.2%) were culture confirmed, and 158 (47.0%) were smear positive.

The proportion of drug resistant TB cases notified in 2008 was 5.3% (25 cases). The proportion of MDR-TB cases was 0.4% (2 cases). Mono-resistance to isoniazid was recorded in 12 cases, to streptomycin in five, to pyrazinamide in two cases, to ethambutol in one and to rifampicin in one case. Two cases were also resistant to isoniazid and streptomycin. Fifteen of the 25 (60.0%) drug resistant cases, including one (50.0%) of the MDR-TB cases, were born outside Ireland.

In 2008, information on treatment outcome was provided for 88.5% (414) of cases. Of the 414 cases, 338 (81.6%) completed treatment, 36 (8.7%) died, 30 (7.2%) were lost to follow up, nine (2.2%) had treatment interrupted and one was still on treatment (0.2%). Nine (25.0%) of the 36 deaths were attributable to TB. Information on treatment outcome data increased compared to 2007 when these data were provided for 86% of cases. 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.

Guidelines on the Prevention and Control of Tuberculosis in Ireland were published in April 2010.[2] These guidelines are an update on the Report of the Working Party on Tuberculosis, originally published by the Department of Health in 1996.[3] All the sections from the original guidelines have been updated and a new section on infection prevention and control has been added. The recommendations in these guidelines are based on a review of international literature, expert opinion and an extensive consultation process. They provide advice on the diagnosis and treatment of active TB and latent TB Infection (LTBI), contact tracing procedures and screening for TB in special situations e.g. healthcare settings, new entrants to Ireland, prison and homeless settings. Chapters on infection prevention and control, TB and HIV infection and BCG vaccine are also included. The guidelines aim to improve the prevention and control of the disease and to help Ireland meet World Health Organization (WHO) targets for the elimination of TB. The WHO aims to reduce the global incidence of TB to less than one case per

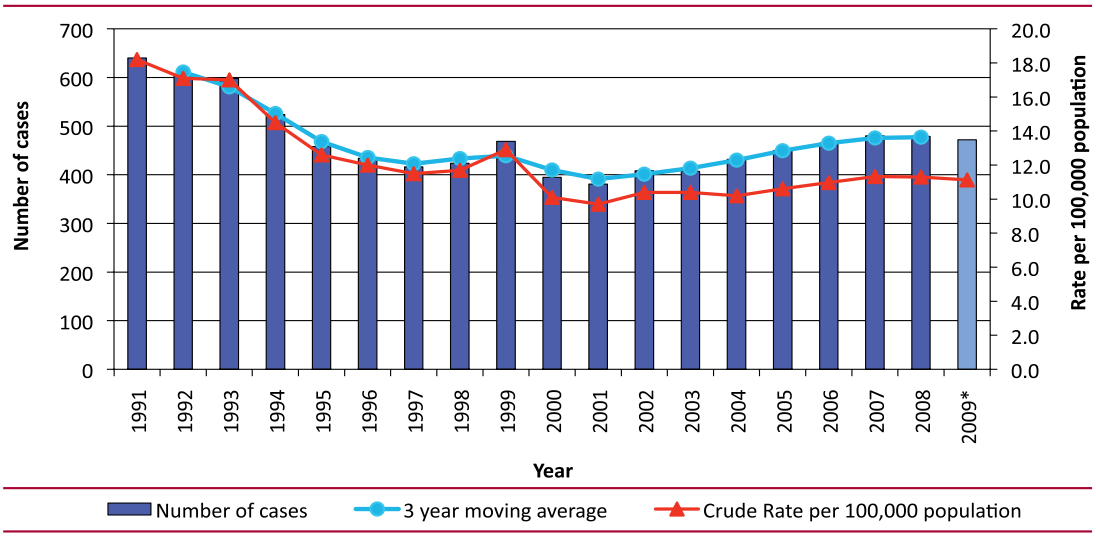

Figure 1: Notified cases of TB in Ireland with crude rates per 100,000 population, 1991 to 2009 and 3-year moving averages, 1992-2008*

*Data for 2009 are provisional data which may change significantly following validation

million population by 2050, which will eliminate the disease as a global health problem. 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 implement effective TB prevention and control strategies in Ireland and in order to reach the elimination target by 2050.

Provisional 2009 data

There were 472 cases of TB provisionally notified in 2009, 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 472 cases provisionally notified in 2009,

- Pulmonary TB was diagnosed in 292 cases (61.9%), extrapulmonary TB in 159 cases (33.7%) and pulmonary and extrapulmonary TB in 19 cases (4.0%). Diagnostic type was not reported for two cases.
- Of the 311 cases with a pulmonary disease component, 171 (55.0%) were culture positive and 136 (43.7%) were smear positive.
- There were seven cases of TB meningitis provisionally notified corresponding to a rate of 0.15 per 100,000 population (1.5/million population).
- There were 267 (56.6%) cases born in Ireland and 191 (40.5%) were foreign-born. Country of birth was not reported for 14 (3.0%) cases.
- There were 293 cases (62.1%) notified in males, 175 cases (37.1%) in females and sex was not reported for four cases (0.8%)
- The mean age of cases was 44 years (range: 0 to 91 years).
- Resistance was reported in 14 cases, five of which were mono-resistant to isoniazid. No cases of MDR-TB were reported during 2009. Eight of the 14 resistant cases were born outside Ireland.

More detailed surveillance reports can be found under Topics A-Z at www.hpsc.ie

References:

1. European Centre for Disease Prevention and Control/WHO Regional Office for Europe: Tuberculosis surveillance in Europe 2008. Stockholm, European Centre for Disease Prevention and Control, 2010. Available at: http://ecdc.europa.eu/en/publications/Publications/1003_SUR_tuberculosis_surveillance_in_europe_2008.pdf
2. Health Protection Surveillance Centre. *Guidelines on the Prevention and Control of Tuberculosis in Ireland 2010.* National TB Advisory Committee. April 2010. Available at: http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/TuberculosisTB/Publications/File,4349,en.pdf
3. Department of Health. Report of the Working Party on Tuberculosis. Dublin. 1996.

03

Infectious Intestinal Diseases

3.1 Campylobacter

Summary

Number of cases: 1,808
Crude incidence rate: 42.6/100,000

Campylobacteriosis 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 characterised by diarrhoea, abdominal pain, malaise, fever, nausea and vomiting. Symptoms generally last for only a few days. In the European Union, poultry meat still appears to be the most important food-borne source of *Campylobacter* as the occurrence of the bacteria remained at high levels throughout the food chain: from animals to meat at retail. This was in contrast to the high prevalence observed in live cattle and pigs which was typically followed by a strong decrease during slaughter and at retail.[1] 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 in 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[2].

Campylobacteriosis is the commonest bacterial cause of gastroenteritis in Ireland and Europe. During 2009, 1,808 cases were notified in Ireland, corresponding to a crude incidence rate (CIR) of 42.6 per 100,000 population. This is a slight increase compared to the number of cases reported during 2008 (n=1,747, CIR: 41.2). The European Centre for Communicable Disease Prevention and Control (ECDC) annual epidemiological report on communicable diseases in Europe reported a European crude incidence rate of 46.7 per 100,000 population during 2007.[3]

Geographical variation in CIR was observed within HSE areas. The highest CIR was observed in HSE-W at 57.0 per 100,000 population, an increase from the 2008 CIR of 44.4 per 100,000 population. The lowest CIR was observed in HSE-NE at 34.3 per 100,000 population, which remains stable in comparison to the 2008 CIR of 33.7 per 100,000 population. Figure 1 illustrates the campylobacteriosis CIR by HSE area during 2009 and 2008, with 95% confidence intervals.

Campylobacteriosis is seen in all age groups with the highest burden of illness experienced by the 0-4 year age group. During 2009, this age group accounted

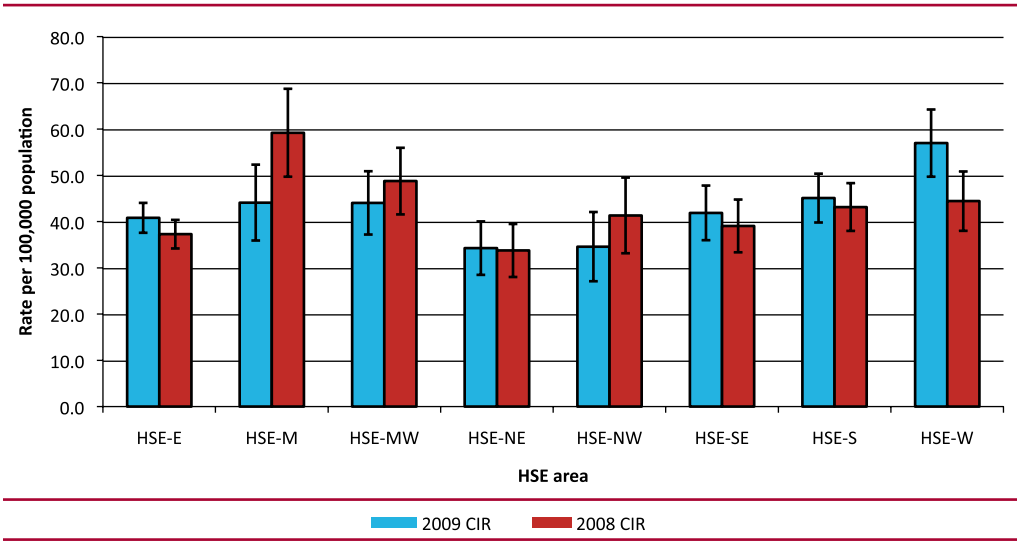

Figure 1: Campylobacteriosis crude incidence rates per 100,000 population (95% CI) by HSE area, 2008 & 2009.

for 27.6% of cases and had the highest age specific incidence rate (ASIR) of 165.1 per 100,000 population. The second highest ASIR observed was in the 5-9 year age group (46.5/100,000 population). The lowest ASIR was observed in the 35-44 year age group (26.1/100,000 population) and the 10-14 year age group (26.3/100,000 population). This preponderance in younger children is a well known characteristic of the disease and is also observed at European level. The highest European notification rate during 2007 was reported in males in the 0-4 year age group (118/100,000 population) and in females of the same age group (99/100,000 population).[3]

During 2009, 52.7% of all cases were male, 46.8% of cases were female and sex was not reported for 0.5% of cases. Further analysis of the age-sex distribution of campylobacteriosis cases shows a predominance of male cases in every age category, except the 25-34 year age group. Figure 2 illustrates the number of campylobacteriosis cases and age specific incidence rates by age group (years) and sex during 2009.

Campylobacteriosis has a well documented seasonal distribution with a peak in early summer. During 2009, notifications of campylobacteriosis peaked during May (n=206), June (n=208) and July (n=229) with a smaller secondary peak observed in September (n=176). Figure 3 illustrates the seasonal distribution of

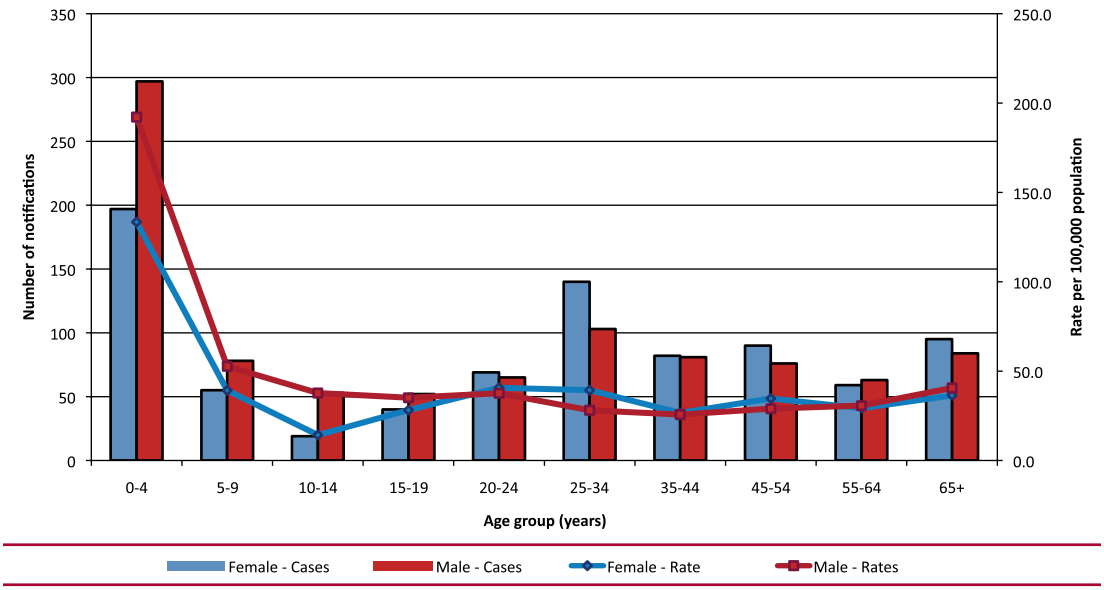

Figure 2: Campylobacteriosis notifications and age specific incidence rate per 100,000 population by age group (years) and sex, 2009 (CIDR)

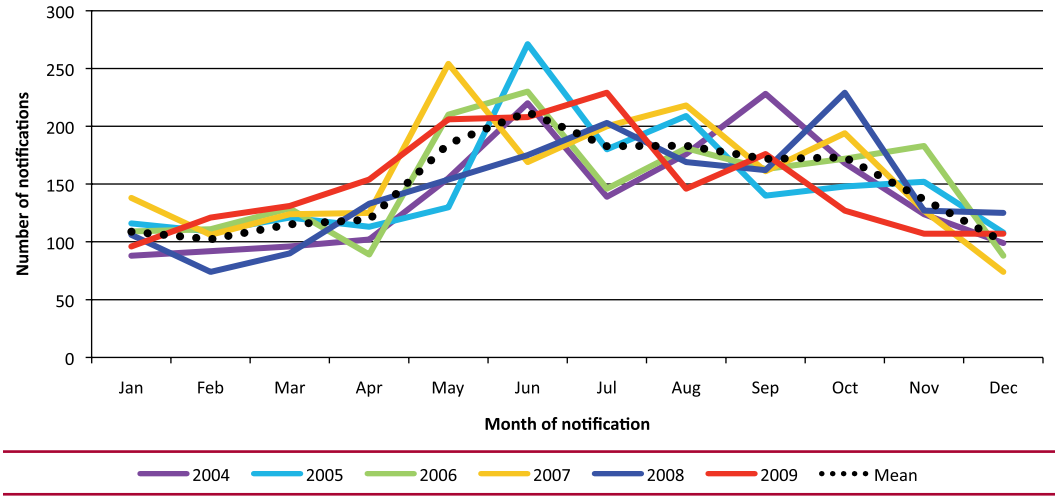

Figure 3: Number of campylobacteriosis notifications by month, 2004-2009

campylobacteriosis notifications in Ireland from 2004 to 2009.

Information on country of infection was recorded in 14.2% of all cases, which is slight decrease on the proportion of cases with this information provided in 2008 (17%). Of the 256 cases where country of origin was specified, indigenous cases accounted for 85.2%. There were also 38 cases (14.8%) with a recent history of foreign travel. These travel associated cases had exposures in 17 different countries. The majority of campylobacteriosis cases (89%) in Europe reported to ECDC during 2007 were also indigenous.[3]

Of the cases notified in Ireland during 2009, 99.7% were laboratory confirmed. However, as there is currently no national reference facility for routine typing of *Campylobacter* isolates, information on *Campylobacter* species is markedly incomplete. In 2009, 32.0% (n=578) of isolates were speciated. Of the 578 speciated isolates, 88.4% of isolates were *C. jejuni* while 11.6% were *C. coli*. The remaining 67.7% (n=1,224) of *Campylobacter* isolates identified were not further speciated. This compares with 46% of *Campylobacter* isolates in Europe reported to ECDC during 2007 remaining unspeciated.[3]

During 2009, there were nine family outbreaks of campylobacteriosis reported with 33 associated cases of illness. These were all small clusters of illness with no more than six people ill in any outbreak. Mode of transmission was described in seven of the outbreaks with person to person spread being the most common route (n=6). Four of the outbreaks reported as person to person transmission also reported a foodborne transmission element. Foodborne and animal contact was suggested for the remaining outbreak. No information was available on mode of transmission for two outbreaks.

Table 1. Number of campylobacteriosis outbreaks and number ill, 2009 (CIDR)

Mode of transmission	Number outbreaks	Number ill
Person-to-person & foodborne	4	15
Person-to-person	2	8
Foodborne & animal	1	4
Unknown	2	6
Total	**9**	**33**

References:

1. European Food Safety Authority (EFSA), European Centre for Disease Prevention and Control (ECDC). *The Community summary report on trends and sources of zoonoses and zoonotic agents in the European Union in 2007*. The EFSA Journal (2009) 223.Available at: http://www.efsa.europa.eu/en/scdocs/scdoc/223r.htm
2. Danis K et al., *Risk factors for sporadic Campylobacter infection: an all-Ireland case-control study.* Euro-Surveillance. 2009 Feb 19;14(7). pii: 19123
3. European Centre for Disease Prevention and Control. *Annual epidemiological report on communicable diseases in Europe, 2009*. Stockholm, European Centre for Disease Prevention and Control. Available at: http://ecdc.europa.eu/en/publications/surveillance_reports/Pages/index.aspx

3.2 Cryptosporidiosis

Summary

Number of cases, 2009: 445
Number of cases, 2008: 416
Crude incidence rate, 2009: 10.5/100,000

Cryptosporidium is a protozoal parasite that causes a diarrhoeal illness in humans known as cryptosporidiosis. It is transmitted by the faecal-oral route, with both ruminants and humans serving as reservoirs. Human cryptosporidiosis became a notifiable disease in Ireland in 2004, and the case definition in use is published in the HPSC case definition booklet.

In 2009, 445 cases of cryptosporidiosis were notified in Ireland, a crude incidence rate of 10.5 per 100,000 population, with 28% of notified cases reported as hospitalised for their illness. This was a 7% increase on the number of cases notified in 2008 (Figure 1). In 2007 (the most recent year for which data are available), the ECDC reported an incidence rate overall of 2.4 per 100,000 population in the European Union, with Ireland reporting the highest rate among those countries reporting on this disease at the time.[1]

Consistent with previous years, the highest reported incidence was in children under 5 years, with over 90 cases per 100,000 population in this age group (Figure 2). While there is likely to be a bias towards testing of diarrhoeal stool specimens from children (as opposed to adults) for *Cryptosporidium,* it is also likely that this distribution reflects to some extent a true difference in risk between adults and children.

The crude incidence (CIR) rates by HSE area for 2009 are reported in Figure 3. As in previous years, there was a strong urban-rural divide, with the HSE-E having a much lower reported incidence rate (0.73 per 100,000) than other HSE areas. The HSE-M and HSE-W reported the highest crude incidence rates (23.84 and 26.07 per 100,000 respectively) –over twice the national rate.

Since 2004, a large increase in cases has been recorded each spring, and in 2009 a similar peak in the reported number of cases occurred (Figure 4). This year, there was also a smaller peak in case numbers in September. Notably although only 16 notifications across the full year were specifically reported as being associated with foreign travel, eight of these were reported during the month of September.

Speciation of *Cryptosporidium* specimens can provide valuable information on the epidemiology of this disease. *C. hominis* is a species primarily linked with humans, whereas both humans and animals can be sources of *C. parvum* infections. In 2009, around 17% of positive human *Cryptosporidium* specimens in Ireland were referred for speciation to the UK *Cryptosporidium*

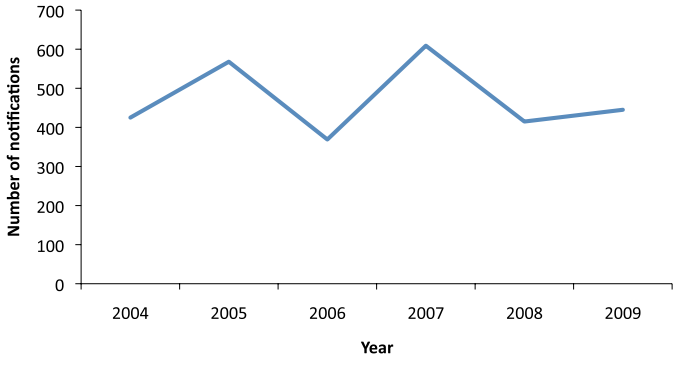

Figure 1: Annual number notifications cryptosporidiosis, Ireland 2004-2009.

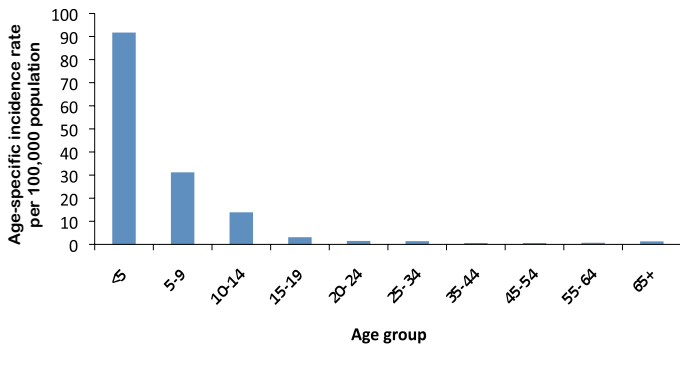

Figure 2: Age-specific incidence rate cryptosporidiosis, Ireland 2009

Reference Unit in Swansea by a small number of hospital laboratories. This is a decrease on the proportion of cases for which specimens were typed in 2008 (35%). As in 2008, *C. parvum* was the most common species reported (Table 1).

Six outbreaks of cryptosporidiosis were reported in 2009: one general outbreak and five family outbreaks (Table 2). All were small outbreaks, and between them accounted for only 7 cases. Table 2 lists the transmission routes and locations for these outbreaks. Three were reported due to person-to-person transmission; no waterborne outbreaks were reported. The overwhelming majority of cases in 2009 were reported as sporadic cases.

Reference

1. ECDC. 2009. Annual Epidemiological Report on Communicable Disease in Europe. ISBN 978-92-9193-196-5.

Table 1. Species distribution of Cryptosporidium cases, Ireland 2009

Species	Number of cases	% of cases
C. parvum	68	15.3%
C. hominis	7	1.6%
C. sp:nontypeable	1	0.2%
C. species	369	82.9%
Total	445	100%

Table 2. Cryptosporidiosis outbreaks Ireland 2009

Month	HSE-area	Transmission route	Type	Location	No. ill
Mar	NWHB	Person-to-person	Family	Private house	2
Apr	MHB	Animal contact	Family	Private house	3
Apr	NEHB	Unknown	Family	Private house	3
May	NWHB	Person-to-person	General	Community outbreak	3
Jun	SEHB	Unknown	Family	Private house	2
Jun	WHB	Person-to-person	Family	Private house	4

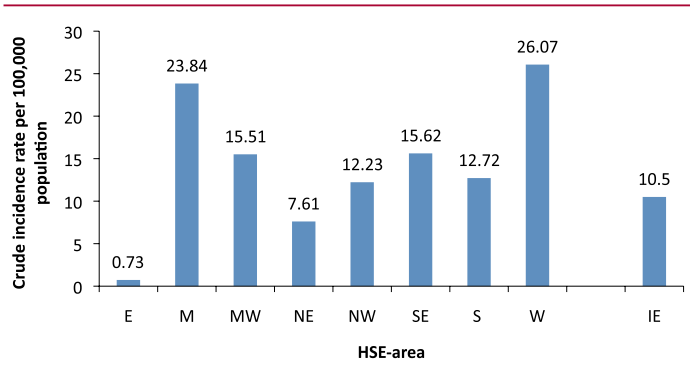

Figure 3: Regional crude incidence rates cryptosporidiosis, Ireland 2009.

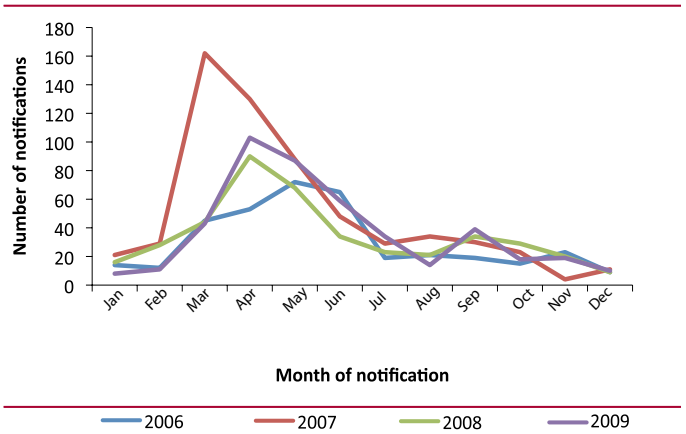

Figure 4. Seasonal distribution of cryptosporidiosis cases 2006-2009

3.3 Verotoxigenic *E. coli*

Summary

Number of cases, 2009: 241
Number of cases, 2008: 226
Crude incidence rate, 2009: 5.7/100,000

Reported verotoxigenic *E. coli* (VTEC) incidence rates in Ireland have been rising steadily over the last five years, such that in 2008, Ireland reported the highest VTEC incidence rate of any Member State in the European Union.[1] The dominant transmission routes for VTEC in Ireland appear to be person-to-person spread and waterborne transmission associated with exposure to water from untreated or poorly treated private wells.[2,3,4] Other important transmission routes identified internationally include food, and contact with infected animals or contaminated environments.[5]
Full details on how surveillance of VTEC is conducted in Ireland are available at http://ndsc.newsweaver.ie/a3xarrpcw5bqkeph6tk9uv?email=true

Incidence

In 2009, there were 241 confirmed and probable cases of VTEC notified, equating to a crude incidence rate (CIR) of 5.7 per 100,000 (table 1). If only confirmed VTEC cases are considered, the 238 confirmed cases (CIR=5.6 [4.9-6.3]) notified this year represent a 12% increase on the number of confirmed cases notified in 2008. Non-O157 VTEC made up 31% of cases in 2009.

One additional (HUS) case was reported as a suspected VTEC case.

Regional and seasonal distribution

The highest crude incidence rates for VTEC overall this year were reported in the HSE-MW and HSE-NW, where the rates were almost twice the national crude rate. As in previous years, the HSE-E reported the lowest overall crude incidence rate (Table 2), one third of the national rate this year. The crude incidence rate in the HSE-NE was also low this year.

Historically, the HSE-NW has reported relatively high numbers of VTEC O26, and this year almost three-quarters of VTEC cases in the NW were associated with serogroup O26. While it is possible that there is a true geographical difference in risk for different serogroups, it is also possible 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, almost 40% of cases were reported in quarter 3, although this varied by HSE-

Table 1. Number and crude incidence rates confirmed and probable VTEC, Ireland 2004-2009

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	213	13	226	5.3 (4.6-6.0)
2009 [b]	238	3	241	5.7 (5.0-6.4)

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

[b] Confirmed cases include 167 VTEC O157 cases, 45 VTEC O26 cases and 26 VTEC strains of other serogroups. Three probable cases were reported on the basis of detection of verotoxin genes without isolation of the implicated strain (all Ungroupable strains).

area with the HSE-MW and HSE-NW reporting their highest incidence in quarter 4 and the HSE-W reporting their highest number of cases in quarter 2 (Table 2).

Age-sex distribution
The reported disease incidence was highest among young children (median age =6 years), which is consistent with previous years. While there were roughly equal numbers of male and female cases, there were more females reported this year among adult cases and more males in younger age groups.

Severity of illness and clinical features
154 notified cases were reported as symptomatic, 71% of the cases for whom this information was available (n=218). Reported symptoms included bloody diarrhoea in 76 cases (39%), and HUS in 24 cases (11%). Ninety VTEC cases were admitted to hospital in 2009 (37%), and an adult male in his sixties died due to VTEC infection.

Of the 24 HUS cases, twenty were paediatric HUS cases and there were four adult HUS cases. Thirteen (54%) of the 24 HUS cases were infected with VTEC O157 strains, five (21%) were infected with VTEC O26, two (8%) with VTEC O145, two (8%) with Ungroupable VTEC strains, and one (4%) each with VTEC O5 and VTEC O78 strains. The additional HUS case reported as a suspected VTEC case was a young child from whom a verotoxin-negative strain of *E. coli* O111 was cultured. *E. coli* O111 is one of the serogroups listed by the World Health Organisation as being frequently associated with HUS.[6] It is possible that during the course of the patients' illness that the strain had lost its' verotoxin genes. The loss of verotoxin genes during infection among HUS patients has been previously documented by Schimmer *et al* (2008) and Bielaszewska *et al* (2007). [7,8]

The year 2009 had the highest annual number of non-O157 VTEC-associated HUS cases notified since VTEC surveillance was extended to include all VTEC strains in 2003, and the highest overall annual number of confirmed or probable VTEC-associated HUS cases since that time.

VTEC typing
In 2009, 238 human VTEC isolates were confirmed and typed at the HSE PHL Dublin Mid Leinster, Cherry Orchard Hospital (Table 3). In addition, laboratory findings are included in Table 5 from three 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 (PT) reported among VTEC O157 strains (96/167), accounting for 57% of the confirmed VTEC O157 reported. Other common phage types in 2008 were PT21/28 (n=13), PT8 (n=11), PT31 (n=12) and RDNC (n=9) –Table 3. Two sorbitol-fermenting VTEC O157 were reported, one each PT31 and RDNC. All phage typing was undertaken at the HPA Laboratory of Enteric Pathogens (LEP), Colindale, UK

The verotoxin (VT) profiles of VTEC O157 strains were similar to those reported historically for human isolates in Ireland (Table 3). Eighty-nine per cent of VTEC O157 strains carried the genes for VT2 only while 11% carried the genes for both VT1 and VT2. In contrast, 38% of non-O157 VTEC isolates carried the genes for VT1 only, 26% for VT2 only, and 36% VT1 and VT2.

There are new developments in the National VTEC Service provided at the DML-PHL in Cherry Orchard in relation to VTEC typing from 2010. Phage typing data will no longer be provided and the DML-PHL in Cherry Orchard will instead undertake timely molecular typing (i.e. pulsed field gel electrophoresis (PFGE)) of all human VTEC isolates, as this provides greater discrimination between isolates than phage typing, allowing more timely public health decision-making and intervention in the event of outbreaks.

Country of infection
At least seven VTEC cases (2.9%) in 2009 were considered to be foreign travel-associated. The countries of infection reported were France (n=2), Spain (n=2), Nigeria (n=1), Turkey (n=1) and Egypt (n=1). The overwhelming majority of infections in 2009 were as usual acquired in Ireland.

Table 2. Number and crude incidence rate of confirmed and probable VTEC by quarter and HSE area, Ireland 2009

Quarter	E	M	MW	NE	NW	SE	S	W	Total
Q1	0	4	5	0	2	1	1	2	**15**
Q2	8	5	8	1	8	5	15	12	**62**
Q3	12	11	12	5	6	19	25	5	**95**
Q4	8	0	15	2	10	9	15	10	**69**
VTEC O157	14	19	29	7	6	28	38	26	**167**
VTEC O26	7	1	5	1	19	3	6	3	**45**
Other VTEC	7	0	6	0	1	3	12	0	**29**
Total	**28**	**20**	**40**	**8**	**26**	**34**	**56**	**29**	**241**
CIR VTEC* (95% CI)	**1.9 (1.2-2.6)**	**8.0 (4.5-11.4)**	**11.1 (7.7-14.5)**	**2.0 (0.6-3.4)**	**11.0 (6.8-15.2)**	**7.4 (4.9-9.9)**	**9.0 (6.7-11.4)**	**7.0 (4.5-9.6)**	**5.7 (5.0-6.4)**

*Rates calculated using CSO census 2006

Outbreak and environmental investigations
Forty-two VTEC outbreaks were notified in 2009, which included 115 of the 238 confirmed cases notified. Six outbreaks were described as general outbreaks and 36 as family outbreaks. Two general outbreaks occurred in childminding facilities and one general outbreak was suspected to be linked to a food outlet. The remaining three occurred in private houses, and in two instances included either the families' childminder or another child who was minded in that home.

Twenty-seven outbreaks (64%) were caused by VTEC O157, eight (19%) caused by VTEC O26, three (7%) by other non-O157 and four (10%) were caused by a mixture of VTEC strains. The suspected modes of transmission reported are listed in table 4.

Person-to-person spread is an important mode of VTEC transmission particularly between young children, and was suspected to have played a role in 16 VTEC outbreaks in 2009 in which 35 persons were reported ill. These included the two outbreaks associated with childminding facilities mentioned above.

The second most common transmission route reported for outbreaks in 2009 was waterborne, with drinking water believed to have contributed to 12 outbreaks. For three family outbreaks, there was definitive microbiological evidence implicating their drinking water supply in transmission. These included two outbreaks where household private wells were implicated and one outbreak where a group water scheme was contaminated. Examination of water in all three outbreaks confirmed the presence of the same VTEC strain in the water as was identified in some or all of the associated patients in each of the outbreaks. For one further outbreak, although the VTEC strain identified in water from the household

Table 3. Verotoxin (VT) and phage typing (PT) results for VTEC referred to the PHL HSE Dublin Mid Leinster, Cherry Orchard Hospital in 2009

Serogroup	PT[c]	VT1 only	VT2 only	VT1 & VT2	VT type not reported	Total
O157	**1**			1		**1**
	2		3			**3**
	8		1	10		**11**
	14		6	1		**7**
	31		12			**12**
	32		95	1		**96**
	49		1			**1**
	51		2			**2**
	54			1		**1**
	63		1			**1**
	21/28		13			**13**
	RDNC[b]		7	2		**9**
	Untypable		1			**1**
	N/K		6	2	1	**9**
O26	-	19	3	23		**45**
O Ungroupable[a]	-	2	7	4		**13**
O145	-		4			**4**
O103	-	3				**3**
O105ac	-		3			**3**
O128	-	1				**1**
O21	-		1			**1**
O3	-	1				**1**
O5	-	1				**1**
O55	-	1				**1**
O78	-		1			**1**
Total		**28**	**167**	**45**	**1**	**241**

[a]Includes information on laboratory findings from 3 probable cases identified on the basis of detection of *vt* genes in the absence of obtaining an isolate.
[b] RNDC –reacts but does not conform to a designated phage type.

[c]All phage typing was undertaken at the HPA Laboratory of Enteric Pathogens (LEP), Colindale, UK

Table 4. VTEC outbreaks in Ireland 2009 by suspected mode of transmission

Suspected mode of transmission	Number of outbreaks	Number ill	Number confirmed cases
Animal contact	1	4	4
Foodborne	1	1	3
Foodborne/waterborne	2	6	6
Person-to-person	11	26	32
Person-to-person & foodborne	2	4	4
Person-to-person & waterborne	3	5	9
Waterborne	7	14	19
Unknown/Not specified	15	34	38
Total	**42**	**94**	**115**

private well was not identical to the strain detected in the associated cases, the detection of VTEC in their drinking water was strongly suggestive that their private well was responsible for their infections. For seven further outbreaks, evidence implicating water as the transmission route was circumstantial in that *E. coli* and/or coliforms were detected in the suspected water samples. These included outbreaks where household private wells (n=5) and group water schemes (n=2) were suspected. No water result was available for the private well suspected in the remaining outbreak.

In addition for four sporadic VTEC cases, environmental investigations identified VTEC of the same type in private household well samples as was found in the associated cases. In total, these reported waterborne incidents (outbreaks and sporadic cases) gave rise to 39 VTEC cases, four of whom developed HUS. Drinking water from untreated/inadequately treated private water supplies remains a very important risk factor for VTEC infection in Ireland.

Food was reported as a suspected transmission route in five outbreaks with 11 persons ill (Table 4). No definitive evidence was reported implicating any specific food. And animal contact was reported as the suspected transmission route for one outbreak with four persons ill. For one third of VTEC outbreaks, no suspected transmission route was reported.

Seasonal distribution of VTEC cases and private well water supply exposure data

As in previous years, the highest number of VTEC cases was reported between July and September, with an additional smaller peak this year in incidence in November (Table 5)

Among the enhanced data collected on VTEC cases is information on water supply exposures. In 2009, 90 VTEC cases (37% of cases) reported exposure to private well water prior to onset of their illness (Table 5). The number and proportion of cases reporting this exposure was highest in the months of July and November [18 cases (66.7%) and 17 cases (63.0%), respectively]. Annual rainfall totals in Ireland in 2009 were well above normal, with the summer period being extremely wet and with November being the wettest November on record since records began at many weather stations in Ireland.[9] Thus there may be a correlation between the incidence of VTEC disease that might be due to exposure to private well water and rainfall. This suggests that private wells can be vulnerable during times of high rainfall and that householders who have private wells should be vigilant for changes in their water quality during periods of high rainfall.

References

1. EFSA. 2010. The Community Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents, Antimicrobial resistance and Foodborne outbreaks in the European Union in 2008. Accessible online at http://www.efsa.europa.eu/en/scdocs/doc/1496.pdf
2. Garvey, P. et al. 2009. Epidemiology of verotoxigenic E. coli in Ireland, 2007. Epi-Insight: 10(3): 1-3
3. O'Sullivan et al. 2008. Increase in VTEC cases in the south of Ireland: link to private wells? Eurosurveillance 13(39) http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=18991
4. HPSC. 2008. Press release. Householders must properly maintain private water supplies following increase in contamination – HPSC. http://www.hpsc.ie/hpsc/PressReleases/2008PressReleases/MainBody,3127,en.html
5. CDC. Ongoing multistate outbreak of Escherichia coli serotype O157:H7 infections associated with consumption of fresh spinach—United States, September 2006. MMWR 2006; 55(38): 1045-6.
6. WHO Scientific Working Group. Zoonotic Non-O157 Shiga Toxin-Producing Escherichia Coli (STEC). Report of a WHO Scientific Working Group Meeting. 1-35. 1998. World Health Organisation.
7. Schimmer B, Nygard K, Eriksen HM, Lassen J, Lindstedt BA, Brandal LT, Kapperud G, Aavitsland P. Outbreak of haemolytic uraemic syndrome in Norway caused by stx2-positive Escherichia coli O103:H25 traced to cured mutton sausages. BMC Infect Dis. 2008 Apr 3;8:41.
8. Bielaszewska M, Köck R, Friedrich AW, von Eiff C, Zimmerhackl LB, Karch H, Mellmann A. Shiga toxin-mediated hemolytic uremic syndrome: time to change the diagnostic paradigm? PLoS One. 2007 Oct 10;2(10):e1024.
9. Met Eireann –Annual Summary of the weather in 2009. http://www.met.ie/climate/monthly-summary.asp

Table 5. Number and percentage of VTEC cases exposed to private well water during incubation period by month of notification, Ireland 2009

Exposed to private well?	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Yes			4	5	5	6	18	10	10	5	17	10	**90**
No	3	1	1	10	14	9	5	12	24	8	7	8	**102**
Unknown	2		4	6	4	3	4	2	10	3	3	8	**49**
Grand Total	**5**	**1**	**9**	**21**	**23**	**18**	**27**	**24**	**44**	**16**	**27**	**26**	**241**
% exposed to private well	**0.0%**	**0.0%**	**44.4%**	**23.8%**	**21.7%**	**33.3%**	**66.7%**	**41.7%**	**22.7%**	**31.3%**	**63.0%**	**38.5%**	**37.3%**

3.4 Hepatitis A

Summary

Number of cases, 2009: 52
Crude notification rate, 2009: 1.2/100,000 population
Number of cases, 2008: 42

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 2009, with 52 cases notified. This corresponds to a crude notification rate of 1.2/100,000 population and represents a 24% increase compared to 2008, when 42 cases were notified (figure 1). Case classification was reported for all cases. Fifty one cases were laboratory confirmed and one was classified as a possible case.

Fifty two percent of cases were male (n=27) and forty eight percent were female (n=25). All age groups were affected (figure 2).

Eight cases were linked to travel outside of Ireland, seventeen cases were contacts of cases infected outside of Ireland and one case had travelled outside of Ireland within the incubation period of the disease but could also have been infected in Ireland.

Of the remaining cases, eight were infected in Ireland and information on country of infection was not available for eighteen.

Two hepatitis A outbreaks were reported in 2009 and both of them occurred in the HSE-E. The largest outbreak involved mainly transmission in a school and included thirteen children and four young adults. The index case was a young child who was infected in India. The remaining cases were infected in Ireland through person to person contact within the school. Some later secondary transmissions occurred within families and the wider community. The outbreak lasted from May to December with low level spread. A high level of awareness of good hand hygiene practices during

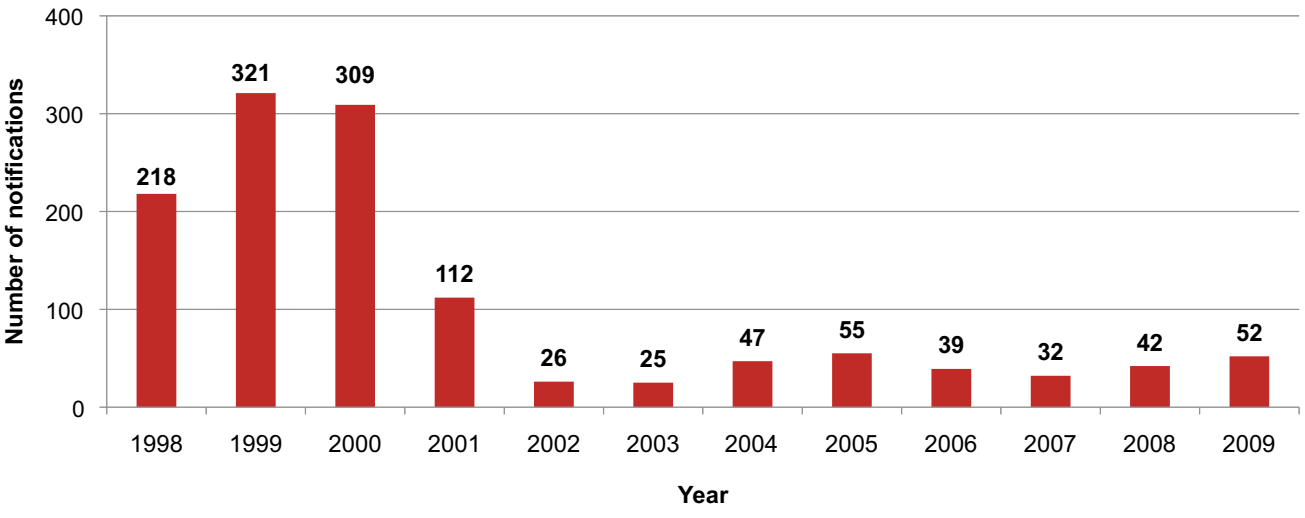

Figure 1. Number of hepatitis A notifications, 1998-2009

the height of the (H1N1) 2009 pandemic may have contributed to the limited level of spread. The second outbreak involved two adults who shared a house. Country of infection was uncertain for the index case but may have occurred in Spain.

There were no fatalities recorded in any of the hepatitis A cases in 2009.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 23rd June 2010. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

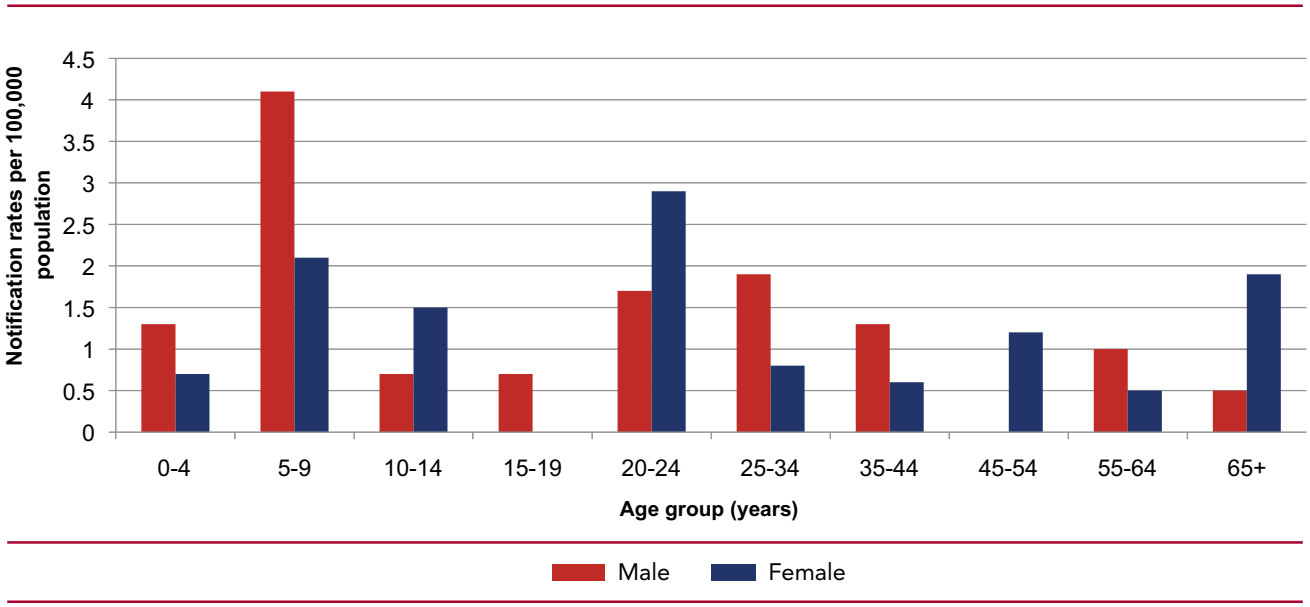

Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis A, 2009

3.5 Rotavirus

Summary

Number of cases: 2,354
Crude incidence rate: 55.5/100,000 population

Rotavirus is 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 occasionally seen in elderly and immunocompromised adults, particularly in institutional settings. By the age of six years old, virtually all children will have had at least one episode of rotavirus infection. 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 the newly notifiable C*lostridium difficile* associated disease. On 4th May 2008 these amended definitions formally replaced the previous AIG case classification.

Rotavirus case definition:
A case of rotavirus infection is a patient with acute onset of vomiting followed by watery diarrhea 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

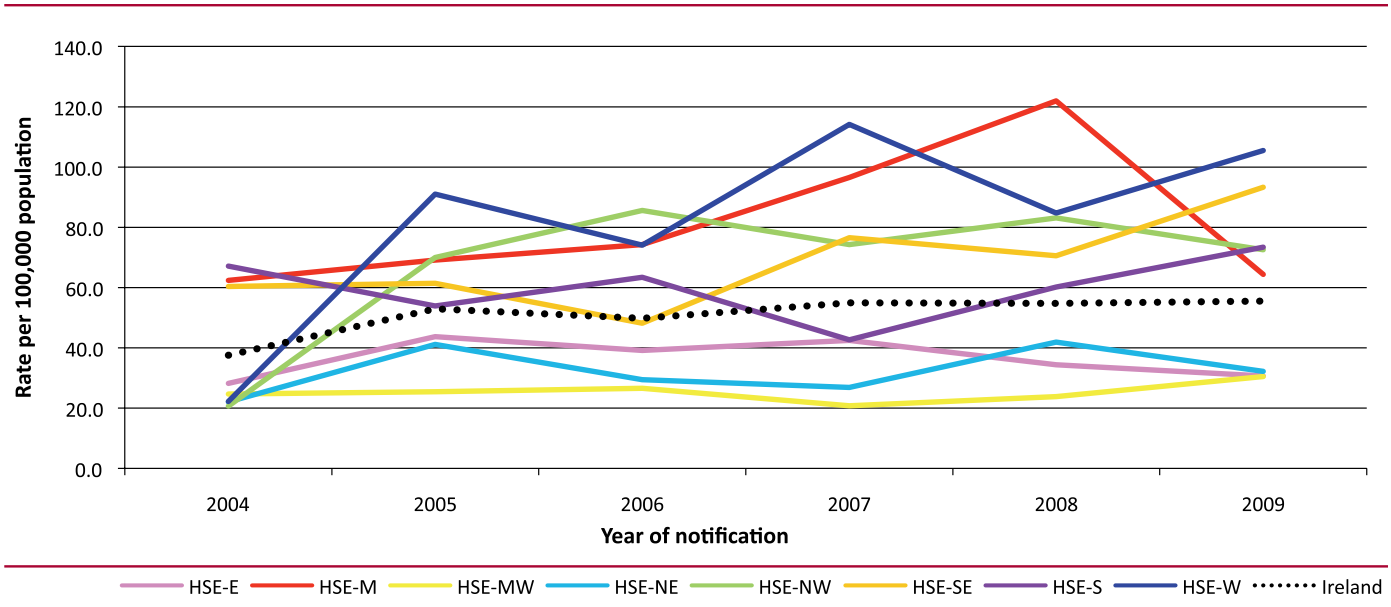

Figure 1: Rotavirus crude incidence rate by HSE area and year, 2004-2009 (CIDR).

During 2009, there were 4,359 cases of AIG notified in Ireland, corresponding to a national crude incidence rate (CIR) of 102.8 per 100,000 population and representing an increase of 4.3% compared to 2008. Rotavirus notification numbers remained similar to the previous year with 2,354 rotavirus cases notified in 2009 corresponding to a national CIR of 55.5 per 100,000 population and representing an increase of 1.5% compared to 2008.

Significant geographical variation was observed in regional rotavirus CIR. The highest regional CIR was observed in HSE-W at 105.5 per 100,000 population and in HSE-SE at 93.3 per 100,000 population. The lowest regional CIR was observed in HSE-MW at 30.5 per 100,000 population and HSE-E at 30.7 per 100,000 population.

Rotavirus infection has a well documented seasonal pattern in Ireland with the number of cases peaking each year in early spring. During 2009, this pattern was evident with rotavirus notifications peaking during April (n=686). Figure 2[1] illustrates the seasonal variation in rotavirus cases by month of notification from 2004 to 2009.

Rotavirus is the most common cause of acute gastro-enteritis in children worldwide with children generally affected in the first 2-3 years of life. In 2009, 74.3% (n=1,748) of cases were aged two or under. Data from 2004 to 2009 show that the peak incidence of clinical disease occurred in the 6-18 month age group. Figure 3 presents the number of cases of rotavirus in children less than two years of age by year, 2001 to 2009.

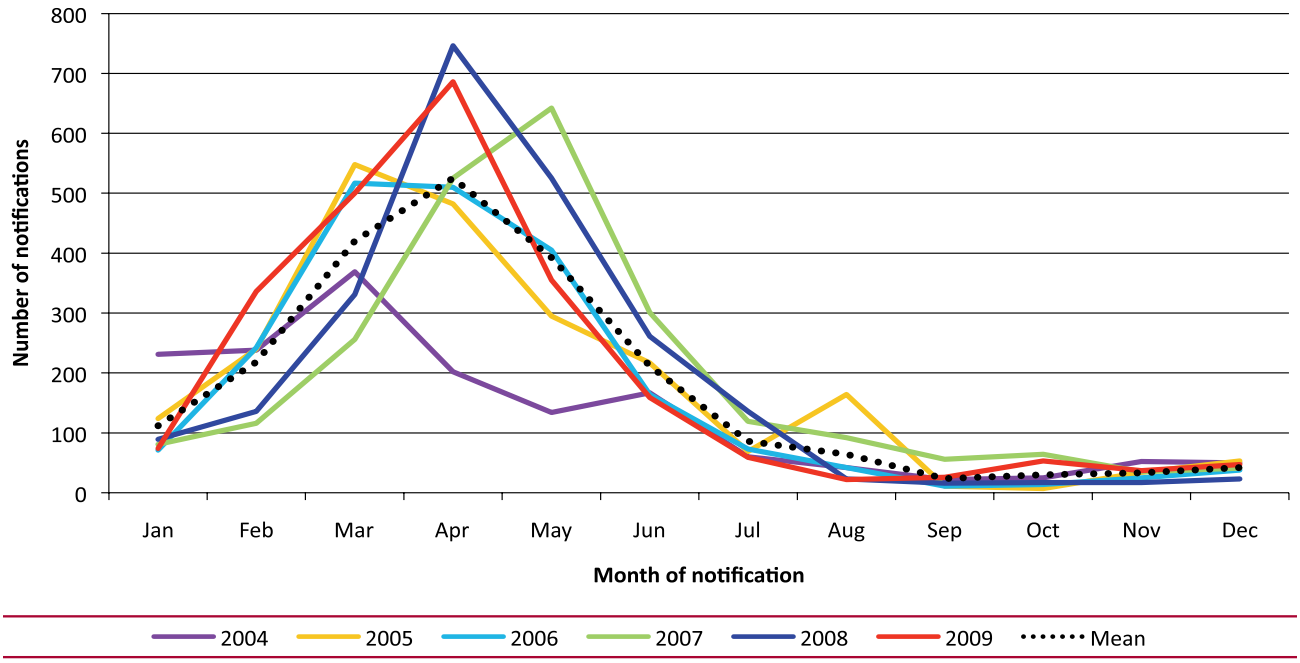

Figure 2: Number of rotavirus notifications by month, 2004-2009 (CIDR).

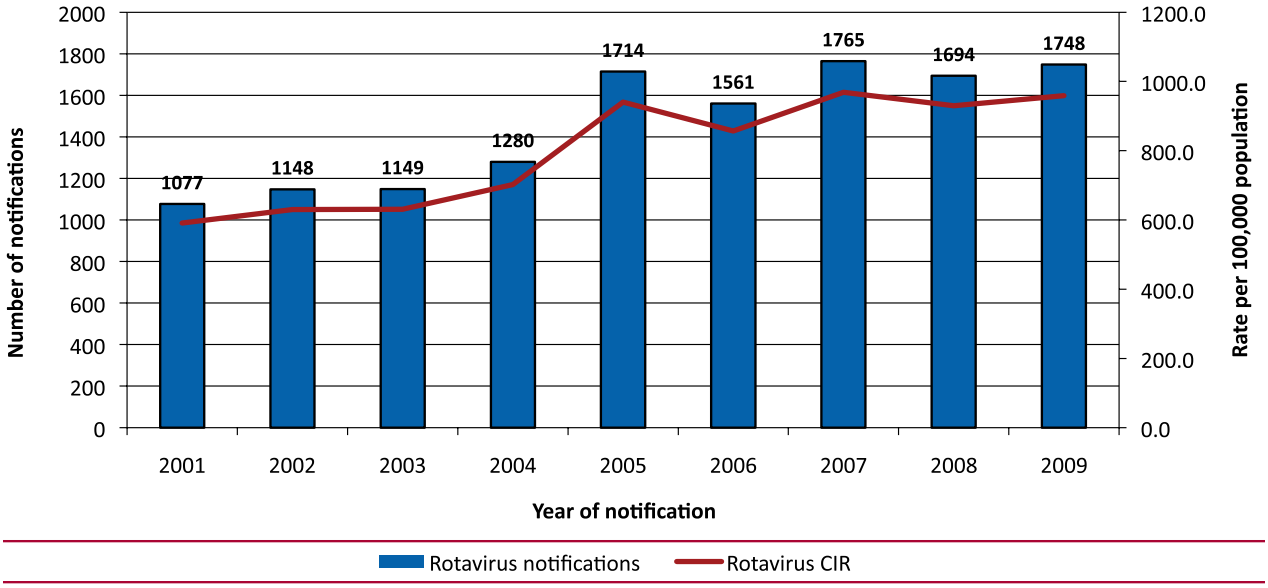

Figure 3: Number of cases of rotavirus in children less than two years of age by year, 2001 to 2009

During 2009, 1,103 cases (46.9%) were female, 1,239 (52.6%) were male and sex was not reported for 12 (0.5%) cases. This represented a ratio of females: males of 0.9:1.1, similar to the ratio observed in previous years.

There were 12 outbreaks of rotavirus notified during 2009 with 74 cases of associated illness. One outbreak was reported as a rotavirus and norovirus coinfection. Of the 12 outbreaks, four occurred in crèches, four were family outbreaks in private homes, three were in hospitals and one was in a community hospital/long-stay unit. Mode of transmission was reported as person to person spread in 10 outbreaks and no information on mode of transmission was reported for the remaining two. During 2009, 50% of all rotavirus outbreaks occurred during April, coinciding with the peak in rotavirus notifications. The largest outbreaks with the highest numbers ill also occurred during April. Table 1 details the number of rotavirus outbreaks by location, transmission mode and month during 2009

Reference

1. There is a 'false' second peak seen in 2005 during week 33, 2005 caused by bulk uploading of notifications for the HSE-W

Table 1: Number of rotavirus outbreaks by location, transmission mode and month, 2009

Outbreak month	Outbreak location	Outbreak transmission mode		Total
		Person-to-person	Unknown	
January	Private house	1		**1**
February	Creche	1		**1**
	Private house	1		**1**
March	Creche	1		**1**
April	Comm. Hosp/Long-stay unit	1		**1**
	Creche	2		**2**
	Hospital		2	**2**
	Private house	1		**1**
October	Hospital	1		**1**
November	Private house	1		**1**
	Total	**10**	**2**	**12**

3.6 Salmonella

Summary

Number of confirmed cases 2009: 332
Number of probable cases 2009: 1
Crude incidence rate 2009: 7.9/100,000

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 not very common in Ireland and is almost invariably travel-associated.

There were 333 cases of salmonellosis in 2009. Of these 332 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 nine cases of *S.* Typhi and eight cases of *S.* Paratyphi notified on CIDR. There were two fewer cases of paratyphoid detected by the clinical notification system than were identified by the NSRL in 2009. The National Salmonella Reference Laboratory (NSRL) based in Galway has been providing reference services nationally since 2000. In 2009 the NSRL analysed 366 human isolates submitted for *Salmonella* typing.

The national crude incidence rate (CIR) for salmonellosis in 2009 was 7.9 per 100,000 population which was a decrease compared to 2008 (10.6/100,000) as shown in figure 1. Figure 2 illustrates the regional variation in CIR during 2009. The highest CIR occurred in HSE-NW (10.1/100,000), representing an increase of 2.1 per 100,000 population compared to 2008. This was the only region to experience an increase in the regional CIR during 2009. The lowest CIR occurred in HSE-S (5.6/100,000), representing a decrease of 3.2 per 100,000 population compared to 2008. The largest decrease in regional CIR during 2009 was observed in HSE-M, with a decrease of 8.7 per 100,000 population.

The female:male ratio for the year was 0.9:1.1. In terms of age distribution, 21.6% of cases occurred in children

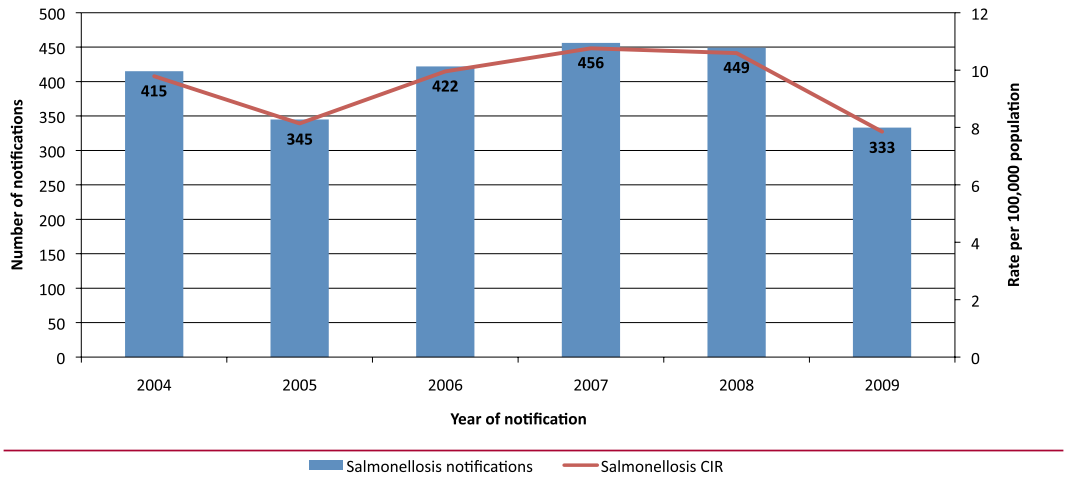

Figure 1: Salmonellosis notifications and crude incidence rate per 100,000 population by year of notification (CIDR)

under five. This is likely to be a reflection of clinicians more readily seeking clinical samples in that age group. This is also reflected in the age specific incidence rate (ASIR) with the 0-4 age group having the highest ASIR nationally (22.3/100,000 in females and 25.2/100,000 in males) in both sexes (figure 3).

The seasonality of salmonellosis notifications in Ireland during 2009 is shown in figure 4. The highest number of notifications occurred between May and October. Further examination of these data show that the highest number of travel associated salmonellosis notifications are reported during this period. These are expected seasonal increases that correlate with peak holiday

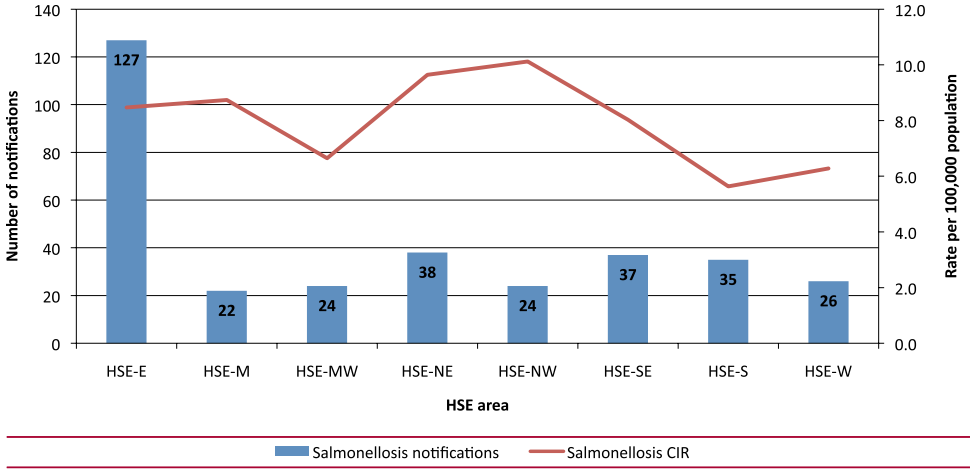

Figure 2: Salmonellosis notifications and crude incidence rate per 100,000 population by HSE area, 2009 (CIDR)

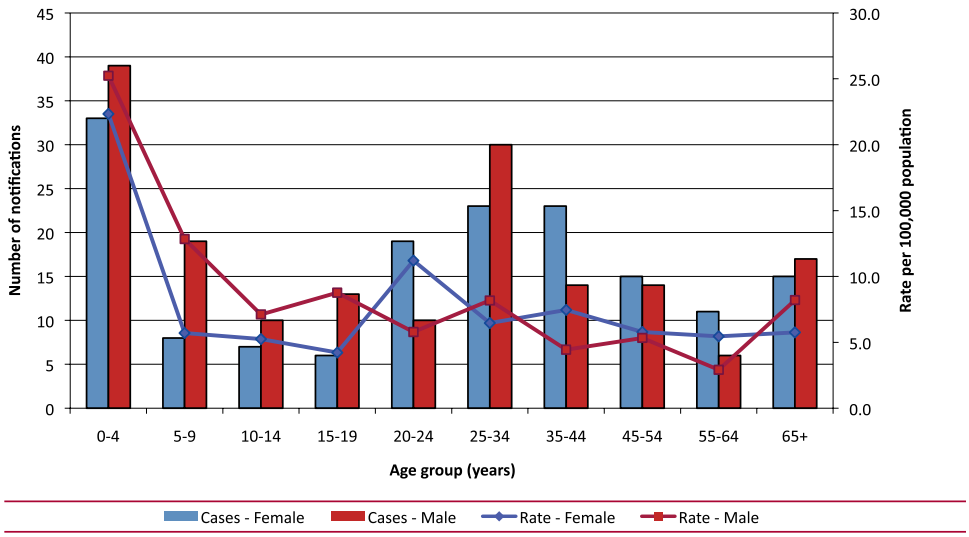

Figure 3: Salmonellosis notifications and age specific incidence rate per 100,000 population by age group (years) and sex, 2009 (CIDR)

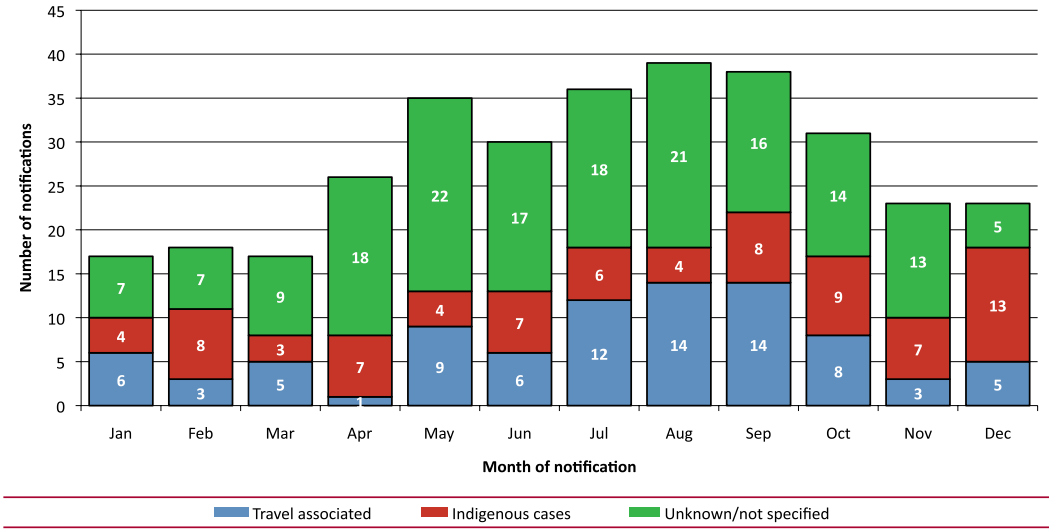

Figure 4: Salmonellosis notifications by month of notification and travel history, 2009 (CIDR)

periods and resultant increase of people travelling abroad.

Of the 333 cases notified on CIDR during 2009, travel history was provided for 166 cases (49.8%). Of the 166 cases where travel history was reported, 86 (51.8%) of salmonellosis cases were indigenous to Ireland and 80 cases (48.2%) reported a recent history of travel. Where travel history was documented, the three countries with highest occurrence of recent travel and subsequent development of salmonellosis were; Spain (n=20), Nigeria (n=9) and Thailand (n=5). When serotyping data are analysed by travel history, 44.2% of all travel associated cases are *S.* Enteritidis whereas 43.8% of cases indigenous to Ireland are *S.* Typhimurium (table 1).

During 2009, 366 human *Salmonella* isolates were referred to the NSRL for further typing, identifying 72 serotypes. Table 2 presents the most dominant serotypes detected during 2009. *S.* Typhimurium (n=118) was the most common serotype, followed by *S.* Enteritidis (n=87).

The NSRL conducted phage typing analysis on all *S.* Typhimurium and *S.* Enteritidis isolates. Phage types were assigned to all 118 *S.* Typhimurium human isolates. DT193 (22.9%), DT104 (20.3%) and DT104b (11.9%) were the commonest phage types observed. All 87 *S.* Enteritidis isolated were typed. PT14b (23.0%), PT8 (14.9%), PT21 (12.6%) and PT1 (10.3%) were the dominant types.[1]

Of the 366 human isolates analysed by the NSRL, 185 (50.5%) were fully sensitive to all antibiotics tested. The remaining 181 isolates exhibited some degree of antibiotic resistance. The three commonest resistance patterns[+] seen were type ACSSuT (n=38, 10.4%) followed by ASSuT (n=36, 9.8%) and Na (n=35, 9.6%). Over 97% of human isolates with a resistance profile of ACSSuT or ASSuT were *S.* Typhimurium while 57.1% of human isolates with a resistance profile of Na were *S.* Enteritidis. One *S.* Concord isolate was resistant to nine antibiotics tested, one *S.* Indiana isolate was resistant to eight antibiotics tested and five *S.* Kentucky human isolates were resistant to seven antibiotics tested. Please refer to the NSRL's Annual Report 2009 for more detailed analysis of results[1].

The number of *S.* Typhi and *S.* Paratyphi cases diagnosed in Ireland remains elevated when compared to previous years. In 2009 there were nine cases of

Table 1: Percentage of Salmonellosis notifications by serotype and travel history, 2009 (CIDR)

Salmonella serotype	Travel associated (%)	Indigenous (%)	Travel history unknown (%)	Total (%)
S. Enteritidis	44.2	18.8	18.6	**31.2**
S. Typhimurium	11.6	43.8	35.3	**25.2**
Other serotypes	41.9	26.3	35.3	**34.8**
Serotype not specified	2.3	11.3	10.8	**8.7**
All serotypes	**86**	**80**	**167**	**100.0**

Table 2: Number and percentage of human Salmonella isolates by serotype, NSRL 2009.

***Salmonella* serotype**	**Number of isolates**	***% Isolates***
Typhimurium*	118	*32.2*
Enteritidis	87	*23.8*
Unnamed	12	*3.3*
Typhi	11	*3.0*
Paratyphi A	9	*2.5*
Kentucky	7	*1.9*
Dublin	6	*1.6*
Agona	6	*1.6*
Java	6	*1.6*
Other	104	*28.4*
Total	**366**	***100.0***

*This includes 87 S. Typhimurium isolates and 31 isolates with serotype 4,5,12:i

+Where A= Ampicillin, C= Chloramphenicol, Na = Naladixic acid, S= Streptomycin, Su= Sulphonamide and T= Tetracycline

S. Typhi reported and eight cases of *S.* Paratyphi (two fewer cases of paratyphoid than were identified by the NSRL). Four of the *S.* Typhi had known recent travel history to India, two to Bangladesh and one each to Pakistan and the Phillipines. For the remaining typhoid case the travel history of the patient was unknown. In the *S.* Paratyphi cases three had known recent travel history to Pakistan, two to India and one each to Bangladesh and Chile. The remaining paratyphoid case's travel history was not specified.

There were 15 outbreaks of *Salmonella* during the year resulting in 93 persons ill, one death and an associated hospitalisation rate of 21.5% (n=20 cases). This is a decrease of 31.8% compared to the number of salmonellosis outbreaks reported in 2008. Twelve outbreaks were family outbreaks, nine of which were in private houses, two were travel associated and one occurred across an extended family. Of the two travel associated family outbreaks, one reported exposure in Spain. Three general outbreaks occurred in community locations. Table 3 outlines the number of salmonellosis outbreaks and number ill by outbreak location and outbreak transmission mode during 2009.

One general outbreak in HSE-NE was caused by a mixture of *Salmonella* Kentucky and *S.* Agona strains resulting in 35 cases of illness, seven of which were laboratory confirmed. Although no specific food item was implicated, the outbreak was suspected to be food-borne as all cases attended one of two private parties served by a single food caterer.

A national outbreak of 12 laboratory confirmed cases of *S.* Typhimurium DT193 occurred in early summer 2009. No source was identified although food-borne transmission was again suspected.

A national outbreak of *S.* Enteritidis 14b occurred between November 2009 and March 2010[2]. There were 19 confirmed cases, including one person who died.[3] An outbreak of *S.* Enteritidis 14b occurred in the UK around the same time which was associated with imported eggs, however, no link was identified with eggs or any other food source for the Irish outbreak.

References

1. National *Salmonella* Reference Laboratory of Ireland, Annual Report for 2009.
2. http://ndsc.newsweaver.ie/epiinsight/17zjkjbtdx5-i8xmmjicne
3. http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19489

Table 3: Number of salmonellosis outbreaks and number ill by outbreak location and outbreak transmission mode, 2009 (CIDR)

Location	Animal contact		Foodborne		Person-Person & Foodborne		Person-to-person		Unknown		Total	
	No. outbreaks	No. ill	No. outbreaks	No. ill	No. outbreaks	No. ill	No. outbreaks	No. ill	No. outbreaks	No. ill	No. outbreaks	No. ill
Community outbreak	0	0	3	66	0	0	0	0	0	0	**3**	**66**
Extended family	0	0	0	0	0	0	1	2	0	0	**1**	**2**
Private house	1	4	1	2	2	4	4	8	1	2	**9**	**20**
Travel related	0	0	1	2	0	0	0	0	1	3	**2**	**5**
Total	**1**	**4**	**5**	**70**	**2**	**4**	**5**	**10**	**2**	**5**	**15**	**93**

3.7 Less common gastroenteric infections

Listeriosis

Ten cases of human listeriosis were notified in 2009 compared to 13 in 2008 and 21 in 2007.

There was one pregnancy-related case and no neonatal cases reported.

There were also nine adult cases. Five were male and four female, and ages ranged from 24 to 94 years of age. Five cases were reported as elderly (>65 years) including at least two who were reported as having an underlying illness that predisposed them to listeriosis, and three were cases younger than 65 years also reported as suffering from an underlying illness that predisposed them to listeriosis. No enhanced information was available on the ninth case.

There were no reported deaths among cases.

Since 2007, the National Salmonella Reference Laboratory has offered a national service for typing of *Listeria* strains. In 2009, isolates for eight of the notified cases were received for typing at NSRL (80%). The serotype distribution of these strains is outlined in the table below.

The number of adult cases remains similar to previous years: however, the number of pregnancy-related and neonatal cases in Ireland had decreased since 2007 when there were nine listeriosis cases among neonates and pregnant women, many of whom were of non-Irish origin.[1] Targeted leaflets by *Safe*food aimed at pregnant women, in particular those whose first language was not English, may have had an effect. [2] A similar risk among pregnant women from ethnic minorities has recently been reported in England and Wales. [3]

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

References

1. Garvey, P *et al.* 2008. Human listeriosis: surveillance, epidemiology, transmission and prevention. Epi-Insight 2008 9(7):1,4
2. *Safe*food leaflet for pregnant women at http://www.safefoodonline.com/
3. Mook P *et al.* 2010. Emergence of pregnancy-related listeriosis amongst ethnic minorities in England and Wales. Eurosurveillance, Volume 15, Issue 27, 08 July 2010

Listeriosis notifications by case type and serotype, Ireland 2009 -typing data provided courtesy of Prof Martin Cormican and staff at the NSRL

	Serotype 1/2	Serotype 4b	Not referred for serotyping	Total
Adult or juvenile	4	3	2	**9**
Pregnancy-related	0	1	0	**1**
Neonatal	0	0	0	**0**
Total	**4**	**4**	**2**	**10**

Giardiasis

In 2009, there were 61 cases of giardiasis notified, a slight decrease on the number notified in 2008 (n=71) but similar to the number reported in 2007 (n=62).

Cases ranged in age from 0-75 years (median age=33 years) with only eight cases less than fifteen years of age. Similar numbers of males (n=29) and females (n=32) were affected.

Nineteen cases (31%) were reported as being associated with foreign travel: the countries of infection reported were India (n=6), Dominican Republic (n=3), Sudan (n=2), Vietnam (n=2) and there was one case each reported associated with travel to Cambodia, Sri Lanka, Congo, Iceland, Egypt and Chad. Four cases were reported as being acquired in Ireland, and for the remaining 38 cases, country of infection was unknown or not specified.

In 2009, there was one small outbreak reported with three persons ill which was related to foreign travel.

Yersiniosis

In 2009, there were three cases of yersiniosis, compared to three in 2008 and six in 2007.

One case was a child and there were two adult cases; one case each male and female with the sex not reported for the third case.

Two cases were reported as *Y. enterocolitica* and one as *Yersinia* species.

Foodborne intoxications

Notifications of foodborne intoxications in Ireland are uncommon. In 2009, there was one case of *Clostridium perfringens* (type A) food-borne disease, one case of staphylococcal food poisoning and one case of *Bacillus cereus* food-borne infection/intoxication notified.

There was also one family outbreak of *Clostridium perfringens* (type A) food-borne disease notified with 11 persons ill; none were hospitalised.

3.8 Shigellosis

Summary

Number of cases, 2009: 71
Number of cases, 2008: 76
Crude incidence rate, 2009: 1.7/100,000

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.

While person-to-person spread is an important transmission route between children, risks also remain from food, with at least four general outbreaks having been reported in Scandinavia in 2009 associated with imported fresh produce.[1-5] Transmission between men who had sex with men (MSM) has been reported in Canada.[6]

Seventy one cases of shigellosis were notified in Ireland in 2009, all of which were laboratory confirmed. This compares to 76 cases in 2008 and 43 in 2007 (Figure). Cases ranged in age from 1 to 60 years (mean age=29 years, median age=29 years), with more males (n=40) than females (n=31) notified. This differs to the last four years where there were more females than males reported each year.

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 over two-thirds (49/71) of notifications. In 2009, 41 cases (58%) were reported associated with foreign travel (Table 1). The countries of infection reported were Egypt (n=9), Nigeria (n=6), Morocco (n=4), three each

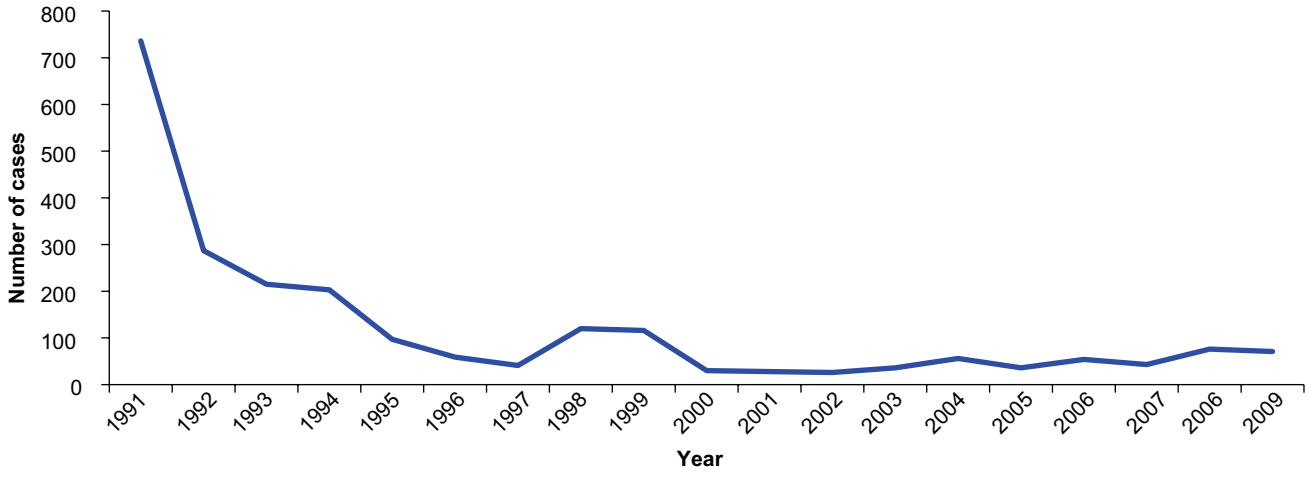

Figure. Annual number of notifications shigellosis, Ireland 1991-2009

Table 1. Number of notifications shigellosis by species and country of infection, Ireland 2009

	Ireland	Africa	Asia	Other	Not known/ not reported	Total
S. boydii	0	1	1	0	2	**4**
S. dysenteriae	0	3	0	0	1	**4**
S. flexneri	3	13	3	3	7	**29**
S. sonnei	5	11	2	4	11	**33**
Species not specified/not known	0	0	0	0	1	**1**
Total	8	28	6	7	22	**71**

in India, Pakistan and South Africa, two in Dominican Republic, and one each in Chad, Argentina, Portugal, Northern Europe, Tunisia, Algeria, Uganda, Nicaragua, Ghana, Czech Republic and Mozambique. Eight infections (11%) were reported as being acquired in Ireland, while no country of infection information was provided for 22 (31%) cases.

In 2009, *Shigella sonnei* was the most common species reported (n=33, 46%), closely followed by *S. flexneri* (n=29, 38%). There were also four *S. boydii* (6%), four *S dysenteriae* (6%) and one confirmed case (1%) 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 2009, 48 human *Shigella* isolates were referred to the NSRL, over two-thirds of all confirmed cases. The species/serotype distribution of these cases is reported in Table 2.

There were three shigellosis outbreaks notified in 2009, details of which are provided in Table 3. For the family outbreak in the HSE-M, the index case acquired their illness abroad.

Although foreign travel is a major risk factor for shigellosis among Irish residents, indigenous risks are likely to be through person-to-person spread (in some instances from persons who have contracted shigellosis abroad), and from food as demonstrated by the Scandinavian outbreaks associated with imported foods in recent years.

References

1. Shigella sonnei infections in Norway associated with sugar peas, May – June 2009. B T Heier 1, K Nygard1, G Kapperud1, B A Lindstedt1, G S Johannessen2, H Blekkan3 http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19243
2. Imported fresh sugar peas as suspected source of an outbreak of Shigella sonnei in Denmark, April – May 2009. L Müller 1, T Jensen2, R F Petersen3, K Mølbak1, S Ethelberg1,3 http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19241
3. Lewis HC, Ethelberg S, Olsen KE, Nielsen EM, Lisby M, Madsen SB, et al. Outbreaks of Shigella sonnei infections in Denmark and Australia linked to consumption of imported raw baby corn. Epidemiol Infect 2009;137(3):326-34.
4. Lewis HC, Kirk M, Ethelberg S, Stafford R, Olsen KE, Nielsen EM, Lisby M, Madsen SB, Mølbak K. Outbreaks of shigellosis in Denmark and Australia associated with imported baby corn, August 2007 – final summary. Euro Surveill. 2007;12(40):pii=3279. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3279
5. M Löfdahl, S Ivarsson, S Andersson, J Långmark, L Plym-Forshell 2009. An outbreak of Shigella dysenteriae in Sweden, May–June 2009, with sugar snaps as the suspected source. Eurosurveillance 14:28 http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19268
6. Gournis, E. 2010. SHIGELLOSIS, CHANGING EPIDEMIOLOGY - CANADA: (ONTARIO) REQUEST FOR INFORMATION. http://www.promedmail.org/pls/apex/f?p=2400:1001:687576564639::NO::F2400_P1001_BACK_PAGE,F2400_P1001_PUB_MAIL_ID:1010,81401

Table 2. Species/serotypes of isolates referred to NSRL in 2009
(Data courtesy of Prof. Martin Cormican and staff at NSRL)

Strain	Number of isolates
Shigella boydii	1
Shigella dysenteriae	2
Shigella dysenteriae E112707-96	1
Shigella dysenteriae type 2	1
Shigella flexneri 1b	5
Shigella flexneri 1c	3
Shigella flexneri 2a	11
Shigella flexneri 2b	2
Shigella flexneri 3a	1
Shigella flexneri 6	2
Shigella sonnei	19
Total	**48**

Table 3. Shigellosis outbreaks, Ireland 2009

Month	HSE-area	Transmission Route	Location	Type	Number ill
Mar	E	Person-to-person	Private house	Family	2
Jul	M	P-P/Foodborne	Private house	Family	6
Jul	E	P-P/Foodborne	Community	General	3

04

Vectorborne and Zoonotic Diseases

4.1 Non-IID Zoonotic Diseases

Toxoplasmosis

During 2009, 37 cases of toxoplasmosis were notified compared to 49 each in 2008 and 2007.

In contrast to the previous four years, no congenital cases were reported.

The 37 cases ranged in age from 14 years to 77 years (median, 28 years). Of the 37 cases, 28 (76%) were female. The high number of cases reported among women of child-bearing age may reflect enhanced testing during pregnancy (Table).

Brucellosis

During 2009, no cases of brucellosis were notified compared 3 in 2008 and 28 notifications in 2007. The age and sex distribution for human brucellosis cases 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 previous years, many cases were reported as chronic cases with only small numbers of acute cases reported.

Table: Toxoplasmosis notifications by age and sex, Ireland 2009

Age group	Male	Female	Total
<1 yr	0	0	**0**
1-4 yrs	0	0	**0**
5-14 yrs	0	1	**1**
15-24 yrs	3	4	**7**
25-44 yrs	3	21	**24**
45-64 yrs	1	2	**3**
65+ yrs	2	0	**2**
Total	**9**	**28**	**37**

Q Fever

Seventeen cases of Q fever were notified during 2009, seven of whom were reported to have been hospitalized (41%). This compares to 13 notifications in 2008 and 17 notifications in 2007.

Seven cases occurred in males and ten in females (table). The cases ranged in age from two to 67 years (mean age, 42 years; median age, 44 years). All cases were classified as confirmed.

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

Over a number of 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]

In response to the outbreak in the Netherlands, the ECDC conducted an assessment on the risk to the EU from Q fever.[2]

References

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

2. ECDC. 2010. Risk Assessment on Q Fever. ISBN 978-92-9193-210-8 http://www.ecdc.europa.eu/en/publications/Publications/Forms/ECDC_DispForm.aspx?ID=523

Table: Q fever notifications by age and sex, Ireland 2009

Age group	Male	Female	Total
<5 yr	1	0	**1**
5-14 yrs	0	1	**1**
15-24 yrs	0	1	**1**
25-44 yrs	3	4	**7**
45-64 yrs	1	4	**5**
65+ yrs	2	0	**2**
Total	**7**	**10**	**17**

Echinococcosis

In 2009, there was one notification of echinococcosis in an adult. This is the third case of echinococcosis notified in Ireland since the disease became notifiable in 2004; in 2008, two adult cases were notified.

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.

4.2 Malaria

Summary

Number of cases, 2009: 90
Number of cases, 2008: 82
Crude incidence rate 2009: 2.1/100,000

In 2009, 90 cases of malaria were notified in Ireland, similar to the numbers reported for the previous three years (Figure 1). Malaria, in particular that caused by *Plasmodium falciparum,* is a potentially fatal illness, and one individual in 2009 died as a result of their illness. Furthermore, 62% of cases required hospitalisation (42/68 cases for which data were provided).

Table 1 describes the distribution of cases by country of birth and reason for travel. The primary reason for travel reported was 'visiting family in country of origin' (Table 1). The majority of cases reported were non-Irish born (75%), and even among those described as Irish-born, half reported their reason for travel as 'visiting family in country of origin' (presumably the children of immigrants).

Where country of infection was reported, around two-thirds of cases reported being exposed in Nigeria, with most of the remaining cases reporting travel to other Sub-Saharan African or Asian countries (Table 2). One *P. falciparum* case was reported not to have travelled to a malaria endemic country for many years.

P. falciparum was responsible for the majority of cases which were acquired in Africa, while *P. vivax* was the most common species acquired in Asia (Table 2). As

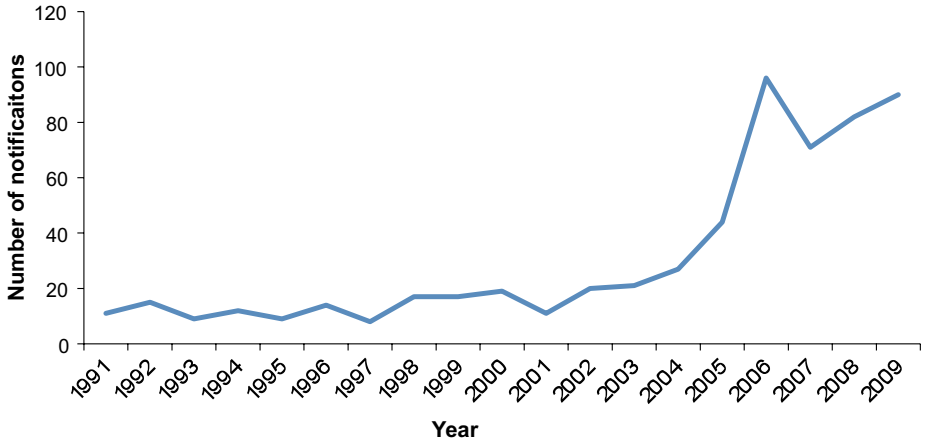

Figure 1. Annual number of notifications malaria, Ireland 1991-2009

Table 1. Number of cases malaria by reason for travel and country of birth, Ireland 2009

Reason for travel	Country of birth						
	Nigeria	Other Africa	Asia	Ireland	Other	Not specified	Total
Visit family country origin	26	5		8		1	**40**
Holiday travel	2	1		2	2		**7**
Other	4	2	4	6			**16**
Not specified	3					24	**27**
Total	**35**	**8**	**4**	**16**	**2**	**25**	**90**

Other reasons for travel include: new entrants, Irish citizens living abroad, volunteer workers, etc

expected, the median interval between return/arrival from a malarious area and onset of illness was shorter for *P. falciparum* cases (7 days) than *P. ovale* (87 days) and *P. vivax* (237 days) cases.

Half of all cases in Ireland in 2009 were notified during quarter 3 (Figure 2), coinciding with the summer holiday period, and most likely reflecting increased travel to endemic countries during this time. This seasonal peak was most prominent among cases who reported their reason for travel to an endemic country as 'visiting family in country of origin'. Cases reported among holidaymakers were more common during winter months (Figure 2).

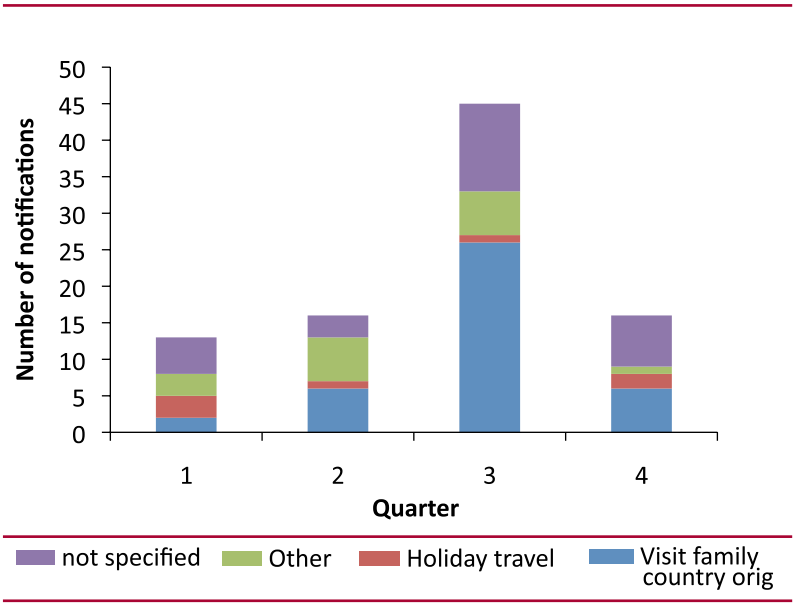

Figure 2. Number of malaria notifications by reason for travel and quarter of notification, Ireland 2009. [Other includes: new entrants, Irish citizens living abroad, volunteer workers, etc.]

Table 2. Number of cases malaria by infecting species and country of infection, Ireland 2009

Species	Country of infection					
	Nigeria	Other Africa	Asia	Ireland	Not specified	Total
P. falciparum	35	11	1	1	23	**71**
P. ovale	3	1	1			**5**
P. vivax		1	3		2	**6**
P. malariae		1				**1**
Not Specified	3		1		3	**7**
Total	**41**	**14**	**6**	**1**	**28**	**90**

4.3 Leptospirosis

Summary

Number of cases, 2009: 24
Number of cases, 2008: 30
Crude incidence rate, 2009: 0.57/100,000

Twenty-four cases of leptospirosis were notified in Ireland in 2009, a 20% reduction compared to the 30 cases notified in 2008 (Figure 1). This equates to a crude incidence rate of 0.57 per 100,000 (95% CI 0.34-0.79). The last year for which data are available across the EU is 2007. Among the 25 countries that reported on leptospirosis incidence at that time, Ireland reported the second highest incidence rate. The incidence in the EU as a whole was 0.22 per 100,000.

The leptospirosis notification dataset is typically dominated by adult males, and this year is no exception. Twenty-three cases (96%) were male and the age range was 17-81 (mean age =42 years, median age=40 years). This is consistent with the exposures most commonly associated with leptospirosis in temperate regions, e.g. occupational contact with farm animals, and watersports.

Among the 19 cases for which hospital admission status was reported, 17 (89%) required hospitalization. No deaths were reported.

Seven cases (29%) were believed to have acquired their illness occupationally –at least three of these were farmers. Seven (29%) cases reported canoeing/kayaking activity. For two of these cases, these activities occurred outside of Ireland –one in Asia and one in the United Kingdom. For three cases (13%), their infections were reported to have been possibly due to engaging in more common outdoor activities such as gardening/DIY, or holidaying in a tropical destination. One case (4%) was reported as resulting from accidental exposure to river water after falling in. No risk factor information was available for the remaining six (25%) 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 confirmation and for typing where possible.Species information was available for only two cases in 2009 – one each *Leptospira interrogans hardjo* and *Leptospira interrogans icterohaemorrhagiae*. Species was not reported for the remaining 22 cases.

Activities that continue to be associated with leptospirosis risk in Ireland include farming and recreational activities such as water sports. In the last few years, travel to Asia has emerged as a risk factor for leptospirosis. In general the incidence of leptospirosis is higher in tropical climates than in temperate areas like Ireland.

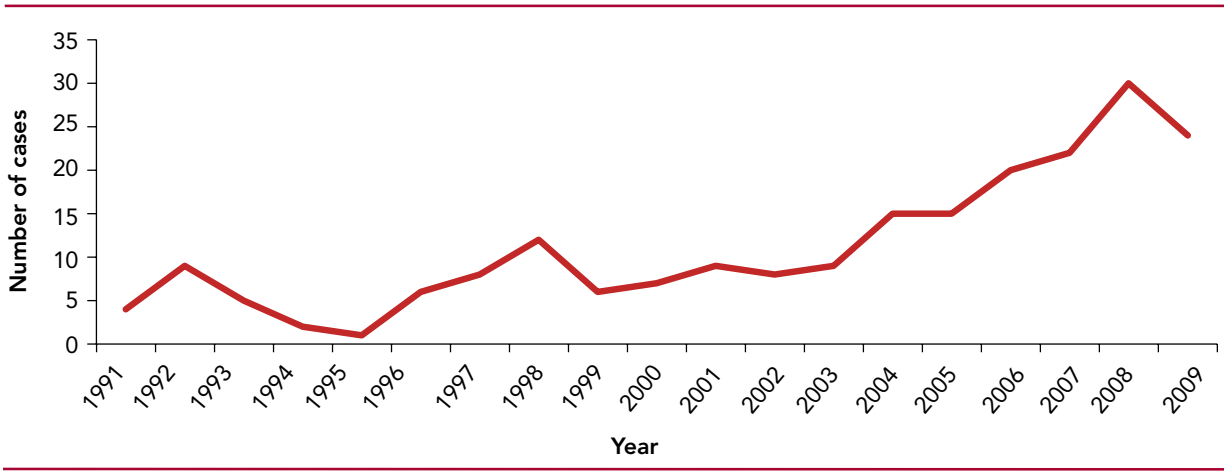

Figure 1: Annual number of leptospirosis notifications, Ireland 1991-2009
(data source: CIDR)

05

Blood-borne and Sexually Transmitted Infections

5.1 Hepatitis B

Summary

Number of cases, 2009: 820
Crude notification rate, 2009: 19.5/100,000 population
Number of cases, 2008: 949

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, or vertical transmission from mother to baby, or 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 decreased by 14% in 2009, with 820 cases (19.5/100,000 population) notified compared to 949 in 2008 (figure 1). Fifty eight percent (n=472) of notifications were from the HSE-E, corresponding to a notification rate of 31.5/100,000 population.
All cases were laboratory confirmed. Ninety three percent contained information on acute/chronic status. Where status was known, 89% of cases were chronic (n=683) and 11% were acute (n=83).

Acute cases (recent infections)
Of the 83 acute cases notified in 2009, 86% (n=71) were male and 14% (n=12) were female. The highest notification rates were in young to middle aged adults. Eighty six percent (n=71) of acute cases were aged between 20 and 54 years when notified (figure 2). Female cases were younger than males overall, with a median age of 30.5 years compared to 35 years for males.

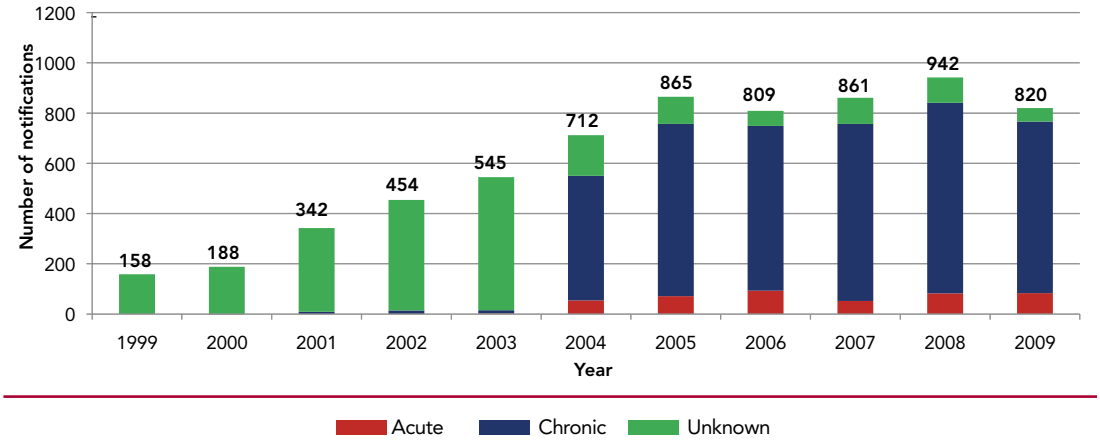

Figure 1. Number of hepatitis B notifications by acute/chronic status, 1999-2009

Information on risk factor was available for 69% (n=57) of acute cases. Of these, 74% (n=42) were likely to have been sexually acquired. Twenty two were men who have sex with men, nineteen were heterosexual and sexual orientation was not known for one case. A further eight cases (14%) were born in a hepatitis B endemic country (hepatitis B surface antigen prevalence ≥ 2%). No risk factors were identified for twenty six cases (31%).

Country of birth was known for 72% of acute cases (n=60). Seventy two percent (n=43) were born in Ireland and 8% were born in Eastern or Central European countries. Where country of infection was known, 75% (n=33) of acute cases were infected in Ireland, 9% (n=4) were infected in Thailand and 7% (n=3) were infected in Poland. Information on reason for testing was available for 69 acute cases. Most were identified because they were symptomatic (64%, n=44) or through STI services (14%, n=10).

Chronic cases (long-term infections)

Of the 683 chronic cases notified in 2009, 54% (n=368) were male, 45% (n=308) were female and sex was not known for 1% (n=7). Eighty nine percent (n=610) of chronic cases were aged between 20 and 54 years when notified (figure 2). The median age for female cases was 27.5 years and the median age for males was 33 years.

Some enhanced data were available for 50% (n=339) of the chronic cases notified in 2009. Of these, 67% (n=227) were born in hepatitis B endemic countries or were identified as asylum seekers. A further 16% (n=45) were likely to have been sexually acquired and 4% (n=13) were children born to hepatitis B infected mothers. Data on country of birth was available for 39% (n=265) of chronic cases. The most common regions of birth were Eastern or Central Europe (32%, n=86), Sub-Saharan Africa (28%, n=75) and Asia (26%, n=69).

Reason for testing was known for 64% (n=436) of chronic cases. Thirty three percent (n=144) were identified through antenatal screening programmes, 19% (n=84) were identified through asylum seeker screening programmes, 14% (n=63) were tested in STI settings and 10% (n=44) were identified through routine health or hospital screens.

Twenty six chronic cases were known to have been born in Ireland. Eight of these were residents of intellectual disability institutions. Their ages ranged from 42 to

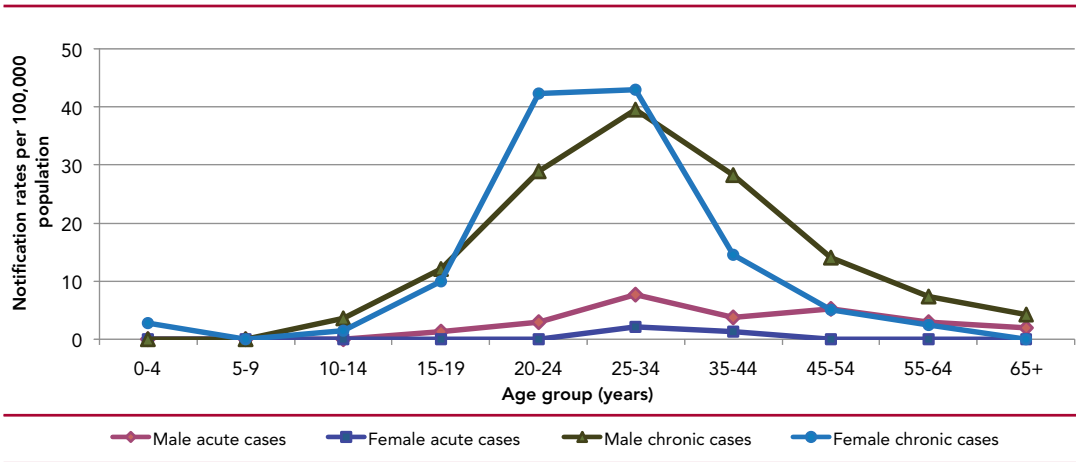

Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis B by acute/chronic status, 2009

67 years. Most were diagnosed as a result of routine screening and may have been infected for some time. A further six Irish cases were acquired through sexual exposure.

Two outbreaks of hepatitis B were reported in 2009 both involving MSM sexual exposure among young adult males.

Discussion

Notification rates for hepatitis B in Ireland had increased considerably since the late 1990s, mostly due to increasing immigration from countries with intermediate or high hepatitis B endemicity and increases in sexually transmitted hepatitis B in Ireland. However, the number of new notifications for hepatitis B decreased in 2009. This may be partly explained by reduced immigration rates to Ireland.

Although most chronic cases were young adults at the time of notification, this reflects their age when tested. 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 several decades. This has implications for the likely future burden of disease due to hepatitis B in Ireland. The number of acute cases acquired sexually, both heterosexually and through MSM contact, is of concern and indicates a target area for prevention activities. The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 26th June 2010. 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, 2009: 1,258
Crude notification rate, 2009: 30/100,000 population
Number of cases in 2008: 1,537

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 70 to 90% of cases, but between 55 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. There was an 18% decrease in the number of cases reported in 2009 (n=1258) compared with 2008 (n=1537) (figure 1). The crude notification rate decreased from 36 to 30/100,000 population.

The sex distribution of cases was very similar to previous years with a strong predominance of male cases (figure 2). In 2009, 66% (n=830) of cases were male, 33% (n=418) were female and sex was not known for 10 cases. The highest notification rates were in young to middle aged adults. Seventy one percent (n=898) 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 74% of all cases (n=929) notified in 2009. Their age-standardised notification rate, of 62/100,000 population, was over 3 times that of the next highest area (figure 3).

Some information on most likely risk factor was available for 54% of cases (n=684) in 2009. The most likely risk factor for 77% (n=528) was injecting drug use. A further 3.5% (n=24) were either prison inmates or homeless.

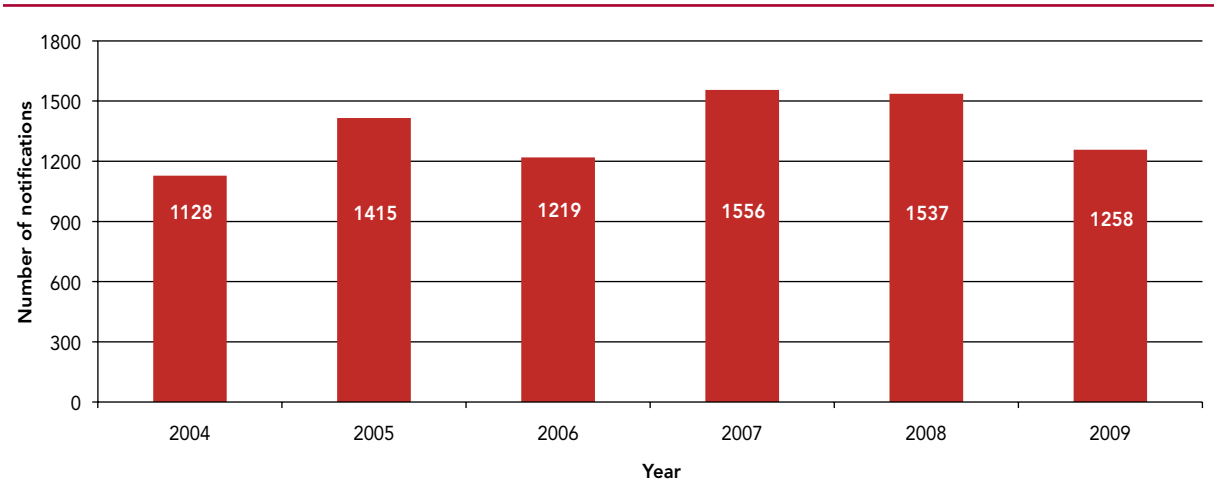

Figure 1. Number of hepatitis C notifications, 2004-2009

Although mode of transmission was not reported for these cases, injecting drug use is likely to have been the source of infection in many of these cases.

Thirty cases (4%) were reported as infected through receipt of blood or blood products. Of these, fifteen were infected in Ireland. No further information was available for three cases, 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 2009. Fourteen cases (2%) were known to be asylum seekers, forty six cases (7%) were born in an endemic country and the most likely risk factor for twenty cases (3%) was sexual exposure.

Discussion

The number of cases of hepatitis C notified in 2009 decreased to a level similar to that recorded in 2006. However, the high hepatitis C notifications seen in previous years (2005 to 2008) may not accurately reflect incidence trends in Ireland. It is likely that many of the cases notified in these years were not newly acquired infections but were diagnosed by screening certain groups identified as been at risk. These notifications may also include some cases diagnosed before 2004 (when hepatitis C became notifiable) as a result of repeat testing. There was an 18% decrease in hepatitis C notifications in 2009 compared to 2008. The lower 2009 figure may reflect a decrease in the number of previously diagnosed cases been notified due to repeat testing.

Risk factor information on hepatitis C has improved over the last few years. For 2009, risk factor data were available for 54% of cases compared with only 38% in 2008. Where risk factor data were available, injecting drug use remained the predominant mode of transmission. Although information on risk factor was not available for 46% 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.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 25th June 2010. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

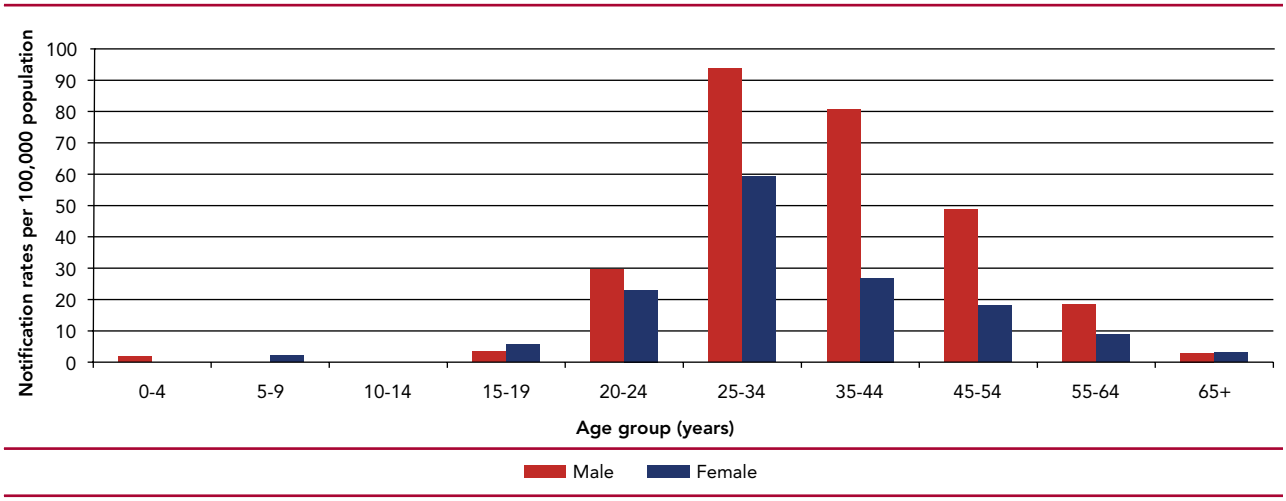

Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis C, 2009

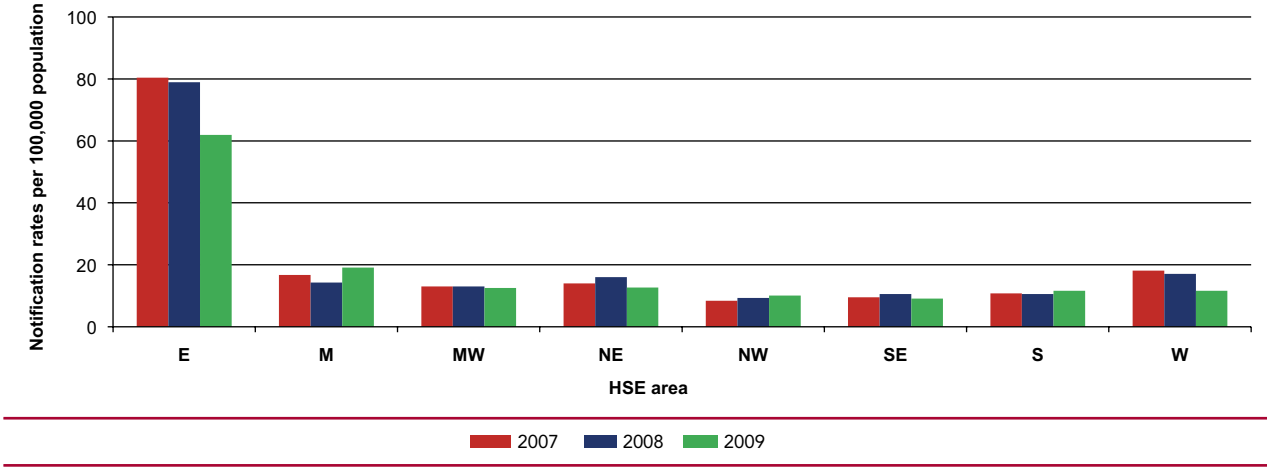

Figure 3. Notification rates/100,000 population for hepatitis C by HSE area, 2007-2009

5.3 HIV and AIDS

Summary

Number of HIV cases: 395
Crude HIV incidence rate: 9.3/100,000 population
Number AIDS cases: 33
Number deaths in AIDS cases: 2

A total of 395 new HIV diagnoses were reported to the HPSC during 2009. This compares to 404 in 2008 and represents a 2.2% decrease. The rate of newly diagnosed HIV infection in Ireland in 2009 was 93.2 per million population. The cumulative total number of HIV infections reported in Ireland since surveillance began to the end of December 2009 is 5,637.

The total number of AIDS diagnoses reported to the end of 2009 is 1,038 with reports of 33 new AIDS diagnoses during 2009. The total number of deaths among AIDS cases reported to the end of 2009 is 414 with reports of two deaths among AIDS cases in 2009. 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 2009.

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 1990 and 2009.

The 315 reported cases of HIV with information available on probable route of transmission indicate that:

- 47.3% (156 cases) were reported as due to heterosexual transmission

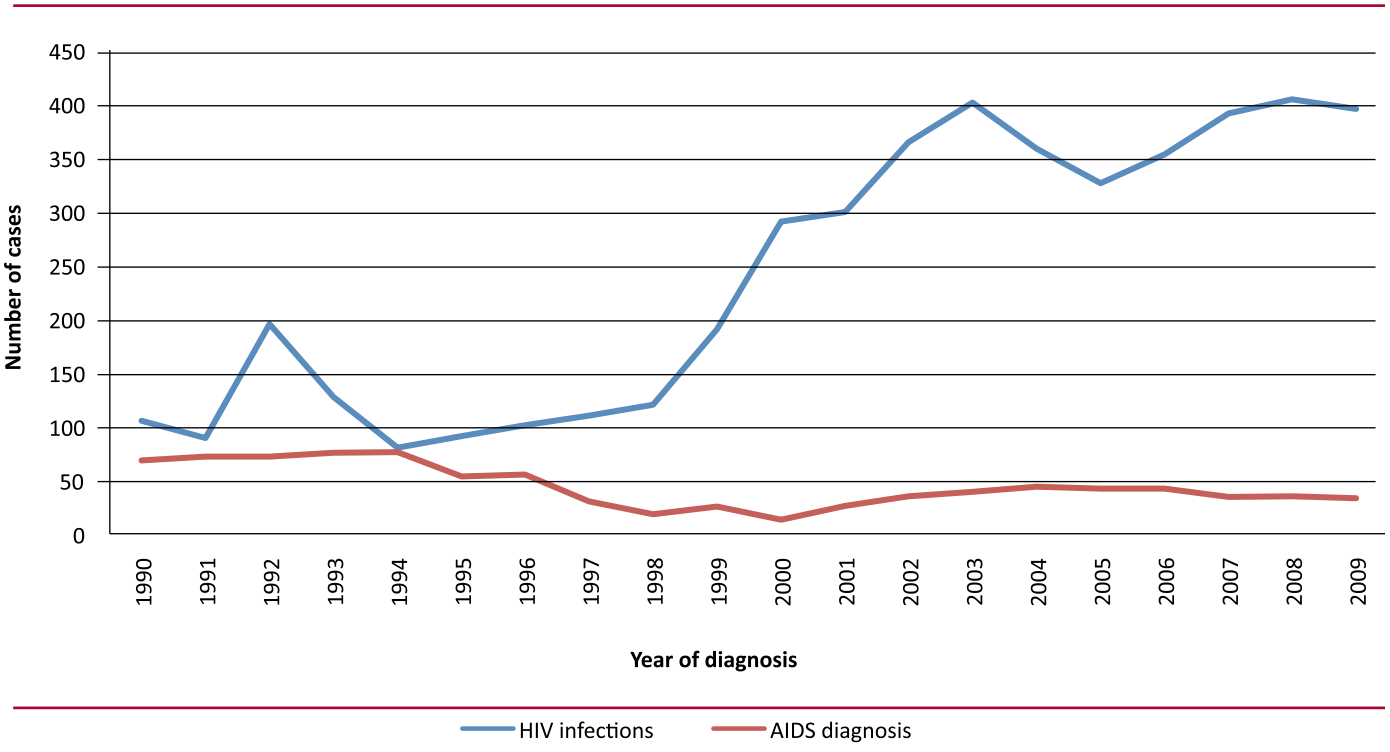

Figure 1. New HIV and AIDS diagnoses by year of diagnosis (1990-2009)

- 41.8% (138 cases) of new infections were among MSM.
- 9.1% (30 cases) of new infections were among IDUs.

During 2009, 136 babies were born to 131 HIV infected mothers (5 twin deliveries) in Ireland. Based on serial HIV PCR testing; 122 are not infected, 13 remain of indeterminate status (i.e. do not meet the criteria for HIV infection and are <18 months at time of test) and one is infected. The infected baby was born to a mother who was known to be infected during pregnancy and is originally from sub-Saharan Africa. In addition, HIV infection was newly diagnosed in four children. All four were born in sub-Saharan Africa with the probable route of transmission reported as mother to child transmission (MCT).

Table 2: HIV diagnoses in Ireland by probable route of transmission and sex (2009)

Probable route of transmission	Sex	Number
MSM	Male	138
	Sub total	**138**
Heterosexual contact	Female	96
	Male	60
	Unknown	0
	Sub total	**156**
Injecting drug user	Female	6
	Male	24
	Sub total	**30**
Mother to child	Female	3
	Male	2
	Sub total	**5**
Other	Female	1
	Male	0
	Unknown	0
	Sub total	**1**
Undetermined	Female	31
	Male	34
	Unknown	0
	Sub total	**65**
Total		**395**

Of the 395 cases, 34.7% (137 cases) were female and 65.3% (258 cases) were male. Of the 137 female cases newly diagnosed in 2009, 25 (18.2%) were reported to be pregnant at HIV diagnosis. A breakdown of cases in 2009 by probable route of transmission and sex can be seen in Table 2.

Most of the newly diagnosed cases (68.1%) were aged between 25 and 44 years. The mean age at HIV diagnosis among the three major risk groups was:

- Heterosexual: 35.6 years (range 16-73 years)
- IDUs: 35.9 years (range 22-57 years)
- MSM: 35.6 years (range 18-80 years)

The 307 reported cases of HIV with information available on geographic origin indicate that:

- 45.9% (141 cases) were born in Ireland
- 31.3% (96 cases) were born in sub-Saharan Africa
- 6.8% (21 cases) were born in Western Europe
- 4.9% (15 cases) were born in Eastern Europe
- 4.6% (14 cases) were born in South America
- 4.2% (13 cases) were born in Central Europe.

Of the 156 cases acquired through heterosexual contact, 56% (87 cases: 58 female and 29 male) were born in sub-Saharan Africa and 26% (40 cases: 18 female and 22 male) were born in Ireland.

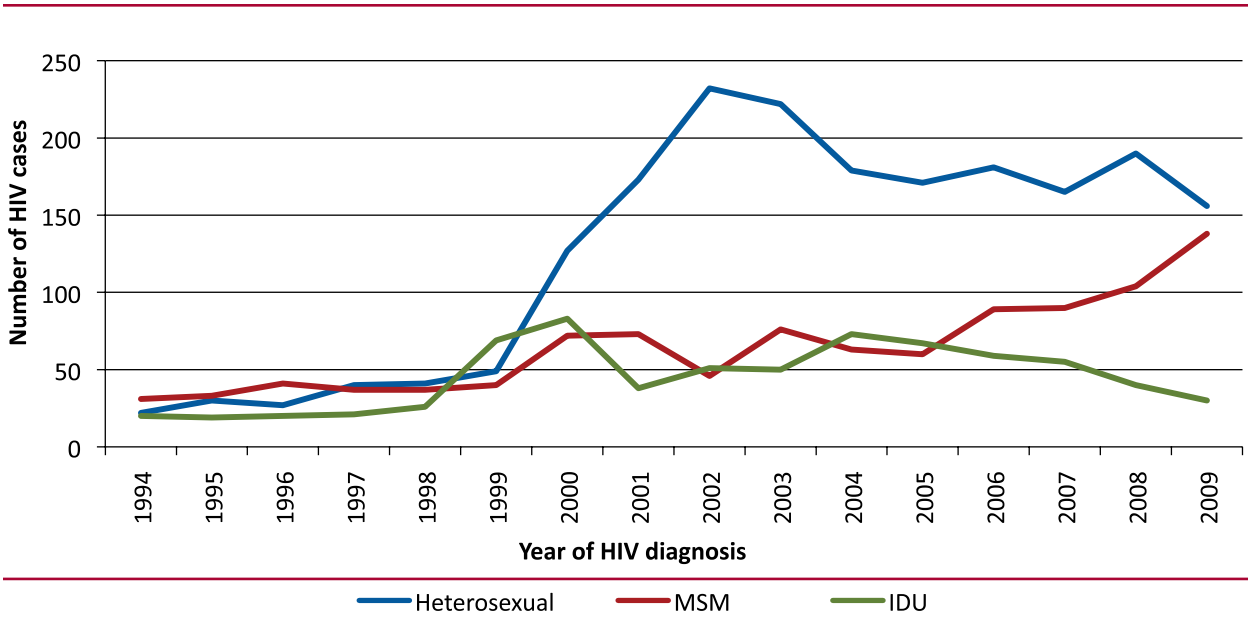

Figure 2: New HIV diagnoses in Ireland by probable route of transmission (1994 to 2009)

Information on stage of infection at time of HIV diagnosis was available for 304 of the 395 cases. Of the 304 cases where stage of infection was known, 235 were asymptomatic at time of HIV diagnosis and 27 were diagnosed with AIDS at the same as HIV diagnosis (i.e. diagnosed "late").

Discussion

Since 2002, the annual HIV total has been in excess of 320 infections. The data suggest that the epidemic is concentrated among a number of risk groups. 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, 10-20% of case reports are incomplete each year.

More detailed information on the epidemiology of HIV and AIDS in Ireland in 2009 is available at www.hpsc.ie/hpsc/A-Z/HepatitisHIVAIDSandSTIs/HIVandAIDS/

5.4 Sexually Transmitted Infections (STIs), 2008

Summary

Total number of STI notifications in 2008: 11,294

Three most common STIs reported in 2008:

1. *Chlamydia trachomatis* infection (genital): 6,290 cases (148.4/100,000)
2. Ano-genital warts: 2,134 cases (50.3/100,000)
3. Non-specific urethritis: 1,636 cases (38.6/100,000)

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 o n 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 2008.

In 2008, 11,294 STIs were reported in Ireland, a decrease of 5.2% compared to 2007 when 11,915 STIs were reported (table 1). Despite the overall decline, there were increased notifications of *Chlamydia trachomatis* (up by 25.2%, n=6,290) and gonorrhoea (by 6.5%, n=444). A decrease in notifications was observed for many STIs, in particular, non-specific urethritis (n=1,636), and ano-genital warts (n=2,134), notifications for these infections decreased by 12.5% and 35% respectively. The overall decrease should be interpreted with caution as one STI clinic in the HSE-MW Area was unable to provide returns. Three infectious diseases accounted for 89.1% of all STI notifications in 2008: ano-genital warts, *Chlamydia trachomatis* and non-specific urethritis.

STIs in males accounted for 52.2% (n=5,898) of all notifications; 45.1% were in females (n=5,097). Gender data were not reported for 2.6% of notifications (n=299) (table 2). The number of notifications among males generally exceeded that of females for all STI diseases with the exception of *C. trachomatis*, herpes simplex (genital) and trichomoniasis (table 2). In 2008, the highest number of notifications was in the 20-29 year age group, accounting for 60.0% of all STIs notified (table 2). This age group also had the highest number of notifications for each of the STI diseases except syphilis and hepatitis B (acute or chronic) (table 2).

During 2008, 47.1% (n=5,322) of all STI notifications were from the HSE-E. Four areas (HSE-E, HSE-SE,

Table 1 Notifiable sexually transmitted infections from 1999 to 2008

Sexually Transmitted Infection	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Ano-genital warts	3049	3735	3993	3932	3981	4174	3456	3494	3283	2134
Chancroid	1	16	1	1	0	1	0	1	1	0
Chlamydia trachomatis infection (genital)	869	1343	1649	1922	2258	2803	3353	3144	5023	6290
Gonorrhoea	175	290	349	214	186	270	342	431	417	444
Granuloma inguinale	1	0	0	0	0	1	0	0	0	0
Hepatitis B (acute or chronic)	2	15	39	57	112	85	80	20	25	14
Herpes simplex (genital)	275	269	331	358	375	411	441	455	988	394
Lymphogranuloma venereum	2	0	0	1	0	0	1	0	2	0
Non-specific urethritis	1265	1726	1634	2025	2332	2746	2106	2161	1870	1636
Syphilis	6	46	279	303	235	144	282	134	212	312
Trichomoniasis	47	78	64	73	59	60	83	52	94	70
Total	**5692**	**7518**	**8339**	**8886**	**9538**	**10695**	**10144**	**9892**	**11915**	**11294**

HSE-S and HSE-W) accounted for more than 85% (n=9,684/11,294) of the STI notifications in 2008 (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, 2008

Ano-genital warts

In 2008, 2,134 cases of ano-genital warts were notified (50.3/100,000 population) which accounted for 18.9% of all STI notifications reported. This number represents a decrease of 35% since 2007. More cases were notified among males than females (1,173 versus 959) and in the 20-29 year old age group which had 63.9% (n=1,364) of all such cases reported.

Chlamydia trachomatis infection (genital)

The crude incidence rate in 2008 for *C. trachomatis* infection was 148.4/100,000 (6,290 notifications). Chlamydia notifications constituted 55.7% of all STI notifications reported in 2008 and represent an increase of 25.2% since 2007. More cases were notified among females than males (3,540 versus 2,481) and 60.7% (n=3,820) of cases were reported in the 20-29 year old age group.

Non-specific urethritis

In 2008, 1,636 cases of non-specific urethritis were notified (38.6/100,000), a decrease of 12.5% since 2007. These notifications constituted 14.5% of all STI notifications reported. Almost 10-times more cases were notified among males than females (1,486 versus 150). Cases in the 20-29 year old age group represented 62.2% (n=1,017) of reported cases.

Herpes simplex (genital)

The crude incidence rate for genital herpes in 2008 was 9.3/100,000 (394 notifications). The notifications constituted 3.5% of all STI notifications reported in 2008 and represent a decrease of 60.1% since 2007. More cases were notified among females than males (238 versus 149) and in the 20-29 year old age group (53.8% of all such cases notified; n=212).

Table 2 Notifiable sexually transmitted infections by gender and age group, 2008

Sexually Transmitted Infection	Male	Female	Gender Unknown	0-19	20-29	30-39	40+	Age Unknown	Total
Ano-genital warts	1173	959	2	178	1364	355	130	107	2134
Chancroid	0	0	0	0	0	0	0	0	0
Chlamydia trachomatis infection (genital)	2481	3540	269	814	3820	819	170	667	6290
Gonorrhoea	360	73	11	31	247	92	48	26	444
Granuloma inguinale	0	0	0	0	0	0	0	0	0
Hepatitis B (acute or chronic)	12	2	0	1	4	8	1	0	14
Herpes simplex (genital)	149	238	7	34	212	69	53	26	394
Lymphogranuloma venereum	0	0	0	0	0	0	0	0	0
Non-specific urethritis	1486	150	0	100	1017	368	143	8	1636
Syphilis	229	76	7	1	90	116	86	19	312
Trichomoniasis	8	59	3	2	27	19	14	8	70
Total	**5898**	**5097**	**299**	**1161**	**6781**	**1846**	**645**	**861**	**11294**
(% of Total)	**52.2%**	**45.1%**	**2.6%**	**10.3%**	**60.0%**	**16.3%**	**5.7%**	**7.6%**	**-**

Gonorrhoea

In 2008, 444 cases of gonorrhoea were notified (10.5/100,000), an increase of 6.5% since 2007. These notifications constituted 3.9% of all STI notifications reported in 2008. Considerably more cases were notified among males than females (360 versus 73) and most frequently in the 20-29 year old age group (55.6% of all such cases reported; n=247).

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 2008 based on census 2006 denominator data.

Table 3 Notifiable sexually transmitted infections by HSE area, 2008

Sexually Transmitted Infection	HSE-E	HSE-M	HSE-MW*	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Ireland
Ano-genital warts	206	8	0	0	284	402	568	666	2134
Chancroid	0	0	0	0	0	0	0	0	0
Chlamydia trachomatis infection (genital)	3541	152	558	166	79	940	325	529	6290
Gonorrhoea	304	5	26	8	7	33	30	31	444
Granuloma inguinale	0	0	0	0	0	0	0	0	0
Hepatitis B (acute or chronic)	0	0	0	2	0	0	9	3	14
Herpes simplex (genital)	210	1	0	0	8	47	58	70	394
Lymphogranuloma venereum	0	0	0	0	0	0	0	0	0
Non-specific urethritis	842	0	0	2	225	161	301	105	1636
Syphilis	190	26	32	1	3	24	14	22	312
Trichomoniasis	29	6	6	5	0	12	6	6	70
Total	**5322**	**198**	**622**	**184**	**606**	**1619**	**1311**	**1432**	**11294**
(% of Total)	**47.1%**	**1.8%**	**5.5%**	**1.6%**	**5.4%**	**14.3%**	**11.6%**	**12.7%**	**-**

* 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, 2008

Summary

Number of case-based syphilis reports with enhanced surveillance data, 2008: 221
Number of early syphilis cases, 2008: 125
Crude incidence rate of early syphilis, 2008: 2.9/100,000

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 relate to 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 2008 data and the second part on the main syphilis trends between 2000 and 2008.

Syphilis 2008

In 2008, case-based reports with enhanced surveillance data were received on 221 syphilis notifications, an increase of 75 cases compared with 2007 (n=146). One-hundred-and-twenty-five (2.9/100,000 population) cases were diagnosed with early, infectious syphilis (i.e. primary, secondary and early latent stages) and 96 cases were latent, late, tertiary, other or unknown.

The 125 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 19 to 63 years of age (median 35 years). The majority of cases were diagnosed in the HSE-E (92%, n=115/125) and the majority of the cases were also resident in HSE-E (75%, n=94/125). Ireland was recorded as the country of birth for 70% of early cases (n=88/125), while 72% of early cases (n=90/125) were acquired in Ireland.

Eighty percent of early syphilis cases (n=100/125) were

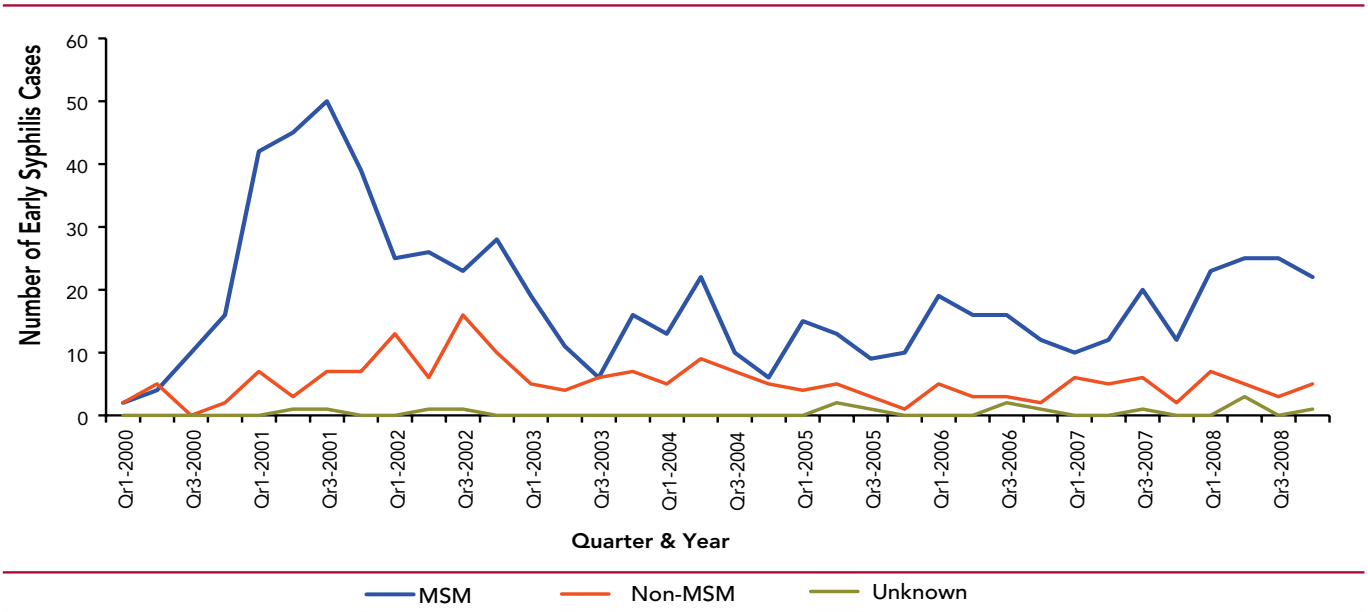

Figure 1 Quarterly number of early syphilis cases diagnosed in Ireland by sexual orientation, 2000-2008, based on completed enhanced forms (excluding fifteen cases without quarterly year details)

men who had sex with men (MSM). These cases ranged in age between 19 and 57 years (median 35 years), with the 25-29 years age group having the highest number of cases (n=24). Among MSM diagnosed with early syphilis, 31% percent (n=31) were primary syphilis, 36% (n=36) were secondary and 32% (n=32) were early latent. One case was reported as early syphilis but the detailed stage of disease was not given.

Sixty percent (n=60/100) of early syphilis MSM cases had between 1 and 9 sexual contacts in the 12 months prior to diagnosis; 15% (n=15/100) had 10-19 sexual contacts; 7% (n=7) had 20-39 sexual contacts; 5% (n=5/100) had more than 40 sexual contacts, while the number of contacts was not recorded for 13% (n=13/100) of cases. The most common mode of transmission was reported as oral sex in 62% (n=62) of early syphilis MSM cases.

Syphilis trends, 2000-2008

Between 2000 and 2008, a total of 1,996 case-based reports were received on syphilis. Most syphilis cases were among males (73%; n=1,465) while females accounted for 26% of cases (n=516); gender was not recorded for 15 cases (1%). Cases ranged in age from 0 to 95 years, with a median age of 33 years. The majority of cases occurred in the 25-29 year old and 30-34 year old age groups: 397 and 405 cases respectively. Fifty percent (n=992) were classified as early, infectious syphilis. The other stages reported were: congenital (n=4), late (n=392) and unknown (n=608).

Enhanced surveillance forms were completed for 66% (n=1,313/1,996) of individual case-based reports and 894 (68%) of these 1,313 cases were reported as early syphilis. The majority of these 1,313 cases were male (81%; n=1,065). Most male cases occurred in the 30-34 years age group (22%, n=229/1,065) while most of cases among females were in the 25-29 years age group (33%, n=80/241).

Among the cases with enhanced data, self-referral was the most frequent reason for attending (31%, n=412/1,313), followed by GP referral (12%, n=159/1,313) and contact referral (11%, n=144/1,313). While self-referral was also the most frequent reason for attending among MSM cases (40%, n=318/805), the next most frequent reason was routine visit (12%, n=95/805), followed by contact referral (11%, n=88/805). However, among non-MSM cases 25% of cases were antenatal referrals (n=118/473). The other most frequently reported reasons for attending among this group were self referral (17%, n=82/473) and GP referral (16%, n=78/473).

Early syphilis is far more common in the MSM population in Ireland compared to the non-MSM population (figure 1, table 1). Enhanced data were reported for 805 MSM cases between 2000 and 2008, 85% (n=682) of which were early syphilis cases.

In the 12 months before diagnosis, the most common range was 1-9 sexual contacts in 59% (n=400/682) of early syphilis MSM cases. Oral sex (36%, n=245/682) was the most common mode of transmission reported for early syphilis MSM cases.

Eleven percent (n=73/682) of early syphilis MSM cases for which enhanced data was received were the result of re-infections. The re-infection rate among early syphilis non-MSM cases with enhanced data for the same period was 4% (n=7/197).

A higher proportion of early syphilis cases among MSM were reported to be HIV positive (19%, n=128/682) compared to early syphilis non-MSM cases (8%, n=16/197). There was no difference between these groups in relation to concurrent STIs, which were relatively common among all early syphilis cases, with 20% of cases (n=177/894) having an STI other than HIV. A history of STIs was more frequent among early syphilis MSM cases (41%, n=281/682) than among early syphilis non-MSM cases (18%, n=35/197).

Table 1 A breakdown of early syphilis cases by sexual orientation in Ireland, 2000-2008, based on completed enhanced forms

Diagnosis	Heterosexual			MSM**	Unknown	Total
	Male	Female*	Unknown		Male	
Primary	45	13	2	255	5	320
Secondary	34	29	1	253	3	320
Early Latent	34	37	0	164	5	240
Other	0	2	0	10	2	14
Total	113	81	3	682	15	894

* Includes one female bisexual
** Includes 55 male, bisexual cases

06

Other infections

6.1 Viral Encephalitis

Summary

Number of cases, 2009: 5
Number of cases, 2008: 5
Number of cases, 2007: 8
Crude incidence rate, 2009: 0.1/100,000

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 notifiable in their own right (apart from one exception, herpes simplex virus).

In 2009, 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 2009 is the same as that which was reported in 2008, and less than the eight reported in 2007 and the 16 recorded 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. Between 2004 and 2009, 45 cases of viral encephalitis were notified, 20 of which (44.4%) were attributable to herpes simplex virus.

Of the five cases notified in 2009, three cases occurred in males and two in females giving a ratio of 1.5:1.0.

Cases ranged in age from 41 to 86 years. The highest incidence rates were in adults aged >=65 years (0.4/100,000) (table 1).

The causative agent was identified in four of the five cases of viral encephalitis notified; herpes simplex virus (n=3), varicella zoster virus (n=1) and unknown (n=1). Three of the cases due to herpes simplex occurred in adults aged between 40 and 74 years. Another case was caused by varicella zoster virus in an adult aged 85+ years. No deaths from viral encephalitis were notified between 1997 and 2009.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 7th July 2010. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

Table 1. Number, age-specific incidence rates per 100,000 population and proportion of viral encephalitis cases by age group, 2009

Age Group	Number	Proportion (%)	ASIR
<1	0	0%	0.0
1-4	0	0%	0.0
5-9	0	0%	0.0
10-44	2	40%	0.1
45-64	1	20%	0.1
65+	2	40%	0.4
All ages	5	100%	0.1

ASIR, age specific incidence rates per 100,000 population

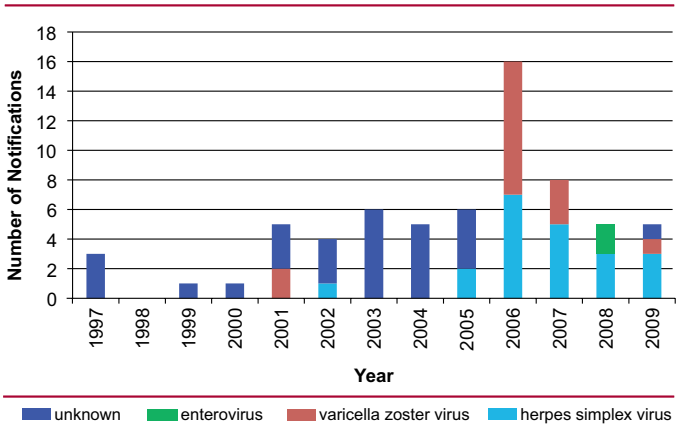

Figure 1. Annual number of viral encephalitis notifications, 1997-2009

6.2 Viral Meningitis

Summary

Number of cases, 2009:142
Number of cases, 2008:97
Number of cases, 2007:45
Crude incidence rate, 2009: 3.3/100,000

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 notifiable in their own right (apart from one exception, herpes simplex virus).

In 2009, 142 cases (3.3/100,000 total population) of viral meningitis were notified in Ireland. Most of the cases were classified as confirmed (74.6%, n=106) with another 36 (25.4%) where the case classification was not specified because the causative organism details were unavailable. The numbers of cases in both sexes were different with more cases in males (n=80) than in females (n-61), giving a ratio of 1.31:1.0. Gender was not reported for one case.

Cases ranged in age from three weeks to 83 years with a median age of 19 years. Seventy-seven percent (n=109/142) of all cases were <35 years of age. Children <1 year of age had the highest incidence rate: 67.1 per 100,000, followed by those in the 15-19 year group, 4.1/100,000 (table 1).

In 2009 the overall incidence of viral meningitis in Ireland was equally highest in both the HSE-NE and HSE-W areas (4.3/100,000) followed by the HSE-E area (3.7/100,000) (table 2).

Of the 142 cases notified in 2009 the causative agent was reported as enterovirus (n=91; 64.1%), herpes simplex virus (n=11; 7.8%), varicella zoster virus (n=4; 2.8%) and unknown (n=36; 25.4%) (table 1).

In Ireland, viral meningitis activity tends to be highest in the second half of the year. In 2009 the numbers of cases peaked in July (n=35) and August (n=22) with an average of 14.7 cases per month (total n=88) between July and December. In contrast, viral meningitis was lower during the first six months of the year with a monthly average of nine cases (total n=54).

Table 1. Number and age specific incidence rates per 100,000 population of viral meningitis notifications by causative organism, 2009

Age Group	entero-virus	herpes simplex virus	varicella zoster virus	unknown	Total	ASIR
<1	29	5	0	7	41	67.1
1-4	2	1	0	2	5	2.1
5-9	7	0	0	3	10	3.5
10-14	3	0	0	1	4	1.5
15-19	8	0	0	4	12	4.1
20-24	6	1	0	6	13	3.8
25-34	16	2	2	4	24	3.3
35-44	17	1	0	5	23	3.7
45-54	2	0	1	2	5	1.0
55-64	0	1	0	2	3	0.7
65+	1	0	1	0	2	0.4
Total	**91**	**11**	**4**	**36**	**142**	**3.3**

ASIR, age specific incidence rate

Although the number of viral meningitis cases fluctuates from year to year, the number of cases notified in 2009 (n=142) exceeded the yearly average (n=70.4) between 1997 and 2009 (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 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.

2009 was a high incidence year for viral meningitis with numbers similar to 2001 and 2006 when 161 and 148 cases were reported, respectively. The majority of cases in both 2006 and 2009 were attributable to enterovirus.

One viral meningitis associated death (a confirmed case) was reported in 2009 with herpes simplex type 6 being identified as the causative organism. Only one other death from viral meningitis (a probable case) has ever been notified since 1997; it occurred in 1997 and 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 17th August 2010. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

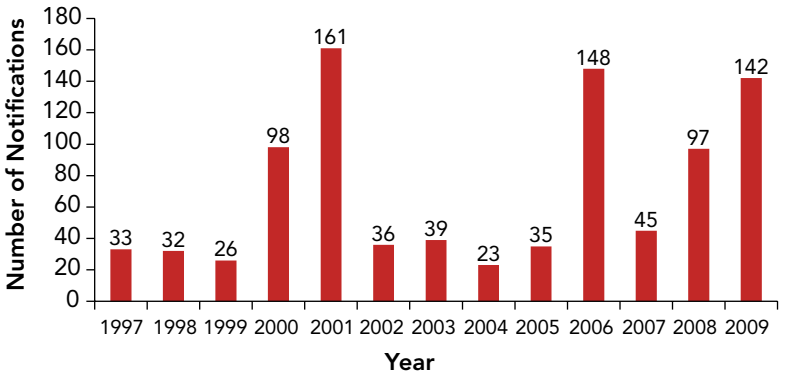

Figure 1. Annual number of viral meningitis notifications, 1997-2009

Table 2. Age specific incidence rates per 100,000 population of viral meningitis notifications by HSE area, 2009

HSE Area	<1	1-4	5-9	10-14	15-19	20-24	25+	Total
E	79.5	4.8	6.3	3.4	3.0	0.7	2.3	3.7
M	0.0	0.0	0.0	0.0	5.7	5.5	1.9	2.0
MW	19.6	0.0	4.0	0.0	0.0	3.5	1.3	1.7
NE	173.0	3.9	0.0	0.0	7.4	0.0	1.2	4.3
NW	0.0	0.0	0.0	0.0	0.0	6.2	2.6	2.1
SE	59.3	0.0	0.0	3.1	6.2	6.2	2.0	3.3
S	69.9	0.0	7.2	0.0	2.4	2.1	2.2	3.2
W	34.7	0.0	0.0	0.0	10.2	18.6	2.6	4.3
Ireland	**67.1**	**2.1**	**3.5**	**1.5**	**4.1**	**3.8**	**2.1**	**3.3**

6.3 Creutzfeldt-Jakob disease

Summary

Number of cases, 2009: 5
Number of cases, 2008: 2

Five cases of Creutzfeldt-Jakob disease (CJD) were notified in 2009 compared to two cases in 2008. All cases in 2009 were aged greater than 54 years and were sporadic CJD cases. Four cases were male and one was female.

In total, 48 cases of CJD were notified since CJD was first specified as a notifiable disease in December 1996. Figure 1 shows the 48 CJD notifications by age group. The majority (n=41, 85%) of the cases were aged greater than 54 years. Of the 48 cases, 27 were male and 21 were female. Forty-five 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 2009. 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 09th September 2010 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.

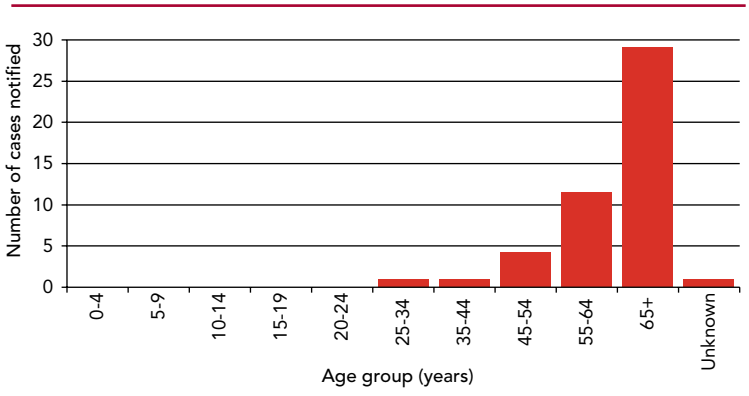

Figure 1. Number of CJD notifications (n=48) from December 1996 to 2009 by age group

07

Infectious Disease Outbreaks

7. Outbreaks

Summary

Number of outbreaks: 468
Number of IID outbreaks: 264
Number of non-IID outbreaks: 204

During 2009, 468 outbreaks of infectious diseases were reported with 7,769 associated cases of illness, including 590 (7.6%) cases hospitalised. In June 2009 the World Health Organization announced that the A(H1N1) influenza had become a global pandemic. This was characterised by extensive influenza activity in Ireland that increased the number of outbreaks (and outbreak cases of illness due to influenza) beyond levels seen in previous years.

Regional variation in all outbreaks was observed between HSE areas with the highest rate observed in HSE-NW at 28.7 per 100,000 population while the lowest rate was observed in HSE-MW at 6.1 per 100,000 population. Table 1 details the regional distribution of all outbreaks of infectious disease, outbreaks of infectious intestinal disease (IID) and outbreaks of non-IID.

General outbreaks accounted for 72.9% (n= 341) of all outbreaks notified during 2009. The remaining outbreaks (27.1%, n= 127) were reported as family/ household outbreaks. Similar to previous years, person-to-person spread was reported as the mode of transmission for the majority of outbreaks in 2009 (53.0%, n=248). Most of these outbreaks were due to norovirus and pandemic influenza A(H1N1).

Private houses were the most frequently reported outbreak location in 2009, accounting for 25.6% (n=120) of all outbreaks while schools were the second most common outbreak location, accounting for 19.7% (n=92) of all outbreaks. The highest numbers ill were reported from outbreaks in schools (n=2,526), hospitals (n=2,137) and residential institutions (n=1,088). Table 2 details the number of IID and non-IID outbreaks and numbers ill by outbreak location for outbreaks reported during 2009.

Infectious intestinal disease (IID) outbreaks:
IID outbreaks accounted for 56.4% (n=264) of all outbreaks reported during 2009. This was a 6% decrease compared to the number of IID outbreaks reported during 2008 (n=281).

Table 1: Number of outbreaks and numbers ill by HSE area for all outbreaks, IID outbreaks and non-IID outbreaks (2009)

HSE area	Number of outbreaks	Outbreak rate per 100,000	Number ill	Number hospitalised	Number of IID outbreaks	Number of Non-IID outbreaks
HSE-E	124	8.3	3,190	126	66	58
HSE-M	31	12.3	263	36	23	8
HSE-MW	22	6.1	182	36	14	8
HSE-NE	55	14.0	956	138	27	28
HSE-NW	68	28.7	866	87	45	23
HSE-SE	45	9.8	680	37	28	17
HSE-S	74	11.9	820	38	35	39
HSE-W	47	11.3	781	79	24	23
HPSC	2	-	31	13	2	0
Total	**468**	**11.0**	**7,769**	**590**	**264**	**204**

Norovirus/ suspect viral outbreaks, accounted for 48.1% of all IID outbreaks reported in 2009. Norovirus was also responsible for the two largest outbreaks during 2009. Both occurred in hospitals with 717 and 576 cases of illness respectively. Figure 1 compares norovirus/suspect viral outbreaks with non-norovirus IID outbreaks by year from 2001 to 2009. 2009 was the first year where less norovirus/suspect viral outbreaks were reported than other IID outbreaks.

After norovirus (n=115), the next most commonly reported IID outbreaks during 2009 were acute infectious gastroenteritis (n=68), Enterohaemorrhagic *E. coli* (n=42), salmonellosis (n=15) and campylobacter (n=9). The number of general and family outbreaks of IID disease and numbers ill, are outlined in Table 3.

The most frequently reported locations for IID outbreaks were private houses (n=69), residential institutions (n=54) and hospitals (n=49). The most commonly reported outbreaks in private homes were of EHEC (n=36), *Campylobacter* (n=9) and *Salmonella* (n=9). In residential institutions the most commonly reported outbreak were of norovirus/suspected norovirus (n=40) while in hospitals the most commonly reported outbreaks were also of norovirus/ suspected norovirus (n=38) and of *C. difficile* (n=6).

Table 2: Number of IID and non-IID outbreaks and numbers ill by outbreak location, 2009

Outbreak location	IID		Non-IID		Total outbreaks	
	Number of outbreaks	Number ill	Number of outbreaks	Number ill	Number of outbreaks	Number ill
Private house	69	185	51	143	**120**	**328**
School	4	144	88	2,382	**92**	**2,526**
Residential institution	54	915	16	173	**70**	**1,088**
Hospital	49	2,127	3	10	**52**	**2,137**
Comm. Hosp/Long-stay unit	40	686	2	10	**42**	**696**
Other	12	87	8	58	**20**	**145**
Crèche	9	70	8	56	**17**	**126**
University/College	0	0	13	249	**13**	**249**
Hotel	8	169	1	3	**9**	**172**
Community outbreak	6	87	3	48	**9**	**135**
Travel related	4	10	3	11	**7**	**21**
Extended family	3	8	4	55	**7**	**63**
Workplace	1	5	2	33	**3**	**38**
Coach tour	2	14	0	0	**2**	**14**
Unknown	1	11	1	2	**2**	**13**
Guest house / B and B	1	9	0	0	**1**	**9**
Restaurant / Cafe	1	5	0	0	**1**	**5**
Public house	0	0	1	4	**1**	**4**
Total	**264**	**4,532**	**204**	**3,237**	**468**	**7,769**

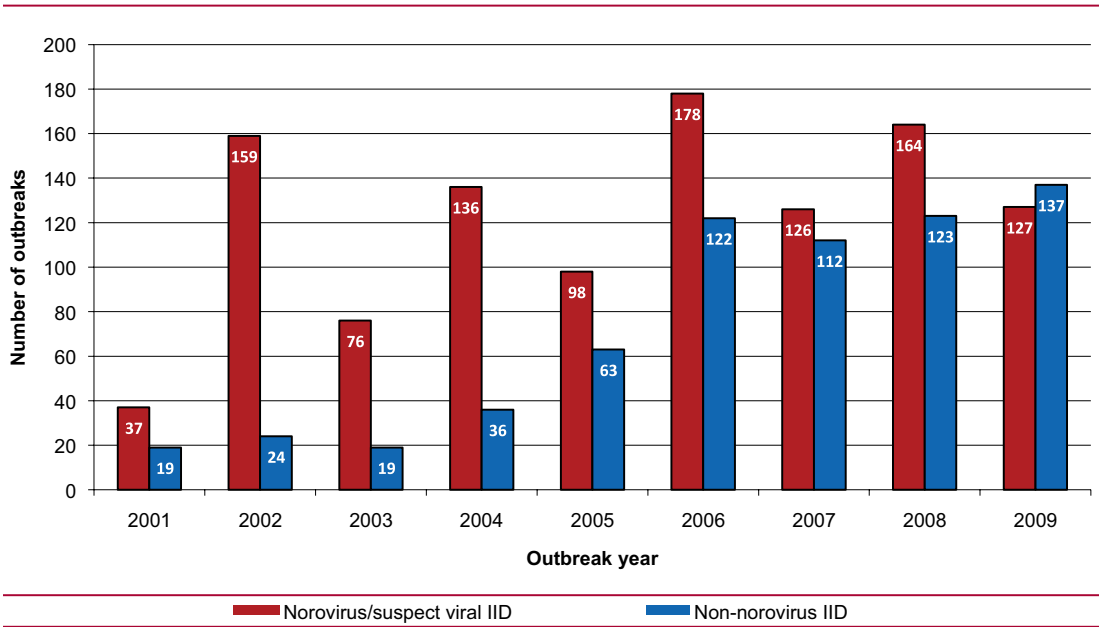

Figure 1: Number of norovirus/suspect viral outbreaks and number of non-norovirus IID outbreaks by year, 2001-2009

Person-to-person (P-P) spread was the most frequently reported mode of transmission implicated in IID outbreaks during 2009 (54.9%, n=248). The second most frequently reported transmission mode was P-P and airborne (9.5, n=25).

The number of IID outbreaks peaked during the first three months of 2009. This peak is due to high numbers of norovirus outbreaks, with 30 norovirus outbreaks reported during January, 28 during February and 22 during March. This seasonal variation has been observed in previous years. Figure 2 illustrates the number of IID and non-IID outbreaks by month of notification during 2009.

Non-IID outbreaks:
During 2009, 204 outbreaks of non-IID diseases were reported, which was more than double the number of non-IID outbreaks reported during 2008 (n=99). This increase was due to the high numbers of outbreaks of pandemic influenza A(H1N1) and influenza-like illness (ILI) which accounted for 54.4% (n=111) and 16.2% (n=33) of all non-IID outbreaks reported respectively. The third most common non-IID outbreak was mumps accounting for 15.7% (n=32) of all non-IID outbreaks reported. The number of general and family outbreaks of non-IID disease and numbers ill are outlined in Table 4.

During 2009, the number of non-IID outbreaks peaked during September and October with 30 and 72 outbreaks reported respectively (figure 2). This peak was due to high numbers of outbreaks of pandemic influenza (AH1N1) and ILI reported, with 29 outbreaks of pandemic influenza (AH1N1)/ILI reported during September and 71 during October. The most frequently

Table 3: Number of general and family IID outbreaks by disease, 2009

Outbreak disease/pathogen	Family outbreak		General outbreak		Total IID outbreaks	
	Number of outbreaks	Number ill	Number of outbreaks	Number ill	Number of outbreaks	Number ill
Acute infectious gastroenteritis	6	38	62	777	**68**	**815**
Campylobacter infection	9	33	0	0	**9**	**33**
Clostridium perfringens (type A) food-borne disease	1	11	0	0	**1**	**11**
Cryptosporidiosis	5	14	1	3	**6**	**17**
Enterohaemorrhagic *E. coli* (EHEC)	36	78	6	16	**42**	**94**
Giardiasis	0	0	1	3	**1**	**3**
Hepatitis A (acute)	1	2	2	17	**3**	**19**
Noroviral infection	1	10	114	3,424	**115**	**3,434**
Paratyphoid	1	2	0	0	**1**	**2**
Salmonellosis	12	27	3	66	**15**	**93**
Shigellosis	2	8	1	3	**3**	**11**
Total	**74**	**223**	**190**	**4,309**	**264**	**4,532**

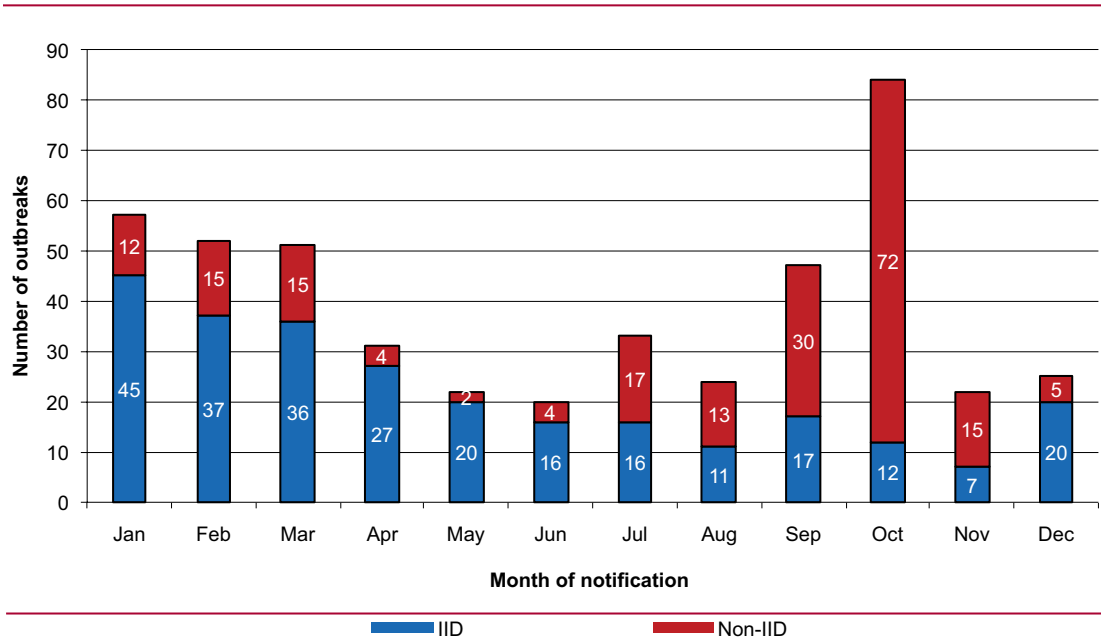

Figure 2: Number of IID and non-IID outbreaks by month of notification, 2009

reported locations for non-IID outbreaks were schools (n=88), private houses (n=51), residential institutions (n=16) and university/college (n=13). Non-IID outbreaks in these locations were most frequently caused by pandemic influenza A(1N1)/ILI and mumps (table 2) .

Person-to-person (P-P) spread was the most frequently reported mode of transmission implicated in non-IID outbreaks during 2009 (50.5%, n=103). The second most frequently reported transmission mode was P-P and airborne (29.4%, n=60).

The information gathered from outbreaks reported is used to inform public health professionals on the causes and factors contributing to outbreaks, to target prevention strategies and to monitor the effectiveness of prevention programmes.

For further information on disease specific outbreaks, please refer to the individual disease chapter.

Table 4: Number of family and general non–IID outbreaks by disease, 2009

Outbreak disease/pathogen	Family outbreak		General outbreak		Total Non-IID outbreaks	
	Number outbreaks	Numbers ill	Number outbreaks	Numbers ill	Number outbreaks	Numbers ill
Pandemic influenza A(H1N1)	34	97	77	2,011	**111**	**2,108**
Influenza-like illness	0	0	33	585	**33**	**585**
Mumps	13	37	19	243	**32**	**280**
Measles	4	11	4	94	**8**	**105**
Influenza	0	0	3	44	**3**	**44**
Coronavirus	0	0	1	30	**1**	**30**
Scabies	0	0	1	20	**1**	**20**
Varicella	0	0	2	9	**2**	**9**
ESBL	0	0	2	9	**2**	**9**
Chickenpox	0	0	2	9	**2**	**9**
Scarlet fever	0	0	1	8	**1**	**8**
Tinea	0	0	1	7	**1**	**7**
Possible rubella	0	0	1	6	**1**	**6**
Mycobacterium tuberculosis	0	0	1	5	**1**	**5**
Rubella-like illness	1	3	0	0	**1**	**3**
Suspected *Streptococcus pyogenes*	0	0	1	3	**1**	**3**
MRSA	0	0	1	2	**1**	**2**
Hepatitis B (acute and chronic)	0	0	1	2	**1**	**2**
Legionellosis	1	2	0	0	**1**	**2**
Total	**53**	**150**	**151**	**3,087**	**204**	**3,237**

08

Immunisation Uptake

8. Immunisation Uptake

Summary

At 12 months (based on available data) uptake of:
D_3, T_3, P_3, Hib_3, $Polio_3$, $HepB_3$, $MenC_2$ and PCV_2 was 89% and $MenC_3$ was 86%
Note: $MenC_3$ data were for Quarters 1 and 2 only and $HepB_3$, $MenC_2$ and PCV_2 data were for Quarters 3 and 4 only

At 24 months (based on available data) uptake of:
D_3, T_3, P_3 and $Polio_3$ was 94%
Hib_3 and $MenC_3$ was 93%
MMR_1 was 90%
Hib_b was 87%

In 2009, the HSE Areas 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 2009 quarterly data. The proportion of children who completed the recommended childhood immunisation schedule by 12 months (born between 01/01/2008 and 31/12/2008) or 24 months (born between 01/01/2007 & 31/12/2007) of age in 2009 are reported.

The Irish childhood immunisation schedule recommended that babies born during 2007 and January to June 2008 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) and a Hib booster (Hib_b). Children born on or after September 2nd 2006 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.

Since September 1st 2008 the new primary childhood immunisation schedule has been implemented for children born on or after 1st July 2008 (table 1). These children should receive one dose of vaccine against tuberculosis (BCG vaccine) at birth or by one month of age; three doses of vaccines against diphtheria, tetanus, pertussis, *Haemophilus influenzae* type b, polio and Hepatitis B ($HepB_3$) with one dose of each given at two, four and six months of age; three doses of pneumococcal conjugate vaccine (PCV) given at

Table 1. Change in primary childhood immunisation schedule (introduced on September 1st 2008)

Age	Children born before 01/07/2008	Children born on or after 01/07/2008
Birth	BCG	BCG
2 months	DTaP/Hib/IPV + MenC	DTaP/Hib/IPV/HepB + PCV
4 months	DTaP/Hib/IPV + MenC	DTaP/Hib/IPV/HepB + MenC
6 months	DTaP/Hib/IPV + MenC	DTaP/Hib/IPV/HepB + PCV + MenC
12 months	MMR + Hib	MMR + PCV
13 months	-	MenC + Hib

Please see www.immunisation.ie for complete information on the Irish childhood immunisation schedule.

BCG	Bacille Calmette Guerin vaccine
DTaP	Diphtheria, Tetanus and acellular Pertussis vaccine
Hib	*Haemophilus influenzae* type b vaccine
IPV	Inactivated Polio Virus vaccine
MenC	Meningococcal group C vaccine
HepB	Hepatitis B vaccine
PCV	Pneumococcal Conjugate Vaccine
MMR	Measles, Mumps and Rubella vaccine

two, six and 12 months of age and three doses of meningococcal group C (MenC) given at given at four, six and 13 months of age. At 12 months of age the uptake rates of two doses of PCV (PCV_2) and MenC ($MenC_2$) are measured. At 12 months of age MMR_1 is recommended and at 13 months Hib_b is recommended.

Further vaccinations are recommended for older children, please see www.immunisation.ie for complete information on the Irish childhood immunisation schedule.

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.

Caveats to data

As a new childhood immunisation schedule was introduced in 2008, for those born on or after July 1st 2008, the 2009 $MenC_3$ data at 12 months are for those born between January 1st and June 30th 2008 (i.e. Quarters 1 and 2 data) only and the 2009 $HepB_3$, $MenC_2$ and PCV_2 data at 12 months are for those born between July 1st and December 31st 2008 (i.e. Quarters 3 and 4 data) only.

The 2009 data for those at 12 months are incomplete as the following were unavailable: the Quarter 1 2009 HSE-E D_3, T_3, P_3 and $Polio_3$ data for those born on the 31/03/2008; the Quarter 3 2009 HSE-M data, HSE-S data, HSE-E $MenC_2$ and PCV_2 data and HSE-MW $MenC_2$ data and; the Quarter 4 2009 HSE-M, HSE-MW and HSE-S data. The available 2009 national 12 month D_3, T_3, P_3, Hib_3 and $Polio_3$ cohort data may be around 88% (this figure is an estimate only) of the 2009 national birth cohort. The $MenC_3$ cohort data are complete (for Quarters 1 and 2 2009). The available national $HepB_3$, $MenC_2$ and PCV_2 data may be around 76%, 54% and 58% (these figures are estimates only), respectively, of the (combined Quarters 3 and 4) national birth cohort.

The 2009 data for those at 24 months are incomplete as the following were unavailable: the Quarter 1 2009 HSE-E D_3, T_3, P_3 and $Polio_3$ data for those born on the 31/03/2007; the Quarter 2 2009 HSE-E Dublin North Hib_b uptake data and; the Quarter 4 2009 HSE-MW data, HSE-E Dublin North Hib_b data and HSE-SE Hib_b data for those given a Hib dose as part of the five in one or six in one vaccine after 12 months of age. The available 2009 national 24 month D_3, T_3, P_3, Hib_3, $Polio_3$, $MenC_3$ and MMR_1 birth cohort data may be around 98% of the national birth cohort and the available Hib_b data may be around 95% of the national birth cohort (these figures are estimates only).

Data in 2009 are compared here to data in 2008. The 2008 $MenC_3$ data (at 12 and 24 months) were incomplete as the HSE-E and HSE-MW $MenC_3$ data were not available in Quarter 3 2008 and the 2008 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. The available 2008 12 month national $MenC_3$ data may be around 88% of the national birth cohort. The available 2008 24 month national $MenC_3$ and Hib_b data may be around 89% and 95%, respectively, of the national birth cohort.

BCG uptake data were available for the HSE-M, HSE-MW, HSE-NW, HSE-SE and HSE-S Areas (HSE-S data relate to Kerry only) in 2008 and in Quarters 1 and 2 2009; for the HSE-MW, HSE-NW and HSE-SE Areas in Quarter 3 2009 and for the HSE-NW and HSE-SE Areas in Quarter 4 2009. The available 2008 national BCG data represent one third of the national birth cohort and the available 2009 national BCG cohort data may be around 27% (this figure is an estimate only) of the national birth cohort.

Immunisation uptake rates at 12 months

National immunisation uptake rates (based on available data), in children 12 months of age in 2009, were 89% for D_3, P_3, T_3, Hib_3 and $Polio_3$, 95% for BCG, 86% for $MenC_3$ (based on Quarters 1 and 2 2009 data only) and 89% (based on available data in Quarters 3 and 4 2009 only) for $HepB_3$, $MenC_2$ and PCV_2 (table 2). Compared with 2008, the uptake rates for D_3, P_3, T_3, Hib_3, $Polio_3$ and BCG increased by one percent while $MenC_3$ decreased by two percent.

Among the LHOs, uptake rates (based on available data) for D_3, T_3, P_3 and $Polio_3$ ranged from 82% to 96%, Hib_3 ranged from 82% to 95% and $MenC_3$ (based on Quarters 1 and 2 2009 data only) ranged from 76% to 94% (appendix 2.1). Based on available data in Quarters 3 and 4 2009 only $HepB_3$ ranged from 84% to 95%, $MenC_2$ ranged from 82% to 95% and PCV_2 ranged from 82% to 96% (appendix 2.1). The target uptake of 95% was reached or exceeded in Roscommon for D_3, P_3, T_3, Hib_3, $Polio_3$, $HepB_3$, $MenC_2$ and PCV_2 (appendix 2.1).

Immunisation uptake rates at 24 months

National immunisation uptake rates, in children 24 months of age in 2009, were 94% for D_3, T_3, P_3 and $Polio_3$ and 93% for Hib_3 and $MenC_3$ (table 2). Compared with 2008, the uptake rates for these vaccines increased by one percent in 2009 except for Hib_3 uptake which was unchanged (figure 1).

Among the HSE Areas, uptake rates for D_3, P_3, T_3 and Hib_3 ranged from 92% to 96%, $Polio_3$ ranged from 92% to 97% and $MenC_3$ ranged from 91% to 96% (table 2). The target uptake of 95% was reached or exceeded during 2009 for D_3, T_3, P_3, Hib_3, $Polio_3$ and $MenC_3$ in the HSE-M and HSE-NW and for $MenC_3$ in the HSE-NE (table 2).

Uptake rates for D_3, T_3, P_3, Hib_3, $Polio_3$ and $MenC_3$ ranged from 89% to 98% among the LHOs, with 27

LHOs reporting uptake rates of ≥90% (appendix 2.2). The target uptake of 95% was reached or exceeded for D_3 (figure 2a), T_3, P_3 and $Polio_3$ in 13 LHOs, for $MenC_3$ in 12 LHOs and for Hib_3 in 11 LHOs (appendix 2.2).

During 2009 MMR_1 uptake was 90% nationally; an increase of one percent when compared to 2008 (figure 1). Among the HSE Areas, uptake rates for MMR_1 ranged from 89% to 93%, with seven HSE Areas reporting uptake of ≥90% (table 2). Uptake rates for MMR_1 ranged from 84% to 97% among the LHOs, with 21 LHOs reporting uptake of ≥90% and one LHO (Roscommon) reaching and exceeding the target uptake of 95% (figure 2b, appendix 2.2).
Hib_b figures relate to children who received a dose of Hib after 12 months of age. National uptake (based on available data) of Hib_b in 2009, in those 24 months of age, was 87% (table 2 and figure 1). This is an increase of five percent compared to available data in 2008.

Among the HSE Areas, uptake of Hib_b in 2009 ranged from 83% to 93%, with four HSE Areas reporting uptake rates of ≥90% (table 2). Among the LHOs, uptake of Hib_b ranged from 78% to 98%, with 13 of the LHOs reporting uptake of ≥90% and one (Roscommon) reporting uptake of ≥95% (appendix 2.2).

Annual immunisation uptake rates at 24 months, for the majority of vaccines, 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 2009, national

Table 2. Annual immunisation uptake rates (based on available data) by HSE Area for children 12 and 24 months of age in 2009

	% Uptake at 12 months Cohort born 01/01/2008 - 31/12/2008*								% Uptake at 24 months Cohort born 01/01/2007 - 31/12/2007					
	D_3	Hib_3	$Polio_3$	$MenC_3$	$HepB_3$	$MenC_2$	PCV_2	BCG	D_3	Hib_3	Hib_b	$Polio_3$	$MenC_3$	MMR_1
HSE-E	87	87	87	83	88	87	87	na	93	92	83	93	92	89
HSE-M	92	92	92	92	na	na	na	94	96	96	93	96	96	93
HSE-MW	91	91	91	89	92	na	92	97	94	93	89	94	93	91
HSE-NE	91	91	91	87	92	91	89	na	94	94	92	94	95	92
HSE-NW	92	92	92	91	90	90	90	95	96	96	93	97	95	92
HSE-SE	90	90	90	88	90	90	90	96	92	92	90	92	91	90
HSE-S	86	86	86	86	na	na	na	93	94	94	88	94	94	90
HSE-W	88	88	88	87	88	88	89	na	94	94	86	94	93	90
Ireland	**89**	**89**	**89**	**86***	**89***	**89***	**89***	**95**	**94**	**93**	**87**	**94**	**93**	**90**

na=not available
The 2009 data are incomplete, please see text for details of caveats
*$HepB_3$, $MenC_2$ and PCV_2 uptake data presented here are only for those born between 01/07/2008 and 31/12/2008 and $MenC_3$ data at 12 months are only for those born between 01/01/2008 and 30/06/2008
Since T_3 and P_3 uptake identical to D_3 uptake only D_3 uptake figures presented

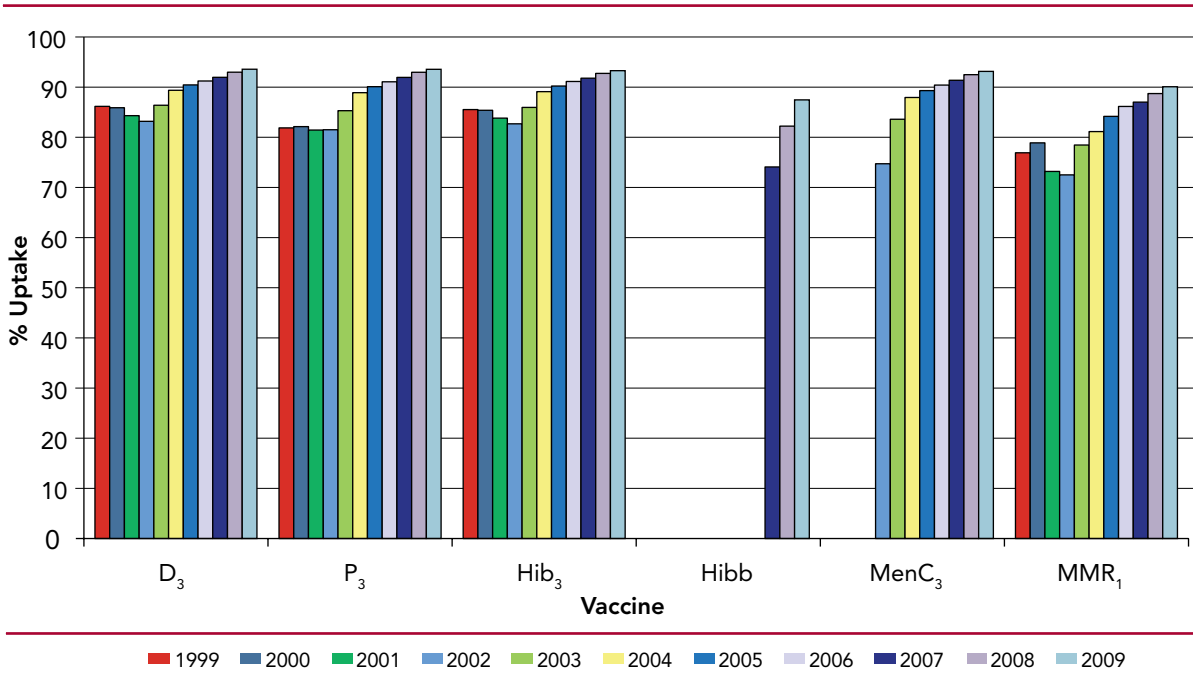

Figure 1. National annual immunisation uptake rates (based on available data) at 24 months, 1999-2009

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. The 2009 data are incomplete, please see text for details of caveats.

uptake rates at 24 months for D_3, T_3, P_3 and $Polio_3$ were one percent below the target rate, Hib_3 and $MenC_3$ were two percent below the target, MMR_1 was five percent below the target and Hib_b was eight percent below the target rate. However, among the HSE Areas the target uptake of 95% was reached or exceeded for those at 24 months during 2009 for D_3, T_3, P_3, Hib_3, $Polio_3$ and $MenC_3$ in the HSE-M and HSE-NW and for $MenC_3$ in the HSE-NE. Among the LHOs, the target uptake of 95% was reached or exceeded for those at 24 months during 2009 for D_3, T_3, P_3, Hib_3, $Polio_3$ and $MenC_3$ in 10 LHOs and for all vaccines in one LHO (Roscommon). Roscommon reached or exceeded the target of 95% for D_3, T_3, P_3, Hib_3, $Polio_3$, $HepB_3$, $MenC_2$ and PCV_2 at 12 months and for all vaccines at 24 months and had the highest uptake for all vaccines at 24 months.

The 2009 immunisation uptake rates for each LHO are presented in appendix 2. The immunisation reports for Quarters 1 to 4 2009 are available on the HPSC website in *Topics A-Z* under the heading *vaccination*.

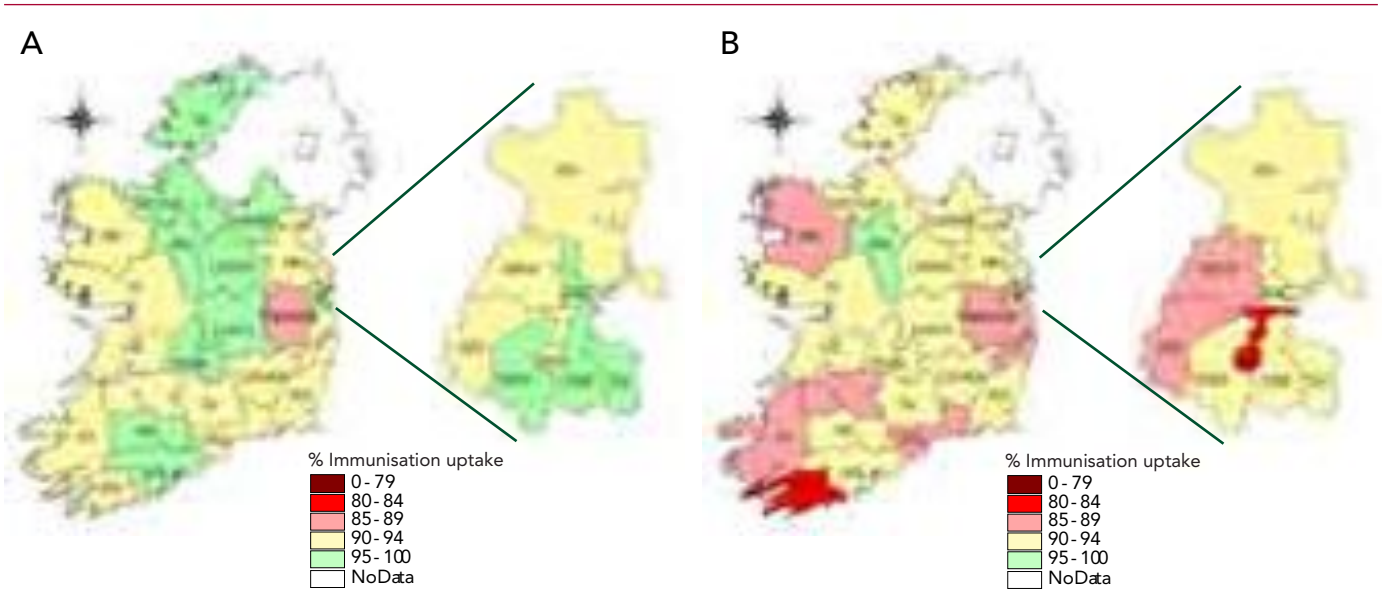

Figure 2. D_3 (A) and MMR_1 (B) immunisation uptake rates (%) in those 24 months of age in 2009 by Local Health Office (LHO)

2009 data are incomplete, please see text for details

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 rate is reported here

Please see appendix 2.3 to translate LHO codes

09

Antimicrobial Consumption and Resistance

9.1 Antimicrobial Consumption

Summary

Outpatient antibiotic consumption, 2009: 20.8 DID
Outpatient antibiotic consumption, 2008: 21.5 DID
Median hospital antibiotic consumption, 2009: 75.2 DBD
Median hospital antibiotic consumption, 2008: 77.4 DBD
EU Network: ESAC www.esac.ua.ac.be

Ireland participates in the European Surveillance of Antimicrobial Consumption (ESAC) project 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 100 bed-days used (DBD) for inpatients. Please see "**Antimicrobial consumption"** and **"Denominator data"** parts of the explanatory notes section for further details.

Outpatient Antibiotic Consumption

The overall outpatient antibiotic consumption for Ireland in 2009 was 20.8 DID, a fall from the previous year's rate of 21.5 DID. In the latest ESAC annual yearbook (2008), the reported range of outpatient antibiotic usage was 10.0 DID (Russian Federation) to 45.2 DID (Greece). The median for all 30 European countries with reliable data was 19.7 DID and the interquartile range (25%-75%) was 15.1 to 23.1 DID. Since outpatient antibiotic usage in Ireland has been 19 - 23 DID over the last five years, the overall rate in Ireland is mid-to-high in Europe.

In Ireland in 2009, outpatient consumption of penicillins accounted for the largest class used (51% of total at 10.7 DID), followed by macrolides (18%, 3.8 DID), tetracyclines (13%, 2.7 DID), cephalosporins (6%, 1.3 DID), sulphonamides (5%, 1.1 DID) and quinolones (5%, 0.9 DID). Other antibiotic classes accounted for just over 1% of total use.

Penicillin in combination with beta-lactamase inhibitor (such as co-amoxiclav) accounted for the largest proportion of penicillins. This group of antibiotics had been showing a dramatic rise in the rate of consumption in recent years (2000-2008), however, 2009 was the first year a decrease was observed (5.5 DID in 2009 from 5.6 DID in 2008). Broad-spectrum penicillin (such as ampicillin and amoxicillin) usage was high (3.3 DID) but showed a slight decline.

There was considerable variability in the overall outpatient antibiotic usage at county level (16.8 to 28.1 DID) as shown in figure 2.

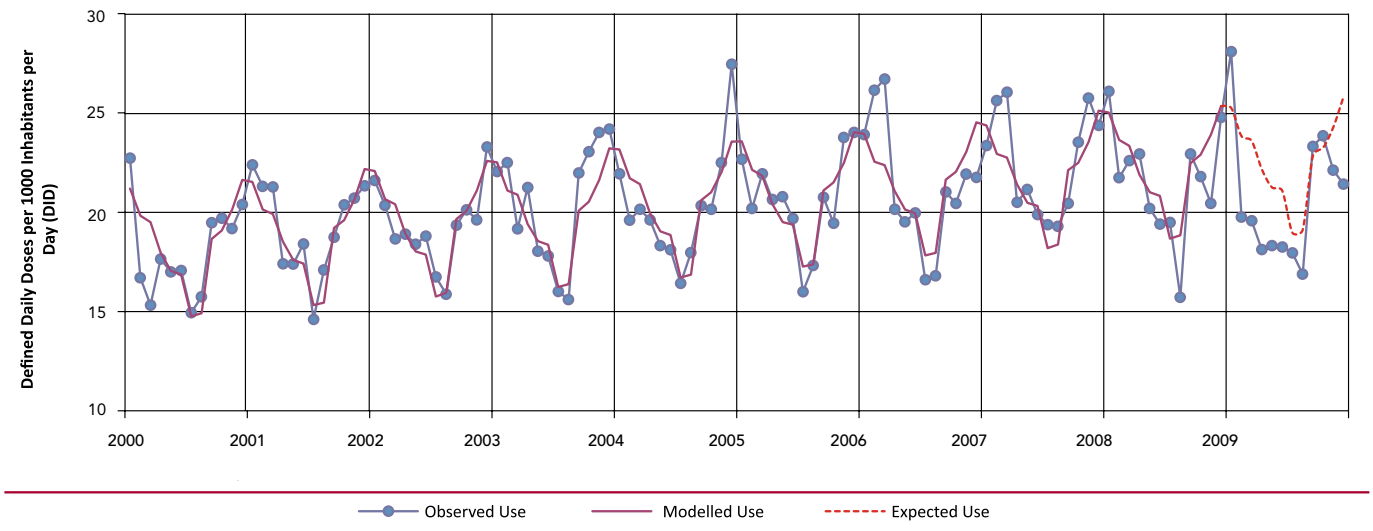

Figure 1. Outpatient antibiotic consumption in Ireland by month, 2000-2009.

In a separate analysis of recent Irish data, it was shown that outpatient use of specific antibiotics is strongly associated with influenza activity. It is very likely that the General Practitioner education programme and interventions that took place around the European Antibiotic Awareness Day (EAAD) in November 2008 had an effect on lowering the antibiotic consumption rate in 2009. Despite this effort, antibiotic consumption rates did increase at two time periods during 2009: in January, and between September and October 2009.

The 2008/2009 seasonal influenza activity was the highest in the preceding nine years with the influenza-like illness (ILI) rate at over 120 consultations per 100,000 population. It is therefore likely that the high antimicrobial use in January of 2009 was, at least partly, a result of inappropriate prescribing for respiratory viral infections. The rate for September and October 2009 returned to levels in line with expected rates projected from the historical trend. Influenza 2009 H1N1 Pandemic, which resulted in a peek ILI rate of over 200 consultations per 100,000 and lasted over 20 weeks, may be the reason for this return to former levels.

Hospital Antibiotic Consumption

Forty-two public acute hospitals provided valid antibiotic usage data for 2009. The median rate of antibiotic consumption usage was 75.2 DBD (range 20.1 – 113.0 DBD). This was a drop from the previous year's revised rate of 77.4 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 77.8 and 79.0 DBD) centred just above the median for Ireland, while the rate for single specialist facilities (maternity, orthopaedic or paediatric) was much lower (median 42.9 DBD). The lower median consumption in single speciality hospitals probably reflects differences in case-mix, compared to other hospitals. However it 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

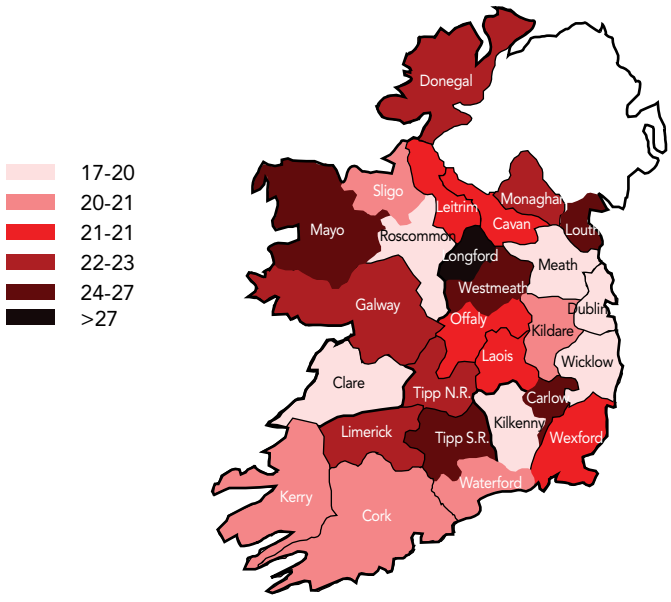

Figure 2. Outpatient antibiotic consumption in Ireland by county, in DDD per 100 inhabitants per day for 2009.

(those with good oral bioavailability) over total use, from a median of 9.4% in 2008 to 8.1% in 2009. This measure reflects patient acuity and also the hospital function.

ESAC Hospitals Care Point Prevalence Survey 2009 (ESAC HC PPS 2009)

ESAC co-ordinated a hospital care sector point prevalence study (HC PPS) between May and July of 2009 among 172 acute facilities across 25 European countries. In Ireland, 21 hospitals provided valid data that were also analysed at the HSPC.

In all 5824 Irish patients' records were examined, of which 2000 received systemic antimicrobial therapy. The median prevalence in Irish hospitals was 34.3% (range 21.4 - 55.3%) compared with the European median of 29.0%.

The Irish Antibiotic Pharmacists Group (IAPG) facilitated HC PPS 2009. As most of the participating hospitals already had an antibiotic pharmacist in place, the results may be an under-estimation of the true national prevalence.

The data collected included patient demographics, details of systemic antimicrobial therapy, diagnoses and indication, compliance with local guidelines and documentation of reason for therapy. In most respects practices in Ireland were broadly in line with other European hospitals. Feedback from Irish participants highlighted difficulties encountered in data entry and the length of time commitment involved in data collection. A third of the participants said they implemented changes as a result of the survey outcome and this shows the value of PPS as a method of antimicrobial consumption surveillance. The IAPG plan to conduct a national point prevalence survey annually.

ESAC Nursing Home Point Prevalence Surveys 2009 (ESAC NH PPS 2009-1 & -2)

Two point prevalence surveys were co-ordinated by ESAC to measure antibiotic use in nursing homes (NH) across Europe: NH PPS-1 in April 2009 and NH PPS-2 in November 2009.

In PPS-1, 304 NH took part across 20 countries. In Ireland, 18 skilled NH participated, in which antibiotics were prescribed to a total of 175 out of the 1662 eligible residents (overall prevalence of 10.5%, median 12.4%, range 2.8 – 27.8%) compared to the European overall prevalence of 5.9%, median of 5.4% and a range of 0 – 30%. By country, the medians ranged from 0.6% to 15.1%.

For PPS-2, 11 Irish NH participated with an overall prevalence of 10.1% (range 2.3 – 22.0%). An ESAC report on PPS-2 is due later in 2010.

More detailed analyses of antibiotic usage data can be found at www.hpsc.ie, through "Topics A-Z", under "ESAC". The figures presented in this report may vary from previously published levels owing to methodological changes.

9.2 Antimicrobial Resistance

Summary

Key Points

- There were 1,309 reports of *S. aureus* bacteraemia submitted to the European Antimicrobial Resistance Surveillance Network (EARS-Net), of which 355 (27.1%) were meticillin-resistant *S. aureus* (MRSA). This represents a significant decrease from 33.7% reported in 2008. Overall, the number of MRSA reports was down by 19% from 439 in 2008

  For acute hospitals, the rate of MRSA bacteraemia was 0.089 cases per 1,000 patient bed days used, a decrease from 0.111 in 2008. Over the same period, the rate of meticillin-susceptible *S. aureus* (MSSA) increased from 0.216 to 0.237

- There were 356 reports of invasive *S. pneumoniae* infection compared to 447 in 2008, a decrease of 20%. The national rate of invasive infection was 8.6 compared to 10.8 per 100,000 population in 2008. The biggest reductions in numbers of reports and rates of infection were seen in children <2 years, the target population for the 7-valent conjugate (PCV-7) introduced in September 2008

  The proportion of penicillin-non-susceptible *S. pneumoniae* (PNSP) decreased from 23.1% in 2008 to 20.2% in 2009; the proportion of isolates with high-level resistance to penicillin decreased marginally from 6.1% in 2008 to 5.6% in 2009 while intermediate level resistance decreased significantly from 16.9% to 13.3%

  Serotype data were available on 302 of 356 isolates (85%) and results indicate good coverage for both the 23-valent polysaccharide (PPV23) and PCV7 vaccines in their target populations: 87% (adults ≥65 years) and 56% (children <2 years), respectively

- There were 397 reports of *E. faecium* bacteraemia compared with 406 in 2008. The proportion that was vancomycin-resistant *E. faecium* (VREfm) increased from 35.7% in 2008 to 38.3% in 2009. Multi-drug resistant (MDR) *E. faecium* increased from 16.2% to 26.7%

- There were 2,064 reports of invasive *E. coli* infection, an increase of 7% from 1,924 reports in 2008. Resistance to third-generation cephalosporins (3GCs) remained stable at 7.5% but extended-spectrum beta-lactamase (ESBL)-production increased from 5.0% to 5.8% in 2009. Ciprofloxacin resistance decreased slightly from 23.3% to 22.3%, the first decrease since surveillance began in 2002. MDR *E. coli* also decreased from 12.1% in 2008 to 10.4% in 2009

- There were 323 reports of invasive *K. pneumoniae* infections compared to 311 in 2008

- There were 248 reports of invasive *P. aeruginosa* infections compared to 199 in 2008, an increase of 25%

- For the 14 laboratories participating in enhanced bacteraemia surveillance, the rate of clinically-significant MRSA bloodstream infection decreased from 0.065 cases per 1,000 patient bed days used in 2008 to 0.058 in 2009, while the rate for MSSA increased from 0.080 in 2008 to 0.122 in 2009

- See http://www.hpsc.ie for further details of EARS-Net, antimicrobial resistance and enhanced bacteraemia surveillance in Ireland

- European data are available at http://ecdc.europa.eu/en/activities/surveillance/EARS-Net/Pages/Database.aspx

Introduction

The European Antimicrobial Resistance Surveillance Network (EARS-Net), previously the European Antimicrobial Resistance Surveillance System (EARSS), in Ireland collects routinely-generated antimicrobial susceptibility testing data on seven important bacterial pathogens using the EARS-Net case definition. Participating laboratories submit data on the "primary" or first isolate from blood or cerebrospinal fluid (CSF) per patient per quarter. EARS-Net does not distinguish clinically significant isolates from contaminants and primarily serves as a surveillance system to measure national levels of antimicrobial resistance (AMR). In 2009, all 44 microbiology laboratories (43 by year-end) participated in EARS-Net resulting in complete coverage of the Irish population.

Staphylococcus aureus

There were 1,309 reports of *S. aureus* bacteraemia from 1,262 patients, of which 355 (27.1%) were meticillin-resistant *S. aureus* (MRSA) (table 1). This represents the lowest annual proportion since surveillance began in 1999. In 2008, the proportion was 33.7%. The decrease observed in 2008 was highly significant (Chi^2=13.3, P=0.0003). This is the third successive year in which a decrease has been observed and this downward trend is also highly significant (Chi^2_{trend}=71.4, P<0.0001) (figure 1). Overall, there was a 19.1% reduction in the number of MRSA bacteraemia reports compared with 2008 (355 vs. 439). The total number of meticillin-susceptible *S. aureus* (MSSA) bacteraemia reports increased by 10.4% from 864 in 2008 to 954 in 2009. The reason for this increase is unclear, but may be related to differences in the epidemiology of MSSA versus MRSA, or to infection control interventions that selectively target 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 to consider is that MRSA tends to be clonal (i.e. one or two strains may be responsible for the majority of infections in a healthcare setting) while MSSA is generally much more heterogeneous in nature (i.e. many different strains are present) and often acquisition is from the patient's own normal bacterial flora, although clonal spread of MSSA in healthcare settings is increasingly recognised. Despite the decrease in numbers and proportion of MRSA, Ireland still had one of the higher proportions of MRSA in Europe in 2009 (see http://ecdc.europa.eu/en/activities/surveillance/EARS-Net/Pages/Database.aspx for European data, including EARS-Net tables, charts and maps).

No MRSA isolates with reduced susceptibility to vancomycin were detected at the National MRSA Reference Laboratory by the Etest® macromethod. The MRSA rate for all acute hospitals in 2009 was 0.089 cases per 1,000 patient bed days used, representing a decrease from 0.111 in 2008, while the MSSA rate increased from 0.216 to 0.237 [Note: the rates are now calculated taking into account the denominator data (bed days used) obtained from the Business Intelligence Unit at the Health Services Executive for all acute public hospitals; and directly from the hospitals for private hospitals where available, where both numerator (MRSA numbers) and denominator data have been provided. This contrasts with previous reports when only data from acute public hospitals were considered].

In patients with laboratory-confirmed *S. aureus* bacteraemia, the probability that the infecting organism was MRSA as compared to MSSA was over 1.7-times greater in patients aged ≥65years than in those aged <65 years (RR=1.66, Chi^2=29.5, P<0.0001).

Males were approximately 1.8-times more likely to get an invasive *S. aureus* infection (2.1-times for MRSA, z=7.0, P<0.0001; 1.7-times for MSSA, z=8.7, P<0.0001) than females (z=11.0, P<0.0001). The frequency of

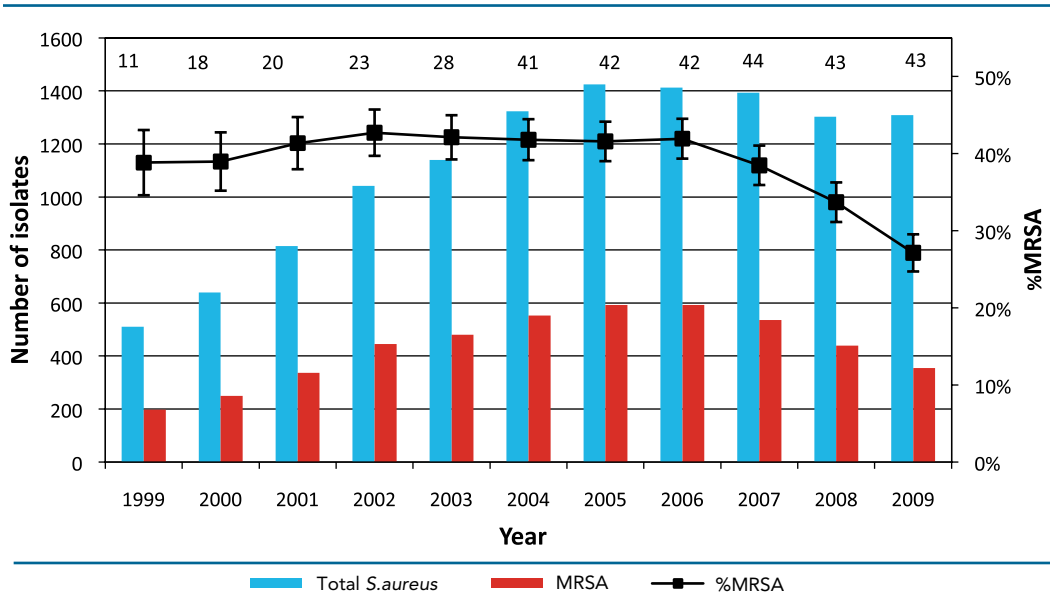

Figure 1. Trends for S. aureus – total numbers of S. aureus/MRSA and percentage MRSA with 95% confidence intervals The numbers of participating laboratories by year-end are indicated above the bars

Table 1. Summary of EARSS data by pathogen and year, 1999-2009

Pathogen	Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Number laboratories by year-end	**12**	**19**	**20**	**23**	**28**	**41**	**42**	**42**	**44**	43	**43**
S. aureus											
Number of isolates	510	639	815	1042	1140	1323	1424	1412	1393	1303	1309
Number Meticillin-R (or MRSA)	198	249	337	445	480	553	592	592	536	439	355
Meticillin-R (or MRSA)	38.8%	39.0%	41.3%	42.7%	42.1%	41.8%	41.6%	41.9%	38.5%	33.7%	27.1%
Number VISA	0	0	0	0	0	0	0	2	1	0	0
VISA*	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%
Number laboratories by year-end	**12**	**19**	**20**	**23**	**28**	**41**	**42**	**42**	**44**	**42**	**43**
S. pneumoniae											
Number of isolates	157	201	245	278	364	400	401	407	438	447	356
Penicillin-NS*	19.1%	13.4%	12.2%	11.5%	11.8%	10.3%	11.7%	15.7%	17.4%	23.1%	20.2%
of which: HLR	0.0%	3.5%	1.6%	1.4%	2.2%	1.8%	3.0%	2.9%	5.7%	6.1%	5.6%
Int	16.6%	8.5%	10.6%	9.7%	8.8%	7.0%	8.7%	12.5%	11.0%	16.9%	13.8%
Erythromycin-R*	14.0%	12.0%	12.5%	12.7%	11.6%	14.4%	12.1%	16.1%	16.4%	16.7%	17.3%
E. faecalis											
Number of isolates				168	218	242	290	294	281	301	289
Ampicillin-R*	No data	No data	No data	8.1%	5.1%	0.8%	3.5%	4.5%	2.2%	0.7%	2.1%
Vancomycin-R				2.4%	1.4%	1.3%	2.5%	3.7%	2.8%	3.7%	0.7%
HLG-R*				38.5%	33.9%	41.3%	43.1%	42.4%	37.2%	30.5%	36.7%
E. faecium											
Number of isolates				85	135	187	224	265	332	406	397
Ampicillin-R*	No data	No data	No data	88.9%	91.0%	95.7%	92.3%	93.9%	93.1%	95.1%	92.9%
Vancomycin-R				11.1%	19.4%	23.2%	31.7%	37.1%	33.5%	35.7%	38.3%
HLG-R*				16.7%	53.8%	58.0%	51.4%	44.3%	34.9%	28.1%	39.1%
MDR*				3.7%	11.4%	18.5%	25.6%	25.6%	22.3%	16.2%	26.7%
E. coli											
Number of isolates				741	991	1256	1445	1656	1784	1924	2064
Ampicillin-R*				62.2%	61.9%	65.0%	67.6%	70.7%	68.3%	70.3%	68.7%
3GC-R*				3.0%	2.4%	2.4%	4.1%	4.1%	6.7%	7.5%	7.5%
Ciprofloxacin-R*	No data	No data	No data	5.4%	9.5%	12.6%	17.3%	21.5%	22.1%	23.3%	22.3%
Gentamicin-R*				2.7%	3.9%	5.7%	8.5%	7.7%	9.9%	10.2%	7.7%
Gentamicin/Tobramycin/Amikacin-R*				2.9%	4.3%	6.1%	8.6%	8.6%	10.6%	11.0%	9.3%
ESBL-producers*				1.2%	1.3%	1.1%	2.4%	2.5%	4.1%	5.0%	5.8%
MDR*				2.4%	3.8%	5.6%	7.7%	9.0%	11.4%	12.1%	10.4%
Number laboratories by year-end								**36**	**39**	**41**	**42**
K. pneumoniae											
Number of isolates								217	244	311	323
Ampicillin-R*								97.7%	99.2%	99.7%	99.7%
3GC-R*								10.2%	9.9%	11.3%	11.2%
Ciprofloxacin-R*	No data	No data	No data	No data	No data	No data	No data	15.3%	18.1%	12.7%	13.0%
Gentamicin-R*								7.8%	9.9%	10.6%	11.1%
Imipenem/meropenem-R*								0.0%	0.6%	0.0%	0.0%
ESBL-producers*								8.6%	3.7%	7.7%	8.2%
MDR*								11.2%	11.9%	9.9%	11.9%
P. aeruginosa											
Number of isolates								128	177	199	248
Pipericillin/tazobactam-R*								9.4%	12.6%	9.7%	8.9%
Ceftazidime-R*	No data	No data	No data	No data	No data	No data	No data	10.6%	11.8%	8.7%	11.8%
Imipenem/meropenem-R*								11.8%	12.2%	9.3%	9.7%
Ciprofloxacin-R*								18.0%	22.9%	21.8%	12.1%
Gentamicin-R*								10.2%	13.3%	9.0%	7.7%
MDR*								9.5%	12.5%	11.1%	6.4%

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
Changes to the data presented in previous reports are highlighted in red

invasive *S. aureus* infection increased with age, with the majority of infections (n=775; 59%) occurring in adults over 60 years. The median age for patients with an MRSA infection was 72 years (95%CI, 70-73) while the median age for patients with MSSA was 62 years (95%CI, 60-64). This was considered to be a significant difference as the confidence intervals did not overlap.

Streptococcus pneumoniae

There were 356 reports of invasive *S. pneumoniae* infection (350 from blood and six from CSF) from 356 patients, a decrease of 20.4% from 447 reports in 2008. 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 20.2% (n=72) of all isolates tested against penicillin (n=356) in 2009 (table 1). Of the 72 PNSP isolates, 49 were intermediately-resistant (Int; MIC=0.1-1.0mg/L) and 20 were HLR (MIC >1.0mg/L) to penicillin. No penicillin MICs were available for three non-susceptible (NS) isolates. The proportion of PNSP in Ireland increased significantly over the four years from 10.3% in 2004 to 23.1% in 2008 (Chi^2_{trend}=31.5, P<0.0001) but shows signs of a decrease in 2009 (figure 2). The proportion of isolates with high-level resistance (HLR) to penicillin decreased slightly from 6.1% in 2008 to 5.6% in 2009. Fifty-eight (17.3%) of 336 isolates were resistant to erythromycin, a slight increase from 16.7% in 2008.

In 2009, Ireland had one of the highest proportions of PNSP, and HLR to penicillin among *S. pneumoniae*, in countries reporting to EARS-Net, although comparisons with other EARS-Net countries is problematic due to the possibility of different interpretive criteria being applied to the data. [Note: The Clinical Laboratory Standards Institute (CLSI) now provides three sets of breakpoints for interpreting penicillin susceptibility of *S. pneumoniae* isolates: meningitis, non-meningitis and oral. In Ireland, EARS-Net data are reported using the "oral" breakpoints (which correspond to the original CLSI breakpoints) for epidemiological purposes, and thus consistency].

Moderately high levels of erythromycin resistance were seen, similar to the situation observed in much of Southern and Central Europe. Of isolates tested against both penicillin and erythromycin (n=336), 40 (11.9%) were simultaneously PNSP (29 Int, 10 HLR) and erythromycin-resistant in 2008 compared with 10.2% in 2008.

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 302 pneumococcal isolates from 30 laboratories (of 34 that reported pneumococcal isolates to EARS-Net in 2009) representing 85% of all pneumococcal isolates reported in 2009. Overall, 272 (90%) and 124 (41%) 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, 119 of 137 (87%) isolates were covered by PPV23, while from children <2 years, 15 of 27 (56%) isolates were covered by PCV7. Of the 57 PNSP isolates for which serotyping data were available, 28 of 30 (93%) from adults ≥65 years were covered by PPV23 while 7 of 8 (87.5%) from children <2 years were covered by PCV7. 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.

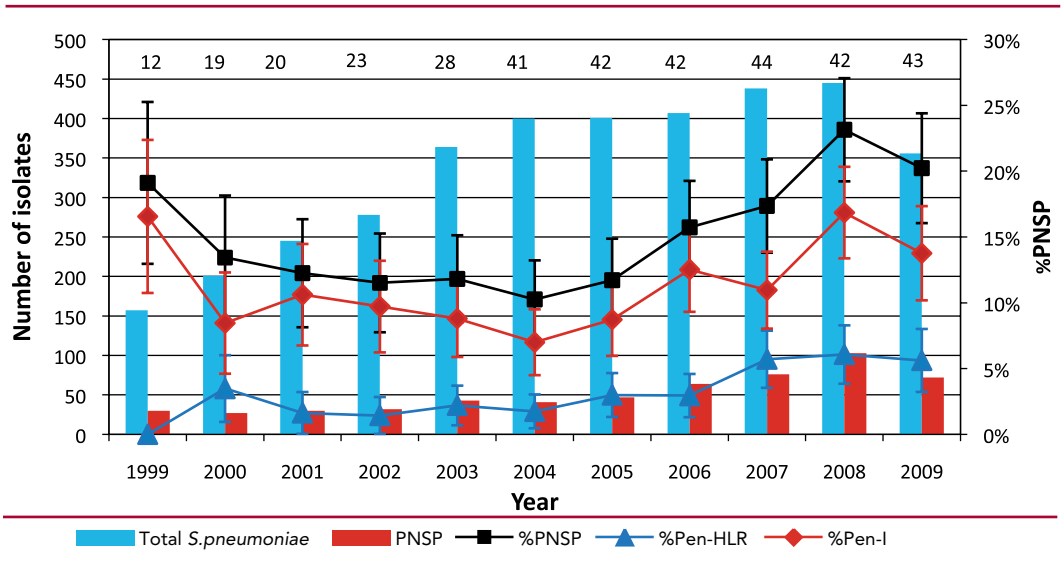

Figure 2a. Trends for S. pneumoniae – total numbers of S. pneumoniae/PNSP and percentage PNSP with 95% confidence intervals
HLR, High-level resistant; I, Intermediately resistant
The numbers of participating laboratories by year-end are indicated above the bars

The rate of invasive pneumococcal disease (IPD) in Ireland in 2009 was estimated to be 8.6 per 100,000 population compared with 10.8 in 2008 (note: both calculated using the 2006 census data and adjusted for the estimated population coverage by EARS-Net for that year). The highest rates of IPD were observed in children <1 year (27.8 per 100,000) and adults aged 75-79 years (24.4), 80-84 years (44.3) and ≥85 years (53.1) (figure 2b). The rates in all age groups decreased compared with the data for 2008 with the exception of the 5-9 year group, which increased marginally from 1.0 to 2.8. The biggest drop was seen in the <1 and 1 year age groups, which decreased from 57.3 to 27.8 and 28.1 to 18.2, respectively.

Males were approximately 1.2-times more likely to have an invasive *S. pneumoniae* infection [1.25-times for PNSP, z=0.95, P=0.35; 1.2-times for penicillin-susceptible *S. pneumoniae* (PSP), z=1.55, P=0.12] than females (z=1.8, P=0.07). None of these findings were significant. The median age was 63 years (95%CI, 59-65).

Enterococcus faecalis

There were 289 reports of *E. faecalis* bacteraemia from 285 patients, a decrease of 4.0% from 301 reports in 2008. 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 0.7% of isolates, a significant decrease from 3.7% in 2008 (Chi^2=5.9; P=0.015). Although this proportion was low, Ireland still had one of the higher proportions of VREfa in Europe in 2008.

Six 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=3.9, P<0.0001). The frequency of invasive *E. faecalis* infection increased with age with the majority of infections (n=218; 75%) occurring in adults over 50 years. The median age was 66 years (95%CI, 64-71).

Enterococcus faecium

There were 397 reports of *E. faecium* bacteraemia from 386 patients, a decrease of 2.2% from 406 reports in 2008 (but still up on 332 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 38.3% of isolates. This represents an increase from 35.7% in 2008. While the rate of increase in the proportion of VREfm appeared to slow down after 2006, the number of VREfm isolates increased by almost 50% between 2006 (n=98) and 2009 (n=145). Between 2002 and 2009, the proportion of isolates that was VREfm increased significantly (Chi^2_{trend}=36.9; P<0.0001) (figure 3). In 2009, Ireland had the highest proportion of VREfm in Europe, followed by Luxembourg (35.7%) and Greece (29.2%).

Resistance to high-level gentamicin increased significantly from 28.1% in 2008 to 29.1% in 2009 (Chi^2=10.2; P=0.0014). This marks a reversal of the highly significant downward trend seen between 2004 and 2008 (Chi^2_{trend}=62.1; P<0.0001) (figure 3).

Of 375 isolates tested against all three "indicator" antibiotics, 100 (26.7%) were resistant to all three and therefore classed as multi-drug resistant (MDR). This represents a significant increase from 16.2% in 2008 (Chi^2=12.3; P=0.0005).

Males were approximately 1.3-times more likely to have an invasive *E. faecium* infection than females (z=2.8, P=0.005). The frequency of invasive *E. faecium* infection increased with age with the majority of infections (n=324; 81%) occurring in adults over 45 years. The median age was 66 years (95%CI, 63-67).

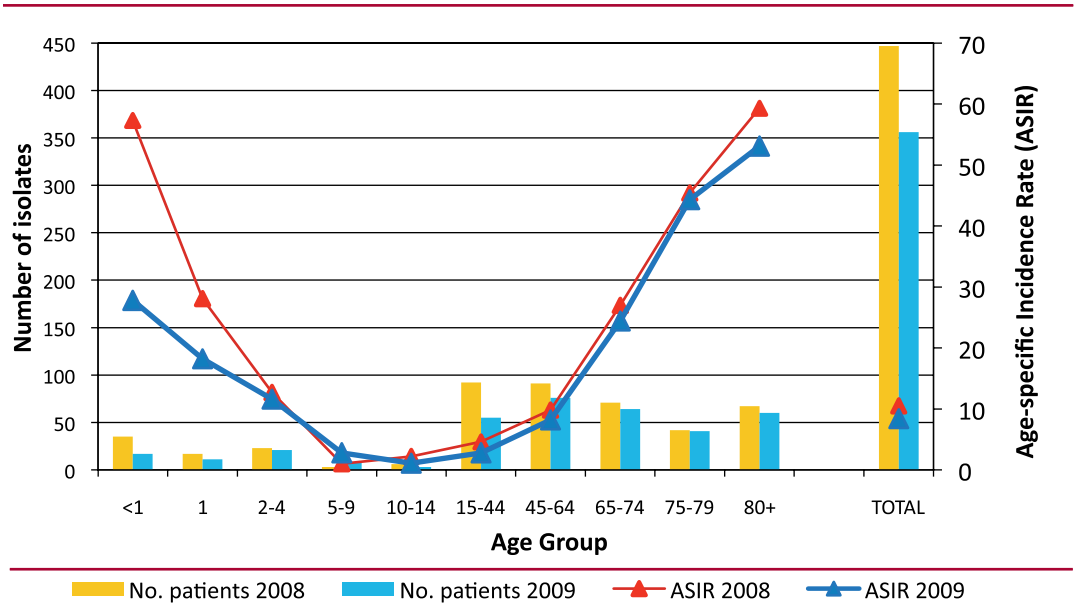

Figure 2b. Numbers and age-specific incidence rates of patients with invasive S. pneumoniae infection in 2009 compared with 2008

Escherichia coli

There were 2,064 reports of invasive *E. coli* infection (2,061 from blood and three from CSF) from 2,012 patients, an increase of 7.3% from 1,924 reports in 2008. 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 aminoglycosides (gentamicin, amikacin or tobramycin)] by year since 2002. Ciprofloxacin resistance decreased from 23.3% in 2008 to 22.3% in 2009 (non-significant; Chi^2=0.54, P=0.46). Looking at the overall trend, the proportion of ciprofloxacin resistant isolates increased significantly between 2002 and 2008 (Chi^2_{trend}=209.5, P<0.0001) (figure 4), although the rate of increase slowed down since 2006 and showed the first signs of a downward trend in 2009, but this finding is not statistically significant. The proportion of isolates with resistance to 3GCs remained the same in 2009 as in 2008 (7.5%) while resistance to gentamicin decreased from 10.2% in 2008 to 7.6% in 2009 (borderline not significant; Chi^2=7.4, P=0.064). Resistance to 3GCs, ciprofloxacin and gentamicin in *E. coli* isolates increased in many European countries in 2009, which is not the case in Ireland. 3GC and gentamicin resistance are at moderately low levels in this country, similar to those in other northern European countries, while ciprofloxacin resistance is at moderately high levels along with the majority of other European countries.

Extended spectrum beta-lactamases (ESBLs) were detected in 114 (5.8%) of 1,978 isolates tested. Although the increase in ESBLs from 5.0% in 2008 was not found to be significant (Chi^2=1.2, P=0.28), the increasing trend since 2004 (1.1%) is highly significant (Chi^2_{trend}=60.1, P<0.0001). ESBLs are enzymes that confer resistance to most penicillins and cephalosporins (including 3GCs). ESBL-producing bacteria (including *E. coli* and *K. pneumoniae*) are often resistant to other classes of antibiotics and have emerged as important causes of infections in hospitals.

Of 2,032 isolates tested against all four "indicator" antibiotics, 211 (10.4%) were identified as MDR (defined as resistance to three or more of these), including 56 with resistance to all four. The proportion of isolates that are MDR increased significantly (Chi^2_{trend}=125.3, P<0.0001) from 2.4% in 2002 when surveillance began. However, the decrease from 12.1% in 2008 was not significant (Chi^2=2.9, P=0.09).

Females were approximately 1.25-times more likely to have an invasive *E. coli* infection than males (z=4.9, P<0.0001), however males were 1.2-times more likely to get an infection with ciprofloxacin-resistant *E. coli* (z=2.3, P=0.024) and 1.2-times more likely to get an infection with MDR *E. coli* (z=1.45, P=0.15), however, the latter was not significant. The frequency of invasive *E. coli* infection increased with age with the majority of infections (n=1,597; 77%) occurring in adults over 55 years. The median age was 72 years (95%CI, 71-73).

Klebsiella pneumoniae

There were 323 reports of invasive *K. pneumoniae* infection (all from blood) from 316 patients (with 42 of 43 laboratories participating in the surveillance of this pathogen), an increase of 3.8% from 311 reports in 2008. 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 increased marginally from 12.7% in 2008 to 13.0% in 2009, while gentamicin resistance increased slightly from 10.6% to 11.1%. Neither of these increases was found to be significant. Resistance to 3GCs remained approximately stable (11.2% in 2008 vs. 11.3% in 2009). No isolates with resistance to imipenem/meropenem were reported.

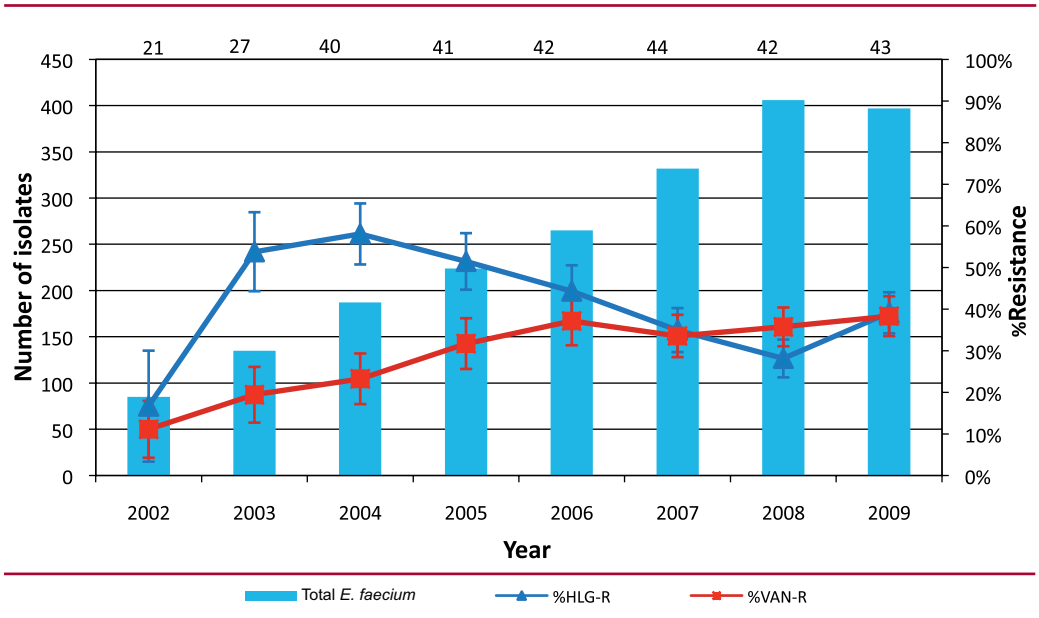

Figure 3. Trends for E. faecium – total numbers of E. faecium and percentage resistance to high-level gentamicin (HLG) and vancomycin (VAN) with 95% confidence intervals
The numbers of participating laboratories by year-end are indicated above the bars

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 25 (8.2%) of 305 isolates tested, representing a slight increase from 7.7% in 2008. Thirty-eight, or 11.9%, of 319 isolates tested against all four "indicator" antibiotics were identified as MDR, including 16 with resistance to all four, an increase from 9.9% in 2008.

Males were approximately 1.3-times more likely to have an invasive *K. pneumoniae* infection than females (z=2.3, P=0.021). The frequency of invasive *K. pneumoniae* infection increased with age with the majority of infections (n=250; 77%) occurring in adults over 50 years. The median age was 65 years (95%CI, 62-68).

Pseudomonas aeruginosa

There were 248 reports of invasive *P. aeruginosa* infection (247 from blood and one from CSF) from 236 patients (with 42 of 43 laboratories participating in the surveillance of this pathogen), an increase of 24.6% from 199 reports in 2008. 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 most significant change in the resistance proportions in 2009 compared to 2008 was for ciprofloxacin, which decreased from 21.8% to 12.1% (Chi^2=7.6, P=0.006). This may be related to a reduction in fluoroquinolone prescribing in hospitals with antibiotic stewardship interventions that targeted this class of antibiotics. Ceftazidime resistance increased from 8.7% to 11.8% but this was not significant (Chi^2=1.1, P=0.29).

Fifteen (6.4%) of 235 isolates tested against all five "indicator" antibiotics were MDR, including one with resistance to all five. This represents a decrease from 11.1% in 2008, which was not significant (Chi^2=2.95, P=0.09).

Males were approximately 1.3-times more likely to have an invasive *P. aeruginosa* infection than females (z=2.05, P=0.04). The frequency of invasive *P. aeruginosa* infection increased with age with the majority of infections (n=180; 73%) occurring in adults over 55 years. The median age was 67 years (95%CI, 65-70).

Enhanced Surveillance

EARS-Net 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 2,003 individual records (cases or isolates under the EARS-Net definition) submitted from 14 laboratories. This figure is up from the 2008 finalised figure of 1,917. The total number of records thus far for 2009 represents 40% of the total core EARS-Net

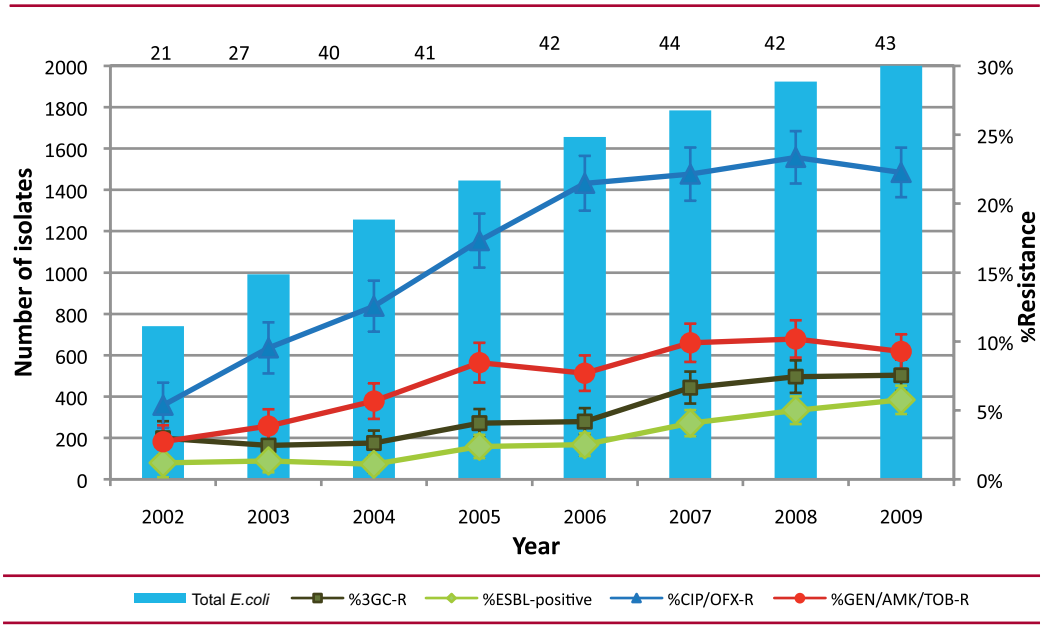

Figure 4. Trends for E. coli – total numbers of E. coli and percentage resistance to 3GCs, ciprofloxacin/ofloxacin (CIP/OFX) and gentamicin/amikacin/tobramycin (GEN/AMK/TOB), and percentage ESBL-positive with 95% confidence intervals.
The numbers of participating laboratories by year-end are indicated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

dataset. Demographic and other basic data for the major resistance profiles of EARS-Net pathogens are shown in table 2.

Analysis of consistent data from hospitals showed that the rate of clinically significant BSI that was acquired in the reporting hospital has changed for *S. aureus* infection. For MRSA, the rate decreased from 0.065 cases per 1,000 patient bed days used in 2008 to 0.058 in 2009, while the rate for MSSA increased from 0.080 in 2008 to 0.122 in 2009.

For further details, go to the HPSC website (http://www.hpsc.ie) and click on "Topics A-Z", then "Enhanced Bacteraemia Surveillance".

Conclusion

Recent improvements in infection prevention and control resources and interventions, along with hospital antibiotic stewardship programmes, may have contributed to reducing the burden of MRSA bacteraemia in Ireland since 2006. The introduction of the 7-valent pneumococcal conjugate vaccine, PCV7, into the childhood immunisation program in September 2008 has already resulted in a reduction in the burden of invasive pneumococcal disease in children. Despite these successes, AMR remains a major problem in other EARS-Net pathogens in this country, in particular the high numbers and proportions of VREfm and *E. coli* isolates that are fluoroquinolone-resistant, plus increases in ESBL-production in *E. coli* and *K. pneumoniae* and high levels of MDR in all three pathogens. AMR is also an issue in other bacterial species as well as in sites other than blood and/or CSF for which no surveillance is currently undertaken in Ireland. The observed increase in reports of MSSA bloodstream infection remains unexplained.

In addition, there are continued threats posed by emerging resistance mechanisms in these and other bacterial pathogens in other countries (e.g. carbapenemases in klebsiellae and other enterobacteriaceae, and vancomycin resistance in *S. aureus*). These current problems and future threats highlight the on-going commitment and resources that are necessary to reduce the burden of AMR and healthcare-associated infection (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 EARS-Net project.

The data presented in this report were taken from the EARS-Net database on 1st August 2010.

For further details of EARS-Net and antimicrobial resistance in Ireland see http://www.hpsc.ie

European data are available at http://ecdc.europa.eu/en/activities/surveillance/EARS-Net/Pages/Database.aspx

Table 2. Age and gender breakdown of patients by organism with major resistance profiles (data from 14 laboratories participating in enhanced surveillance). Proportion of isolates detected <48 hours and >5 days post-admission is also shown.

	Total for 2009	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	**168**	38%	69.7	1%	68%	42%	48%
MSSA	**431**	35%	60.9	4%	53%	56%	28%
PNSP	**24**	46%	60.7	13%	63%	67%	8%
PSSP	**112**	42%	56.8	5%	46%	64%	12%
FQREC	**194**	46%	70.0	0%	70%	54%	19%
FQSEC	**591**	59%	66.9	3%	63%	53%	20%
VRE	**66**	32%	61.9	0%	41%	11%	76%
VSE	**199**	45%	65.4	3%	60%	30%	44%
KPN	**134**	44%	64.2	1%	52%	49%	32%
PAE	**84**	45%	65.7	0%	60%	33%	37%

Abbreviations used (not in text): PSSP, Penicillin-susceptible S. pneumoniae; FQREC, Fluoroquinolone-resistant E. coli; FQSEC, Fluoroquinolone-susceptible E. coli; VRE, Vancomycin-resistant enterococci; VRE, Vancomycin-susceptible enterococci; KPN, Klebsiella pneumoniae; PAE, Pseudomonas aeruginosa

9.3 Healthcare-associated infection surveillance

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. 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. Participants complete the survey once weekly and capture ICU data on MRSA prevalence, transmission, bed occupancy and isolation capabilities. Data is fedback to participants on a quarterly basis to enable ICUs to monitor trends over time. Information on MRSA screening practices are also collected annually.

In 2009, 34 ICUs participated in the MRSA in ICU prevalence study, an additional two ICUs compared to 2008. 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.

There were 20 level 2/3 ICUs and 14 level 3 ICUs in 2009.

During 2009, ICU bed occupancy and isolation room occupancy were high in both level 2/3 (88% and

72%, respectively) and level 3 ICUs (89% and 79%, 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 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 reported among the 34 participating ICUs. Five ICUs were reported as having no single rooms to isolate patients (table 1). Of the remaining 29 ICUs, there were a total of 65 single rooms ranging from 1 to 6 per ICU. The ratio of single rooms to critical care beds ranged from 1:9 to 1:1.5 with 32% of ICUs falling below the recommendation of one single room to every four to six critical care beds as set out in the 2005 national MRSA guidelines. The majority (63%, n=41) of single rooms are found within level 3 ICUs (table 1). Seventy-five percent of ICUs with single rooms have one to two single rooms. All ICUs with five or more single rooms are level 3 ICUs.

All single rooms were found to be equipped with hand sinks but only 40% were found to have anterooms. On average 78% of all MRSA patients reported were capable of being isolated in 2009, similar to what was reported in 2008. Only 14.7% (n=5) of participating ICUs could successfully isolate all of their MRSA patients all of the time when surveyed, an increase from 6.3% (n = 2) in 2008. There are several reasons for this, including lack of isolation room availability, isolation room occupancy for other reasons, e.g., a risk assessment prioritises other patients with infectious disease for a room, (e.g., tuberculosis), or insufficient staff available to care for a patient in an isolation room. The data showed that on average 19.5% of all ICU patients were isolated in 2009; another 3.3% required isolation but could not be isolated due to a lack of facilities. This data does not include isolation of patients in designated cohort areas.

As recommended in national MRSA guidelines, all ICUs screen for MRSA colonisation on admission to ICU and weekly thereafter. However, different hospitals are using screening methodologies with different levels of sensitivity. Effective control of MRSA in a hospital setting hinges on early detection and early isolation of patients who are found to be colonised or infected with MRSA. It is difficult to control MRSA transmission 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 MRSA containment a difficult issue. An improvement in the time to diagnose patients along with an improvement in isolation room resources would enhance efforts to minimise ICU transmission of MRSA.

The mean prevalence of MRSA within participating ICUs ranged nationally from 1.4% to 21.2%, with a median of 9.3%. 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 (figure 1). The level 2/3 ICU group had a median MRSA prevalence of 7.9% in 2009, up from 5.9% in 2008. The level 3 group had a significantly higher median prevalence of 9.6%, ($p < 0.001$) in 2009, down from 13% in 2008.

Transmission of MRSA in the ICU was monitored by capturing the weekly proportion of MRSA that were ICU-acquired. The mean weekly proportion of ICU-acquired MRSA varied nationally from 0 to 2.9% in 2009 with a national median of 0.6%. No difference was observed in the proportion of ICU-acquired MRSA between level 2/3 (median = 0.6%) and level 3 ICUs (median = 0.5%). Since April 2008, the majority of ICUs (82%) reported that <1.5% of MRSA cases were acquired in the ICU indicating that figures on MRSA transmission in the majority of ICUs is low (figure 2).

While there are several limitations to using a simple point prevalence surveillance tool, this project has allowed the collation of national data within current resources which have provided valuable insights into

Table 1: Number of single 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=24)	0	4	1		
	1	1	4	5	
	2	1	1	1	
	4		1	1	
Level 3 (n=41)	1		4	1	
	2				3
	3				1
	4				1
	5				1
	6				3

Table 2: National data on alcohol hand rub consumption in acute public hospitals in Ireland, 2006 – 2009.

	Year			
	2006	2007	2008	2009
Number of participating hospitals	52	50	50	49
Minimum value	0.5	5.2	5.9	7.8
National consumption rate*	**10.5**	**15.0**	**18.7¥**	**21.2**
Maximum value	29	47.1	52.5	48

* The consumption rate is the total volume of alcohol hand rub consumed in the defined time period (in litres) per 1,000 bed days used. The national rate represents the median of the national sample for each time period.

¥ An error was made in the 2008 annual report where a national consumption rate of 19.5 was reported. This has now been corrected to 18.7.

the burden of MRSA in Irish ICUs. The prevalence of MRSA is significantly higher in level 3 ICUs compared to level 2/3 ICUs. This is most likely due to the difference in patient case-mix between groups. Level 3 ICUs are mainly based in tertiary referral hospitals and thus cater for a complex patient population with a higher risk of acquiring MRSA prior to ICU admission and post admission through increased intensity of care.

Since the prevalence 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 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. Moreover, many ICUs do not capture APACHE scores on all patients. 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 data on MRSA over time at a local level and feedback to their local infection prevention and control team and management team. It is unsuitable to compare individual ICUs due to the large variability in patient case-mix.

HPSC plan to continue to improve this project in 2010 to allow hospitals capture other aspects of infection prevention and control such as the staff to patient ratio as a predictor of cross-infection. 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 2).

In 2009 the median rate of alcohol hand rub consumption increased to 21.2 litres per 1,000 bed-days used, from 18.7 in 2008. This represents a 13% increase in national consumption since 2008 and a 100% overall increase in consumption since surveillance began in 2006 (table 2). This increase between 2006 and 2009 could be explained in part by the increased importance placed on hand hygiene since the publication of the national hand hygiene 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 2) may be largely explained

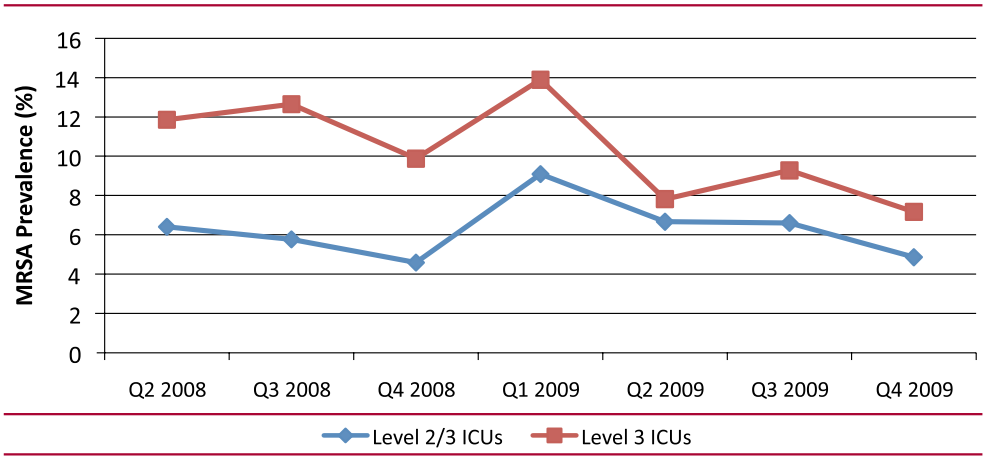

Figure 1. National trends on the median MRSA prevalence in Irish ICUs stratified by ICU type, 2008 – 2009.

by differences in methodologies for collecting and reporting the data, and difference in types and range of hand hygiene agents used.

The main limitations to be noted when examining the data in table 2 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 a hand hygiene observation audit tool and standard operating procedure for use in acute hospitals was developed in conjunction with the Infection Prevention Society.(http://www.hpsc.ie/hpsc/A-Z/Gastroenteric/Handwashing/)

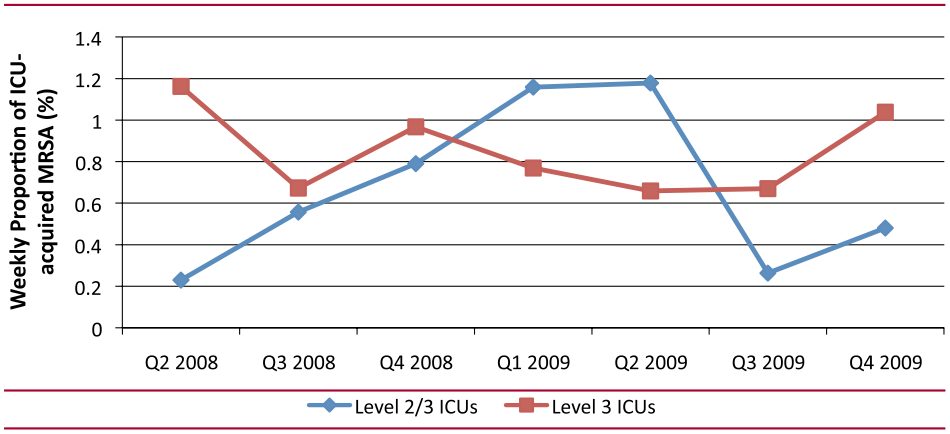

Figure 2. National trends in the average weekly proportion of ICU-acquired MRSA by ICU type, 2008 - 2009

9.4 *Clostridium difficile*-associated disease in Ireland

***Clostridium difficile* as a notifiable disease**
New cases of *Clostridium difficile*-associated disease (CDAD) in persons two years or older have been notifiable in Ireland under the disease category acute infectious gastroenteritis (AIG) since 4th May 2008. Recurrent CDAD cases are not currently notifiable.

There were 4,359 notifications of acute infectious gastroenteritis (AIG) in 2009, of which 1,897 (44%) were new CDAD cases, giving a national crude incidence rate (CIR) of 44.7 new CDAD cases per 100,000 population. All cases were laboratory confirmed. This represents a decrease from 56.9 cases per 100,000 population reported in 2008 (table 1). Regional variation was observed in the incidence of CDAD (table 1); however, this most likely reflects differences in diagnosis and reporting rather than true variation in disease incidence.

As in 2008, new cases of CDAD in 2009 were more prominent in female patients (57.6%) and older age groups. The mean age of cases was 71 years (range 2-102 years) (figure 1) and 1418 cases (74.7%) were reported in the over 65 year age category. Of note, the 75-84 year age group had the highest number of cases (615, representing 43% of the over 65 year age group).

The majority of CDAD cases (67%) were notified by healthcare institutions. Patients classified as 'hospital inpatient' had the highest occurrence of cases accounting for 64% of all cases notified.

Of the remaining, 9% were classified as GP patients, 3% hospital outpatient, 2% as 'other' and 22% as either 'not specified' or 'unknown'. However, this data does not provide information on the origin or onset of CDAD; rather it represents the location of the patient at CDAD diagnosis. Information on the origin and onset of CDAD cases is collected as part of the enhanced surveillance system.

The seasonal trend is indistinguishable at present as only one complete annual data set is available. In addition, identification of seasonal patterns is hindered by late and batch notifications from institutions.

In 2009, nine *Clostridium difficile* outbreaks, all healthcare-associated, involving 50 patients were notified on CIDR (table 2). Six of these were linked to hospitals, two to nursing homes and one to a long-term care facility.

***C. difficile* Enhanced Surveillance**
Although the information notified through CIDR has given important preliminary information on the burden of new cases of CDAD in Ireland, it represents an underestimate of the true burden of infection (capturing new cases only) and does not capture information on

Table 1. Number of notified cases, crude incidence rate of CDAD in Ireland by HSE area, 2009, and total number with estimated crude incidence rate for 2008.

HSE Area	No. of cases	*CIR incl. 95% C.I.
East	705	47 [43.5 - 50.5]
Midlands	44	17.5 [12.3 - 22.7]
Mid West	184	51 [43.6 - 58.4]
North East	84	21.3 [16.7 - 25.9]
North West	133	56.1 [46.6 - 65.6]
South East	251	54.5 [47.8 - 61.2]
South	237	38.2 [33.3 - 43.1]
West	259	62.5 [54.9 - 70.1]
Total 2009	1897	44.7 [42.7 - 46.7]
Total 2008**	1624	56.9 [54.6 - 59.2]**

* Rates calculated using 2006 census data

** Using the number of notifications over the 35 week period in 2008, the estimated CIR for a 52 week period was calculated

Table 2. C. difficile outbreaks reported in Ireland in 2009 by HSE area

HSE Region	Outbreak location	Total number ill
East	Nursing Home	6
Mid-West	Hospital	3
Mid-West	Hospital	19
North East	Hospital	7
North East	Nursing Home	2
North East	Hospital	4
South	Comm. Hosp /Long-stay unit	2
South	Hospital	3
West	Hospital	4

the origin or onset of cases. Since 1st August 2009, national collation of *C. difficile* enhanced surveillance commenced on a voluntary basis in Ireland. Information on case type, origin, onset and severity of CDAD is collected. CDAD case definitions proposed by the European Centre for Disease Control are employed. By the end of 2009, 33 hospitals were participating, corresponding to 30 acute public hospitals (seven regional, 21 general, two specialist hospitals) and three private hospitals.

From August to December 2009, there were 527 cases of CDAD reported to the enhanced surveillance project, 444 (84.3%) new cases and 79 (15%) recurrent CDAD. Of these, 337 (64%) originated within the participating hospital. This corresponds to an overall national CDAD incidence rate of 3.2 cases per 10,000 bed days used. This rate is based only on the number of cases that originated in the participating healthcare facility and is calculated using acute public hospital activity data from the National Hospitals Office at the Health Services Executive. There was a wide range in the incidence of CDAD infection among participating hospitals (range, 0 – 8.6 cases per 10,000 bed days used, median, 2.7 cases) with general hospitals showing a higher median incidence rate (CDAD rate = 3.8, n = 21) compared to tertiary hospitals (CDAD rate = 3.0, n = 7) over the five month period. This is likely due to the differences in patient case mix, *C. difficile* ribotypes, testing facilities and practices, antibiotic policies and surveillance resources between hospitals.

Most cases were in females (59%) and in the over 65 age group (74%). While the majority of cases were associated with healthcare facilities, specifically acute hospitals (78%), 15% of all CDAD cases were community-associated (figure 2). Ten percent of all healthcare-associated cases originated in nursing homes. Of note, while the majority of patients with CDAD had onset of symptoms in a healthcare facility (75%), predominantly in acute hospitals (acute hospitals 90%, nursing homes, 9%), a significant proportion of patients with CDAD had onset of symptoms in the community (24%) (figure 2).

There was a low incidence of severe CDAD (defined as admission to ICU or surgery due to complications arising from CDAD) reported in 2009 (1%, n = 5).

National Typing Project

In March 2009, HPSC in conjunction with St. Vincent's University Hospital and University College Dublin conducted a one month national *C. difficile* typing study. Participating healthcare facilities collected clinical details of all CDAD cases in March 2009, which included; case type, onset and origin of CDAD, antimicrobial exposure prior to diagnosis and case

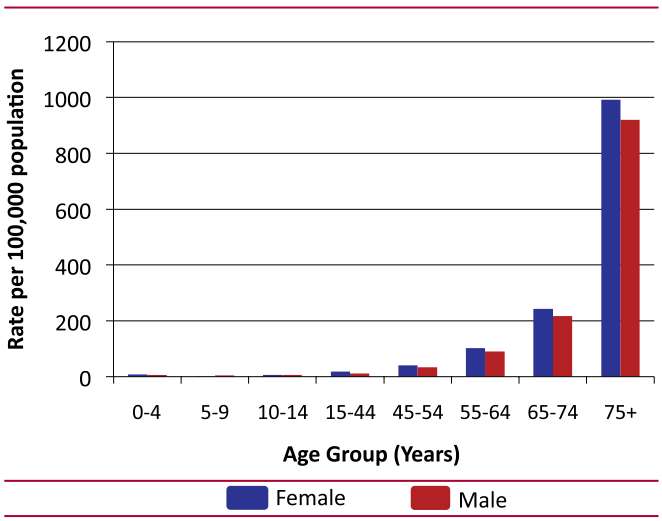

Figure 1: Age and Sex distribution of CDAD in Ireland, 2009

*Rates calculated using 2006 census data

severity. In addition, faecal specimens from patients with CDAD were submitted for PCR ribotyping.

Information on 211 CDAD cases was submitted from 33 inpatient healthcare facilities. The national median CDAD rate in acute hospitals was 2/10,000 bed days used (range 0 - 13).

Seventy-nine percent of cases (166) were new and 18% (38) were recurrent. The median age of cases was 78 years and 76% of patients (160) had received antimicrobial therapy within eight weeks prior to CDAD diagnosis. Eighty-three percent of cases (176) were healthcare-associated, of which 13% (23) originated in nursing homes. Ten percent (21) of cases were community-associated.

Thirty-four percent of toxin-positive faecal specimens submitted (72) failed to grow *C. difficile* on culture. Of the 139 samples successfully cultured, the most common ribotypes encountered were; 027 (19%), 001 (16%), 106 (13%), 078 (10%) and 014 (8%). Ribotypes 001 (21%), 027 (20.7%) and 106 (19.5%) predominated among new cases with 027 (37.5%), 001 (21%) and 078 (16.6%) among recurrent cases.

Conclusion

The collation of national data on *C. difficile* through both surveillance systems has provided a valuable insight into the burden of CDAD in Ireland.

Data to date suggests a decline in the number of new CDAD cases reported in 2009 compared to 2008, however, due to the large weekly variability in the data it is too soon to determine if this decline is significant.

Fifteen percent of all CDAD cases reported in 2009 were recurrent infections. Recurrence of CDAD is difficult to manage clinically, can result in severe infection, places a burden on already limited isolation resources and results in significant patient morbidity. Therefore, knowledge of the burden of recurrent CDAD in Ireland is important to help guide preventative strategies.

During 2009, 15% of all CDAD cases from hospital inpatients (including patients admitted through emergency departments and outpatient clinics) were associated with the community and 10% of cases were associated with nursing homes. This indicates that *C. difficile* is no longer an infection limited to the hospital setting. Moreover a quarter of all cases had onset of symptoms in the community. This information collected on the burden of CDAD outside acute hospitals will help to direct appropriate preventative and control programmes at a national level.

In March 2009, national *C .difficile* ribotype data was collected for the first time. In addition to highlighting the burden of CDAD outside acute care facilities, this study demonstrated the overall predominance of PCR ribotype 027 at this time.

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/) and hospital antibiotic stewardship guidelines available at http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/StrategyforthecontrolofAntimicrobialResistanceinIrelandSARI/AntibioticStewardship/Publications/. All healthcare professionals must promote practices known to reduce the incidence of CDAD including; antimicrobial stewardship and compliance with infection prevention and control measures. These measures are outlined in the national guidelines.

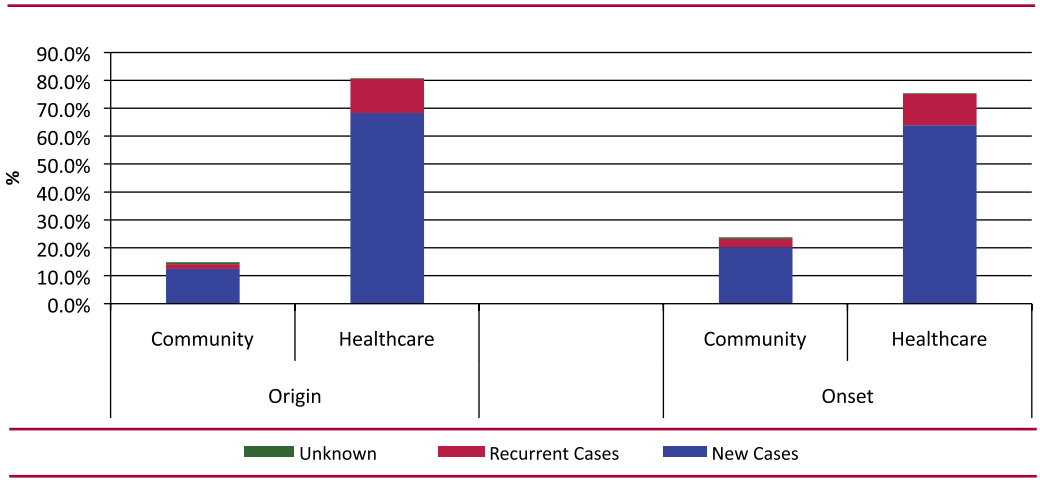

Figure 2. Origin and Onset of CDAD Cases by Case Type, Aug – Dec 2009

10

Computerised Infectious Disease Reporting System (CIDR)

10. Computerised Infectious Disease Reporting (CIDR)

Summary

- CIDR continued to support an increasing number of infectious disease notifications through 2009
- CIDR coped well with 2009 influenza A (H1N1) Pandemic 2009 although significant challenges were posed and lessons learned
- CIDR went live in HSE West, including Public Health in Merlin Park, and the laboratories in University College Hospital Galway, Portiuncula Hospital and Mayo General Hospital
- CIDR Disaster Recovery Site relocated to HSE National Data Hosting Centre

Increased Number of Infectious Disease Notifications on CIDR Through 2009

CIDR continued to support infectious disease surveillance and reporting through 2009 as activity increased over previous years (see Figure 1). Although a proportion of this increased activity was associated with the H1N1 influenza pandemic there was also increased activity in relation to mumps notifications.

2009 Influenza A (H1N1) Pandemic

The major event in 2009 in relation to CIDR, as for the rest of HPSC, was the 2009 Influenza A (H1N1) Pandemic from April 25th to the end of 2009. For the CIDR team the immediate initial task was to define 2009 pandemic influenza A (H1N1) as a new notifiable condition in CIDR and 2009 pandemic influenza A (H1N1) virus as a new organism. CIDR user data access rights needed to be updated to allow pandemic influenza to be managed as a national outbreak in CIDR. The CIDR team worked closely with the National Pandemic Influenza Epidemiological Team within HPSC to identify the additional 'enhanced' information that needed to be collected and to configure CIDR to collect this information. The large number of these 'enhanced' data items (163 during the initial 'containment' phase of the pandemic), over and above core variables and laboratory results, was a major challenge. Additional work was then required to enable these data to be readily retrieved for reporting purposes. Additional 'enhanced' data items were also required to be recorded in conjunction with outbreaks of pandemic influenza, again over and above those associated with individual cases or events.

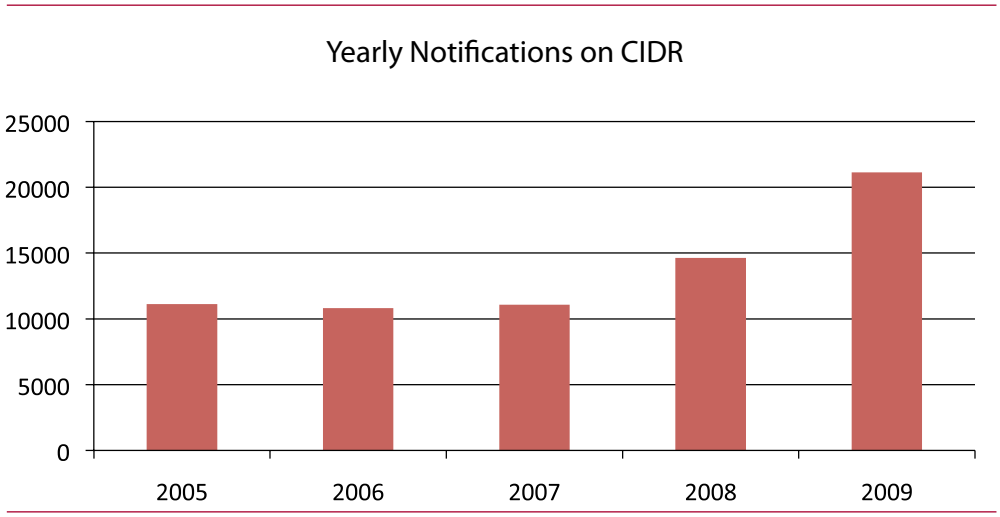

Figure 1. The increase in infectious disease notifications recorded in CIDR since the system went 'live' at the beginning of 2005

Rapidly evolving and expanding reporting requirements for local, regional, national and international reporting of 2009 pandemic influenza A(H1N1) posed a particular challenge on several fronts. The version of reporting software had been significantly updated at the end of 2008 but users (and the CIDR team supporting them) were still familiarising themselves with this when the pandemic occurred. The number, size and complexity of the reports required during the 2009 influenza A (H1N1) pandemic were much greater than the CIDR team might have envisaged beforehand and it was a major challenge to ensure that ongoing reporting needs were met whilst at the same time keeping the CIDR system stable and running. It was also a challenge to ensure that CIDR users were aware of what CIDR could and could not do. Nonetheless the reporting functionality of CIDR was highly praised. It was used to produce the daily EPI report and retrieve real-time data. The standard reports for the National Public Health Emergency Team (NPHET) and the Pandemic Influenza Expert Group (PIEG) etc were very impressive. The system was found to be very flexible for facilitating ad-hoc analysis and queries with a great capacity for diverse reports. CIDR enhanced the profile of HPSC in relation to data management / data quality / response – underscored by the fact that Ireland was one of first countries in EU reporting on surveillance of initial cases, and also hospitalised cases. The system facilitated the national collection of standardised data that would not have been as easy to achieve using stand-alone local health area data systems that were in use pre-CIDR.

Although the new version of CIDR had been extensively load and stress tested before it was deployed in December 2008, it was not possible to anticipate all of the stresses and strains associated with its real life use during a pandemic. The large number of enhanced questions (163) on events of pandemic influenza began to cause significant problems / system errors from the beginning of July as the numbers of events began to increase rapidly (see Figure 2) and multiple users were seeking to enter data at the same time to meet reporting deadlines. Fortunately a decision in the middle of July to move from the containment phase to the mitigation phase was accompanied by a significant reduction in the number of enhanced questions (to 49) which resulted in these errors no longer being encountered.

A number of changes to the CIDR software (some of which were specified before the pandemic but unfortunately had not been developed at that time) are being made to address many of these issues before the occurrence of the next pandemic.

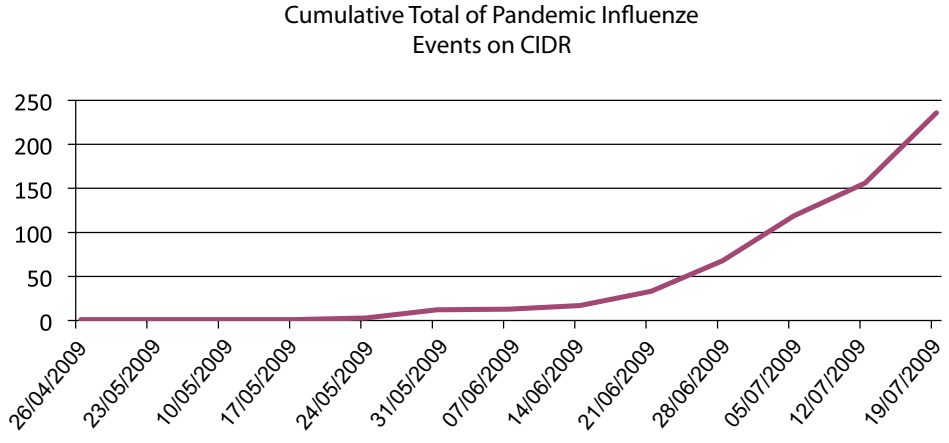

Figure 2. The increase in events of Pandemic influenza on CIDR from 26/04/2009 (Week 17) to 19/07/2009 (Week 29)

Despite the focus on pandemic influenza through 2009 it was also essential to ensure CIDR continued to be able to record and retrieve data for the rest of the notifiable diseases.

CIDR Implementation in HSE West

Another significant milestone achieved in April 2009 was the implementation of CIDR in the Department of Public Health in Merlin Park in Galway and in the laboratories in University College Hospital Galway (UCHG), in Portiuncula Hospital in Ballinasloe, and in Mayo General Hospital in Castlebar. This required significant effort to map existing business processes to identify how to meet these needs within CIDR and to align local personally identifiable data with the anonymised historic HSE West data already loaded into CIDR for national reporting purposes. There was similarly significant work with the laboratories to configure them on CIDR before everyone could go live. HPSC delivered a number of training courses to HSE West Public and laboratory staff to support the go-live that occurred on April 20th. Unfortunately this proved to be a go-live date that immediately became problematic with the declaration of the influenza pandemic by the World Health Organisation the following weekend. A CIDR go-live is a challenge for everyone at the best of times and it is to the credit of our colleagues in HSE West as well as the CIDR team that this particular additional challenge was overcome.

CIDR Disaster Recovery Site relocated to HSE National Data Hosting Centre

An essential element of the CIDR system is the 'Disaster Recovery' (DR) system that enables CIDR to continue to be accessible to users if the main system becomes unavailable because of hardware, software or connectivity problems. This DR site has been located in the Data Centre at Fujitsu's premises in Swords in County Dublin since the system was first built in 2004. Fujitsu were unfortunately unable to continue to provide this service beyond 2009 and it became necessary to find an alternative site. With the help of HSE ICT staff, and supported by Fujitsu, the CIDR team relocated the CIDR DR equipment to the new HSE National Data Hosting Centre in Clonshaugh, Co. Dublin, in August to ensure this backup CIDR system would continue to be available.

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Appendix 1
Notifiable Infectious Diseases in Ireland

Notes:

Figures for the year 2009 presented in this appendix were extracted from the Computerised Infectious Disease Reporting (CIDR) system on the 9th September 2010. 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.

Please note that the pandemic period in the influenza chapter extends from week 17, 2009 to week 32, 2010 and does not include the period weeks 1-16, 2009.

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, 2007-2009 and crude incidence rates of diseases, 2009

Infectious Disease	2007	2008	2009	CIR* 2009
Acute infectious gastroenteritis	2522	4178	4359	102.81
Bacillus cereus food-borne infection or intoxication	0	0	1	0.02
Bacterial meningitis (not otherwise specified)	33	40	40	0.94
Botulism	0	7	0	0.00
Brucellosis	28	3	0	0.00
Campylobacter infection	1890	1747	1808	42.64
Clostridium perfringens (type A) food-borne disease	0	1	1	0.02
Creutzfeldt Jakob disease	3	2	5	0.12
Cryptosporidiosis	609	415	445	10.50
Echinococcosis	0	2	1	0.02
Enterohaemorrhagic Escherichia coli	192	238	255	6.01
Giardiasis	62	71	61	1.44
Haemophilus influenzae disease (invasive)	31	22	43	1.01
Hepatitis A (acute)	32	42	50	1.18
Hepatitis B (acute and chronic)	860	931	824	19.43
Hepatitis C	1552	1527	1259	29.69
Influenza	280	473	484**	11.42
Legionellosis	16	12	9	0.21
Leptospirosis	22	29	24	0.57
Listeriosis	21	13	10	0.24
Malaria	71	82	90	2.12
Measles	53	55	162	3.82
Meningococcal disease	179	168	147	3.47
Mumps	142	1380	3629	85.59
Noroviral infection	1313	1770	1638	38.63
Pandemic H1N1 (2009)	0	0	4572	107.83
Paratyphoid	4	8	8	0.19

Infectious Disease	2007	2008	2009	CIR* 2009
Pertussis	77	104	78	1.84
Q fever	17	13	17	0.40
Rubella	19	40	19	0.45
Salmonellosis	456	449	333	7.85
Shigellosis	43	76	71	1.67
Staphylococcal food poisoning	0	1	1	0.02
Streptococcus group A infection (invasive)	57	70	60	1.42
Streptococcus pneumoniae infection (invasive)	361	465	433	10.21
Tetanus	1	2	0	0.00
Toxoplasmosis	49	49	37	0.87
Trichinosis	2	0	0	0.00
Typhoid	9	5	9	0.21
Viral encephalitis	8	5	5	0.12
Viral meningitis	45	97	142	3.35
Yersiniosis	7	3	3	0.07
Total	**11066**	**14595**	**21133**	**498.44**

See explanatory note on first page of Appendix 1.
*Crude incidence rate per 100,000 total population.
** 134 of these cases were possibly due to 2009 pandemic influenza as they occurred between weeks 17 and 52, 2009, but were reported as influenza.

Table A1.3 Number of notifiable infectious diseases by HSE area, 2009

Infectious Disease	HSE-E	HSE-M	HSE-MW	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Total
Acute infectious gastroenteritis	1204	206	294	211	305	721	693	725	4359
Bacillus cereus food-borne infection or intoxication	*	*	*	*	*	*	*	*	1
Bacterial meningitis (not otherwise specified)	13	4	2	0	0	6	8	7	40
Campylobacter infection	612	111	159	135	82	193	280	236	1808
Clostridium perfringens (type A) food-borne disease	*	*	*	*	*	*	*	*	1
Creutzfeldt Jakob disease	3	0	0	1	0	1	0	0	5
Cryptosporidiosis	11	60	56	30	29	72	79	108	445
Echinococcosis	*	*	*	*	*	*	*	*	1
Enterohaemorrhagic Escherichia coli	31	20	45	8	31	34	56	30	255
Giardiasis	29	1	1	7	1	2	10	10	61
Haemophilus influenzae disease (invasive)	12	3	8	1	1	5	8	5	43
Hepatitis A (acute)	34	1	1	1	5	3	3	2	50
Hepatitis B (acute and chronic)	473	31	59	46	17	60	73	65	824
Hepatitis C	929	47	48	49	24	42	72	48	1259
Influenza	107	20	134	15	15	26	144	23	484**
Legionellosis	4	2	1	0	2	0	0	0	9
Leptospirosis	6	0	5	3	0	5	4	1	24
Listeriosis	2	1	3	0	0	2	1	1	10
Malaria	33	10	10	10	2	2	11	12	90
Measles	30	3	3	3	0	37	52	34	162
Meningococcal disease	49	8	16	17	8	15	23	11	147
Mumps	974	142	341	333	156	300	559	824	3629
Noroviral infection	593	83	186	241	96	62	223	154	1638
Pandemic H1N1 (2009)	1471	165	335	329	223	399	913	737	4572
Paratyphoid	4	0	0	1	0	3	0	0	8
Pertussis	23	6	17	7	7	3	10	5	78
Q fever	0	1	0	1	0	0	14	1	17

Infectious Disease	HSE-E	HSE-M	HSE-MW	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Total
Rubella	11	0	2	0	1	4	1	0	19
Salmonellosis	127	22	24	38	24	37	35	26	333
Shigellosis	40	7	6	3	1	2	6	6	71
Staphylococcal food poisoning	*	*	*	*	*	*	*	*	1
Streptococcus group A infection (invasive)	32	2	5	3	1	8	5	4	60
Streptococcus pneumoniae infection (invasive)	152	15	27	19	23	99	59	39	433
Toxoplasmosis	13	1	3	0	3	0	12	5	37
Typhoid	5	0	2	0	0	1	1	0	9
Viral encephalitis	0	0	0	0	0	3	0	2	5
Viral meningitis	56	5	6	17	5	15	20	18	142
Yersiniosis	*	*	*	*	*	*	*	*	3
Total	**7087**	**977**	**1800**	**1531**	**1062**	**2162**	**3375**	**3139**	**21133**

See explanatory note on first page of Appendix 1.
*Data not reported to HSE area level when total number in Ireland <5 cases.
** 134 of these cases were possibly due to 2009 pandemic influenza as they occurred between weeks 17 and 52, 2009, but were reported as influenza.

Table A1.4 Number of notifiable infectious diseases by age group (years), 2009

Infectious Disease	0-4	5-9	10-14	15-19	20-24	30-34	35-44	45-54	55-64	65+	Unknown	Total
Acute infectious gastroenteritis	2354	60	13	12	28	65	74	102	202	1417	32	4359
Bacillus cereus food-borne infection or intoxication	0	0	0	0	0	0	1	0	0	0	0	1
Bacterial meningitis (not otherwise specified)	18	1	2	3	0	4	4	4	2	2	0	40
Campylobacter infection	499	134	72	92	134	245	163	166	122	180	1	1808
Clostridium perfringens (type A) food-borne disease	0	0	0	0	0	0	0	1	0	0	0	1
Creutzfeldt Jakob disease	0	0	0	0	0	0	0	0	1	4	0	5
Cryptosporidiosis	277	90	38	9	5	10	4	3	3	6	0	445
Echinococcosis	0	0	0	0	1	0	0	0	0	0	0	1
Enterohaemorrhagic Escherichia coli	123	27	13	6	8	18	22	12	13	13	0	255
Giardiasis	6	2	0	1	3	24	10	8	3	4	0	61
Haemophilus influenzae disease (invasive)	8	5	2	0	0	3	3	0	6	16	0	43
Hepatitis A (acute)	4	9	3	0	8	9	6	3	3	5	0	50
Hepatitis B (acute and chronic)	5	0	7	35	136	360	165	73	28	13	2	824
Hepatitis C	4	2	0	13	91	561	338	177	57	14	2	1259
Influenza	92	31	22	30	26	86	72	46	32	41	6	484*
Legionellosis	0	0	0	0	0	0	1	2	4	2	0	9
Leptospirosis	0	0	0	1	2	7	5	3	4	2	0	24
Listeriosis	0	0	0	0	0	1	0	2	2	5	0	10
Malaria	6	11	4	6	7	25	22	6	1	2	0	90
Measles	88	28	18	11	6	9	0	0	0	0	2	162
Meningococcal disease	81	11	6	21	9	3	4	3	1	8	0	147
Mumps	74	108	204	990	1305	643	142	66	37	26	34	3629
Noroviral infection	96	12	9	17	40	55	51	76	133	1087	62	1638
Pandemic H1N1 (2009)	561	665	660	645	457	679	438	267	131	56	13	4572
Paratyphoid	0	3	0	2	1	1	0	1	0	0	0	8
Pertussis	64	3	5	2	0	1	1	1	1	0	0	78
Q fever	1	0	1	1	0	3	4	2	3	2	0	17
Rubella	15	1	1	0	1	1	0	0	0	0	0	19
Salmonellosis	72	28	17	19	29	53	37	29	17	32	0	333

Infectious Disease	0-4	5-9	10-14	15-19	20-24	30-34	35-44	45-54	55-64	65+	Unknown	Total
Shigellosis	12	3	1	1	9	20	10	10	5	0	0	71
Staphylococcal food poisoning	1	0	0	0	0	0	0	0	0	0	0	1
Streptococcus group A infection (invasive)	9	1	3	0	1	6	7	6	6	21	0	60
Streptococcus pneumoniae infection (invasive)	52	10	6	5	11	28	32	40	53	196	0	433
Toxoplasmosis	0	0	1	2	5	19	5	2	1	2	0	37
Typhoid	1	1	0	0	1	4	2	0	0	0	0	9
Viral encephalitis	0	0	0	0	0	0	2	1	0	2	0	5
Viral meningitis	46	10	4	12	13	24	23	5	3	2	0	142
Yersiniosis	0	0	1	0	1	1	0	0	0	0	0	3
Total	**4569**	**1256**	**1113**	**1936**	**2338**	**2968**	**1648**	**1117**	**874**	**3160**	**154**	**21133**

See explanatory note on first page of Appendix 1

*134 of these cases were possibly due to 2009 pandemic influenza as they occurred between weeks 17 and 52, 2009, but were reported as influenza.

Table A1.5 Number of notifiable infectious diseases by gender, 2009

Infectious Disease	Male	Female	Unknown	Total
Acute infectious gastroenteritis	2098	2248	13	4359
Bacillus cereus food-borne infection or intoxication	1	0	0	1
Bacterial meningitis (not otherwise specified)	21	19	0	40
Campylobacter infection	953	846	9	1808
Clostridium perfringens (type A) food-borne disease	0	1	0	1
Creutzfeldt Jakob disease	4	1	0	5
Cryptosporidiosis	243	200	2	445
Echinococcosis	0	1	0	1
Enterohaemorrhagic Escherichia coli	131	124	0	255
Giardiasis	29	32	0	61
Haemophilus influenzae disease (invasive)	23	20	0	43
Hepatitis A (acute)	26	24	0	50
Hepatitis B (acute and chronic)	470	330	24	824
Hepatitis C	826	411	22	1259
Influenza	223	258	3	484*
Legionellosis	5	4	0	9
Leptospirosis	23	1	0	24
Listeriosis	5	5	0	10
Malaria	57	33	0	90
Measles	87	74	1	162
Meningococcal disease	82	64	1	147
Mumps	1964	1649	16	3629
Noroviral infection	703	934	1	1638
Pandemic H1N1 (2009)	2112	2440	20	4572
Paratyphoid	6	2	0	8
Pertussis	37	39	2	78
Q fever	7	10	0	17
Rubella	11	8	0	19
Salmonellosis	172	160	1	333
Shigellosis	40	31	0	71
Staphylococcal food poisoning	1	0	0	1
Streptococcus group A infection (invasive)	34	26	0	60
Streptococcus pneumoniae infection (invasive)	240	193	0	433

Infectious Disease	Male	Female	Unknown	Total
Toxoplasmosis	9	28	0	37
Typhoid	7	2	0	9
Viral encephalitis	3	2	0	5
Viral meningitis	80	61	1	142
Yersiniosis	1	1	1	3
Total	**10734**	**10282**	**117**	**21133**

See explanatory note on first page of Appendix 1
*134 of these cases were possibly due to 2009 pandemic influenza as they occurred between weeks 17 and 52, 2009, but were reported as influenza.

Table A1.6 Number of notifiable infectious diseases by case classification, 2009

Infectious Disease	Confirmed	Probable	Possible	Not Specified	Total
Acute infectious gastroenteritis	4251	108	0	0	4359
Bacillus cereus food-borne infection or intoxication	1	0	0	0	1
Bacterial meningitis (not otherwise specified)	17	10	13	0	40
Campylobacter infection	1802	3	0	3	1808
Clostridium perfringens (type A) food-borne disease	1	0	0	0	1
Creutzfeldt Jakob disease	5	0	0	0	5
Cryptosporidiosis	445	0	0	0	445
Echinococcosis	1	0	0	0	1
Enterohaemorrhagic Escherichia coli	250	5	0	0	255
Giardiasis	61	0	0	0	61
Haemophilus influenzae disease (invasive)	43	0	0	0	43
Hepatitis A (acute)	49	0	1	0	50
Hepatitis B (acute and chronic)	822	2	0	0	824
Hepatitis C	1258	0	0	1	1259
Influenza	443	0	37	4	484**
Legionellosis	8	1	0	0	9
Leptospirosis	24	0	0	0	24
Listeriosis	10	0	0	0	10
Malaria	90	0	0	0	90
Measles	103	0	58	1	162
Meningococcal disease**	130	4	13	0	147
Mumps	1375	417	1803	34	3629
Noroviral infection	1541	97	0	0	1638
Pandemic H1N1 (2009)	4521	2	49	0	4572
Paratyphoid	8	0	0	0	8
Pertussis	61	0	15	2	78
Q fever	17	0	0	0	17
Rubella	1	0	18	0	19
Salmonellosis	332	1	0	0	333
Shigellosis	71	0	0	0	71
Staphylococcal food poisoning	1	0	0	0	1
Streptococcus group A infection (invasive)	60	0	0	0	60
Streptococcus pneumoniae infection (invasive)	356	69	8	0	433
Toxoplasmosis	37	0	0	0	37
Typhoid	9	0	0	0	9
Viral encephalitis	4	0	1	0	5
Viral meningitis	106	0	0	36	142
Yersiniosis	3	0	0	0	3
Total	**18317**	**719**	**2016**	**81**	**21133**

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.

** 134 of these cases were possibly due to 2009 pandemic influenza as they occurred between weeks 17 and 52, 2009, but were reported as influenza.

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Appendix 2
Immunisation Uptake in Ireland

Table A2.1 Immunisation uptake (%) at 12 months of age in 2009 (i.e. cohort born 01/01/2008-31/12/2008), based on available data*

HSE Area	Local Health Office/HSE Area	Number in cohort for BCG †	Number in cohort for D_3, T_3, P_3 & $Polio_3$ †	Immunisation Uptake (%)†							
				BCG†	D_3	Hib_3	$Polio_3$	$HepB_3$	$MenC_3$	$MenC_2$	PCV_2
HSE-E	Dublin South	na	1565	na	91	91	91	88	90	90	89
	Dublin South East	na	1476	na	93	93	93	92	89	91	90
	Dublin South City	na	1766	na	85	85	85	90	76	89	89
	Dublin South West	na	2619	na	93	92	93	92	90	91	92
	Dublin West	na	2847	na	85	85	85	86	82	86	85
	Dublin North West	na	3889	na	84	84	84	84	81	82	82
	Dublin North Central	na	1722	na	90	89	90	90	85	88	88
	Dublin North	na	4375	na	89	89	89	89	87	88	89
	Kildare/West Wicklow	na	4392	na	82	82	82	86	77	86	86
	Wicklow	na	2114	na	87	87	87	87	85	87	87
	HSE-E Total	**na**	**26765**	**na**	**87**	**87**	**87**	**88**	**83**	**87**	**87**
HSE-M	Laois/Offaly	1466	1466	95	92	92	92	na	92	na	na
	Longford/Westmeath	1109	1109	94	94	94	94	na	94	na	na
	HSE-M Total	**2575**	**2575**	**94**	**92**	**92**	**92**	**na**	**92**	**na**	**na**
HSE-MW	Clare	1379	1378	98	91	91	91	93	89	na	93
	Limerick	1635	1606	97	90	90	90	92	87	na	91
	Tipperary NR/East Limerick	1546	1602	96	91	91	91	91	91	na	92
	HSE-MW Total	**4560**	**4586**	**97**	**91**	**91**	**91**	**92**	**89**	**na**	**92**
HSE-NE	Cavan/Monaghan	na	2287	na	93	93	93	94	88	93	91
	Louth	na	2272	na	91	91	91	91	87	89	88
	Meath	na	3745	na	91	91	91	92	87	91	89
	HSE-NE Total	**na**	**8304**	**na**	**91**	**91**	**91**	**92**	**87**	**91**	**89**
HSE-NW	Donegal	2464	2464	94	92	92	92	91	91	91	92
	Sligo/Leitrim	1481	1481	96	91	91	91	88	91	87	88
	HSE-NW Total	**3945**	**3945**	**95**	**92**	**92**	**92**	**90**	**91**	**90**	**90**
HSE-SE	Carlow/Kilkenny	2170	2170	95	88	88	88	88	87	87	87
	South Tipperary	1458	1458	95	91	91	91	92	91	91	91
	Waterford	2247	2247	95	89	89	89	89	87	89	89
	Wexford	2489	2489	96	91	91	91	92	89	92	92
	HSE-SE Total	**8364**	**8364**	**96**	**90**	**90**	**90**	**90**	**88**	**90**	**90**
HSE-S	North Cork	na	763	na	87	87	87	na	87	na	na
	North South Lee	na	2952	na	87	87	87	na	87	na	na
	West Cork	na	406	na	82	82	82	na	82	na	na
	Kerry	1039	1029	93	83	83	83	na	82	na	na
	HSE-S Total	**1039**	**5150**	**93**	**86**	**86**	**86**	**na**	**86**	**na**	**na**
HSE-W	Galway	na	4250	na	87	87	87	86	85	87	87
	Mayo	na	1906	na	88	88	88	88	87	86	88
	Roscommon	na	1000	na	96	95	96	95	94	95	96
	HSE-W Total	**na**	**7156**	**na**	**88**	**88**	**88**	**88**	**87**	**88**	**89**
Ireland		**20483**	**66845**	**95**	**89**	**89**	**89**	**89**	**86**	**89**	**89**

na=not available

Since T_3 and P_3 uptake identical to D_3 uptake only D_3 uptake figures are presented

* Since September 1st 2008 the new primary childhood immunisation schedule has been implemented. The changes to the primary schedule for children born on or after 1st July 2008 include introduction of a hepatitis B vaccine (as part of a 6 in 1 vaccine) given at 2, 4, 6 months of age, introduction of pneumococcal conjugate vaccine given at 2, 6 and 12 months of age and a change in timing of meningococcal serogroup C conjugate vaccination, now given at 4, 6 and 13 months of age. Therefore, $HepB_3$, $MenC_2$ and PCV_2 uptake data presented here are only for those born between 01/07/2008 and 31/12/2008 and $MenC_3$ data are only for those born between 01/01/2008 and 30/06/2008.

† The 2009 data for those at 12 months are incomplete as the following were unavailable: the Quarter 1 2009 HSE-E D_3, T_3, P_3 and $Polio_3$ data for those born on the 31/03/2008; the Quarter 3 2009 HSE-M data, HSE-S data, HSE-E $MenC_2$ and PCV_2 data and HSE-MW $MenC_2$ data and; the Quarter 4 2009 HSE-M, HSE-MW and HSE-S data. The available 2009 national 12 month D_3, T_3, P_3, Hib_3 (n=66,913) and $Polio_3$ cohort data may be around 88% (this figure is an estimate only) of the 2009 national birth cohort. The national $MenC_3$ cohort data (n=37,434) are complete (for Quarters 1 and 2 2009). The available national $HepB_3$ (n=29,486), $MenC_2$ (n= 20,838) and PCV_2 (n=22,401) data may be around 76%, 54% and 58% (these figures are estimates only), respectively, of the (combined Quarters 3 and 4) national birth cohort.

BCG uptake data were available for the HSE-M, HSE-MW, HSE-NW, HSE-SE and HSE-S Areas (HSE-S data relate to Kerry only) in Quarters 1 and 2 2009; for the HSE-MW, HSE-NW and HSE-SE Areas in Quarter 3 2009 and for the HSE-NW and HSE-SE Areas in Quarter 4 2009. The available 2009 national BCG cohort data may be around 27% (this figure is an estimate only) of the national birth cohort.

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 2009 (i.e. cohort born 01/01/2007-31/12/2007), based on available data

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	1605	1601	97	97	97	96	87	97	96	93
	Dublin South East	1391	1388	97	97	97	97	86	97	97	93
	Dublin South City	1647	1642	90	90	90	89	78	90	89	84
	Dublin South West	2478	2475	95	95	95	94	86	95	93	94
	Dublin West	2798	2791	92	92	92	92	82	92	91	88
	Dublin North West	3636	3631	92	92	92	91	85	92	92	87
	Dublin North Central	1601	1601	95	95	95	94	83	95	93	90
	Dublin North	2160	4259	94	94	94	93	86	94	93	91
	Kildare/West Wicklow	4377	4372	89	89	89	89	80	89	89	85
	Wicklow	2045	2039	92	92	92	91	81	92	91	85
	HSE-E Total	**23738**	**25799**	**93**	**93**	**93**	**92**	**83**	**93**	**92**	**89**
HSE-M	Laois/Offaly	2728	2769	95	95	95	95	92	95	95	92
	Longford/Westmeath	1900	1941	97	97	97	97	94	97	97	94
	HSE-M Total	**4628**	**4710**	**96**	**96**	**96**	**96**	**93**	**96**	**96**	**93**
HSE-MW	Clare	1427	1427	93	93	93	93	89	93	93	92
	Limerick	1537	1537	92	92	92	92	86	92	92	89
	Tipperary NR/East Limerick	1529	1529	96	96	96	95	91	96	95	94
	HSE-MW Total	**4493**	**4493**	**94**	**94**	**94**	**93**	**89**	**94**	**93**	**91**
HSE-NE	Cavan/Monaghan	2116	2116	95	95	95	95	92	95	96	92
	Louth	2083	2083	93	93	93	93	92	93	95	91
	Meath	3559	3559	94	94	94	94	92	94	95	92
	HSE-NE Total	**7758**	**7758**	**94**	**94**	**94**	**94**	**92**	**94**	**95**	**92**
HSE-NW	Donegal	2329	2329	96	96	96	96	93	96	95	92
	Sligo/Leitrim	1467	1467	96	96	96	96	93	97	94	93
	HSE-NW Total	**3796**	**3796**	**96**	**96**	**96**	**96**	**93**	**97**	**95**	**92**
HSE-SE	Carlow/Kilkenny	2050	2050	92	92	92	91	91	92	91	91
	South Tipperary	1457	1457	93	93	93	93	90	93	92	90
	Waterford	2113	2113	90	90	90	90	87	90	89	86
	Wexford	2339	2339	94	94	94	94	92	94	93	91
	HSE-SE Total	**7959**	**7959**	**92**	**92**	**92**	**92**	**90**	**92**	**91**	**90**
HSE-S	North Cork	1486	1475	96	96	96	96	89	96	95	92
	North South Lee	5738	5810	95	95	95	95	90	95	95	92
	West Cork	771	765	90	90	90	90	82	90	89	84
	Kerry	2147	2111	92	92	92	92	84	92	91	87
	HSE-S Total	**10142**	**10161**	**94**	**94**	**94**	**94**	**88**	**94**	**94**	**90**
HSE-W	Galway	3950	3950	94	94	94	94	86	94	93	90
	Mayo	1879	1879	93	93	93	93	82	93	93	87
	Roscommon	877	877	98	98	98	98	98	98	98	97
	HSE-W Total	**6706**	**6706**	**94**	**94**	**94**	**94**	**86**	**94**	**93**	**90**
Ireland		**69220**	**71382**	**94**	**94**	**94**	**93**	**87**	**94**	**93**	**90**

*As the denominator/number in cohort may vary slightly according to vaccine, most commonly used number is presented here.

†The 2009 data for those at 24 months are incomplete as the following were unavailable: the Quarter 1 2009 HSE-E D_3, T_3, P_3 and $Polio_3$ data for those born on the 31/03/2007; the Quarter 2 2009 HSE-E Dublin North Hib_b uptake data and; the Quarter 4 2009 HSE-MW data, HSE-E Dublin North Hib_b data and HSE-SE Hib_b data for those given a Hib dose as part of the five in one or six in one vaccine after 12 months of age. The available 2009 national 24 month D_3, T_3, P_3, Hib_3, $Polio_3$, $MenC_3$ and MMR_1 birth cohort data may be around 98% of the national birth cohort and the available Hib_b data may be around 95% of the national birth cohort.

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 CIDR Business Objects Reporting and MS Excel. Figures for the relevant chapters within this report were extracted from CIDR between July and September 2010. 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 2008 were collated in the regional Departments of Public Health, where data were entered on the Epi2000 NTBSS database. Each HSE Area provided finalised 2008 data with outcome information to HPSC during 2010. Data were validated and cleaned with each area and the national data were collated. Provisional 2009 data were obtained from each area in August 2010.

European Antimicrobial Resistance Surveillance Network (EARS-Net)

Data were collected by participating EARS-Net (formerly the European Antimicrobial Resistance Surveillance System, EARSS) laboratories in 2009 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 EARS-Net project.

Sexually Transmitted Infections (STIs)

Clinicians and laboratories notified their respective Departments of Public Health of probable and confirmed cases of STIs in 2008. Notifications were anonymised prior to notification. Data were collated and analysed by Departments of Public Health and aggregated data were reported 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

Since 2000, HPSC has worked in collaboration with the National Virus Reference Laboratory (NVRL), the Irish College of General Practitioners (ICGP) and the Departments of Public Health on the influenza sentinel surveillance project. During 2009, 60 practices (located in all HSE-Areas and representing 5.6% of the population) 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 to the NVRL on at least five ILI patients per week. Other indicators of influenza activity reported by Departments of Public Health to HPSC on a weekly basis included a network of sentinel hospitals reporting admission levels and sentinel schools reporting absenteeism. The Departments of Public Health also notified HPSC weekly of all cases of influenza, all influenza/ILI outbreaks and enhanced surveillance data on all hospitalised cases of seasonal influenza in 0-14 year olds. HPSC was notified of all registered deaths on a weekly basis from the General Register Office.

On 25th April 2009, a public health emergency of international concern was declared by the WHO due to an outbreak of 2009 pandemic influenza A (H1N1) infection in Mexico and the USA. Once the public health emergency was declared, routine seasonal influenza surveillance was augmented as detailed in chapter 2.1. The 2009 pandemic covered the period of time from week 17 (April) 2009 to week 32 (August) 2010.

At HPSC data were collated from the various sources, analysed and weekly influenza reports were produced. Clinical and virological data were reported weekly to EISN and WHO. During the pandemic period additional epidemiological reports were produced.

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 2009, 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 2009, HSE Areas 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 2009 data were collected by participating general ICUs on MRSA colonisation/infection in the critical care setting. Data were reported monthly to 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 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 2004-2009 data, Census 2002 for 2000-2003 data and Census 1996 for 1999 data.

Monthly population changes were estimated between 1993 and 2009 using a curve interpolation method for the calculation of outpatient antibiotic consumption rates. These are based on April 2010 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
EARS-Net	European Antimicrobial Resistance Surveillance Network
ECDC	European Centre for Disease Prevention and Control
EISN	European Influenza Surveillance Network
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
IPD	Invasive pneumococcal disease
HCAI	Healthcare associated infections
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	Meticillin 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
WHO	World Health Organisation

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