Annual Report 2010
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 2010.

Once again, it was a busy year for surveillance and control of infectious diseases in Ireland. At the start of 2010 we witnessed the last remnants of the first influenza pandemic this century, and a moderately severe influenza season occurred at the end of 2010 and early 2011. While influenza-like-illness (ILI) rates in under 15 year olds were lower than during the pandemic, ILI rates in the 15-64 year age group and those aged over 65 years were higher. Overall, 121 patients with influenza were admitted to intensive care with the highest admission rate in the 55-64 year age group. Although 75% of the 107 adults admitted to ICU had pre-existing medical conditions, only 18 had been vaccinated during the 2010/2011 flu season. Thirty two deaths occurred in people with laboratory confirmed influenza, yet only four of these people were known to have received influenza vaccine. These statistics underline the message that influenza is a serious but preventable illness and reinforce the need for those in high risk groups and those aged over 65 to get vaccinated.

Measles cases continued to increase in 2010, following an upsurge in 2009. Overall, 403 cases were notified in 2010 and 108 of these cases were hospitalised. Forty separate measles outbreaks were reported during the year. Cases predominantly occurred in the traveller and Roma communities and amongst those who choose not to have their children vaccinated against vaccine preventable diseases.

Mumps continued to circulate in 2010 and reported complications of this disease included orchitis, deafness, pancreatitis, encephalitis and appendicitis. A catch-up vaccination campaign is needed to control and eliminate the continued transmission of measles, mumps and rubella in Ireland.

Invasive pneumococcal disease continues to decline following the introduction of the conjugate pneumococcal vaccine. We saw a 25% reduction in all types of invasive pneumococcal disease in 2010 compared with 2008, when the vaccine was introduced. There also has been a reduction in the proportion of penicillin-non-susceptible *S. pneumoniae* isolates. Sadly, in 2010, one death occurred from pneumococcal meningitis in a young child who was unvaccinated.

There was a decline in the uptake of the third dose of Men C vaccine and the booster of Hib vaccine in 2010. This decline coincided with the launch of a new immunisation schedule which introduced an extra visit for children at 13 months of age. It appears that many parents may have missed this new appointment and did not realise that their child was not fully vaccinated. New information materials have since been developed by the Health Service Executive (HSE) to highlight the number of visits required to complete the childhood immunisation schedule.

Much of the data provided to calculate immunisation coverage in 2010 was incomplete, as many of the information providers did not have the immunisation information systems needed to submit the required data. A new national immunisation information system is being planned which hopefully will rectify these inadequacies in the future.

In 2010, we saw a decrease in the provisional number of tuberculosis cases. However, TB continues to be a serious disease. Thirty four people who were diagnosed with tuberculosis in 2009 died, with ten of these deaths deemed directly attributable to the disease. The quality of TB surveillance data declined in 2009. Outcome data were only reported on 82.5% of cases. This may be a reflection of other pressures on surveillance systems, such as work associated with pandemic influenza during 2009. It is critically important for TB control in Ireland that the surveillance is maintained at a high level. New guidelines on the Prevention and Control of Tuberculosis in Ireland were published by the HPSC's Scientific Advisory Committee in 2010.

Campylobacter remains the most common bacterial cause of gastroenteritis. The Food Safety Authority of Ireland has recently published recommendations for a practical *campylobacter* control programme in the poultry production and slaughter chain during 2011 and it is hoped that these new recommendations will lead

to a fall in human cases of food borne *campylobacter* infection.

There has been a continued decline in the number of cryptosporidiosis cases in Ireland. This is very welcome as the most recent European report from the European Centre for Disease Prevention and Control (ECDC) identified Ireland as the member state with the highest incidence of this disease among those countries which provided data to ECDC in their latest report (2008 data).

The very high rate of verotoxigenic *Escherichia coli* (VTEC) reported in 2009 decreased by 17% in 2010. There is a marked urban / rural divide indicating once again that contact with farm animals and the use of private water supplies are potential sources of this infection. It is reassuring that new discriminatory typing performed in the Public Health Laboratory at Cherry Orchard did not detect any large clusters that had not been clinically identified in 2010, which could have raised the possibility of unidentified food sources for the disease.

An outbreak of *S.* Typhimurium in 2010, associated with consumption of duck eggs, prompted excellent collaboration between the Department of Agriculture, Food and the Marine, the FSAI and HPSC, resulting in new legislative controls for prevention of *salmonella* contamination in ducks and duck eggs.

Once again, very large numbers of cases of hepatitis C were reported in 2010, with over 1200 cases reported for the year. A recent study has estimated that between 20,000 and 50,000 people in Ireland are now chronically infected with hepatitis C. This will have serious implications for health services in the future as a significant proportion will go on to develop cirrhosis, liver failure and hepatocellular carcinoma. In this regard, the anticipated publication of the National Hepatitis C Strategy in 2012 is to be welcomed.

The highest proportion of new HIV diagnosis in 2010 were among men who have sex with men (MSM), with 40.5% of 331 newly diagnosed HIV cases occurring in this category. This trend has been observed in many European countries to such an extent that ECDC now recommends that interventions to control HIV among MSM should be the cornerstone of HIV prevention strategies in Europe.

In 2010 there was an 11% decline in new cases of *Clostridium difficile*-associated disease (CDAD). Enhanced surveillance showed that 20% of cases were associated with onset in the community. All health care professionals must promote practices known to reduce the incidence of CDAD, whether working in hospital or community settings.

New studies in Irish critical care units on catheter-related infection were initiated in 2010 and continued surveillance is required to accurately target interventions.

HPSC, in conjunction with the Infection Prevention Society, developed and piloted a national hand hygiene observation audit tool and standard operating procedures for use in acute hospitals in 2010. This will be rolled out in 2011 with a programme of hospital hand hygiene auditor training.

HPSC was the coordinating centre in Ireland for a European survey on healthcare associated infection and antimicrobial use in long term care facilities in the summer of 2010. The low rate of pressure sores and urinary catheter use, despite a high proportion of incontinent and/or immobile residents, reflects a high quality of nursing and medical care within the facilities that participated in the study. However the antimicrobial use was higher than the overall European use.

Overall outpatient antimicrobial consumption fell by 2% in 2010 compared with 2009. However, hospital antimicrobial consumption rose by 4% for the same period. These rates are mid-to-high in comparison with other European countries but the recently launched HSE initiative on reducing unnecessary antibiotic usage should improve our ranking in Europe.

The proportion of *S. aureus* bloodstream infections which were meticillin resistant (MRSA) has been steadily decreasing since 2006, and decreased further from 27.1% in 2009 to 24.4% in 2010. Despite this success, an increase in the numbers and proportions of vancomycin resistant *E. faecium* (VRE) is worrying. Ireland has by far the highest level of resistance in the European Union. Antimicrobial resistance among Gram-negative bacteria, such as *E. coli*, also increased in 2010, and there are continued threats posed by emerging resistance mechanisms in these bacteria, such as carbapenemases in Enterobacteriaceae.

I would like to thank our colleagues who work voluntarily on the HPSC Scientific Advisory Committee and its sub-committees, our partners throughout the country, and all of the staff at HPSC whose dedication throughout the year makes this report possible.

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01

Vaccine Preventable Diseases

1.1 *Haemophilus influenzae* (invasive)

Summary

Number of cases, 2010: 28
Number of cases, 2009: 43
Number of cases, 2008: 22
Crude incidence rate, 2010: 0.7/100,000

In 2010, 28 cases of invasive *Haemophilus influenzae* disease were notified in Ireland (0.7/100,000 total population). This is a marked decrease compared to 2009 when 43 cases were notified in (figure 1).

The main changes in 2010, when compared to 2009, are the reductions in the number of non-typeable/non-capsular strains from 25 to 20, of other typed strains (excluding type b) from eight to three and of non-typed strains from nine to two, but an increase of type b strains from one to three (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 2010 (71.4%, n=20/28). The remaining cases were due to *H. influenza* type b (10.7%, n=3), type f (10.7%; n=3) and isolates that were not typed (7.1%; n=2). The cases ranged in age from four days to 88 years. The incidence rates were highest in infants <1 year (3.3/100,000) and those aged 65 years or more (2.6/100,000) (table 1).

Cases occurring in children <10 years of age (n=5) and elderly adults over 65 years of age (n=12) accounted for 60.7% of all invasive *H. influenzae* notifications in 2010 (table 1).

The clinical manifestations of invasive *H. influenzae* disease in the five children <10 years of age in 2010 were three cases of septicaemia and one case of pneumonia. Clinical diagnosis was not reported in the remaining case. A breakdown by clinical diagnosis for all age groups by year between 2004 and 2010 is presented in table 2.

No imported cases were reported in 2010, nor were there any invasive *H. influenzae* related deaths reported.

In 2010 three cases of *H. influenzae* type b (Hib) occurred, one in a completely vaccinated ten year-old child who had received three doses of Hib vaccine and in two unvaccinated adults (age range 23-76 years). In contrast, in 2009, there was only one Hib case reported: an incompletely vaccinated four year old who received three doses of the 5 in 1 vaccine but not the Hib booster dose.

In 2010, one true Hib vaccine failure was reported; the first since 2007 highlighting the positive impact the Hib booster catch up campaign has had in Ireland. Back in 2007, two true Hib vaccine failures occurred in children aged 14 years or less, one of whom died from

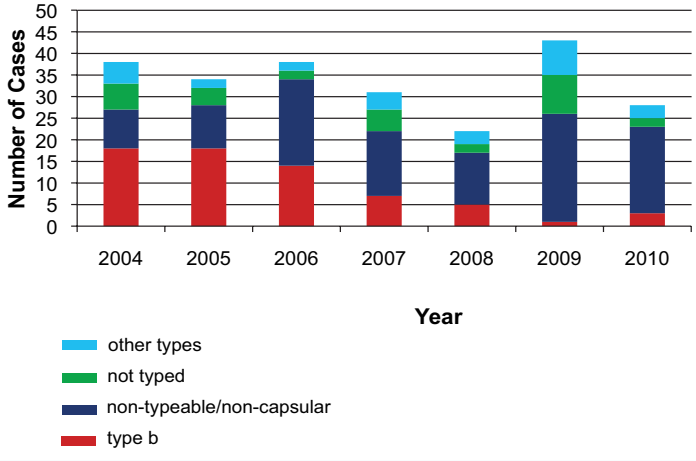

Figure 1. Annual number of invasive Haemophilus influenzae cases notified in Ireland, 2004-2010

Table 1. Number and incidence rates of invasive Haemophilus influenzae cases by serotype plus number of Hib vaccine failures by age group, 2010

Age Group	Type b	Type e	Type f	Non-typeable/ non-capsular	Not Typed	Total	ASIR of Hib	ASIR of all *H. influenzae*	Type b TVFs
<1	0	0	0	2	0	2	0.00	3.27	0
1-4	0	0	0	2	0	2	0.00	0.83	0
5-9	0	0	0	1	0	1	0.00	0.35	0
10-19	1	0	0	1	0	2	0.18	0.35	1
20-34	1	0	0	3	1	5	0.09	0.47	0
35-54	0	0	2	2	0	4	0.00	0.35	0
55-64	0	0	0	0	0	0	0.00	0.00	0
65+	1	0	1	9	1	12	0.21	2.56	0
All Ages	3	0	3	20	2	28	0.07	0.66	1
CIR	**0.07**	**0.00**	**0.07**	**0.47**	**0.05**	**0.66**	-	-	-

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- 2010

Clinical Diagnosis	2004	2005	2006	2007	2008	2009	2010	2004-2010	% of Total
Septicaemia	8	14	13	6	3	9	8	61	26.1%
Pneumonia	5	0	3	6	3	8	5	30	12.8%
Meningitis	3	9	3	2	2	2	1	22	9.4%
Epiglottitis	1	3	3	1	1	0	2	11	4.7%
Cellulitis	1	1	2	1	1	0	0	6	2.6%
Meningitis & septicaemia	1	0	1	0	1	1	1	5	2.1%
Osteomyelitis	1	0	0	0	0	0	0	1	0.4%
Septic arthritis	0	1	0	0	1	0	0	2	0.9%
Unknown	18	6	13	15	10	23	11	96	41.0%
Total	**38**	**34**	**38**	**31**	**22**	**43**	**28**	**234**	**100%**

Table 3. Incidence rates of invasive Haemophilus influenzae by HSE area, 2004-2010

HSE Area	2004	2005	2006	2007	2008	2009	2010
E	1.1	1.0	0.9	0.8	0.5	0.8	0.6
M	0.5	0.5	0.2	0.5	0.3	0.5	0.2
MW	0.8	0.3	0.8	0.6	0.8	2.2	0.6
NE	0.2	1.1	0.2	0.0	0.0	0.2	0.4
NW	0.4	0.0	2.0	0.4	0.0	0.4	0.4
SE	1.3	0.5	1.0	1.3	0.8	1.3	1.3
S	3.0	0.8	3.4	0.8	1.7	3.4	3.0
W	0.5	1.4	0.7	1.4	0.5	1.2	0.2
Ireland	**0.9**	**0.8**	**0.9**	**0.7**	**0.5**	**1.0**	**0.7**

septicaemia. Both children received three doses of Hib vaccine when they were less than one year of age. Similar to the Hib vaccine failure reported in 2010, one of the two true vaccine failures in 2007 occurred in a 10-14 year old child who would not have been targeted by the catch-up programme, which ran between 2005 and 2006 and was aimed (at the time) at children under four years of age.

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 4th August 2011. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

1.2 Measles

Summary

Number of cases, 2010: 403
Number of confirmed cases, 2010: 299
Crude incidence rate, 2010: 9.5/100,000
Crude confirmed incidence rate, 2010: 7.1/100,000

In 2010, there were 403 measles cases (9.5/100,000) notified in Ireland. This is a 2.5-fold increase compared to 2009 when 162 cases were notified and a seven-fold increase compared to 2008 when 55 cases were notified. This increase is a result of a national measles outbreak that was first identified in August 2009 and continued into early May 2010. Measles cases by week and month of notification from July 2009 to December 2010 are shown in figure 1. Eight-one percent (n=328/403) of cases in 2010 were notified between January and early May (Weeks 1-18).

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 early May 2010.

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-

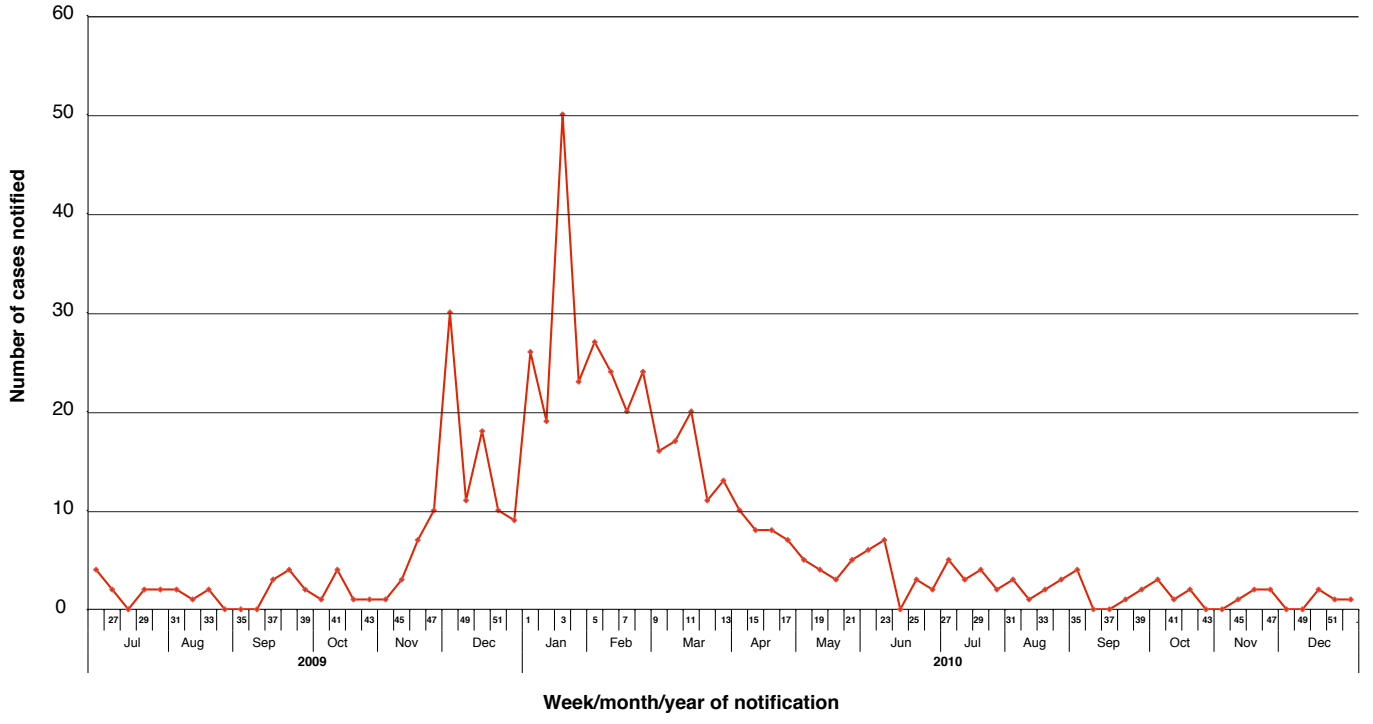

Figure 1. Number of measles cases notified by week and month July 2009 to December 2010

raising among clinicians and in the community) to control the outbreak at national and local level.

Of the 403 measles cases notifed in 2010, 26% (n=104) were classified as possible while 74% (n=299) were classified as confirmed, giving a crude confirmed incidence rate of 7.1 per 100,000 population. Of the confirmed cases, it was known that 76% (n=228) were laboratory confirmed and 24% (n=71) were only epidemiologically linked to a laboratory confirmed case.

The largest number of cases notified in 2010 was in the HSE-E while the highest crude incidence rate was in the HSE-S (table 1).

In 2010, measles cases ranged in age from one month to 50 years. The number of cases by age group and the age specific incidence rates are shown in figures 2 and 3. The highest age specific incidence rate was in those aged <1 year (figure 3). Of the 403 measles cases 50% (n=203) were male and 50% (n=200) were female.

Laboratory results were provided for 272 (67%, n=272/403) cases in 2010. Two hundred and twenty eight cases (57%, n=228/403) were laboratory positive for measles. Two further cases were laboratory positive (based on serology) for measles, however, the positive results may have represented responses to recent vaccinations. The laboratory results for eight cases were recorded as inconclusive. Thirty-four cases were laboratory negative for measles, however, for 29 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). The five cases that were laboratory negative for measles and were known to have a specimen collected at the optimal time were classified as possible cases.

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

Vaccination data were reported for 82% (n=332/403) of measles cases in 2010. Sixty-four percent (n=257/403) of cases were unvaccinated; only 28% (n=73/257) of these were less than 12 months of age.

Sixteen percent (n=64/403) had one dose of MMR vaccine; 81% (n=52/64) of these were less than six years of age. Fifty-two percent (n=33/64) of those reported to have one dose of MMR were classified as confirmed. Seventy-five percent (n=48/64) with one dose of MMR had a vaccination date reported, 29% (n=14/48) of these were vaccinated ≤16 days before onset of illness and were probably incubating measles at the time of vaccination.

Three percent (n=11/403) were reported as having received two doses of MMR. Only four of these cases were laboratory confirmed and only one of these four laboratory confirmed cases had both vaccination dates reported.

One hundred and eight cases were reported as hospitalised, representing 27% (n=108/403) of all cases. The hospitalised cases ranged in age from one month to 50 years with 94% (n=101/108) classified as confirmed cases and six percent (n=7/108) classified as possible cases. Length of hospitalisation was reported for 71% (n=77/108) with a median duration of stay of three days (range one to nineteen days); 18% (n=14/77) were reported as hospitalised for one day. Of the 108 hospitalised cases, 22% (n=24) had no MMR details reported while 68% (n=73) were unvaccinated. Nine percent (n=10/108) were reported to have one dose of MMR; 60% (n=6/10) of these had a vaccination date recorded, 50% (n=3/6) of these were vaccinated less than 10 days prior to onset and may have been incubating measles at the time of vaccination. The remaining hospitalised case (1%) was reported to have

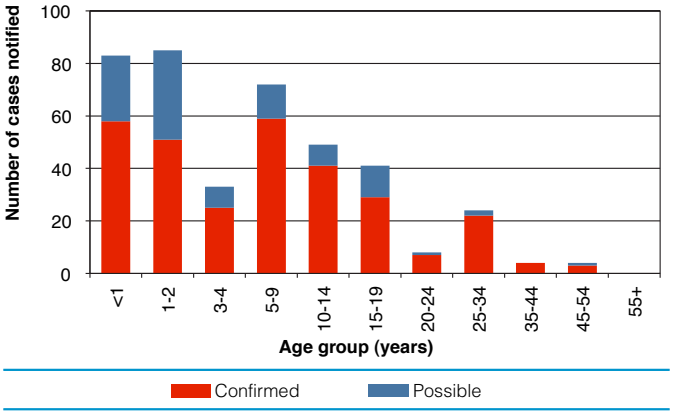

Figure 2. Number of notified measles cases in 2010 by age group and case classification

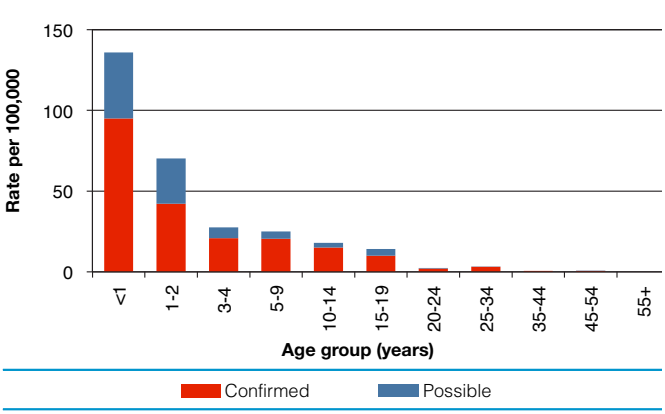

Figure 3. The age specific incidence rate (per 100,000) of notified measles cases in 2010 by case classification

had two doses of MMR; however the vaccination dates and other vaccination details were only reported for one of the doses.

Information on measles associated complications was reported for 52% (n=208/403) of cases. Complications included pneumonia (n=14), otitis media (n=2), tonsillitis (n=2; one of these was also reported to have pneumonia), chest infection (n=1), dehydration (n=1), dehydration /nausea/vomiting (n=1), lower respiratory tract infection (n=1), pharyngitis (n=1) and seizures (n=1). The remaining 185 cases had no complications.

The setting where the case most likely acquired measles was reported as home (n=105, 26%), school (n=30, 7%), daycare/pre-school (n=17, 4%), prison (n=7, 2%), hospital in-patient/hospital out-patient (n=5, 1%), work (n=5, 1%), overseas (n=2, 0.5%), third level (n=1, 0.2%) and was unknown/unreported for the remainder (n=231, 57%). For an additional two cases where the case most likely acquired measles was recorded as unknown but hospitalisation was considered a possible risk factor as both attended hospital prior to onset and during the incubation period.

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, 16% (n=54/328) of the cases notified from week 1 to week 18 2010 were recorded as Irish Travellers while 1.8% (n=6/328) 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. Although information on objectors to vaccination is not routinely collected there were reports from the HSE-S that 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 and Russia.

Forty localised measles outbreaks were notified during 2010, with 149 associated cases of illness. The outbreak locations included 21 private houses (with 63 ill), three community outbreaks (with 19 ill), four crèche outbreaks (with 17 ill), three outbreaks occurring among extended families (with 10 ill), one outbreak in a residential institution (with nine ill), one hospital outbreak (with four ill), six school outbreaks (with 25 ill) and one outbreak associated with day care (with two ill).

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

Table 1. Number of measles cases notified and the crude incidence rate per 100,000 population (CIR) by HSE Area in 2010

HSE Area	Number	CIR
HSE-E	150	10.0
HSE-M	6	2.4
HSE-MW	51	14.1
HSE-NE	6	1.5
HSE-NW	12	5.1
HSE-SE	12	2.6
HSE-S	117	18.8
HSE-W	49	11.8
Total	**403**	**9.5**

1.3 Meningococcal Disease

Summary

Number of cases, 2010: 114
Number of cases, 2009: 147
Number of cases, 2008: 168
Crude incidence rate, 2010: 2.7/100,000

In 2010, 114 cases (2.7/100,000) cases of invasive meningococcal disease (IMD) were notified in Ireland. This continues the downward trend from the previous two years when 147 cases (3.5/100,000) and 168 cases (4.0/100,000), were reported in 2009 and 2008, 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 current meningococcal disease case definition, 98 of the 114 cases (86.0%) notified in 2010 were case classified as definite, none (0.0%) as presumed and 16 (14.0%) as possible. The vast majority of the cases (86.0%; n=98/114) were laboratory confirmed by means of blood/CSF culture testing, PCR testing, blood serology, detection of gram negative diplococci in skin lesions/culture or in CSF specimens, and by screening of nasal, throat and eye swabs. Over half of all definite cases were confirmed by PCR alone (57.1%, n=56/98). Confirmation of the remaining 42 definite cases was by blood or CSF culture only (7.1%; n=7/98); by blood or CSF PCR and/or culture (42.8%; n=42/98). None were confirmed by detection of Gram negative diplococci in skin lesion microscopy exclusively or by serology exclusively.

In 2010, male cases (n=68) exceeded female cases (n=46), resulting in a male to female ratio of 1.47:1.0. Cases ranged in age from two months to 82 years (median age of 2.2 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 (49.1/100,000), followed by children in the 1-4 year age group (18.2/100,000), and the 15-19 year age group (4.1/100,000) (table 1).

In 2010 the overall incidence of IMD in Ireland was highest in the HSE-NW area (4.6/100,000) with the lowest in the HSE-W area (1.0/100,000) (table 2). There were no imported cases in 2010.

Neisseria meningitidis serogroup B was the pathogen most commonly associated with IMD in 2010 and accounted for 93 (81.6%) of the 114 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 eight years with no more than five cases occurring annually. In 2010, four (0.09/100,000)

Table 1. Number of cases, deaths, age-group specific incidence rates per 1000,000 population and case fatality ratios of IMD in Ireland, 2010

Age Group	No. Cases	ASIR	No. Deaths	CFR (%)
<1	30	49.1	2	6.7%
1-4	44	18.2	1	2.3%
5-9	8	2.8	1	12.5%
10-14	4	1.5	0	0.0%
15-19	12	4.1	0	0.0%
20-24	1	0.3	0	0.0%
25+	15	0.5	1	6.7%
All ages	**114**	**2.7**	**5**	**4.4%**

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

serogroup C cases occurred, none of whom were reported to have died (figure 1). Two of these four cases were aged 5-9 years, one was aged 15-19 years and the remaining case was aged 65 years or more. Three of these cases were unvaccinated, but the fourth, aged 5-9 years, who had been in Poland where the Men C vaccine is not on national vaccination schedule, only ever received one dose. In contrast, three MenC vaccine failures occurred in 2009 whilst there was one each in 2008, 2007, 2006 and 2005, with no failures arising in either 2004 or 2003.

The presence of small numbers of MenC vaccine failures in recent years 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. 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 recommended a booster dose of the MenC vaccine for close contacts of cases that 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 five IMD related notified deaths in 2010 (case fatality ratio (CFR) of 4.4%) compared to an average of 6.4 deaths between 2005 and 2009. In 2010, the CFR was highest amongst cases 5-9 years of age (12.5%) as a result of one death among eight cases (table 1). The next highest CFR occurred in children aged <1 year and adults aged 25 years or more (6.7% in each age group) (table 1).

Four of the five IMD deaths in 2010 were due to serogroup B disease (age range two months to 82 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 less than 25 years of age, with no deaths being reported during this period of time (table 3).

Table 2. Number of cases and age specific incidence rates per 100,000 population of IMD by HSE area, 2010

HSE area	<1	1-4	5-9	10-14	15-19	20-24	25+	Total
E	51.4	19.4	3.2	0.0	7.1	0.0	0.5	2.8
M	52.8	6.3	5.3	0.0	0.0	0.0	0.0	1.6
MW	19.6	19.9	4.0	4.2	3.9	3.5	0.4	2.8
NE	62.9	15.8	0.0	3.7	0.0	0.0	0.4	2.5
NW	59.4	51.2	0.0	5.9	5.8	0.0	0.0	4.6
SE	74.1	29.6	6.1	0.0	0.0	0.0	1.0	3.9
S	46.6	8.9	2.4	2.5	4.7	0.0	1.0	2.4
W	17.4	4.4	0.0	0.0	3.4	0.0	0.4	1.0
Ireland	**49.1**	**18.2**	**2.8**	**1.5**	**4.1**	**0.3**	**0.5**	**2.7**

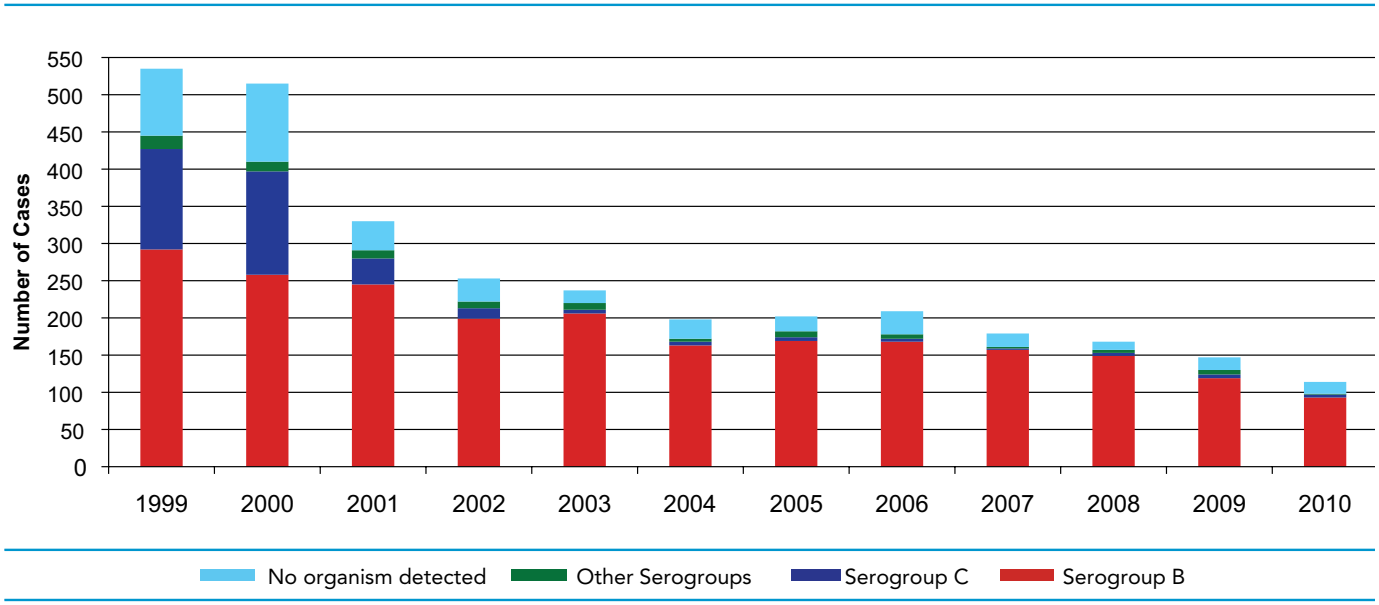

Figure 1. Number of invasive meningococcal disease (IMD) notifications in Ireland by serogroup, 1999-2010

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 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 4th August 2011. 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, 1999-2010

	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%
2010	93	4	4.3%	4	0	0.0%

1.4 Mumps

Summary

Number of cases, 2010: 293
Number of cases, 2009: 3,620
Crude incidence rate, 2010: 6.9/100,000

In total, there were 293 (6.9/100,000) mumps cases notified in 2010. This is a large decline compared to the years 2008/2009 and 2004/2005 when large outbreaks occurred (figure 1). The number of cases notified in 2010, however, is still considerably higher compared to the years 1998 to 2003 when there was an average of 43 cases notified each year.

In 2010, of the 293 mumps cases notified 37% (n=109) were classified as confirmed, four percent (n=11) were classified as probable and 59% (n=173) were classified as possible.

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

Table 1. Number of mumps cases notified and the crude incidence rate per 100,000 population (CIR) by HSE Area in 2010

HSE Area	Number	CIR
HSE-E	141	9.4
HSE-M	12	4.8
HSE-MW	34	9.4
HSE-NE	14	3.6
HSE-NW	10	4.2
HSE-SE	25	5.4
HSE-S	17	2.7
HSE-W	40	9.7
Total	**293**	**6.9**

In 2010, cases ranged in age from one year to 87 years; with a mean age of 24 years and a median age of 20 years (age was unknown for three cases). The number of cases by age group and the age specific incidence rates are shown in figures 2 and 3. The highest age specific incidence rates were in those 15-19 years followed by those 20-24 years. Of the 293 mumps cases, 54% (n=158) were male and 45% (n=133) were female (gender was unreported for two cases).

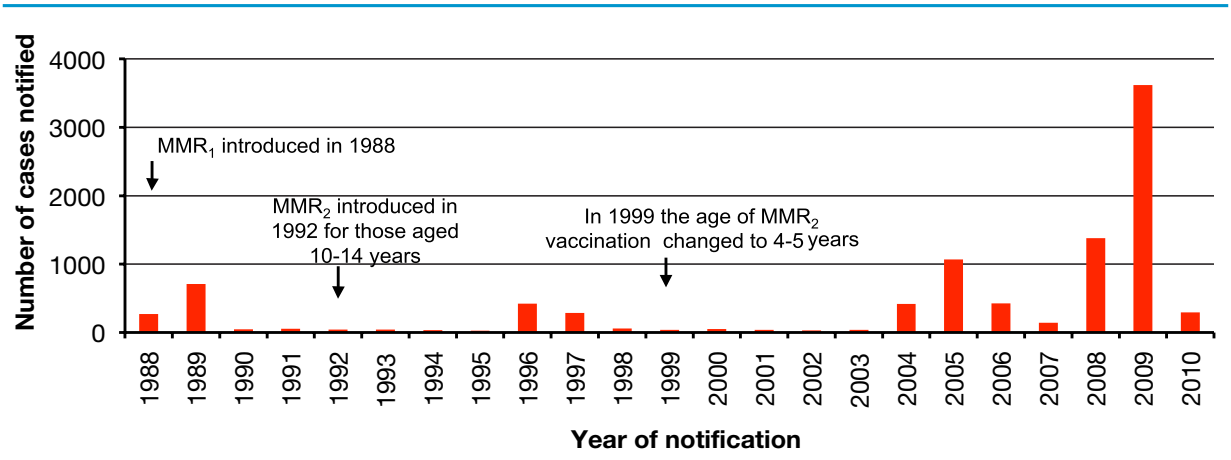

Figure 1. Number of mumps notifications by year and year of introduction of the measles-mumps-rubella (MMR) vaccine in Ireland
MMR_1- first dose of MMR
MMR_2- second dose of MMR
1988-June 2000 data collated by DoHC
July 2000-2010 data collated by HPSC

Of the 293 mumps cases, 17% (n=50) were unvaccinated, 16% (n=47) had one dose of the measles-mumps-rubella vaccine (MMR), 19% (n=56) were reported to have received two doses of MMR while for 48% (n=140) of cases the number of doses of MMR was not reported. The vaccination date was reported for 53% (n=25/47) of cases reported to have received one dose of MMR. Both vaccination dates were reported for 23% (n=13/56) of cases vaccinated with two doses of MMR. One of the cases where both vaccination dates were reported was vaccinated 25 days prior to onset and potentially was exposed just prior to or shortly after vaccination; another mumps case that only had the second MMR date reported was vaccinated three days prior to onset. Nine percent (n=5/56) of the cases reported to have received two doses of MMR were classified as confirmed; only one of these had MMR vaccination dates reported.

Eight cases were hospitalised, representing three percent (n=8/293) of all cases and five percent (n=8/146) of cases where hospitalisation data were provided. The number of days hospitalised was reported for five of the hospitalised cases and ranged from one to 10 days with a median of two days.

Reported complications of mumps included orchitis (14%, n=10/72), deafness (1.6%, n=2/125), mastitis (1.6%, n=2/124), pancreatitis (1.6%, n=2/122), encephalitis (0.8%, n=1/126) and appendicitis (n=1).

The setting where the case most likely acquired mumps was reported for 24% (n=69/293) of cases. Social setting was reported as the setting where the case most likely acquired mumps for 51% (n=35/69) of cases where this information was provided, school/university/college was reported for 23% (n=16/69) and family/household was reported for 14% (n=10/69) of these cases.

Five localised outbreaks of mumps were notified during 2010 with 17 associated cases of illness. The outbreak locations included two private houses (with 7 ill), two schools (with 7 ill) and one university/college (with 3 ill).

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 13th October 2010. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

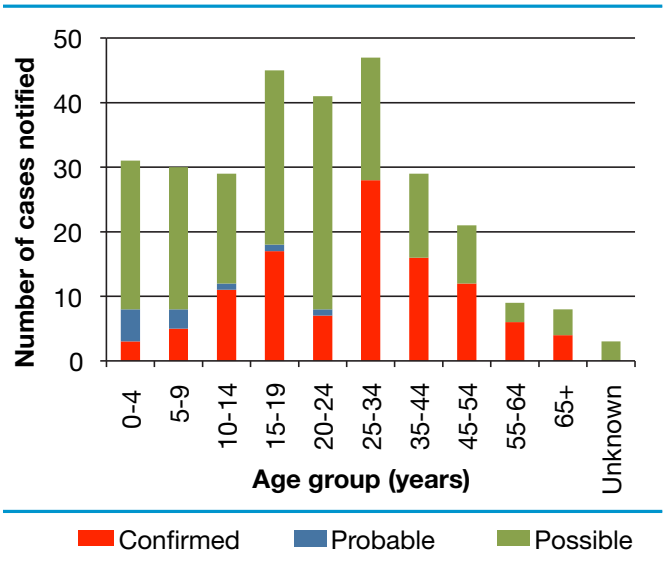

Figure 2. Number of notified mumps cases in 2010 by age group and case classification

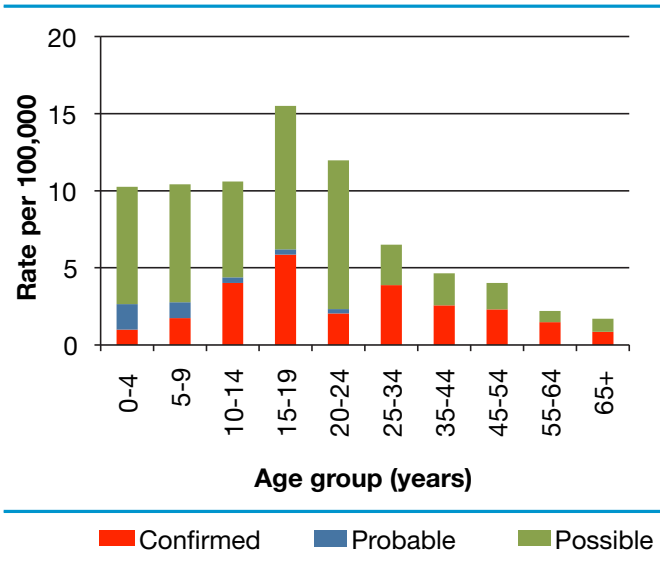

Figure 3. The age specific incidence rates (per 100,000) of notified mumps cases in 2010 (age is unknown for three cases)

1.5 Other forms of Bacterial Meningitis

Summary

Bacterial meningitis, Not Otherwise Specified
Number of cases, 2010:42
Number of cases, 2009:40
Number of cases, 2008:40
Crude incidence rate, 2010: 1.0/100,000

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 4th August 2011. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

Haemophilus influenzae
In 2010, two cases of meningitis due to *H. influenzae* were notified. One was aged between 20 and 24 years, was infected with a type b strain and was unvaccinated. The other was aged between 40-44 years and was infected with a type f strain. No deaths were reported. See a separate chapter on invasive *H. influenzae* disease for further details.

***Leptospira* species**
No case of leptospirosis meningitis was reported in 2010. See a separate chapter on non-IID zoonotic diseases for further details.

Listeria species
Three cases of listeriosis meningitis were notified in 2010: two in women aged between 70 and 74 years, and in a man aged between 55 and 59 years (for whom the country of infection was France). See a separate chapter on listeriosis disease for further details.

***Streptococcus pyogenes* (Streptococcus group A infection (invasive) (iGAS))**
One probable case of iGAS causing meningitis was notified in a 35-39 year old male in 2010. See a separate chapter on iGAS infection for further details.

Streptococcus pneumoniae
In 2010, 20 cases of pneumococcal meningitis were notified, compared to 28 in 2009 and 32 in 2008. Cases in 2010 ranged in age from two months to 67 years. One pneumococcal meningitis related death in 2010 was reported in a child aged between one and four years. This child had not been vaccinated and developed a serotype 6B infection (a serotype that is included in the PCV7 vaccine). See a separate chapter on invasive pneumococcal disease for further details.

Mycobacterium species
In 2010, eight tuberculosis meningitis cases were notified (provisional). Cases ranged in age from 28 to 78 years. One tuberculosis meningitis death was reported. See a separate chapter on tuberculosis for further details.

Bacterial meningitis by other specified notifiable diseases
No cases of meningitis caused by other specified notifiable diseases were reported in 2010.

Bacterial meningitis (not otherwise specified)
In total, 42 cases of meningitis under this disease category were notified in 2010, among which three patients died. The causative pathogens were identified in 21 of the cases. No causative pathogen was identified in the remaining 21 (50%) cases in 2010, a decrease compared to 2009 when 25 cases had no organism identified (62.5%; n=25/40).

Among the bacterial meningitis (not otherwise specified) cases notified in 2010 were 10 cases of Beta Haemolytic Streptococcus Group B (*Streptococcus agalactiae)* occurring in eight infants aged six months or less and in two adults aged between 35 and 67 years, all of whom recovered. *Staphylococcus aureus* occurred in six patients, two of whom died, (age range two weeks to 81 years). *Escherichia coli* meningitis, was reported in two cases (age range 1 week to 61 years), both of whom recovered. Other meningitis notifications include one each caused by *Mycoplasma pneumoniae* in a 5-9 year old, by *Staphylococcus capitis* in a one month old infant and by *Streptococcus* species in a three week old infant, all of whom recovered.

Table 1. Annual notifications of bacterial meningitis other than meningococcal disease, 2008-2010

Notified under	Causative organism	2008	2009	2010	2008-2010
Haemophilus influenzae disease (invasive)	*Haemophilus influenzae*	3	3	2	8
Leptospirosis	*Leptospira* species	1	1	0	2
Listerosis	*Listeria* species	3	1	3	7
Salmonellosis	*Salmonella enteritidis*	0	1	0	1
Streptococcus pneumoniae infection (invasive)	*Streptococcus pneumoniae*	32	28	20	80
Streptococcus Group A infection (invasive)	Streptococcus Group A *(S. pyogenes)*	2	0	1	3
Tuberculosis*	*Mycobacterium* species	6	8*	8*	22
	Beta Haemolytic Streptococcus Group B	6	7	10	23
	Escherichia coli	11	3	2	16
	Staphylococcus aureus	3	2	6	11
	Enterococcus faecalis	1	1	0	2
Bacterial meningitis, NOS	*Citrobacter koseri*	1	0	0	1
(not otherwise specified)	*Mycoplasma pneumoniae*	0	0	1	1
	Serratia liquefaciens	1	0	0	1
	Staphylococcus capitis	0	0	1	1
	Streptococcus bovis	0	1	0	1
	Streptococcus Group D	0	1	0	1
	Streptococcus species	0	0	1	1
	Unknown	17	25	21	63
	Total Bacterial Meningitis, NOS	40	40	42	122
Total		**87**	**82**	**76**	**245**

Notes
* Tuberculosis meningitis figures for 2009 and 2010 are provisional

1.6 Pertussis

Summary

Number of cases, 2010: 114
Number of cases, 2009: 78
Crude incidence rate, 2010: 2.7/100,000

One hundred and fourteen cases (2.7/100,000) of pertussis were notified in 2010 compared to 78 cases in 2009. Of the 114 cases in 2010 45 (39%) were classified as confirmed, 11 (10%) as probable and 58 (51%) were classified as possible.

In 2010, the largest number of cases (n=36, 32%) and the highest age-specific incidence rate (58.9/100,000) were in children aged less than one year with 27% (n=31) of all cases aged less than six months (figures 1 and 2). Sixty-two cases (54%) were female and 52 (46%) were male.

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. The vaccine provides protection in over 80% of children who are fully vaccinated. However, protection declines over time, with little or no protection 10-12 years after primary immunisation, if no booster doses are administered. In 2008 the National Immunisation Advisory Committee (NIAC) recommended a booster with low dose acellular pertussis vaccine for children aged 11-14 years. The adolescent booster dose will commence through the schools immunisation programme in the academic year of 2011-2012.

In 2010, the vaccination status was reported for 58 (51%) pertussis cases. Seventeen (n=17/114, 15%) cases were unvaccinated; these cases ranged in age from three weeks to 11 years, with 15 cases aged less than six months. Nine unvaccinated cases (n=9/17, 53%) were less than two months of age and were therefore not eligible for pertussis vaccine in the Irish schedule. Fifteen (n=15/114, 13%) cases were reported as incompletely vaccinated, but these included eight cases (n=8/15, 53%) who were less than six months of age and were therefore not eligible for three doses of pertussis vaccine in the Irish schedule. Twenty six (n=26/114, 23%) cases were reported as completely vaccinated for

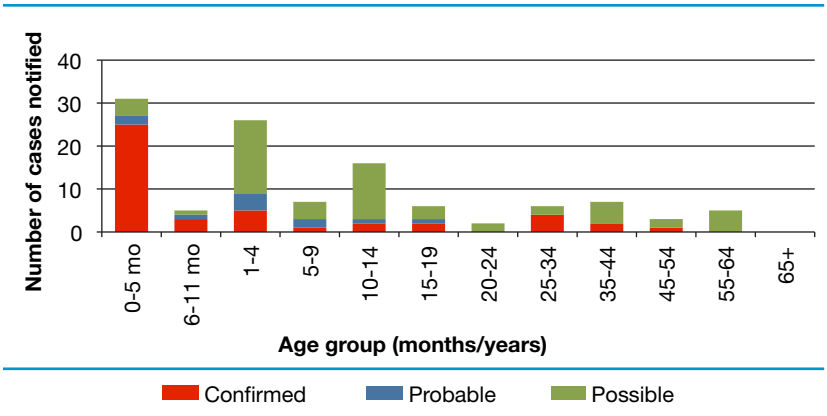

Figure 1. Number of notified pertussis cases in 2010 by age group and case classification. "Mo" in graph indicates months i.e. 0-5 months and 6-11 months, the remaining age groups are in years

their age; four of these were reported to have had three doses of pertussis vaccine, two were reported as having four doses while the number of doses was not specified for the remainder. Five of the 26 cases reported as completely vaccinated for their age were classified as confirmed.

Of the notifications in 2010, 65 (57%) were linked to a community outbreak in the HSE-NW. Of these 65 cases, seven were classified as confirmed, seven as probable and 51 as possible. The largest number of the cases in the outbreak were in the age groups 1-4 years (n= 16) followed by 10-14 years (n=15). The outbreak is described in detail in Eurosurveillance.[1] Three other localised outbreaks of pertussis were notified during 2010; all three were outbreaks in private houses with seven associated cases of illness in total.

Laboratory confirmation of pertussis is recommended, but it can be difficult to confirm the diagnosis as the sensitivity of the test is dependent on obtaining a nasopharyngeal aspirate or pernasal swab early on in the illness and rapid transfer to the hospital laboratory is required. Cultures are unlikely to be positive more than two weeks after onset of the catarrhal stage or one week after onset of cough or for more than a few days after commencing antibiotics. In Ireland laboratory confirmation is usually obtained by isolating the *Bordetella pertussis* organism through culture from nasopharyngeal aspirates or pernasal swabs. Increasingly PCR testing is being used to diagnose pertussis infection. Serology tests are not routinely done in Ireland. The establishment of a national pertussis reference laboratory would improve the quality of pertussis surveillance in Ireland and discussions have commenced to assess the feasibility of supporting this work.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 28th October 2011. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

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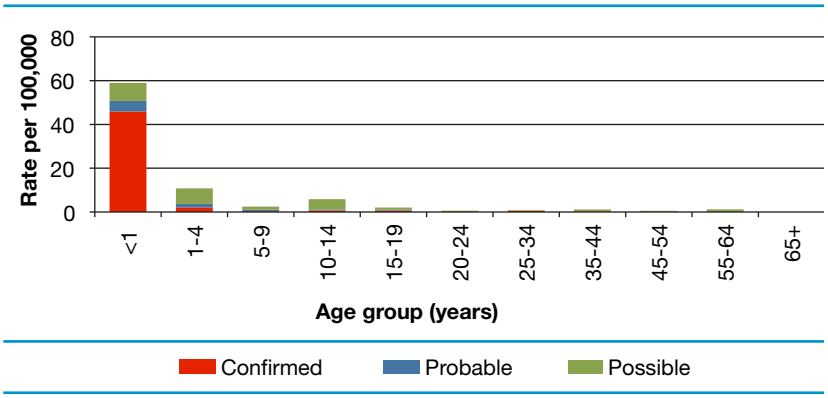

Figure 2. The age specific incidence rate (per 100,000 population) of notified pertussis cases in 2010 by case classification.

1.7 Rubella

Summary

Number of cases, 2010: 24
Number of confirmed cases, 2010: 1
Crude incidence rate, 2010: 0.6/100,000
Crude confirmed incidence rate, 2010: 0.02/100,000

In 2010, 24 cases (0.6/100,000) of rubella were notified in Ireland compared to 19 cases in 2009. Thirteen cases (54%) were notified in the HSE-E (table 1).

One of the cases in 2010 was classified as confirmed (based on specific antibody response and compatible clinical presentation) giving a crude confirmed incidence rate of 0.02 per 100,000 total population. The confirmed case was in the age group 1-2 years (figure 1). Twenty-three cases in 2010 were classified as possible; the majority (n=18/23, 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 24 rubella cases 11 (46%) were male and 13 (54%) were female. The confirmed case was female.

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

In Ireland, vaccination with the first dose of MMR is routinely recommended for all children at twelve months of age and the second dose at four to five years of age. Vaccination status was reported for 22 (92%) of the rubella cases in 2010. Thirteen cases (n=13/24, 54%) were unvaccinated; eight of these were <12 months of age. Nine cases (n=9/24, 38%) were reported as completely vaccinated for their age, only two of these were greater than five years of age (neither of these cases were confirmed). The confirmed case was reported as completely vaccinated for their age.

The diagnosis of rubella based solely on clinical signs and symptoms is unreliable because there are many other causes of rash that may mimic rubella infection and up to 50% of rubella infections may be subclinical. Therefore, samples should always be obtained for the accurate diagnosis of rubella. Serology tests are routinely carried out in Ireland (rubella IgM antibodies or IgG seroconversion or a fourfold or greater rise in titre to rubella virus) except if the individual has received a rubella-containing vaccine eight days to eight weeks before sample collection. Detection of rubella virus RNA in an appropriate specimen or a positive culture for rubella virus (not routinely performed) can also be done (following consultation with the laboratory).

Table 1. Number of rubella cases notified and the crude incidence rate per 100,000 population (CIR) by HSE Area in 2010

HSE Area	Number	CIR
HSE-E	13	0.9
HSE-M	0	0.0
HSE-MW	1	0.3
HSE-NE	0	0.0
HSE-NW	1	0.4
HSE-SE	5	1.1
HSE-S	2	0.3
HSE-W	2	0.5
Total	**24**	**0.6**

The only confirmed case reported in 2010 was laboratory confirmed based on serological response. This case was reported to have received one MMR dose, but the date of vaccination could not be obtained. Accurate information on vaccination dates in relation to disease onset is needed to accurately interpret serology test results.

Accurate and detailed information on all notified rubella cases is needed to monitor progress towards the WHO European Measles and Rubella Elimination Strategy (for 2015). HPSC is currently working with the HSE Areas to improve rubella surveillance data.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 3rd November 2011. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

Guidance on tests used to diagnose rubella is available on the NVRL website at http://www.ucd.ie/nvrl and on the HPSC website www.hpsc.ie/ under the disease name, see Topics A-Z.

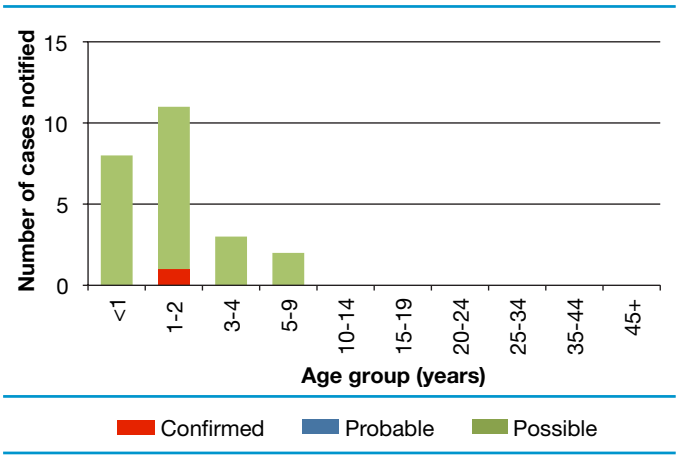

Figure 1. Number of notified rubella cases in 2010 by age group and case classification

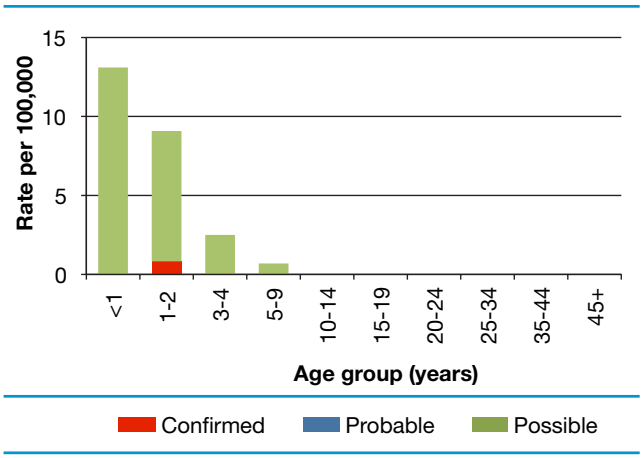

Figure 2. The age specific incidence rate (per 100,000 population) of notified rubella cases in 2010 by case classification

1.8 *Streptococcus pneumoniae* (invasive)

Summary

Number of cases, 2010: 391
Number of cases, 2009: 432
Number of deaths, 2010: 13
Number of deaths, 2009: 18
Crude incidence rate, 2010: 9.2/100,000

Background

Since January 2004, invasive *Streptococcus pneumoniae* infection is a notifiable disease in Ireland, clinicians and laboratories are legally obliged to notify. For the purposes of this report the term invasive pneumococcal disease (IPD) will be used to describe these infections.

A number of surveillance initiatives are in place in Ireland for IPD. Data on IPD notifications are collated in the Computerised Infectious Disease Reporting (CIDR) system. Enhanced surveillance on IPD notifications is undertaken by Departments of Public Health particularly on children born since 2000. A separate surveillance strand (EARS-Net project) involving the microbiology laboratories and HPSC is used to monitor in detail the antimicrobial resistance profiles of invasive *S. pneumoniae* isolates from blood and/or CSF. Since April 2007, the National Pneumococcal Typing Project has been offering a typing service to Irish laboratories for all invasive *S. pneumoniae* isolates submitted. This is a collaborative project involving Beaumont Hospital, the Children's University Hospital, Temple Street and HPSC.

In September 2008, the 7-valent pneumococcal conjugate vaccine (PCV7) was introduced in Ireland to the infant immunisation schedule at 2, 6 and 12 months of age. A catch-up campaign was also implemented at that time, targeting all children <2 years of age. In December 2010, PCV13 replaced PCV7 for new entrants to the infant schedule (i.e. for children born on or after 1st October 2010).

Notifications

In 2010, 391 cases of IPD (9.2/100,000) were notified in Ireland. This was a 9.5% decrease compared with 2009 when 432 cases were notified (10.2/100,000). Seventy seven percent (n=302) of notifications in 2010 were classified as confirmed, 1.0% (n=2) as probable and 22% as possible (n=87). The majority of the possible cases (80%, n=70/87) were notified by HSE-SE and most related to cases that were urinary antigen positive for *S. pneumoniae* (figure 1). These figures do not necessarily indicate a higher burden of IPD in this area relative to other areas, but rather more consistent reporting of urinary antigen positive cases from that area. Comparing the crude incidence rate of confirmed IPD cases by HSE area, the incidence rate in HSE-SE (8.9/100,000; 95% CI

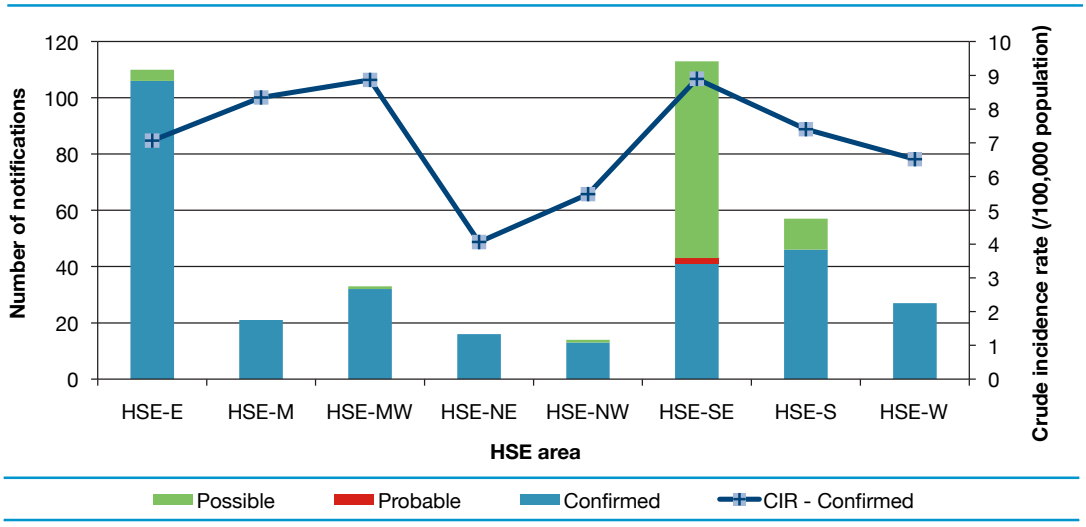

Figure 1. Number of IPD cases notified by case classification and HSE area and crude incidence rate (CIR) of confirmed cases by HSE area, 2010
Data source: CIDR

6.1-11.6/100,000) was not statistically different from the national rate (7.1/100,000; 95% CI 6.3 – 7.9/100,000). In fact the IPD incidence rates for confirmed cases in seven out of the eight HSE areas were not statistically different from the national rate. The only exception was HSE-NE where the incidence rate was significantly lower (4.1/100,000; 95% CI 2.1 – 6.1/100,000) (figure 1).

Clinical diagnosis was reported for just 125 of the 391 cases (32%), which included bacteraemia with pneumonia (n=63), bacteraemia without focus (n=35), meningitis (n=20), peritonitis (n=3), muscoskeletal (n=3) and abscess (n=1). More cases occurred in males (55%; n=215) than in females (45%; n=176), giving a male to female ratio of 1.2:1.0. Cases ranged in age from 6 days to 96 years, with an average age of 58.3 years and a median age of 66 years. Those aged 65 years and older accounted for over half of the cases (51%, n=201). The age specific incidence rate was highest in those 85 years of age and older (106.2/100,000; n=51), followed by 75-84 years age group (48.3/100,000; n=76) and then those aged between 65 and 74 years (28.2/100,000; n=74) (figure 2). In children < 2 years of age the age specific incidence rate was 18.9 cases per 100,000 population (n=23). In this age group the incidence has dropped by more than half when compared with 2008 (42.8/100,000; n=52), highlighting the positive impact the introduction of PCV7 to the infant schedule in September 2008 has had on reducing the burden of IPD in young children (figure 2).
Medical risk factor information was reported for 82 cases (21%), with some patients having multiple risk factors. For those where this information was reported, the main risk factors included immunosuppressive condition or therapies (n=37), chronic lung disease (n=21), diabetes mellitus (n=12) and chronic liver disease (n=12). It should also be noted that being elderly, aged 65 years and older is also a recognised IPD risk factor; 201 cases in 2010 were in this age group.

Outcome was reported on just 27% (n=107) of the IPD notifications in 2010. Therefore, figures presented underestimate IPD mortality in Ireland. Based on the data available, 16 deaths in individuals with IPD in 2010 were reported. The cause of death was reported as directly due to IPD in five cases, not due to IPD in three cases and for the remaining eight the cause of death was not reported. Therefore, based on the outcome data available 13 deaths potentially associated with IPD infection occurred in 2010, giving an IPD case fatality rate of 12%. One death was in a child <5 years of age and 12 deaths were in adults >35 years of age.

IPD notification data was extracted from CIDR on 30th August 2010. These figures may differ slightly from those previously published due to ongoing updating of notification data on CIDR.

Impact of PCV7

Data from the National IPD Typing Project was used to assess the impact of introducing PCV7 on the distribution of *S. pneumoniae* serotypes associated with IPD and on the burden of IPD in Ireland.

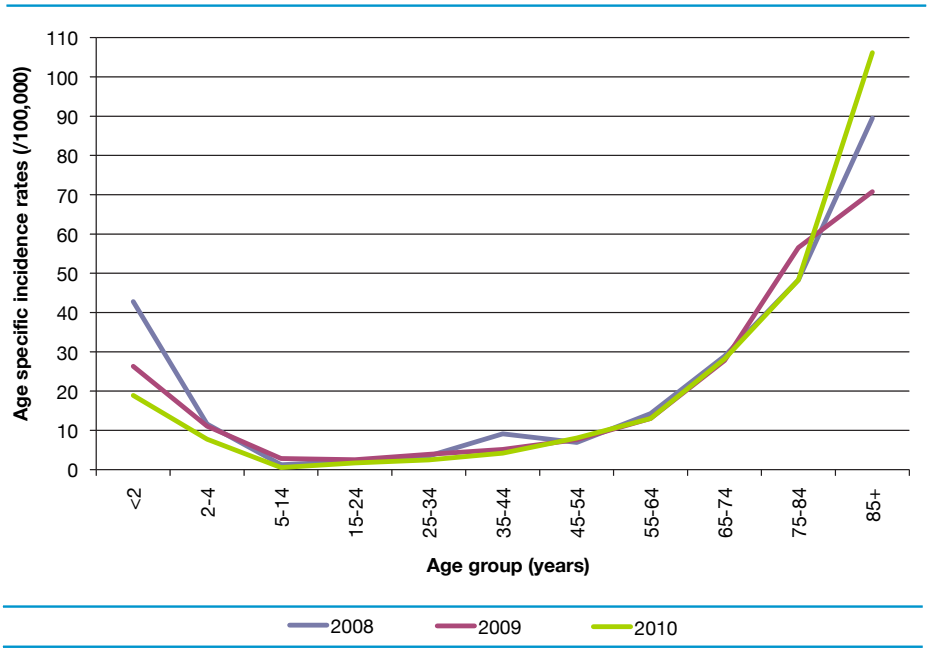

Figure 2. Age specific incidence rate of invasive pneumococcal disease by age group, 2008-2010

Table 1. Number of IPD cases in 2008 and 2010 and percentage change in burden of IPD since introducing PCV7 in September 2008

	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
2008	34	145	179	15	180	195	49	325	374
2010	3	73	76	17	186	203	20	259	279
% change	**-91.2**	**-49.7**	**-57.5**	**13.3**	**3.3**	**4.1**	**-59.2**	**-20.3**	**-25.4**

Date source: National IPD Typing Project

In 2010, isolates relating to 279 cases of IPD were typed, compared to 314 in 2009 and 374 in 2008. In 2010, 27% of IPD infections were due serotypes covered by PCV7, 11% of infections were associated with the three additional serotypes covered by PCV10 (1, 5 and 7F) and a further 17% of IPD infections were due to the other three serotypes covered by PCV13 (3, 6A and 19A) (figure 3). Forty five percent of IPD infections in 2010 were associated with non-vaccine types (NVTs, serotypes excluding the 13 covered by PCV13) (figure 3).

The introduction over two years ago of PCV7 to the Irish immunisation schedule has had a dramatic impact in reducing the burden of IPD, particularly in disease due to the serotypes covered by PCV7. Most impressively disease burden due to PCV7 serotypes has declined by 91% in children under 2 years of age (figure 4 and table 1), by 50% in children 2 years of age and older and by 58% in all age groups (table 1) . An increase in incidence of disease due to non-PCV7 serotypes has been seen, a 13% increase in <2 year olds and 4% increase when all age groups are taken into account (table 1). Overall the incidence of IPD has declined by a quarter when all serotypes and ages are taken into consideration (table 1). For ongoing updates, see "Slides – Impact PCV in Ireland" at http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/PneumococcalDisease/PostersPresentations/

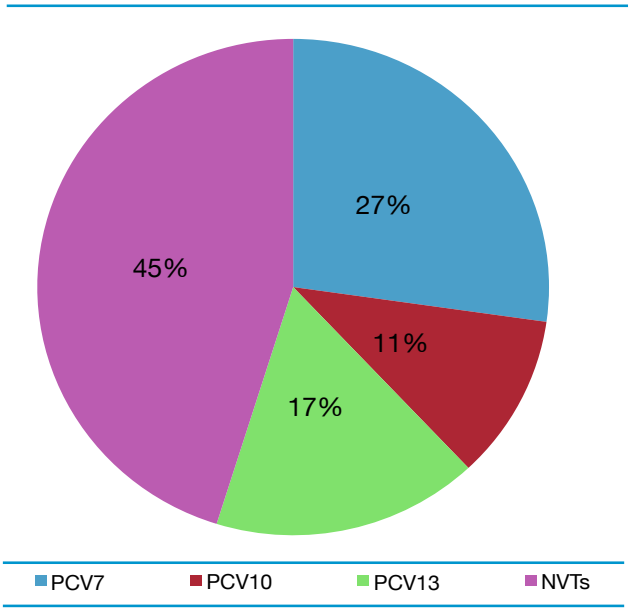

Figure 3. Proportion of IPD cases in 2010 due to serotypes covered by PCV7, the additional serotypes in PCV10 and PCV13 and due to the non-vaccine types (NVTs)
PCV7: 4, 6B, 9V, 14, 18C, 19F and 23F; PCV10: 1, 5 and 7F; PCV13: 3, 6A and 19A
Data source: National IPD Typing Project

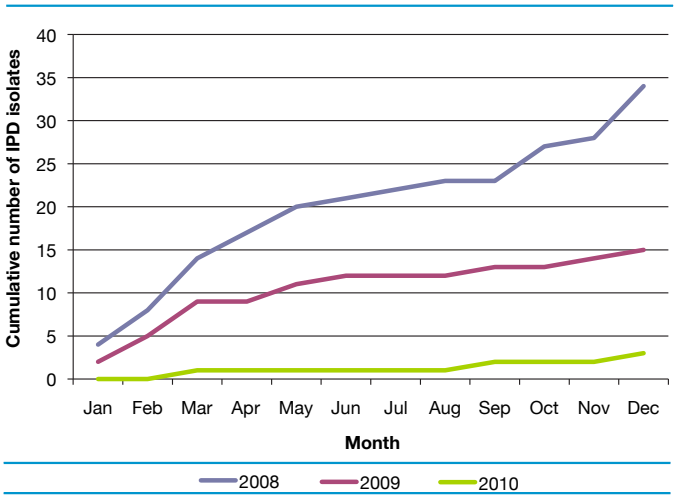

Figure 4. Cumulative number of IPD cases due to PCV7 serotypes in children <2 years of age, 2008 – 2010
Data source: National IPD Typing Project

The predominant serotypes associated with IPD infection in 2010 were 8, 22F, 7F and 19A. In children <2 years of age, the predominant serotype was 7F and this accounted for one third of the cases in this age group.

PCV7 vaccine failures
Based on data obtained through the IPD enhanced surveillance system, two PCV7 vaccine failures occurred in 2010. One was in a 2 year old with serotype 14 *S. pneumoniae* infection; the other in 3 year old due to serotype 19F infection. Both had received one dose of PCV7 vaccine at >12 months of age and therefore were considered fully vaccinated. Two PCV7 vaccine failures also occurred in 2009, also associated with serotype 14 and 19F infections.

Penicillin non-susceptible *S. pneumoniae* (PNSP)
The proportion of penicillin-non-susceptible *S. pneumoniae* (PNSP) decreased from 23.1% in 2008 to 20.2% in 2009, followed by a further decline in 2010 to 18.2% (Data source: EARS-Net). For details on the antimicrobial resistance patterns of *S. pneumoniae*, please see the chapter on Antimicrobial Resistance within this report.

Discussion
The incidence of IPD continued to decline in Ireland, in 2010. Introducing PCV7 has been a major contributory factor in this decline. Compared with 2008, there has been an impressive 91% reduction in IPD in young children due to serotypes covered by PCV7 and the burden of all types of IPD in the total population has been reduced by a quarter. In 2010, 28% of IPD infections were due to one or other of the six additional serotypes covered by PCV13. The impact of introducing PCV13 at the end of 2010 on the burden of IPD and in particular on the burden of disease due to the additional six serotypes covered by PCV13 should become evident over the next year or two.

Considerable progress has been made in recent years in improving the various IPD surveillance initiatives in Ireland. Data from these surveillance systems provide invaluable information in monitoring the incidence of this disease and in determining the impact of interventions such as the introduction of PCV7. The establishment of the National IPD Typing Project and the data available from this project has been vital in this regard, as has the enhanced surveillance undertaken by Departments of Public. Not only can the impact of various interventions be monitored but changes in serotype distribution patterns can also be studied. The data obtained through such initiatives are all vital elements when informing public health decisions on vaccination policy and immunisation schedules.

02

Respiratory and Direct Contact Diseases

2.1 Influenza

Summary

2010/2011 influenza season summary:
Peak influenza-like illness rate: 202.1/100,000
Total confirmed influenza cases hospitalised: 945
Total confirmed influenza cases admitted to ICU: 121
Total deaths associated with influenza: 38

HPSC is working in collaboration with the NVRL, the ICGP and the Departments of Public Health on the influenza sentinel surveillance project. Sixty general practices (located in all HSE-Areas) were recruited to report electronically, on a weekly basis, the number of patients who consulted with influenza-like illness (ILI)[1]. Sentinel GPs were requested to send a combined nasal and throat swab on 1 to 2 ILI patients per week to the NVRL. Other surveillance systems set up to monitor ILI/influenza activity include a network of sentinel hospitals reporting admissions data, sentinel schools reporting absenteeism and enhanced surveillance of hospitalised influenza cases aged 0-14 years.

Several surveillance projects that were initiated/augmented during the 2009 influenza pandemic were continued during the 2010/2011 influenza season:

- Surveillance of all calls to GP out-of-hours (OOHs) centres were monitored for self-reported influenza.
- Surveillance of all confirmed influenza notifications, including hospitalisation status.
- Surveillance of all confirmed influenza adult and paediatric cases admitted to critical care.
- Enhanced surveillance of all confirmed influenza deaths.

Sentinel GP Clinical Data
Influenza activity in Ireland was moderate during the 2010/2011-influenza season, peaking during week 1 2011 at 202.1 per 100,000 population, the highest recorded ILI rate since influenza surveillance began in 2000 (figure 1). ILI rates first increased above baseline levels (17.8 per 100,000) during week 50 2010 and remained above baseline levels until week 10 2011. The highest age specific ILI rates were in the 5-14 year age group (peaking at 254.1/100,000), followed by the 15-64 year age group (244.9/100,000), 0-4 year olds (193.6/100,000) and those aged 65 years or older (66.0/100,000). ILI rates in those under 15 years were lower than during the pandemic period, however ILI rates in the 15-64 year age group and those aged 65 years or older were higher than the pandemic period.

Virological Data
The NVRL tested 1054 sentinel specimens for influenza virus during the 2010/2011 season. Five hundred and thirteen (48.7%) sentinel specimens were positive for influenza: 279 influenza A (267 A (H1) 2009, 9 A (H3) and 3 A (unsubtyped) and 234 influenza B. At the peak of influenza activity, the proportion of influenza positive specimens reached 72.4% (during week 1 2011).

The NVRL tested 7,114 non-sentinel respiratory specimens during the 2010/2011 season, 1518 (21.3%) of which were positive for influenza: 1157 influenza A (1099 A (H1) 2009, 31 A (H3) and 27 A unsubtyped) and 361 influenza B. Eight influenza A cases were co-infected with influenza B: 7 with influenza A (H1) 2009 and one with influenza A (unsubtyped). One influenza B case was also co-infected with respiratory syncytial virus (RSV).

Influenza A (H1) 2009 was the dominant influenza type/subtype detected during the first half of the season, with influenza B dominating during the latter half. Influenza A accounted for 70.7% of all influenza positive specimens and influenza B for 29.3% during the 2010/2011 season. Influenza A (H1) 2009, accounted for 67.3% of all positive influenza specimens.

The NVRL tested eight non-sentinel specimens from six confirmed influenza A (H1) 2009 cases for antiviral resistance. All six patients were hospitalised and admitted to critical care. One (12.5%) of the eight specimens tested was resistant to oseltamivir, carrying the H275Y mutation. As part of the WHO Global Influenza Surveillance Programme, a proportion of influenza viruses (10 A (H1N1) 2009 and 2 B viruses) circulating in Ireland during the 2010/2011 season

were submitted to the WHO Collaborating Centre for Reference and Research on Influenza (Mill Hill, London) for characterisation. Antigenic characterisation results for the circulating influenza A (H1N1 2009) and for the influenza B isolates showed good reactivity with the A/California/7/2009 and the B/Brisbane/60/2008 2010/2011 influenza vaccine strains, respectively. Therefore, indicating a good match between the circulating and vaccine strains.

Outbreaks, GP OOHs, Sentinel hospital & school data
Fourteen general ILI/influenza outbreaks were reported to HPSC: eight ILI outbreaks, five influenza A (H1) 2009 outbreaks and one outbreak associated with both influenza A (H1) 2009 and influenza B. Five outbreaks were reported from HSE-E, seven from HSE-S and two from HSE-W. Two outbreaks were in healthcare settings (one of which was a maternity hospital), seven in schools, one in a community setting, one in a residential institution, one in a prison, one travel related outbreak and one outbreak reported as 'Other' setting.

The percentage of influenza-related calls to GP out-of-hours services in Ireland, peaked during week 1 2011 at 14.7%. This is higher than the proportion recorded during the pandemic period. During the peak of activity, each service received on average, five calls per hour relating to influenza.

Hospital respiratory admissions in sentinel hospitals peaked during week 52 2010 (figure 2), one week prior to the peak in sentinel GP ILI consultation rates. Sentinel school absenteeism data are not presented in this report, as most sentinel schools were closed for an extended period of time due to severe weather and road conditions coinciding with the peak of influenza activity.

Influenza notifications
A total of 2233 influenza notifications were reported on CIDR during the 2010/2011 influenza season. The peak of influenza notifications occurred during week 2 2011, one week following the peak in ILI consultation rates and GP OOHs flu calls. Of the 2233 notifications, 1324 (59.3%) were influenza A (H1) 2009, 23 (1.0%) were influenza A (H3), 203 (9.1%) were influenza A (unsubtyped) and 683 (30.6%) were influenza B.

Hospitalisation
Nine-hundred and forty-five cases with confirmed influenza were hospitalised during the 2010/2011 influenza season. Similar to the pandemic period, the highest age specific rate in hospitalised cases was in the 0-4 year age group (61.9 per 100,000 population) (table 1). Of the 945 hospitalised cases, 602 (63.7%) were influenza A (H1) 2009, 7 (0.7%) were influenza A (H3), 109 (11.5%) were influenza A (unsubtyped) and 227 (24.0%) were influenza B.

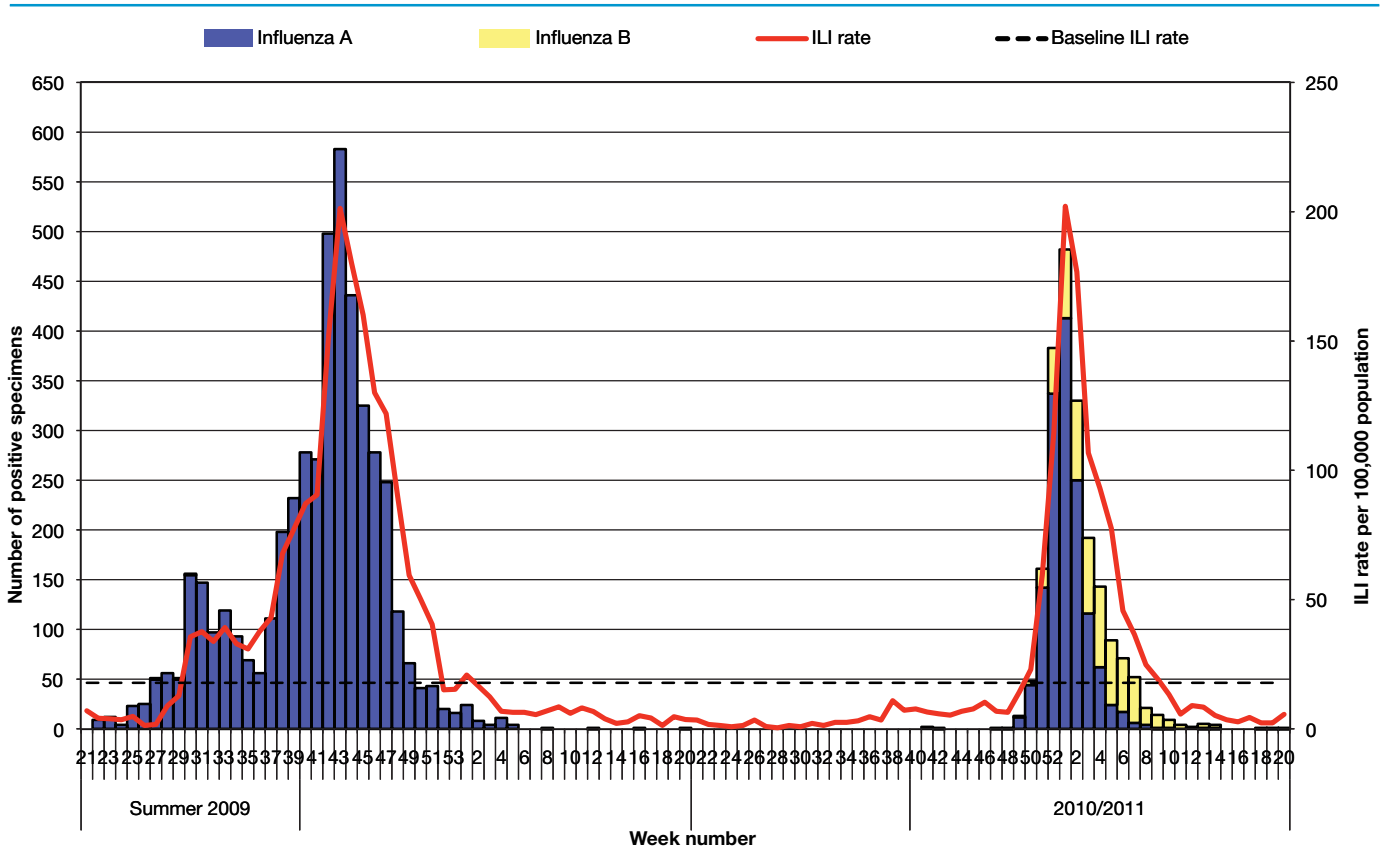

Figure 1. ILI sentinel GP consultation rates per 100,000 population, baseline ILI threshold rate, and number of positive influenza A and B specimens tested by the NVRL[2] , by influenza week and season.
Source: Clinical ILI data from ICGP and virological data from the NVRL.

Pregnancy

A total of 81 laboratory confirmed influenza cases were reported as pregnant during the 2010/2011 season. Fifty-one (63.0%) of these cases were hospitalised: influenza A (H1) 2009 was detected from 42 of these cases, influenza A (unsubtyped) from two cases and influenza B from seven cases. Eight (15.7%) of all reported hospitalised pregnant cases were admitted to ICU, one of whom died.

Enhanced surveillance hospital data on 0-14 year age group

A total of 547 confirmed influenza cases aged between 0 and 14 years were notified on CIDR for the 2010/2011 influenza season, 275 (50.3%) of these cases were hospitalised. Enhanced surveillance data was available on 266 (96.7%) cases. One hundred and seventy-four cases (65.4%) were positive for influenza A (144 influenza A (H1) 2009, 1 A (H3) and 29 A (unsubtyped)) and 92 (34.6%) were positive for influenza B. The predominant influenza type/subtype was influenza A (H1) 2009, accounting for 54.1% of all cases. The median age was 2 years, ranging from 6 days to 14 years. The majority of cases, 66.5% were aged between 0 and 4 years. The most frequently reported symptoms included: fever (74.8%), cough (65.8%) and gastrointestinal symptoms (33.8%). The most frequently reported complications included: secondary bacterial pneumonia, primary influenza viral pneumonia, bronchitis and other respiratory complications, such as bronchiolitis and chest infections. The median length of stay in hospital was 3 days (ranging from 1 - 35 days). Eighty-one (35.4%, n=229) cases had underlying medical conditions. Chronic respiratory disease was the most frequently reported underlying medical condition (33/229, 14.4%). Fourteen (6.1%) cases had more than one underlying medical condition. Vaccination status was known for 175 (65.8%) children. Five (2.9%) cases were vaccinated with the 2010/2011 influenza vaccine and 97.1% (170/175) were not vaccinated. Three of the five vaccinated cases had also received the pandemic influenza vaccine. Thirty-eight percent (73/194) of cases commenced antiviral treatment and 62.4% (121/194) of cases did not. Fourteen percent of cases were associated with an ILI/influenza outbreak. Fourteen cases were admitted to critical care and two cases died (see further details on disease severity below).

Critical care

Of the 945 hospitalised cases, 121 (12.8%) were admitted to critical care (107 adults and 14 paediatric cases). The highest age specific rate for patients admitted to ICU was in the 55-64 year age group (5.9 per 100,000 population) (table 1). The median age of paediatric cases was one year of age and the median age of adult cases was 51 years. Eighty-one (81/107,

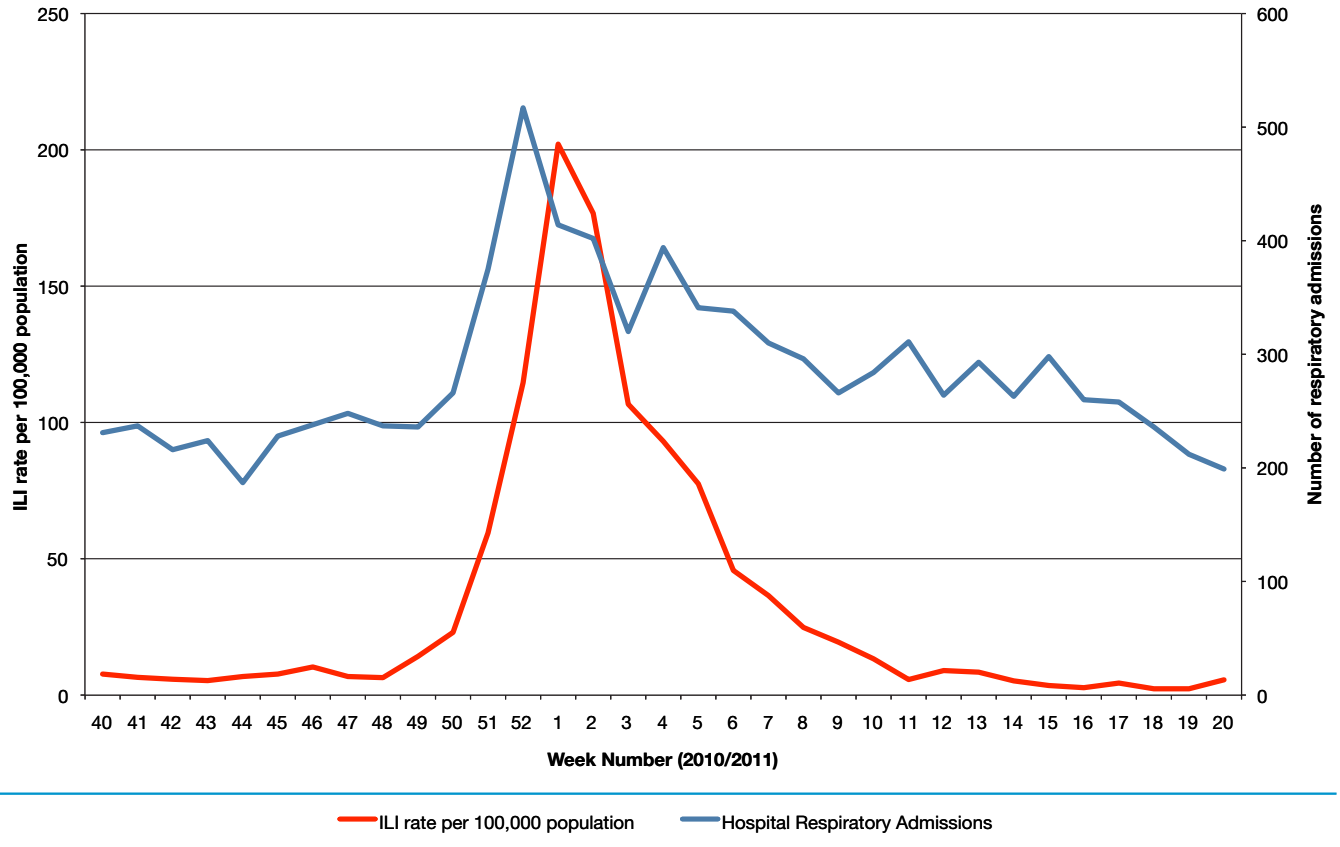

Figure 2. Total hospital respiratory admissions in nine sentinel hospitals and ILI sentinel GP consultation rate per 100,000 population by week for the 2010/2011 influenza season. It should be noted that admissions data from one sentinel hospital were not available for weeks 40-50 2010.

75.7%) adults and nine (9/14, 64.3%) paediatric cases had pre-existing medical conditions.[3] The most frequently reported underlying medical conditions for adults included chronic respiratory disease (n=42/107, 39.3%) and chronic heart disease (n=26/107, 24.3%). The most frequently reported underlying medical conditions for paediatric cases included chronic neurological disease (n=4/14, 28.6%) and chronic respiratory disease (n=3/14, 21.4%). Nine (64.3%) paediatric and 98 (91.6%) adults were ventilated during their stay in ICU. The median length of stay in ICU for paediatric cases was 6.5 days (ranging from 1 - 20 days) and for adult cases was 13.5 days (ranging from 1 - 135 days). Eighteen (n=121, 14.9%) cases were vaccinated during the 2010/2011 influenza season. Clinical outcome data are presented below.

Mortality data
During the 2010/2011 influenza season, 38 influenza-associated deaths[4] were reported, compared to 29[5] during the pandemic period. The median age of cases that died during the 2010/2011 influenza season was 57 years, ranging from 2 – 83 years. Thirty-two (84.2%) cases had underlying medical conditions. Thirty-two (84.2%) cases were admitted to ICU. Of the 38 cases that died, one was infected with influenza A (unsubtyped), one with influenza A (H3), 32 with influenza A (H1) 2009, one co-infection of influenza A (H1) 2009 and influenza B and three with influenza B. Vaccination status was known for 33 of the 38 (86.8%) deaths. Eighty-eight percent (29/33) were not vaccinated and 12.1% (4/33) were vaccinated with the 2010/2011 influenza vaccine.

A summary table of confirmed influenza hospitalised and critical care cases and influenza-associated deaths for all ages is detailed in table 2.

Seasonal influenza vaccine uptake[6]
The average uptake for seasonal influenza vaccination nationally during the period September 2010 to July 2011 in those aged 65 years and older was 60.1%. This is the highest recorded rate for this period since the 2006/2007 influenza season when uptake reached 60.6%. Variation in vaccination coverage was observed between age groups, with the highest uptake (64.0%) in those aged 75 years or older. A slight variation in vaccination coverage was also observed between HSE areas, ranging from 57.7% in HSE-NW to 62.7% in HSE-SE.

Overview of the 2010/2011 influenza season
Based on all influenza/ILI data available at HPSC, influenza activity during the 2010/2011 was regarded as moderate, with the highest ILI rates reported since the GP sentinel surveillance scheme began. ILI/influenza activity was very intense during the peak of influenza activity (week 1 2011). The predominant circulating influenza virus was influenza A (H1) 2009, however for the latter part of the influenza season, influenza B predominated. Fewer cases were admitted to hospital during the 2010/2011 influenza season than during the pandemic period, however more cases were admitted to critical care and more influenza-associated deaths were reported. The median age of severe cases was higher during the 2010/2011 influenza season than during the pandemic period. Similarly, the proportion of severe cases with underlying medical conditions, although still high, was less than that reported during the pandemic period. Critical care and hospitalisation rates were similar to the pandemic period; however, the intensity was greater at the peak of influenza activity during the 2010/2011 season and activity was spread over a longer period of time during the pandemic.

2011/2012 influenza season
For the 2011/2012 influenza season, existing surveillance systems have been strengthened and a number of additional measures have been put in place in Ireland to improve surveillance of ILI/influenza. At HPSC, initiatives have been implemented to streamline reporting and to capture additional data on influenza vaccination status, underlying medical conditions and antiviral treatment. The NVRL has improved standardisation of procedures, testing and reporting algorithms for characterising influenza viruses. They

Table 1. Age specific rate for confirmed influenza cases hospitalised and admitted to critical care during the 2010/2011 influenza season. Age specific rates are based on the 2006 CSO population census.

	Hospitalised		Admitted to ICU	
Age (years)	Number	Age specific rate per 100,000 pop.	Number	Age specific rate per 100,000 pop.
0-4	187	61.9	12	4.0
5-14	91	16.2	2	0.4
15-24	102	16.1	3	0.5
25-34	173	23.9	21	2.9
35-44	104	16.7	18	2.9
45-54	88	16.9	23	4.4
55-64	101	24.8	24	5.9
65+	98	20.9	18	3.8

have also introduced multiplex PCR (swabs) for influenza A, B, RSV, adenovirus, parainfluenza virus types -1 and -3 and human metapneumovirus. The NVRL will also continue monitoring for oseltamivir resistance.

All influenze surveillance projects described for the 2010/2011 season will continue for the 2011/2012 influenza season. A review of the influenza surveillance system in critical care units was conducted at the end of the 2010/2011 influenza season and improvements were made. A pilot project to monitor morbidity and mortality from all severe acute respiratory infections (SARI) admitted to two critical care units is being implemented for the 2011/2012 influenza season. Additional projects not detailed in this report include participation in a European influenza vaccine effectiveness study (I-MOVE project) and an all-cause mortality monitoring project associated with the European mortality monitoring group (EuroMOMO). Data from all of these surveillance systems will assist in guiding the management and control of influenza and any future epidemics or pandemics.

References

1. ILI is defined using the EU case definition which is sudden onset of symptoms AND at least one of the following four systemic symptoms: fever, malaise, headache, myalgia; AND at least one of the following three respiratory symptoms: cough, sore throat, shortness of breath.
2. In addition to the NVRL, Cork University Hospital (CUH) and Galway University Hospital(s) (GUH) also tested for influenza A (H1) 2009 during the pandemic period.
3. Some cases had more than one underlying condition.
4. Influenza-associated deaths include: deaths with influenza as the primary/main cause of death on the death certificate or as reported by the clinician or deaths with influenza listed anywhere on the death certificate.
5. This is an increase to previously reported deaths for the pandemic period, following extensive searches of the General Registrar's Office registered deaths data.
6. Seasonal influenza vaccine uptake data for the 2010/2011 influenza season are provisional.

Table 2. Summary table of confirmed influenza hospitalised and critical care cases and influenza-associated deaths for all ages. Rates are based on the 2006 CSO population census.

	Hospitalised		Admitted to ICU		Influenza associated deaths	
	Pandemic period	*2010/2011*	*Pandemic period*	*2010/2011*	*Pandemic period*	*2010/2011*
Total cases	1059	945	100	121	27	38
Crude rate per 100,000 pop.	25.0	22.3	2.4	2.9	0.6	0.9
Age range (years)	0-84	0-97	0-79	0-80	8-83	2-83
Median age (years)	17	29	34	49	52	57
Females	533	513	50	64	15	18
	50.3%	54.3%	50.0%	52.9%	55.6%	47.4%
Cases with risk factor	507	No data*	81	90	25	32
	47.9%		81.0%	74.4%	92.6%	84.2%

**It should be noted: that risk factor data was not available for all age groups for the 2010/2011 season.*

2.2 Legionellosis

Summary

Number of cases, 2010: 11
Crude incidence rate: 2.6 per million

In 2010, there were eleven cases of legionnaires' disease notified in Ireland, a rate of 2.6 per million population. No deaths associated with legionnaires' disease were reported.

Seven cases were reported from HSE East, two from HSE South East, and one each from HSE Mid-West and HSE North East.

Just over half the cases were male (54.5%). The median age was 63 with a range from 21 to 75 years.

All cases were confirmed by urinary antigen test. The organism involved in all eleven cases was *Legionella pneumophila* serogroup 1.

Seven cases were travel-associated. Countries of travel included Spain (2), Ireland (2), Germany (1), Bulgaria (1), and Cuba (1). Four cases were community-associated, two in Ireland and one each in Spain and the United Arab Emirates.

The peak month for notifications was August when five cases were notified.

Table 1. Number of legionnaires' disease cases per million population in Ireland, 2003-2010

Age group (years)	2003	2004	2005	2006	2007	2008	2009	2010
<30	1	0	0	0	1	0	0	1
30-39	0	0	2	0	3	0	0	0
40-49	0	1	3	7	4	2	0	2
50-59	0	1	1	2	2	3	2	1
60-69	2	1	1	1	3	4	3	3
70+	3	1	1	2	2	2	2	4
Total	**6**	**4**	**8**	**12**	**15**	**11**	**7**	**11**
CIR	**1.5**	**0.9**	**1.9**	**2.8**	**3.5**	**2.6**	**1.7**	**2.6**

2.3 Invasive Group A Streptococcal Disease

Summary

Number of cases, 2010: 68
Crude incidence rate, 2010: 1.60 per 100,000

Notifications
Sixty-eight cases of invasive Group A streptococcal (iGAS) disease were notified in 2010. This corresponds to 1.60 iGAS cases per 100,000 population [95% confidence interval (CI), 1.25 to 2.03 per 100,000] and represents an increase since 2009 when the iGAS rate was 1.42 per 100,000 population (95% CI, 1.08 to 1.82 per 100,000).

Sixty-five cases were confirmed, defined as patients with Group A streptococcus (GAS), or *Streptococcus pyogenes*, isolated from a sterile site. Three cases were probable, defined as patients with streptococcal toxic shock syndrome (STSS) and GAS isolated from a non-sterile site (e.g. throat, sputum, vagina).

Patient demographics
Of the 68 cases, 36 (53%) were males and 32 (47%) were females, with ages ranging from 3 months to 97 years (mean, 49 years; median, 49 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 2010. Of note, the highest number of cases in 2010 occurred in the HSE-East (n=22; CIR, 1.47 per 100,000 population) while the highest CIR occurred in the HSE-North West (n=8; CIR, 3.37 per 100,000 population). As in 2009, the peak period in 2010 occurred between April and July accounting for 29 cases, with other peaks in January (n=7) and October (n=6). Note, the number of monthly cases (based on the date the case was positive for GAS and not the date the case was reported) is small, ranging from three to nine.

Enhanced surveillance data
Enhanced data fields were entered for 57 (84%) of the iGAS cases, which is similar to 2009 (83%, 50 of 60 cases). The source laboratory could not be ascertained for three of the cases. As in previous years, a wide variation in completed fields was observed.

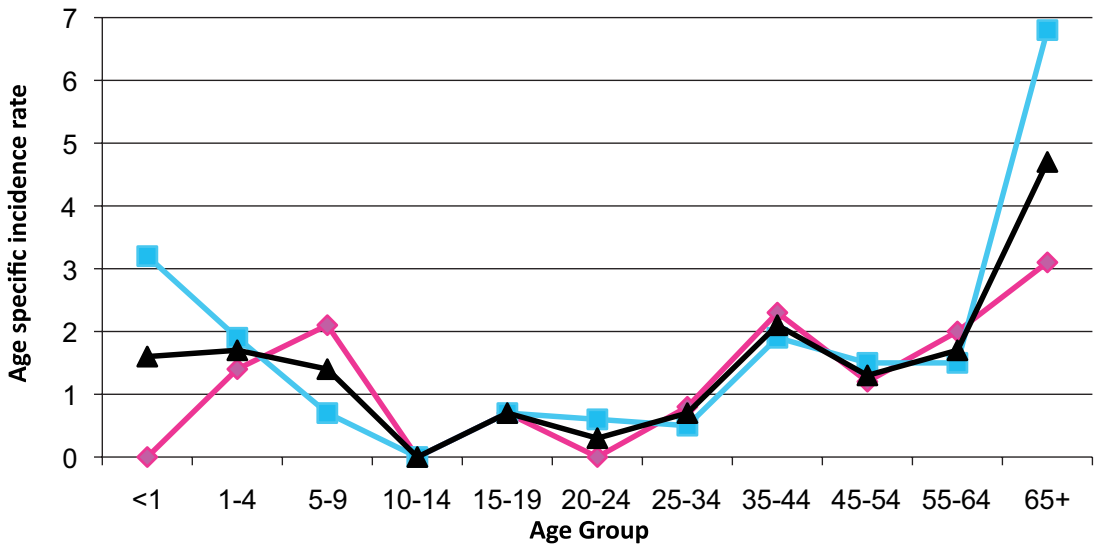

Figure 1. Age and sex specific rates of iGAS disease in 2010

Isolate details
GAS was isolated from a sterile site in 53 of 65 confirmed cases (no data on the source were available for 12 cases), primarily from blood cultures (n=51 isolates, 96%) but also deep tissue (n=1) and a ventriculoperitoneal shunt tip (n=1). For the three probable cases, GAS source was provided for two of these: vaginal swab (n=1) and caesarean section wound (n=1). The third probable case was from a patient with meningitis.

Serological typing data, based on the detection of M and T-proteins, were available on only nine isolates from five laboratories: *emm*/M3, M11, M12, M13, M25, M28, M48, M49 and M78 (one isolate of each, respectively). Of these, enhanced data were available on eight patients with iGAS, two of whom presented with STSS (emm/M12 and M25).

Clinical details
As in 2009 and previous years, bacteraemia (n=51 cases, including cases where bacteraemia was not specifically stated but GAS was isolated from blood) and cellulitis (n=20) were the most common clinical presentations, followed by pneumonia (n=10), STSS (n=9; one of which was implied based on the clinical presentation given), necrotising fasciitis (n=4), puerperal sepsis (n=3), myositis (n=2), septic arthritis (n=2), meningitis (n=1) and peritonitis (n=1). Note that cases could have more than one clinical presentation.

Risk factors
Risk factors associated with iGAS disease included age 65 years and over (n=22), presence of skin and wound lesions (n=16), diabetes mellitus (n=8), intravenous drug use (IVDU) (n=6), malignancy (n=6), non-steroidal anti-inflammatory drug (NSAID) use (n=5), childbirth (n=4), alcoholism (n=3), steroid use (n=2) and varicella infection (n=2). Note that cases could have one or more associated risk factors: 31 cases had one risk factor, 10 had two risk factors, five had three risk factors and two had four risk factors. No risk factors were identified for seven cases. Among the nine cases with STSS, all of whom had at least one risk factor recorded, NSAID use was identified as a risk factor in three cases, age 65 years and over was identified in two cases, and alcoholism in two cases.

Clinical management
Surgical intervention was required for 12 patients (compared with 8 in 2009) ranging in age from one to 71 years, including the four cases that presented with necrotising fasciitis.

Thirteen patients ranging in age from two to 72 years were admitted to an intensive care unit (ICU) (compared to 16 in 2009). This included three patients with pneumonia, three with STSS, one with necrotising fasciitis, one with STSS and necrotising fasciitis, one with STSS and septic arthritis and one with STSS, necrotising fasciitis, septic arthritis and puerperal sepsis (some of these cases also presented with bacteraemia and/or cellulitis).

Risk factors for patients admitted to an ICU included skin and wound lesions (n=4), age over 65 years (n=3), diabetes mellitus (n=3), NSAID use (n=3), alcoholism (n=2), childbirth (n=2), steroid use (n=1) and varicella infection (n=1). Six patients had one, three had two, one had three and one had four risk factors. No risk factors were identified in one patient.

Length of ICU stay was provided for nine cases ranging from one to eight days (mean, 4.3 days; median, 3 days).

Other epidemiological information
Three cases (all bacteraemia, including one with cellulitis) were reported as hospital-acquired, which is the same as in 2009.

As in 2009, no outbreaks of iGAS were notified in 2010.

Table 1. Numbers (n) and Crude Incidence Rates (CIRs) per 100,000 population of iGAS disease by HSE Area, 2004-2010

HSE Area	2004		2005		2006		2007		2008		2009		2010	
	n	CIR	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	22	1.47
HSE-M	0	0.00	1	0.40	2	0.79	0	0.00	0	0.00	2	0.79	2	0.79
HSE-MW	1	0.28	3	0.83	2	0.55	2	0.55	3	0.83	5	1.38	6	1.66
HSE-NE	1	0.25	3	0.76	5	1.27	3	0.76	10	2.54	3	0.76	7	1.78
HSE-NW	0	0.00	3	1.27	1	0.42	3	1.27	3	1.27	1	0.42	8	3.37
HSE-SE	7	1.52	1	0.22	4	0.87	10	2.17	8	1.74	8	1.74	5	1.08
HSE-S	1	0.16	1	0.16	3	0.48	4	0.64	5	0.80	5	0.80	12	1.93
HSE-W	0	0.00	18	4.34	7	1.69	7	1.69	10	2.41	4	0.97	6	1.45
IRELAND	35	0.83	49	1.16	61	1.44	57	1.34	70	1.65	60	1.42	68	1.60

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 for all three patients

The seven-day case fatality rate (CFR) for iGAS disease was 10% in 2010, which is the same as in 2009.
In addition to the above, the overall outcome was stated for a further 10 cases:

- one patient (aged three months) was reported to have died but it was not stated if this was directly attributable to iGAS
- seven patients were recovering
- two patients were still ill

Of the nine STSS cases, two patients died resulting in a CFR of 25% (with outcome provided for eight of nine cases).

Antimicrobial susceptibility
Antimicrobial susceptibility data were reported on 64 iGAS isolates (60 from blood, three from tissue and one from an unspecified fluid) by 16 laboratories in 2010 (note: these were reported via the EARS-Net Antimicrobial Resistance Surveillance Network, of which 55 were also notified to public health via CIDR). All isolates tested were susceptible to penicillin (n=60) and vancomycin (n=43). Resistance to erythromycin was reported in seven (12%) of 58 isolates, to clindamycin in one (4%) of 24 isolates and to tetracycline in three (12.5%) of 26 isolates.

Conclusion
iGAS disease remains an uncommon but potentially severe disease in Ireland. Ongoing surveillance is essential, specifically completion of the enhanced data questionnaire, to gain a greater understanding of iGAS, to enable early detection of clusters/outbreaks, to ensure prompt implementation of infection prevention and control precautions and appropriate management of contacts. The incidence of iGAS has increased since it first became notifiable in 2004: from 0.8 per 100,000 population in 2004 to 1.6 per 100,000 population in 2010, which most likely reflects increased notifications rather than a true increase in incidence. Antimicrobial susceptibility data confirm that iGAS remains susceptible to penicillin and that penicillin should continue to be the first line treatment where iGAS is suspected.

HPSC would like to thank participating microbiology laboratories for their contribution to iGAS enhanced surveillance scheme.

All microbiology laboratories are encouraged to return enhanced iGAS surveillance forms for all patients with iGAS 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 factsheets for patients and contacts and 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 2nd September 2011.

2.4 Tuberculosis, 2009

Summary

Number of cases, 2009: 479
Number of culture confirmed cases: 341
Crude incidence rate, 2009: 11.3/100,000
Number of TB deaths, 2009: 10
Number of cases, 2010*: 427
Crude incidence rate, 2010*: 10.1

In 2009, 479 cases of tuberculosis (TB) were notified in Ireland, corresponding to a crude notification rate of 11.3 per 100,000 population, which remains stable in comparison to 2008 (11.0/100,000 population) and 2007 (11.3/100,000 population). A summary of the epidemiology of TB in Ireland during 2009 is shown in table 1 while the number of cases and crude incidence rates from 1991 to 2010* with three-year moving averages are shown in figure 1.

The highest crude incidence rates were reported by HSE-E (15.7/100,000 population) and HSE-S (13.2/100,000 population) while the lowest rates were reported by HSE-W (5.1/100,000 population) and HSE-SE (6.0/100,000 population). Rates reported in HSE-MW (7.5/100,000 population) and HSE-NE (6.9/100,000 population) were also significantly lower than the national incidence rate.

The highest age-specific rate in 2009 occurred among those aged 65 years and over (18.4/100,000) followed by those aged 25-34 years (17.6/100,000 population). The rate among males (14.1/100,000 population) was higher than that among females (8.3/100,000 population). 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 (1.8 compared to 2.4/100,000 population). The highest rate among males (27.0/100,000 population) was in the group aged 65 years and older while the highest rate in females (13.2/100,000 population) was in the 25-34 year age group. The female to male ratio (0.6:1.7) reported in 2009 was consistent with the ratio reported in previous years.

Geographic origin

During 2009, 43.0% (206 cases) of TB cases were born outside Ireland. This is similar to the proportion of foreign-born cases reported during 2008 (43.3%) and higher than those reported between 2003 and 2007 (range: 22%-40%). The crude rate in the indigenous population at 7.6 per 100,000, was the same as 2008

Table 1. Summary of the epidemiology of TB in Ireland, 2009

Parameter	Number	% of Total cases
Total number of cases	479	
Crude notification rate per 100,000	11.3	
Cases in indigenous population†	270	56.4
Cases in foreign-born persons†	206	43.0
Culture positive cases	341	71.2
Pulmonary cases	314	65.6
Smear positive pulmonary cases	139	44.3
Multi-drug resistant cases	1	0.2
Mono-resistant to isoniazid	11	2.3
Deaths attributable to TB	10	2.1
Outcomes reported in cases	395	82.5
TB meningitis cases	8	1.7

* Data for 2010 are provisional data which may change significantly following validation
† Country of birth was unknown for 3 cases

(7.6/100,000 population). Similarly, the crude rate in the foreign-born population at 33.6 per 100,000 was similar to 2008 (33.0 per 100,000 population). There was a notable difference in age between those born in Ireland and those born outside Ireland, with a median age of 53 years and 32 years respectively. In 2009, among countries in the EU and Western Europe who reported data to the European Centre for Disease Prevention and Control (ECDC), 23.6% of notifications were in foreign-born cases. In Belgium, Slovakia and Slovenia, where crude incidence rates are similar to those reported in Ireland, the percentage of cases of foreign origin in 2009 ranged from 1.4%-48.6%.[1]

Site of infection

Pulmonary TB was reported in 314 (65.6%) cases, 164 (34.3%) had exclusively extrapulmonary disease and diagnostic type was not reported in one case. Of the extrapulmonary cases reported in 2009, there were eight cases of TB meningitis corresponding to a rate of 0.19/100,000 population (1.9/million population).

Microbiology

Of the 479 cases reported in 2009, 71.2% (341 cases) were culture confirmed. Of the 341 culture confirmed cases, species identification showed *M. tuberculosis* in 96.2% (328 cases), *M. bovis* in 2.3% (8 cases) and *M. africanum* in 0.3% (1 case) (organism was not reported for four culture confirmed cases). The number of *M. bovis* isolates detected in 2009 was less than that detected during 2008 (n=12) but slightly higher than the numbers previously reported (3-6 cases per annum between 2002-2007). Of the 314 cases with a pulmonary component, 243 (77.4%) were culture confirmed, and 139 (44.3%) were smear positive.

Drug sensitivity

Information on antibiotic sensitivity testing was available for 323 (94.7%) of the 341 culture confirmed cases. Of these, resistance was documented in 26 (8.0%) cases, one (0.2% of total cases) of which was an MDR-TB case. Mono-resistance to isoniazid was recorded in 11 cases, to streptomycin in three, to pyrazinamide in two cases

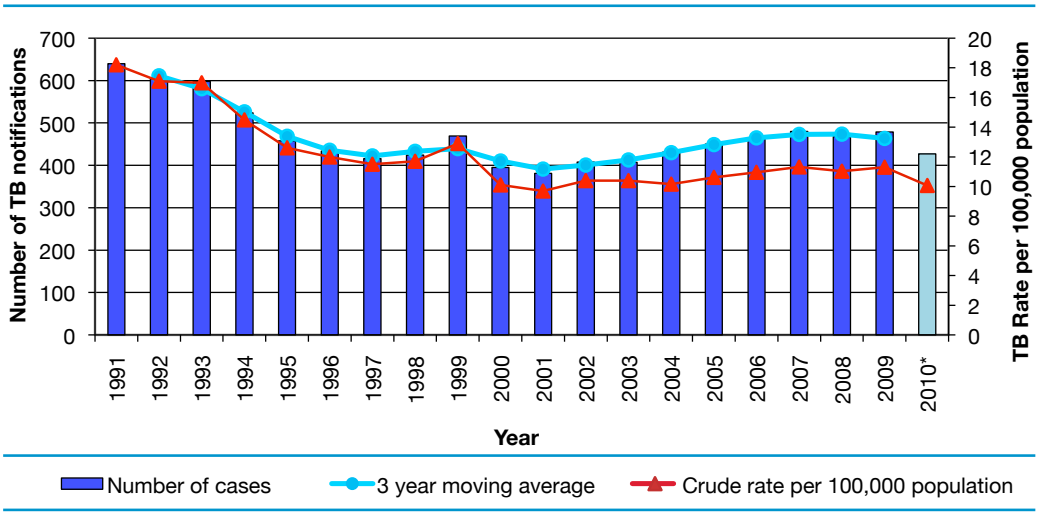

Figure 1: Notified cases of TB in Ireland with crude rates per 100,000 population, 1991 to 2010 and 3-year moving averages, 1992-2009*

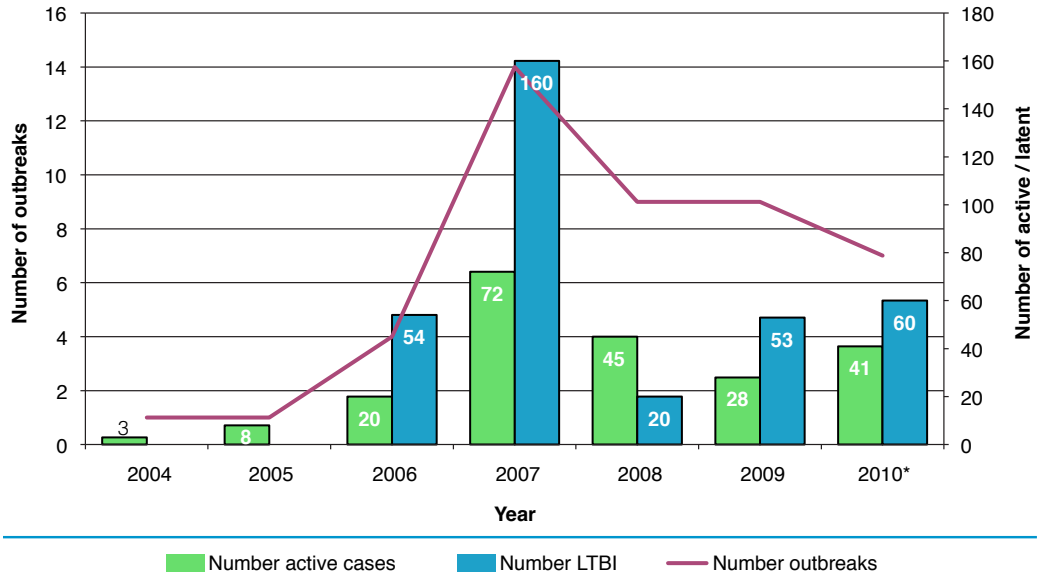

Figure 2: TB outbreak summary by year

* Data for 2010 are provisional data which may change significantly following validation

and to ethambutol in one. For further details on the resistance profiles of TB cases reported 2009 will be available in the HPSC Report on the Epidemiology of TB in Ireland, 2009 (www.hpsc.ie).

Outcome

In 2009, information on treatment outcome was provided for 82.5% (395) of cases, a decrease compared to 88.7% in 2008. Treatment outcome was reported as completed for 307 (64.1%) cases, 34 (7.1%) cases died, 30 (6.3%) were lost to follow up, 19 were still on treatment (4.0%), four (0.8%) had treatment interrupted and one (0.2%) case transferred out. Ten (29.4%) of the 34 deaths were attributable to TB. During 2009, the reported treatment success rate was 67.7% for new culture confirmed pulmonary TB cases and 72.6% for new smear-positive pulmonary TB cases.

Outbreaks

The introduction of the amendment to the Infectious Disease Regulations 1981 on January 1st 2004, made outbreaks, unusual clusters or changing patterns of illness statutorily notifiable by medical practitioners and clinical directors of laboratories to the medical officer of health. Standard reporting procedures for surveillance of TB outbreaks were formally agreed in 2007.

During 2009, nine outbreaks of TB were reported to HSPC, with 28 cases of active TB, 53 with latent TB infection (LTBI), 16 hospitalisations and two deaths. Three outbreaks were reported by HSE-E, two by HSE-SE, three by HSE-S and one by HSE-W. There were five general outbreaks, three of which occurred in community settings, one was in a residential institution and one was in a day care facility. There were also four family outbreaks, two of which occurred across extended families and two were in private houses. The number of outbreaks reported during 2009 remained stable in comparison to 2008, however the number of active TB cases decreased while the number of those with LTBI increased. Figure 2 shows a summary of TB outbreaks from 2004 to 2010 by year of outbreak, number of active TB cases and number of persons with LTBI.

Summary:

When compared to recent years, the crude notification rate of TB for 2009 has remained stable at 11.3 per 100,000. Rates were higher in males for almost all age groups with the highest age specific rates reported in those aged 65 years and over. Over 40% of all TB cases notified were foreign born which is comparable to other European countries with similar crude incidence rates to Ireland. The rate in the indigenous population was 7.6 per 100,000 population. Irish born cases were older than foreign born which is also reflected in other European countries.[1]

Of the 314 cases with a pulmonary component 77.4% were culture confirmed, an increase from 72.7% in 2008. The proportion of new culture confirmed cases with a pulmonary component, increased to 80.1%, an increase compared to 2008 (75.0%) which also reaches the EU monitoring framework target of ≥ 80% culture confirmation among new pulmonary TB cases.[2]

Only one MDR TB case was reported for 2009 which is a decrease compared to recent years with two reported in 2008 and seven reported in 2007. The proportion of new culture confirmed pulmonary cases with reported DST results reported declined from 97.0% in 2008 to 94.7% in 2009. This falls below the EU monitoring framework action plan target of 100% of new culture confirmed pulmonary cases with DST results.[2] Continuous vigilance is needed in relation to drug resistance especially with the global emergence of XDR-TB.

There was a slight decline in the level of outcome data reported compared to 2008. The proportion of total cases where outcome was reported as completed (64.1%) also declined during 2009 compared to 2008 (72.4%) and 2007 (69.2%). The proportion of new culture-confirmed pulmonary TB cases where outcome was reported as completed was 67.7%, falling short of EU monitoring framework action plan targets of successfully treating 85% or more of all new culture-confirmed pulmonary TB cases.[2] 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.

As of January 1st 2011, the National TB Surveillance System moved to the Computerised Infectious Disease Reporting system (CIDR). This increased awareness of TB outbreak reporting and also facilitated the retrospective reporting of outbreaks not previously reported. Data on historic TB outbreaks are now more complete and timeliness has been improved for current outbreak reporting.

Guidelines on the Prevention and Control of Tuberculosis in Ireland were published in April 2010.[3] 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), outbreak management and contact tracing procedures and screening for TB in special situations e.g. healthcare settings, new entrants to Ireland, prison and homeless settings. 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. Stop TB partnership aims to reduce the global incidence of TB to less than one case per million population by 2050, which will eliminate the disease as a global health problem.[4] The importance of good surveillance data cannot be underestimated in this context as they will

help guide where resources should be directed e.g. risk groups in order to implement effective TB prevention and control strategies in Ireland and in order to reach the elimination target by 2050.

Provisional 2010 data

There were 427 cases of TB provisionally notified in 2010, corresponding to a crude rate of 10.1 per 100,000 population. It is important to note that these data are provisional and **may change significantly following validation**.

Of the 427 cases provisionally notified in 2010,

- Pulmonary TB was diagnosed in 250 cases (58.5%), extrapulmonary TB in 150 cases (35.1%) and pulmonary and extrapulmonary TB in 24 cases (5.6%). Diagnostic type was not reported for three cases.
- Of the 274 cases with a pulmonary disease component, 193 (70.4%) were culture positive and 113 (41.2%) were smear positive.
- There were eight cases of TB meningitis provisionally notified corresponding to a rate of 0.19 per 100,000 population (1.9/million population).
- There were 243 (56.9%) cases born in Ireland and 171 (40.0%) were foreign-born. Country of birth was not reported for 13 (3.0%) cases.
- There were 162 cases (37.9%) notified in females, 263 cases (61.6%) in males and sex was not reported for two cases (0.5%)
- The mean age of cases was 41.4 years (range: 0 to 98 years).
- Resistance was reported in 18 cases, five of which were mono-resistant to isoniazid. Two cases of MDR-TB were reported during 2010. Twelve (66.7%) of the 18 resistant cases (including both MDR cases) were born outside Ireland.
- There were seven TB outbreaks reported to HPSC during 2010, with 41 active TB cases, 60 cases of latent TB infection and 20 hospitalisations. No deaths were reported from these outbreaks.

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

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03

Infectious Intestinal Diseases

3.1 Campylobacter

Summary

Number of cases: 1,661
Crude incidence rate: 39.2/100,000

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 (while some cases were included in the former category of "Food Poisoning (bacterial other than salmonella)"). 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. Campylobacteriosis is the commonest bacterial cause of gastroenteritis in Ireland and Europe.

During 2008, a European Union-wide baseline survey of *Campylobacter* in broiler batches and broiler carcasses was carried out by The European Food Safety Authority (EFSA). This survey found that 75.8% of broiler carcasses sampled were contaminated with *Campylobacter* while 98% of Irish broiler carcasses sampled were positive for *Campylobacter*.[1] EFSA currently estimates that handling, preparation and consumption of broiler meat may account for 20-30% of human campylobacteriosis while 50-80% of cases may be attributed to the broiler reservoir as a whole.[2] The importance of poultry meat as a source of human campylobacter infection was supported by the food-borne outbreak data reported to EFSA during 2009, where seven out of 12 verified food-borne outbreaks of campylobacteriosis (with a specified food item) were poultry related.[3] In response to such evidence, the Food Safety Authority of Ireland (FSAI) published "Recommendations for a Practical Control Programme for *Campylobacter* in the Poultry Production and Slaughter Chain" during 2011.[4]

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.[5]

During 2010, 1,661 cases were notified in Ireland, corresponding to a crude incidence rate (CIR) of 39.2 per 100,000 population. This is a decrease compared to the number of cases reported during 2009 (n=1,807,

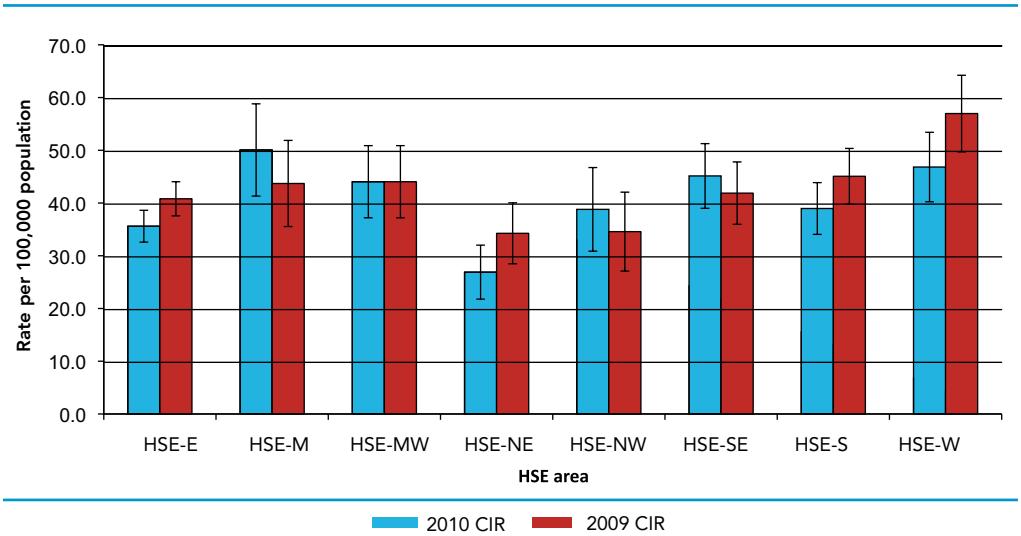

Figure 1. Campylobacteriosis crude incidence rates per 100,000 population (95% CI) by HSE area, 2009 & 2010.

CIR: 42.6). 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 44.1 per 100,000 population during 2008, a decrease of 3% compared to 2007.[6]

Geographical variation in CIR was observed within HSE areas. The highest CIR was observed in HSE-M at 50.1 per 100,000 population, an increase from the 2009 CIR of 43.7 per 100,000 population. The lowest CIR was observed in HSE-NE at 26.9 per 100,000 population, a decrease compared to the 2009 CIR of 34.3 per 100,000 population. Figure 1 illustrates the campylobacteriosis CIR by HSE area during 2010 and 2009, with 95% confidence intervals.

Campylobacteriosis occurs in all age groups with the highest burden of illness experienced in the 0-4 year age group. During 2010, this age group accounted for 25.2% of cases and had the highest age specific incidence rate (ASIR) of 138.3 per 100,000 population. The second highest ASIR observed was in the 20-24 year age group (43.8/100,000 population). The lowest ASIR was observed in the 15-19 year age group (21.0/100,000 population), the 10-14 year and 55-64 year age groups (26.3/100,000 population). This preponderance in younger children is a well described characteristic of the disease and is also observed at European level. The highest European notification rate during 2008 was reported in males in the 0-4 year age group (117.3/100,000 population) and in females of the same age (96.2/100,000 population).[6]

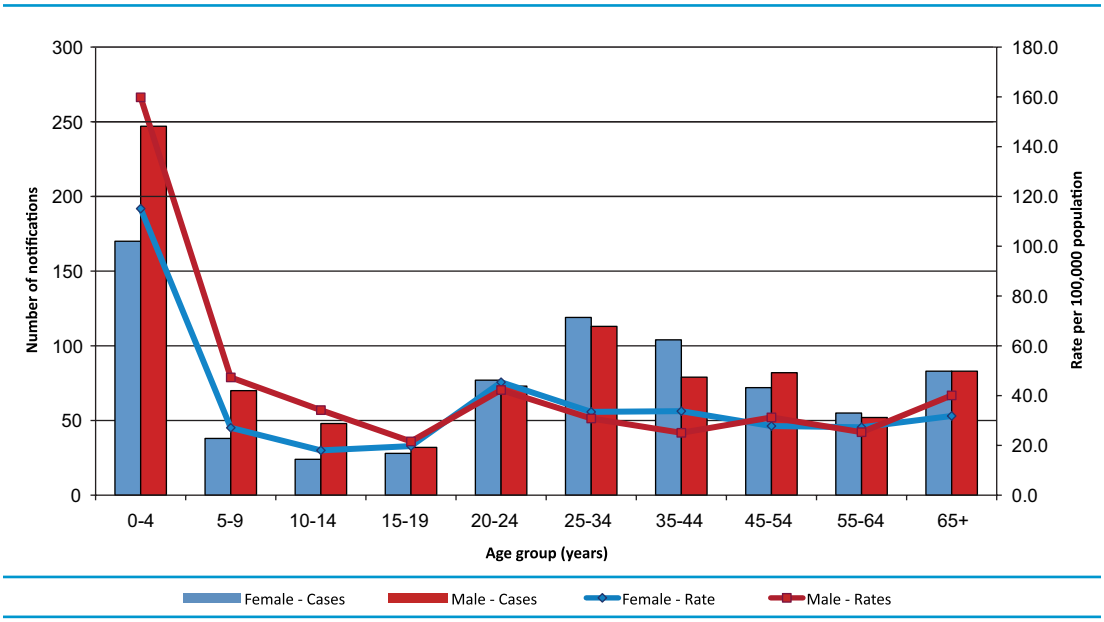

Figure 2. Campylobacteriosis notifications and age specific incidence rate per 100,000 population by age group (years) and sex, 2010 (CIDR)

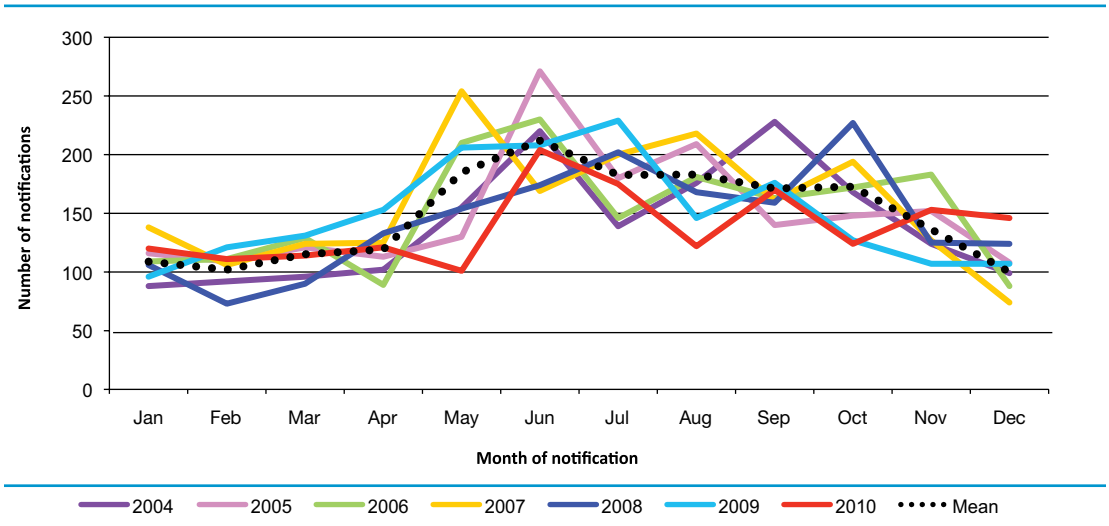

Figure 3. Number of campylobacteriosis notifications by month, 2004-2010

During 2010, 53.3% of all cases were male, 46.7% of cases were female and sex was not reported for 0.4% of cases. Further analysis of the age-sex distribution of campylobacteriosis cases shows a predominance of male cases in the 0-14 year age group and the 65 years age and older group while there was a predominance of female cases in the 35-44 year age group. Figure 2 illustrates the number of campylobacteriosis cases and age specific incidence rates by age group (years) and sex during 2010.

Campylobacteriosis has a well documented seasonal distribution with a peak in early summer. During 2010, notifications of campylobacteriosis peaked during June (n=204) and July (n=175) with a smaller secondary peak observed in September (n=170). Figure 3 illustrates the seasonal distribution of campylobacteriosis notifications in Ireland from 2004 to 2010.

Information on country of infection was recorded in 12.0% of all cases, which is a slight decrease on the proportion of cases with this information provided in 2009 (14.2%). Of the 200 cases where country of origin was specified, indigenous cases accounted for 77.0%. There were also 46 cases (23.0%) with a recent history of foreign travel. These travel associated cases had exposures in 24 different countries. The majority of campylobacteriosis cases (92%) in Europe reported to ECDC (where country of infection was known) during 2008 were also indigenous.[6]

Of the cases notified in Ireland during 2010, 99.9% were laboratory confirmed. However, as there is currently no national reference facility for routine typing of *Campylobacter* isolates, information on *Campylobacter* species is strikingly incomplete. In 2010, 37.7% (n=626) of isolates were speciated. Of the 626 speciated isolates, 89.9% of isolates were *C. jejuni*, 9.9% were *C. coli* and 0.2% were *C. fetus*. The remaining 62.3% (n=1,034) of *Campylobacter* isolates identified were not further speciated. This compares with 49% of *Campylobacter* isolates in Europe reported to ECDC during 2008 remaining unspeciated.[6]

During 2010, there were two outbreaks of campylobacteriosis reported with 20 associated cases of illness, one of whom was hospitalised. One local general outbreak occurred in a hotel with mode of transmission reported as food-borne. The remaining outbreak occurred across an extended family with mode of transmission reported as person to person spread (Table 1). During 2009, sixteen European countries reported 333 food-borne outbreaks of campylobacteriois to EFSA. These outbreaks comprised 1,421 associated cases of illness, 97 hospitalisations and one death and accounted for 6% of the total food-borne outbreaks reported to EFSA.[3]

References:

1 European Food Safety Authority (EFSA), *Analysis of the baseline survey on the prevalence of Campylobacter in broiler batches and of Campylobacter and Salmonella on broiler carcasses in the EU, 2008.* The EFSA Journal (2010); 8 (03): 1503. Available at: http://www.efsa.europa.eu/en/efsajournal/pub/1503.htm

2. European Food Safety Authority (EFSA), *Scientific Opinion of the Panel on Biological Hazards (BIOHAZ) related to Campylobacter in animals and Foodstuffs.* The EFSA Journal (2010); 8 (1): 1437. Available at: http://www.efsa.europa.eu/en/efsajournal/pub/173.htm

3. 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 2009.* The EFSA Journal (2011) 223. Available at: http://www.efsa.europa.eu/en/efsajournal/pub/2090.htm

4. Food Safety Authority of Ireland (FSAI), *Recommendations for a Practical Control Programme for Campylobacter in the Poultry Production and Slaughter Chain.* 2011 Available at: www.fsai.ie

5. 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

6. European Centre for Disease Prevention and Control. *Annual epidemiological report on communicable diseases in Europe, 2010.* Stockholm, European Centre for Disease Prevention and Control. Available at: http://ecdc.europa.eu/en/publications/surveillance_reports/Pages/index.aspx

Table 1. Campylobacteriosis outbreaks summary, 2010 (CIDR)

Mode of transmission	Outbreak location	Number outbreaks	Number ill	Number hospitalised	Number dead
Person-to-person	Extended family	1	15	0	0
Foodborne	Hotel	1	5	1	0
Total		**2**	**20**	**1**	**0**

3.2 Cryptosporidiosis

Summary

Number of cases, 2010: 294
Number of cases, 2009: 445
Crude incidence rate, 2010: 6.9/100,000

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 animals and humans serving as potential 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 2010, 294 cases of cryptosporidiosis were notified in Ireland, a crude incidence rate (CIR) of 6.9 per 100,000 population, with 34% of notified cases reported as hospitalised for their illness. This was a 34% decrease on the number of cases notified in 2009 (Figure 1). In 2008 (the most recent year for which data are available), the ECDC reported an incidence rate overall of 2.44 per 100,000 population in the European Union, with Ireland reporting the highest rate among those countries reporting on this disease at the time. The second highest incidence rate among EU Member States was reported by the United Kingdom at 8.1 per 100,000.

Consistent with previous years, the highest reported incidence was in children under 5 years, with around 60 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 possible that this distribution reflects to some extent a true difference in risk between adults and children, and may also reflect in part some immunity among a proportion of the adult population.

The crude incidence (CIR) rates by HSE area for 2010 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 (1.2 per 100,000) than most other HSE areas. The HSE- W reported the highest crude incidence rate (16.66 per 100,000) –over twice the national rate. Compared to 2009, six areas reported decreased rates: in the HSE-W and the HSE-M, these decreases were statistically significant.

The highest number of cases was recorded in spring, albeit at lower levels than in previous years (Figure 4). Notably although only 17 (6%) notifications across the full year were specifically reported as being associated with foreign travel, seven of these were reported during the month of August (Figure 5).

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,

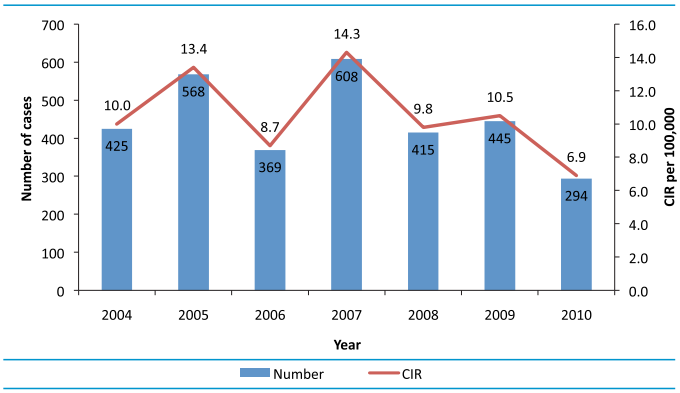

Figure 1. Annual number and crude incidence rate cryptosporidiosis, Ireland 2004-2010.

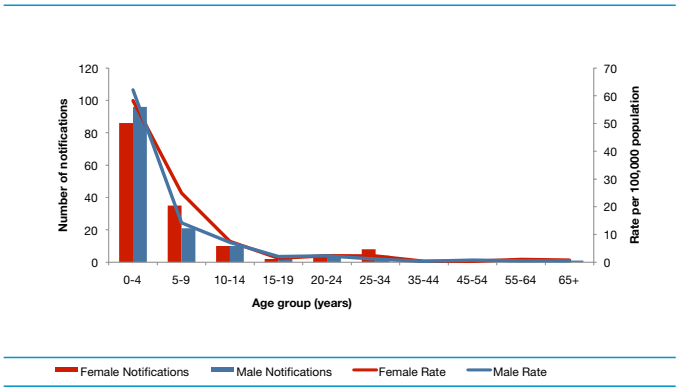

Figure 2. Age-specific incidence rate cryptosporidiosis, Ireland 2010

in particular calves and lambs, can be sources of *C parvum* infections. Species that are less commonly reported in humans have been associated with other animal reservoirs. In 2010, less than 5% of positive human *Cryptosporidium* specimens were referred for speciation to the UK *Cryptosporidium* 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 2009 (17%) and 2008 (35%), and may reflect the enhanced use of this service when outbreaks are occurring. As in 2008 and 2009, *C. parvum* was the most common species reported (12/14 cases). There was one case each of *C. hominis* and *C. meleagridis*.

There were no general outbreaks of cryptosporidiosis this year. Over the last couple of years, there has been a decrease in the number of general outbreaks reported, with one general outbreak in 2009, four in 2008 and six in 2007.

All eight outbreaks of cryptosporidiosis reported in 2010 were family outbreaks: all were small outbreaks, and between them accounted for only 15 cases. Table 1 lists the reported transmission routes and locations for these outbreaks. Six were suspected to be due to person-to-person transmission, one was suspected to be due to animal contact and one travel-associated outbreak was suspected to be waterborne. The overwhelming majority of cases in 2010 were reported as sporadic cases.

The seasonal distribution of cases in Ireland suggests an important role for animal sources in human cryptosporidiosis: historically in the United Kingdom, spring peaks in incidence have been associated with transmission from sources such as calves and lambs. The species distribution reported here is consistent with this. The higher disease incidence in more rural versus more urban HSE-areas suggests that animal contact or waterborne routes of transmission may play a stronger role overall in transmission in Ireland than person-to-person spread, food or travel, as the latter would be expected to have a more even geographical distribution.

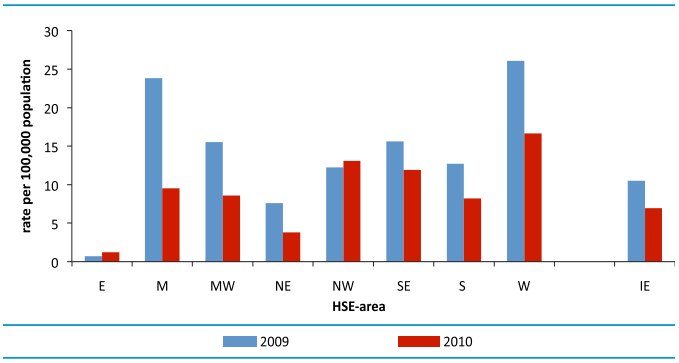

Figure 3. Regional crude incidence rates cryptosporidiosis, Ireland 2010 relative to 2009

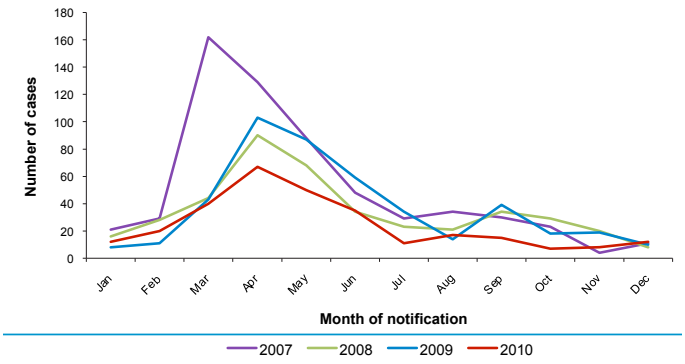

Figure 4. Seasonal distribution of cryptosporidiosis cases 2007-2010

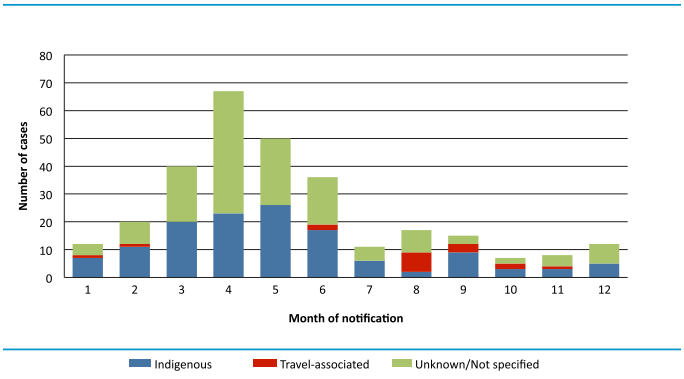

Figure 5. Seasonal distribution cryptosporidiosis cases by travel status, Ireland 2010

Table 1. Cryptosporidiosis outbreaks Ireland 2010

Month	HSE-area	Outbreak type	Transmission mode	Location	No. ill
Mar	S	Family	Person-to-person	Private house	2
Mar	SE	Family	Person-to-person	Private house	2
Apr	S	Family	Person-to-person	Extended family	2
May	NW	Family	Person-to-person	Private house	2
Jun	S	Family	Animal contact	Private house	2
Jun	NW	Family	Person-to-person	Private house	2
Oct	M	Family	Waterborne	Travel related	1
Oct	NE	Family	Person-to-person	Private house	2

3.3 Verotoxigenic *E. coli*

Summary

Number of cases, 2010: 199
Number of cases, 2009: 241
Crude incidence rate, 2010: 4.7/100,000
Number of VTEC-Associated HUS 2010: 19

Introduction

Reported verotoxigenic *E. coli* (VTEC) incidence rates in Ireland have been rising steadily over the last five years, such that in 2008 and 2009, Ireland reported the highest VTEC incidence rate of any Member State in the European Union.[1, 2] In Ireland, infection has historically been most commonly associated with VTEC serogroup O157, with smaller numbers of non-O157 VTEC reported, although this may reflect diagnostic bias as the techniques for the detection of non-O157 VTEC are more complex than for VTEC O157, and different policies may exist in different laboratories for the routine examination of stool specimens.

The dominant transmission routes for VTEC in Ireland appear to be person-to-person spread, especially in creches/childminding facilities and among families with young children, and waterborne transmission associated with exposure to water from untreated or poorly treated private wells. Other important transmission routes identified internationally include food (often minced beef products or fresh produce such as lettuce and spinach), and contact with infected animals or contaminated environments.

Data Source and Methods

Infection due to Enterohaemorrhagic *E. coli* (EHEC) is a notifiable disease (S.I. 707 of 2003) since 2004. This chapter focuses on cases that conform to the case definition used for VTEC enhanced surveillance (http://www.ndsc.ie/hpsc/A-Z/Gastroenteric/VTEC/SurveillanceForms/).

Incidence

In 2010, there were 199 confirmed and probable cases of VTEC notified, equating to a crude incidence rate (CIR) of 4.7 per 100,000 (Table 1). If only confirmed VTEC cases are considered, the 197 cases (CIR=4.7 [4.0-5.3]) notified this year represent a 17% decrease overall on the number of confirmed cases notified in 2009. Non-O157 VTEC made up 41% of cases in 2010, however, and this overall change in VTEC case numbers was made up of a 30% decrease in the number of VTEC O157 cases and an 11% increase in non-O157 VTEC cases reported compared to 2009 (Figure 1).

Interesting in 2010 in Scotland, there was also a decrease in the VTEC O157 incidence rate to 4.1 per 100,000 (11% decrease) and in England and Wales, VTEC O157 case numbers fell by 23%. [3, 4] The CIR for VTEC overall of 4.7 per 100,000 population in Ireland, however, remains high relative to Europe [1,2]

Table 1. Number and crude incidence rates confirmed and probable VTEC, Ireland 2004-2010

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	238	3	241	5.7 (5.0-6.4)
2010 [b]	197	2	199	4.7 (4.0-5.4)

[a] Data from the 2006 census were used to calculate rates
[b] Confirmed cases include 116 VTEC O157 cases, 67 VTEC O26 cases and 14 VTEC strains of other serogroups. Two probable cases were reported on the basis of being epidemiologically linked to laboratory confirmed cases (VTEC O157 in one instance and VTEC O121 in the second instance).

The reported VTEC incidence in 2009 at European community level was 0.7 VTEC cases per 100,000 population, with Denmark (2.90/100,000), Sweden (2.46/100,000) and the United Kingdom (2.19 per 100,000) reporting the next highest rates after Ireland.

Of 192 cases where information was available on symptoms, 147 (77%) were symptomatic, 75 (51%) of which developed bloody diarrhoea. Nineteen individuals (9.5%) developed HUS compared to 24 (10%) last year (21% decrease). And where reported, 42% of notified cases required hospitalisation (72/173).

The reduction of 21% in the VTEC-associated HUS numbers suggests that the decrease in the overall reported incidence of VTEC in 2010 was a true decrease.

Seasonal distribution

Typically, VTEC cases are most commonly associated with late summer; overall this year, 48% of cases were reported in quarter 3. However, the seasonal distribution varied by serogroup, with VTEC O26 being more common in quarter 2 while VTEC O157 remained more common in quarter 3. It is possible that the overall seasonal distribution noted previously was biased by the dominance of VTEC O157 in the national dataset, and that these variations in seasonal distribution by serogroup may reflect a seasonal difference in sources or transmission routes for different serotypes.

Regional distribution

Overall the highest VTEC incidence rates were reported in the HSE-MW and HSE-NW, where the rates were over twice the national crude rate (Table 2). As in previous years, the HSE-E reported the lowest overall crude incidence rate (Table 2), just over one quarter of the national rate this year. The crude incidence rate in the HSE-NE is also consistently low relative to other areas.

When the incidence by HSE-area is examined by serogroup, the incidence rate across HSE-areas for VTEC O157 is similar across six of the HSE-areas, with only HSE-E and HSE-NE showing lower incidence rates (Table 2 and Figure 3). The elevated overall incidence rates in the HSE-MW and HSE-NW were strongly influenced by their high reported incidence rates for non-O157 infections. Historically, the HSE-NW (and more recently the HSE-MW) have reported relatively high numbers of non-O157 VTEC infections. While it is possible that there is a true geographical difference in risk for different serogroups, it is likely that this regional variation in reported non-O157 VTEC incidence to some extent reflects regional differences in laboratory diagnostic practice for non-O157 infections.

Review of regional HUS incidence due to confirmed or probable VTEC infection gives a slightly different perspective on the relative importance of VTEC by region (Table 2 and Figure 3). The HSE-S reported the highest VTEC-associated HUS incidence rates in 2010, followed by HSE-M, HSE-MW and HSE-NW. The eastern part of Ireland including HSE-E, HSE-SE and HSE-NE displayed the lowest VTEC-associated HUS incidence rates.

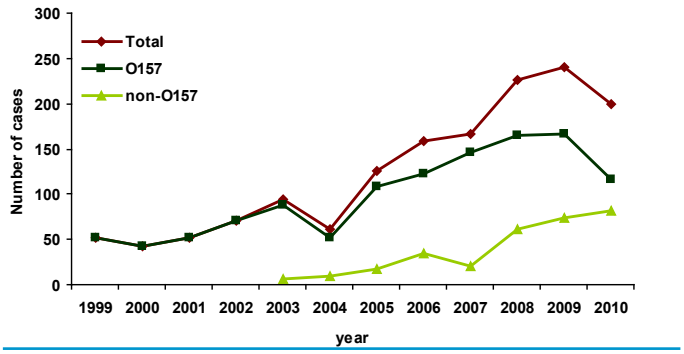

Figure 1. Annual number of confirmed and probable VTEC cases by serogroup, Ireland 1999-2010

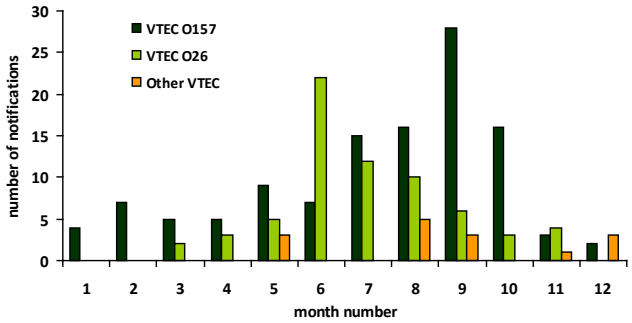

Figure 2. Seasonal distribution of VTEC cases by serogroup, Ireland 2010

Table 2. Number and crude incidence rate confirmed and probable VTEC by serogroup and HSE area, and number and crude incidence rate VTEC-associated HUS by HSE-area, Ireland 2010

HSE-area	Number [CIR (95% CI)] VTEC O157	Number [CIR (95% CI)] non-O157 VTEC	Number [CIR (95% CI)] all VTEC	Number [CIR (95% CI)] VTEC-associated HUS
East	11 [0.7 (0.3-1.2)]	7 [0.5 (0.1-0.8)]	**18 [1.2 (0.7-1.8)]**	3 [0.2 (-0.0-0.4)]
Midlands	11 [4.4 (1.8-7.0)]	6 [2.4 (0.5-4.3)]	**17 [6.8 (3.5-10.0)]**	2 [0.8 (-0.3-1.9)]
Mid-West	13 [3.6 (1.6-5.6)]	26 [7.2 (4.4-10.0)]	**39 [10.8 (7.4-14.2)]**	3 [0.8 (-0.1-1.8)]
North-East	7 [1.8 (0.5-3.1)]	1 [0.3 (-0.2-0.8)]	**8 [2.0 (0.6-3.4)]**	1 [0.3 (-0.2-0.8)]
North-West	9 [3.8 (1.3-6.3)]	25 [10.5 (6.4-14.7)]	**34 [14.3 (9.5-19.2)]**	2 [0.8 (-0.3-2.0)]
South-East	17 [3.7 (1.9-5.4)]	0 [0.0 (0.0-0.0)]	**17 [3.7 (1.9-5.4)]**	0 [0.0 (0.0-0.0)]
South	30 [4.8 (3.1-6.6)]	10 [1.6 (0.6-2.6)]	**40 [6.4 (4.4-8.4)]**	6 [1.0 (0.2-1.7)]
West	19 [4.6 (2.5-6.7)]	7 [1.7 (0.4-2.9)]	**26 [6.3 (3.9-8.7)]**	2 [0.5 (-0.2-1.2)]
Ireland	117 [2.8 (2.3-3.3)]	82 [1.9(1.5-2.4)]	**199 [4.7 (4.0-5.4)]**	19 {0.5 (0.3-0.7)]

*Rates per 100,000 calculated using CSO census 2006 for denominator data

VTEC typing

In 2010, all isolates from the 197 confirmed VTEC cases were referred to the HSE PHL Dublin Mid Leinster, Cherry Orchard Hospital and their serotype and verotoxin profiles are displayed in Table 3. As usual among VTEC O157 in Ireland, isolates containing the genes for verotoxin 2 (*vt2*) were more common (86%) than isolates containing both *vt1* and *vt2*. VTEC O26 isolates containing only *vt1* made up 55% of all VTEC O26 reported, with 36% of VTEC O26 containing the genes for both *vt1* and *vt2*.

HUS cases in 2010 were associated with VTEC O157 isolates containing *vt2* or both *vt1* and *vt2*, and with VTEC O26 containing *vt2 or* both *vt1* and *vt2*, but not with any of the VTEC O26 strains containing *vt1* alone.

In 2010, the DML-PHL at Cherry Orchard introduced a new more highly discriminatory typing service whereby all human VTEC isolates were routinely typed by pulsed field gel electrophoresis (PFGE) rather than referred to the Health Protection Agency laboratory in the United Kingdom for phage typing. This confirmed that no large undetected clusters/outbreaks occurred among laboratory confirmed VTEC cases in Ireland in 2010. On a small number of occasions, indistinguishable isolates were identified among pairs of cases reported as sporadic (and sometimes between a family cluster and another case reported as sporadic). On these occasions, the HSE PH departments were informed and review of case histories undertaken, however, no epidemiological evidence of links were uncovered on any of these occasions.

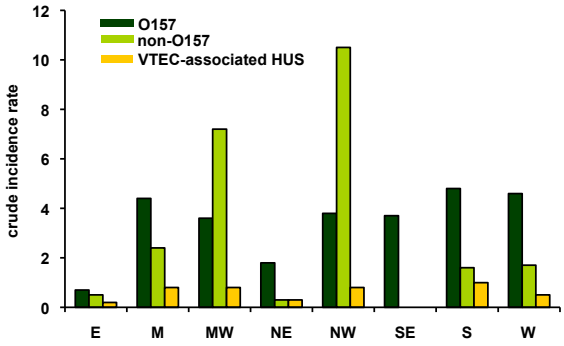

Figure 3: Crude incidence rate VTEC O157, non-O157, and VTEC-associated HUS by HSE-area, Ireland 2010

Risk factors

Under enhanced surveillance for VTEC, risk factor information is routinely collected on VTEC notifications (Table 4).

Among VTEC cases in Ireland in 2010, exposure to farm animals or their faeces and exposure to private well water were common among cases; 52.4% and 42.9% reported these exposures respectively. This is consistent with the low incidence of VTEC infection among residents in the largely urban HSE-E population and the higher incidence recorded in more rural parts of the country.

Unlike salmonellosis, foreign travel plays only a minor role in VTEC infection in Ireland, with the majority of infections acquired indigenously. The countries where the small number of travel-associated Irish VTEC cases had travelled to during their potential incubation periods were Bulgaria, Cyprus, Sri Lanka and United Kingdom (n=2).

Table 3. Serotype and verotoxin (VT) profiles for VTEC isolates as determined at the PHL HSE Dublin Mid Leinster, Cherry Orchard Hospital in 2010 by HUS status as recorded on CIDR

Strain		HUS [a]	Non-HUS [a]	Unknown	Total
O157	**VT1 + VT2**	1	14	2	**17**
	VT2	11	86	3	**100**
O26	**VT1**		35	1	**36**
	VT1 + VT2	4	19	1	**24**
	VT2	2	4		**6**
Other –non O157 VTEC	**VT1**		6		**6**
	VT1 + VT2		6		**6**
	VT2		2		**2**
Total		**18**	**172**	**7**	**197**

[a] One HUS and one non-HUS case in 2010 were reported on the basis of being epidemiologically linked to laboratory confirmed cases, and thus no isolates were available for inclusion in this table

Table 4. Number of cases (and percentage where information received) for which specified risk factor was reported, Ireland 2010

Risk factor	Number 'Yes' and % where reported	Number 'No' and % where reported	Number where risk factor was unknown or not reported
Food suspected	19 (12.2%)	137 (87.8%)	43
Exposure to farm animals or their faeces	97 (52.4%)	88 (47.6%)	14
Exposure to private well water[a]	73 (42.9%)	97 (57.1%)	29
Foreign travel	6 (3.3%)	176 (96.7%)	17

[a]This is a composite variable recoded from two different water supply exposure variables in CIDR

For the 19 cases where food was suspected as the cause of illness, burgers and other minced beef products were listed as suspected for seven cases, sausages were listed for three cases, and other meat products and foods for five cases. Where tested, no foods were found positive for the VTEC strains implicated in the human cases, although one raw sausage product tested was found positive for an unrelated VTEC O8 strain.

Outbreak and environmental investigations

Forty-five VTEC outbreaks were notified in 2010, which included 103 of the 199 VTEC notifications. The majority of outbreaks (96%) were family outbreaks with only two general outbreaks notified. Both general outbreaks involved private households and childcare arrangements/creche facilities: five persons in total were reported ill between these two outbreaks. One general outbreak was reported as being due to person-to-person spread while the transmission route for the second general outbreak was reported as unknown.

Twenty-four outbreaks (53%) were caused by VTEC O157, sixteen (36%) by VTEC O26, four (9%) by other non-O157 and one (2%) was caused by a mixture of VTEC strains. The suspected modes of transmission reported are listed in table 5.

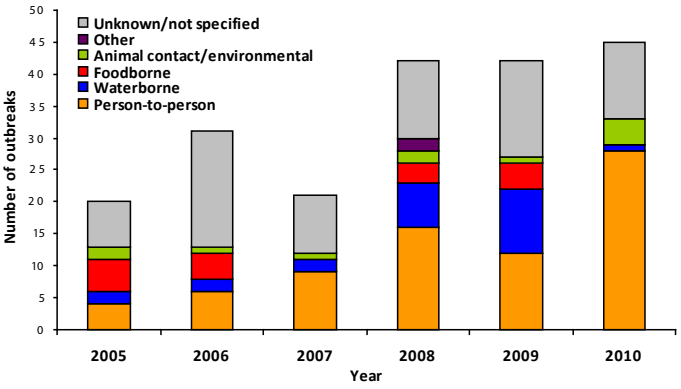

Figure 4. Number of VTEC outbreaks by suspected transmission route and year, Ireland 2004-2010

Note: In this figure, reported transmission routes were grouped for simplicity. Any outbreak where food was suspected to have contributed was reported as foodborne, any outbreak where water was suspected to have contributed was reported as waterborne, any outbreak where animal contact was suspected to have contributed was reported as Animal contact. Person-to-person outbreaks include only those outbreaks reported as being due only to person-to-person transmission.

Table 5. VTEC outbreaks in Ireland 2010 by suspected mode of transmission

Suspected mode of transmission	Number of outbreaks	Number ill	Number confirmed cases
Animal contact	2	3	4
Person-to-person & animal contact	2	3	4
Person-to-person	27	60	58
Person-to-person & airborne	1	2	2
Waterborne	1	1	2
Unknown/Not specified	12	30	33
Total	45	99	103

Person-to-person spread is an important mode of VTEC transmission particularly between young children, and was suspected to have played a role in 30 (67%) VTEC outbreaks in 2010 in which 65 persons were reported ill.

Unusually, the second most common transmission route reported for VTEC outbreaks in 2010 was animal contact, which was reported to have contributed to four outbreaks (9%).

Unlike previous years, when exposure to private well water was a commonly reported transmission route (Figure 4) , there was only one VTEC outbreak reported as waterborne in 2010 (Figure 4). This family outbreak was reported associated with an untreated private well. No VTEC organisms were identified in the suspected water supply.

Separately, a family outbreak of two VTEC cases was reported to the United Kingdoms' outbreak reporting system comprising two UK residents who had returned home following a visit to Ireland. Follow-up investigation by the HSE-E showed the outbreak also to be waterborne. A private well water sample taken from a premises at which they had stayed was found positive at the DML-PHL for a VTEC strain indistinguishable from one of their infections.

Unlike previous years, no foodborne VTEC outbreaks were reported in 2010 (Figure 4). But for over one quarter (n=12) of VTEC outbreaks, the transmission route was reported as unknown.

In 2010, one sporadic VTEC case was reported in a laboratory worker who had exposure to VTEC during the course of their work.

Acknowledgements

The authors wish to acknowledge the co-operation of microbiologists, medical scientists, SMOs, SPHMs, surveillance scientists, infection control nurses, PEHOs, and EHOs in providing the information on which this report is based.

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3.4 Hepatitis A

Summary

Number of cases, 2010: 46
Crude notification rate, 2010: 1.1/100,000
Number of cases, 2009: 50

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 also occur.

The incidence of hepatitis A in Ireland has been low in recent years and remained low in 2010, with 46 cases notified. This corresponds to a crude notification rate of 1.1/100,000 population and is similar to 2009 when 50 cases were notified (figure 1). Case classification was reported for all cases. Forty cases were laboratory confirmed, three cases were classified as probable and three as possible.

Fifty two percent of cases were male (n=24) and 48% were female (n=22). All age groups were affected but the highest notification rates were in children, teenagers and young adults (figure 2).

Fourteen cases were linked to travel outside of Ireland

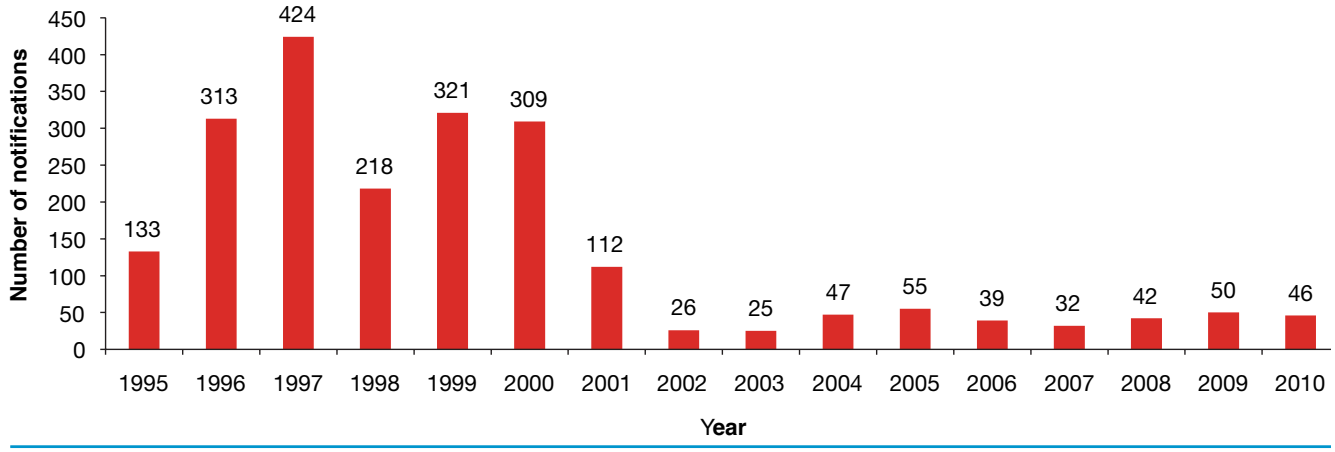

Figure 1. Number of hepatitis A notifications, 1995-2010

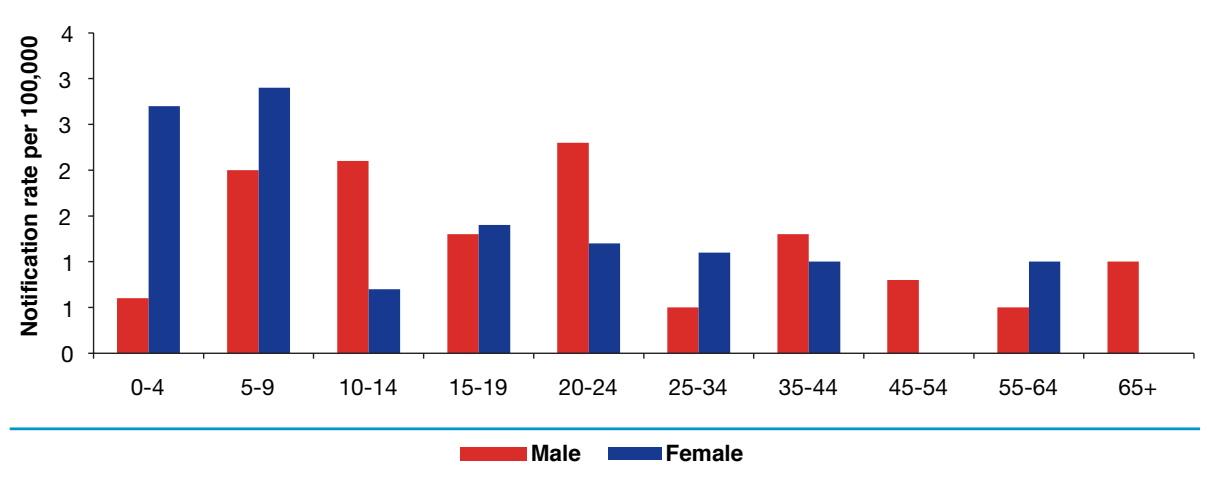

Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis A, 2010

and a further four cases had a history of recent travel outside of Ireland but could also have been infected in Ireland. Twenty two cases were infected in Ireland, but ten of these were contacts of an index case infected outside of Ireland. Country of infection was not known for the remaining six cases.

Three hepatitis A outbreaks were reported in 2010 and one case notified in 2010 was associated with a 2009 outbreak. The 2009 outbreak involved 18 people and was associated with an index case who had travelled to India. The largest of the 2010 outbreaks was in the HSE-S and involved 7 adults and 4 children. The index case was a child adopted from an endemic country and most of the other cases were family or extended-family members. The other two outbreaks were in the HSE-E. One involved two children and one adult and the other involved two young adults. All were infected in Ireland.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 13th October 2011. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

3.5 Rotavirus

Summary

Number of cases: 2,501
Crude incidence rate: 59.0/100,000

Rotavirus is the commonest cause of paediatric gastrointestinal infection and causes sporadic, seasonal and occasionally severe gastroenteritis of infants and young children, characterised by vomiting, fever and watery diarrhoea. Transmission is usually person-to-person, mainly via the faecal-oral route. Children less than two years of age are most susceptible to infection, although cases are often seen in elderly and immunocompromised adults, particularly in institutional settings. 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. Three primary serogroups of rotaviruses infect humans; A, B and C; A being the commonest infecting serogroup. 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, rotavirus caress were notified in the former notification category of "Gastroenteritis in children under two years". In April 2008 the case definition of AIG was amended specifying definitions for both rotavirus and the newly notifiable *Clostridium difficile* associated disease. On 4th May 2008 these amended definitions formally replaced the previous AIG case classification.

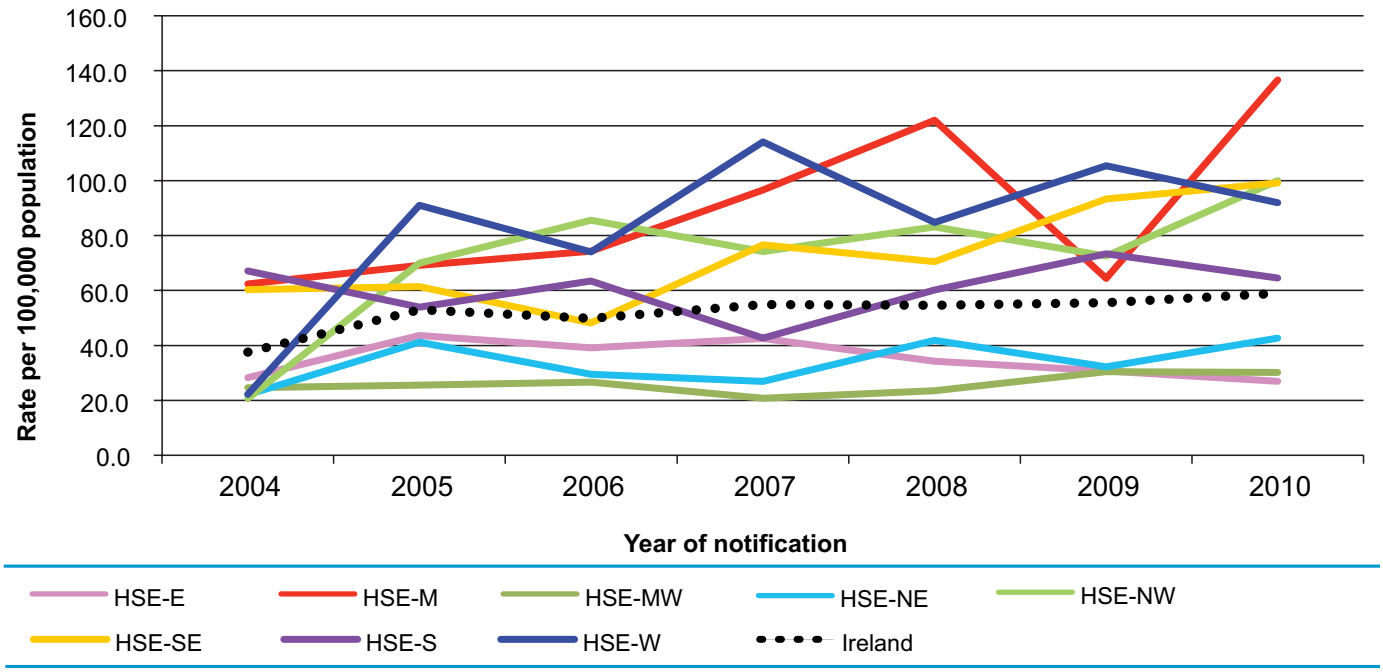

Figure 1. Rotavirus crude incidence rate by HSE area and year, 2004-2010 (CIDR).

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

During 2010, there were 4,288 cases of AIG notified in Ireland, corresponding to a national crude incidence rate (CIR) of 101.2 per 100,000 population and representing a decrease of 1.5% compared to 2009. Of the 4,288 AIG notifications, 2,501 (58.3%) were rotavirus. This corresponds to a national CIR of 59.0 per 100,000 population and represents an increase of 5.9% compared to 2009.

Significant geographical variation was observed in regional rotavirus CIR. The highest regional CIR was observed in HSE-M at 136.7 per 100,000 population and in HSE-NW at 100.0 per 100,000 population. The lowest regional CIR was observed in HSE-E at 26.9 per 100,000 and HSE-MW at 30.2 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 2010, this pattern was evident with rotavirus notifications peaking during March (n=698) and April (n=643). Figure 2* illustrates the seasonal variation in rotavirus cases by month of notification from 2004 to 2010.

Rotavirus is the most common cause of acute gastroenteritis in children worldwide with children generally affected in the first 2-3 years of life. In 2010,

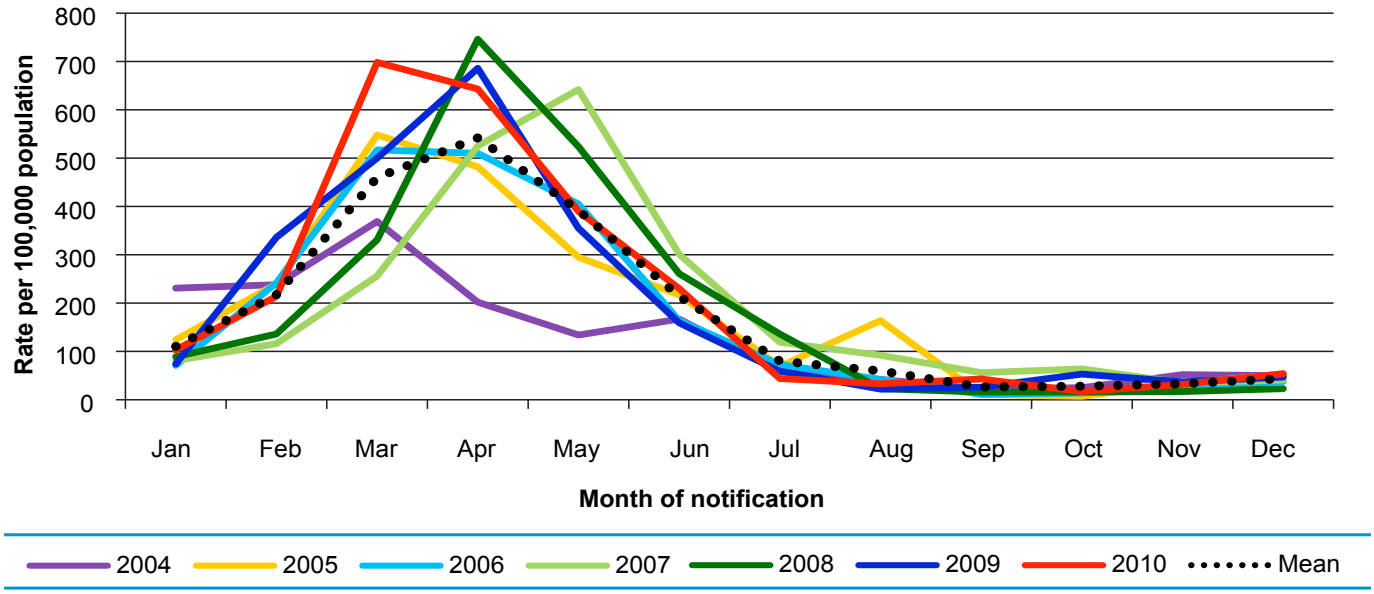

Figure 2. Number of rotavirus notifications by month, 2004-2010 (CIDR).

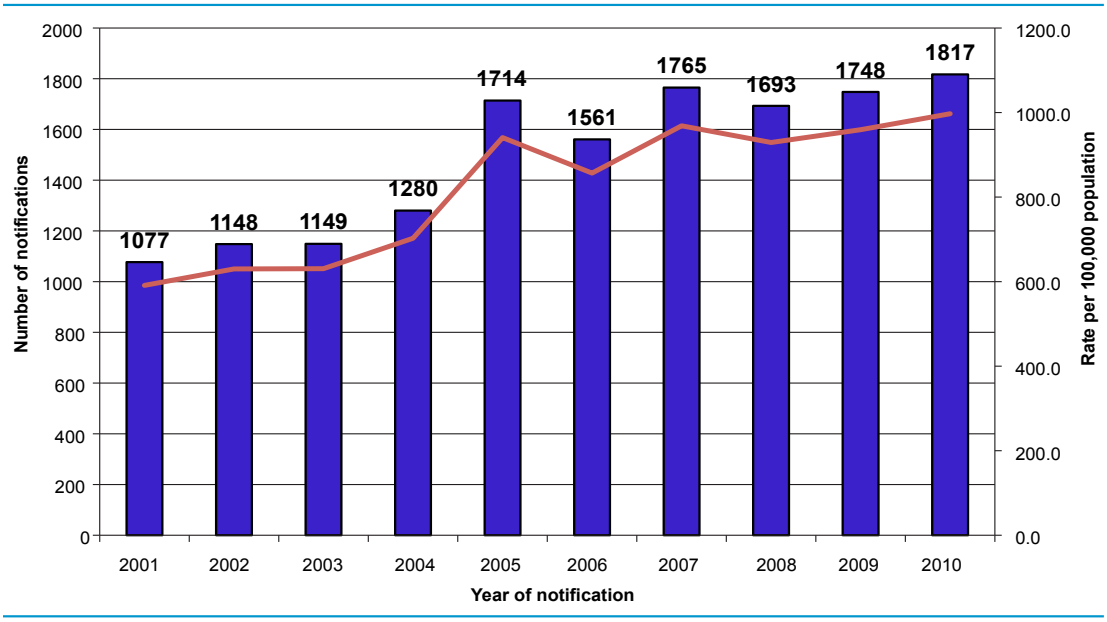

Figure 3. Number of cases of rotavirus in children less than two years of age by year, 2001 to 2010

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

72.7% (n=1,817) of cases were aged two years or under. Data from 2004 to 2010 show that the peak incidence of clinical disease occurred in the 6-18 month age group, with 59.1% of notifications in this age group. Figure 3 presents the number of cases of rotavirus in children less than two years of age by year, 2001 to 2010.

During 2010, 1,191 cases (47.6%) were female and 1,306 (52.2%) were male. Sex was not reported for four (0.2%) cases. This represented a ratio of females: males of 0.9:1.1, which was similar to the ratio observed in previous years.

There were seven outbreaks of rotavirus notified during 2010 with 59 cases of associated illness and six cases were hospitalised. One outbreak was reported as a rotavirus and norovirus co-infection. Of the seven outbreaks, five were family outbreaks occurring in private homes or across extended families while two general outbreaks occurred in a crèche and in a restaurant/cafe. Mode of transmission was reported as person to person spread for all outbreaks. During 2010, 43% of all rotavirus outbreaks occurred during March, coinciding with the peak in rotavirus notifications. The largest outbreaks with the highest numbers ill occurred during April, also coinciding with high levels of rotavirus activity. Table 1 summarises the number of rotavirus outbreaks by location and month during 2010.

Table 1: Summary of rotavirus outbreaks by location and month, 2010

Month	Location	Number of outbreaks	Number ill	Number hospitalised	Number dead
February	Crèche	1	9	2	0
March	Private house	3	6	2	0
April	Restaurant / Cafe	1	35	2	0
May	Private house	1	2	0	0
June	Extended family	1	7	0	0
	Total	**7**	**59**	**6**	**0**

3.6 Salmonella

Summary

Number of confirmed cases, 2010: 349
Number of probable cases, 2010: 7
Crude incidence rate, 2010: 8.4/100,000

Salmonellosis typically presents clinically as an acute enterocolitis, with sudden onset of, abdominal pain, diarrhoea, nausea, headache and occasionally vomiting. Fever is almost always present. Dehydration, especially amongst vulnerable populations such as infants, the immunocompromised and the elderly, may be severe. Invasive infection occurs in a proportion of cases. *S.* Typhi and *S.* Paratyphi can cause enteric fever, a severe systemic life threatening condition, but this is not common in Ireland and is almost invariably travel-associated.

Notification data (CIDR)

There were 356 cases of salmonellosis in reported in 2010. Of these, 349 were laboratory confirmed with an additional seven probable cases that were not laboratory confirmed. The national crude incidence rate (CIR) for salmonellosis in 2010 was 8.4 per 100,000 population which was a slight increase compared to 2009 (7.9/100,000) as shown in figure 1. Figure 2 illustrates the regional variation in CIR during 2010. The highest CIR occurred in HSE-M (18.3/100,000), representing an increase of 9.5 per 100,000 population compared to 2009. This was the only region to experience a significant increase in the regional CIR during 2010. The lowest CIR occurred in HSE-S (6.4/100,000), which remains stable compared to 5.6 per 100,000 population during 2009. The largest decrease in regional CIR during 2010 was observed in HSE-NW, with a decrease of 3.4 per 100,000 population.

The female:male ratio for 2010 was 0.96:1.05. In terms of age distribution, 21.1% of cases occurred in children under five. This is likely to be, at least in part, 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 27.2/100,000 in males) in both sexes (figure 3).

The seasonality of salmonellosis notifications in Ireland during 2010 is shown in figure 4, with the highest number of notifications occurring between May and October. A peak in indigenous notifications was observed during May due to an outbreak of *S.* Infantis

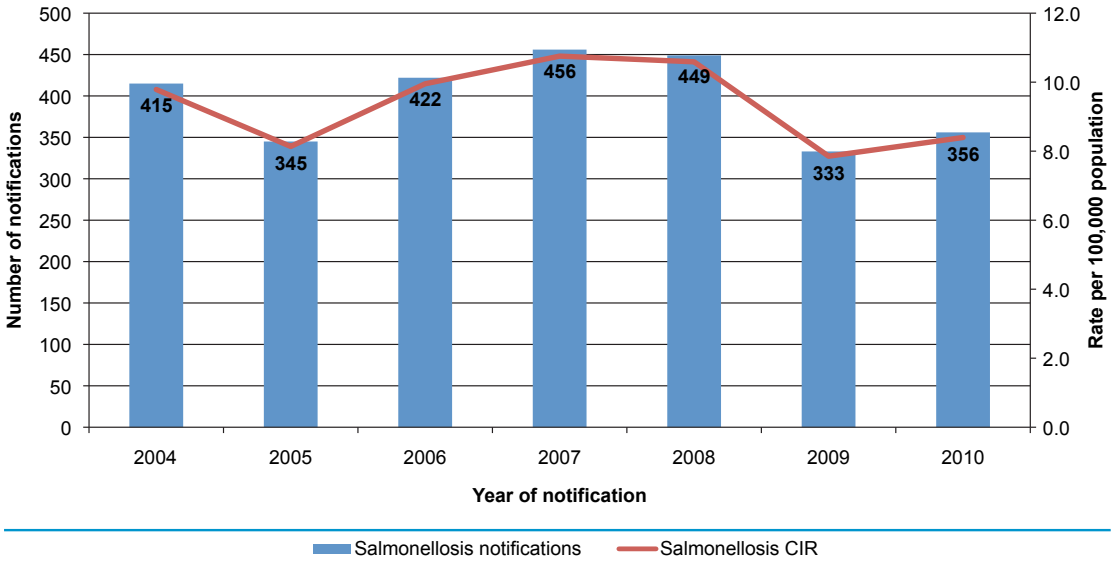

Figure 1. Salmonellosis notifications and crude incidence rate per 100,000 population by year of notification (CIDR)

while the peaks observed during August to October were largely due to travel associated salmonellosis notifications. These are anticipated seasonal increases that correlate with peak holiday periods and resultant increase of people travelling abroad.

Of the 356 cases notified on CIDR during 2010, travel history was provided for 277 cases (77.8%). Of the 277 cases where travel history was reported, 149 (53.8%) of salmonellosis cases were indigenous to Ireland and 128 cases (46.2%) 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=23), Thailand (n=13) and Turkey (n=8). When serotyping data are analysed by travel history, 30.5% of all travel associated cases are *S.* Enteritidis whereas 45.6% of cases indigenous to Ireland are *S.* Typhimurium (table 1).

NSSLRL data:
The National Salmonella, Shigella and Listeria Reference Laboratory (NSSLRL) based in Galway has been providing reference services nationally since 2000. In 2010, the NSSLRL analysed 363 human *Salmonella* isolates referred for further typing, identifying 62 serotypes. Table 2 presents the most dominant serotypes detected during 2010. *S.* Typhimurium* (n=132) was the most common serotype, followed by *S.* Enteritidis (n=70).

The NSSLRL conducted phage typing analysis on all 132 *S.* Typhimurium and all 70 *S.* Enteritidis isolates. Phage types DT8 (21.2%), DT104 (19.7%), DT193 (13.6%), Untypable (11.4%) and DT104b (10.6%) were the commonest phage types observed among *S.* Typhimurium isolates while phage types PT14b (24.3%), PT1 (20.0%) and PT4 (12.9%) were the dominant types observed among *S.* Enteritidis isolates.

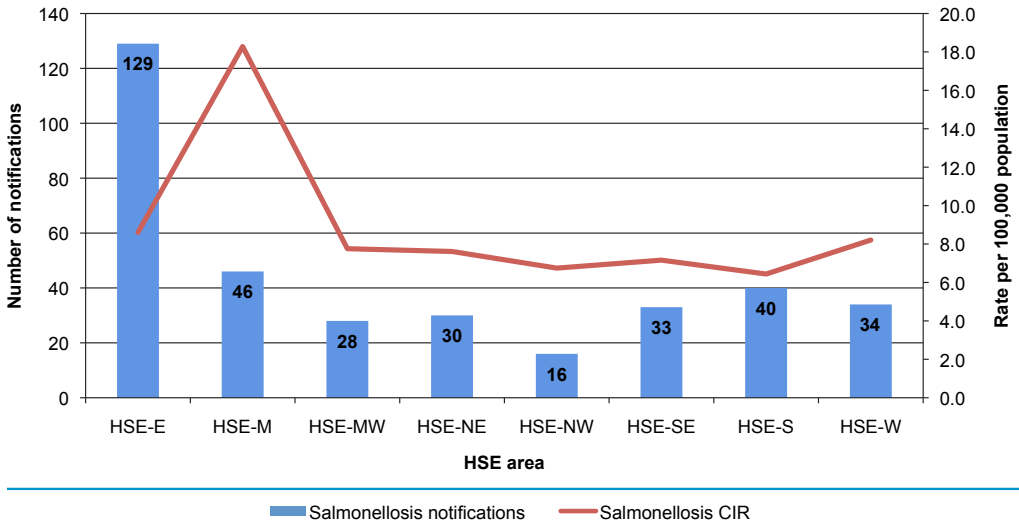

Figure 2. Salmonellosis notifications and crude incidence rate per 100,000 population by HSE area, 2010 (CIDR)

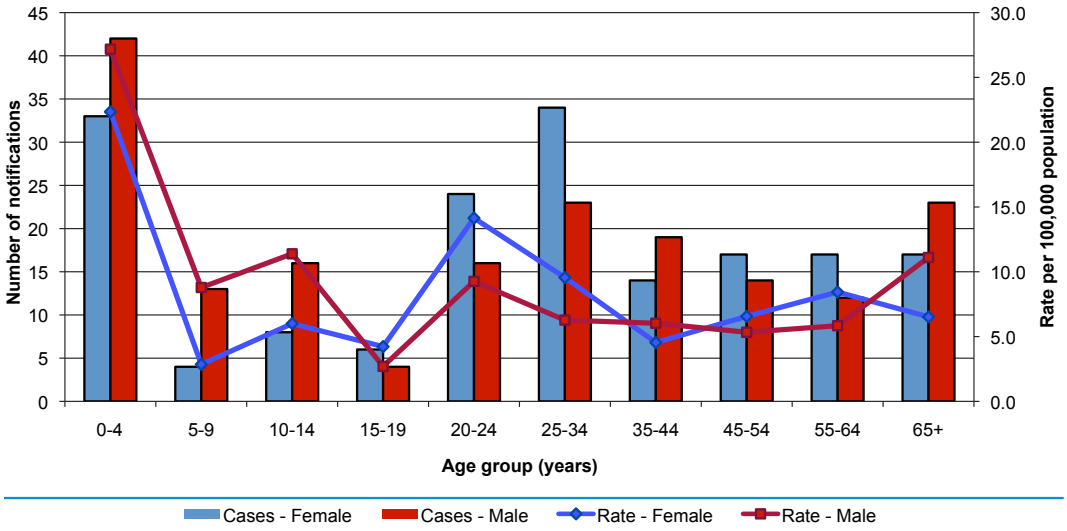

Figure 3. Salmonellosis notifications and age specific incidence rate per 100,000 population by age group (years) and sex, 2010 (CIDR)

Of the 363 human isolates analysed by the NSSLRL, 189 (52.1%) were fully susceptible to all antimicrobials tested. The remaining 174 isolates exhibited some degree of antimicrobial resistance. The three commonest resistance patterns[§] seen were isolated resistance to nalidixic acid (Na, n=38, 10.5%), resistance to ampicillin, streptomycin, sulphadiazine and tetracycline (ASSuT, n=27, 7.4%) followed by ampicillin, chloramphenicol, streptomycin, sulphadiazine and tetracycline (ACSSuT, n=26, 7.2%). Over 96% of human isolates with a resistance profile of ACSSuT or ASSuT were *S.* Typhimurium while 73.7% of human isolates with a resistance profile of Na were *S.* Enteritidis. One isolate each of *S.* Concord and *S.* Worthington were resistant to nine antibiotics tested; three *S.* Concord and one isolate each of *S.* Infantis, *S.* Newport and *S.* Unnamed were resistant to eight antibiotics tested while four *S.* Typhimurium, and one isolate each of *S.* Enteritidis, *S.* Infantis and *S.* Kentucky were resistant to seven antibiotics tested. Please refer to the NSSLRL's Annual Report 2010 for more detailed analysis of results[1] . The pattern of antimicrobial resistance observed is broadly similar to previous years. To date carbapenemase production in salmonella has not been detected in Ireland.

Outbreaks:
There were 16 outbreaks of *Salmonella* during 2010 which remains stable compared to the number of salmonellosis outbreaks reported in 2009. These outbreaks resulted in 87 cases of illness, one death and an associated hospitalisation rate of 41.4% (n=36 cases). Table 3 outlines the number of salmonellosis outbreaks and number ill by outbreak location and outbreak transmission mode during 2010.

There were 11 family outbreaks during 2010, six of which were in private houses, three occurred across extended families and two were travel associated. Of the two travel associated family outbreaks, one reported exposure in Spain and the other reported exposure in the Bahamas. Four family outbreaks were reported as food-borne transmission, four as person to person transmission and two as animal contact. Transmission was unknown for the remaining outbreak. Of the four food-borne outbreaks, suspected food items reported included raw milk[2], imported eggs and a catered meal. Of the outbreaks linked with animal contact, both reported reptile contact.

There were five general outbreaks during 2010, two of which were national outbreaks in community locations, one was a national travel related outbreak and the remaining two were local outbreaks occurring in a private house and a community location.

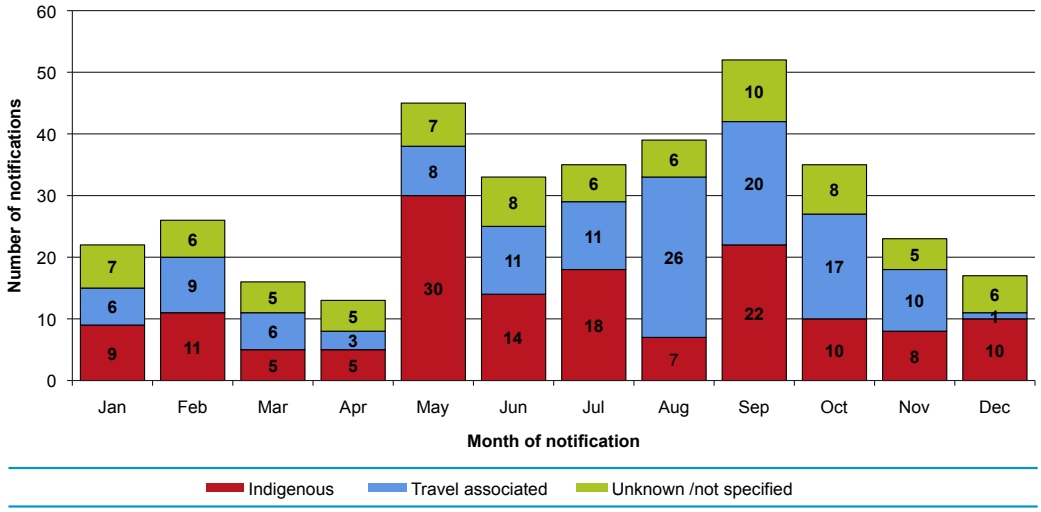

Figure 4. Salmonellosis notifications by month of notification and travel history, 2010 (CIDR)

Table 1. Percentage of Salmonellosis notifications by serotype and travel history, 2010 (CIDR)

Salmonella serotype	Travel associated	Indigenous	Travel history unknown	Total
***S.* Enteritidis (%)**	30.5	8.1	19.0	18.5
***S.* Typhimurium (%)**	11.7	45.6	40.5	32.3
Other serotypes (%)	57.0	43.0	39.2	47.2
Serotype not specified (%)	0.8	3.4	1.3	2.0
All serotypes (n)	**128**	**149**	**79**	**356**
All serotypes (%)	**36.0**	**41.9**	**22.2**	**100.0**

* This includes 19 *S.* Typhimurium isolates with serotype 4,5,12:1
[§] Where A= Ampicillin, C= Chloramphenicol, Na = Naladixic acid, S= Streptomycin, Su= Sulphonamide and T= Tetracycline

One national general outbreak of *S.* Typhimurium DT8 was reported which was associated with duck egg exposure. Thirty-five people were reported ill in total, 18 (51%) of which were reported to have been admitted to hospital for their illness and one case died. Salmonellosis was not considered to be the cause of death in this case. The cases were dispersed across seven of the eight HSE-areas, with onset dates ranging from mid August 2009 to the end of February 2011. Descriptive and microbiological evidence pointed towards duck eggs as being the most likely source of these infections. Exposure to duck eggs explained 72% of cases. Trace-back investigations identified *S.* Typhimurium from several egg-laying duck flocks which were indistinguishable or closely related on molecular typing to the strains producing human illness. Press releases were issued to the public, and point of sale notices were distributed to duck egg retailers, advising consumers to handle and cook duck eggs appropriately. A series of control measures were also taken by the Department of Agriculture including restriction of infected duck flocks, development of a code of practice for duck egg producers, and introduction of legislation (S.I. No. 565 of 2010), the 'Diseases of Animals Act 1966 (Control of Salmonella in Ducks) Order 2010'. This Order now sets down a legal basis for the control of salmonellosis in ducks and duck eggs.[3,4]

One national general outbreak of *S.* Java, consisting of four associated cases during a two week period, was detected by NSSLRL during 2010. No history of recent travel was reported by the cases and the route of transmission remains unknown for this outbreak.

One national general outbreak was caused by *S.* Typhimurium and resulted in four cases of illness, two of whom were hospitalised. All cases reported a history of recent travel to Spain.

One local general outbreak in HSE-NE was caused by *S.* Montevideo with five confirmed cases, two of whom were hospitalised and two of whom died. The cause of death was not salmonellosis in one case and the cause of death for the other deceased case was not known. Mode of transmission was reported as unknown for this outbreak.

Table 2. Number and percentage of human Salmonella isolates by serotype, NSSLRL 2010

Salmonella serotype	Number of isolates	*% Isolates*
Typhimurium†	132	*36.4*
Enteritidis	70	*19.3*
Infantis	17	*4.7*
Unnamed‡	10	*2.8*
Newport	8	*2.2*
Typhi	8	*2.2*
Braenderup	7	*1.9*
Dublin	7	*1.9*
Java	7	*1.9*
Montevideo	7	*1.9*
Saintpaul	7	*1.9*
Other	83	*22.9*
Total	**363**	*100.0*

Table 3. Number of salmonellosis outbreaks and number ill by outbreak location and outbreak transmission mode, 2010 (CIDR)

Location	Animal contact		Food-borne**		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**
Community out-break	0	0	1	33	0	0	2	7	**3**	**40**
Extended family	0	0	2	8	1	2	0	0	**3**	**10**
Private house	2	4	2	17	3	8	0	0	**7**	**29**
Travel related	0	0	1	2	0	0	2	6	**3**	**8**
Total	**2**	**4**	**6**	**60**	**4**	**10**	**4**	**13**	**16**	**87**

† This includes 19 (14.4%) *S.* Typhimurium isolates with serotype 4,5,12:1
‡ Unamed is not a serotype. The term refers to a very diverse group of isolates where the complete antigenic formula cannot be determined and which therefore can not be formally designated as belonging to any specific serovar
** Includes 1 outbreak reported as Person to Person and Foodborne
†† Includes 1 outbreak reported as Person to Person and Animal contact

One local general outbreak in HSE-M was caused by *S.* Infantis and resulted in 15 cases of illness, two of whom were hospitalised. This outbreak was reported as food-borne transmission associated with a catered party in a private house.

Typhoid/Paratyphoid:
The number of *S.* Typhi and *S.* Paratyphi cases diagnosed in Ireland remains elevated when compared to previous years. In 2010 there were eight cases of *S.* Typhi reported and five cases of *S.* Paratyphi. Four of the *S.* Typhi had known recent travel history to India, two to Bangladesh and one each to Nepal and Guinea. In the five *S.* Paratyphi cases one had known recent travel history to Bangladesh, one to Pakistan and one to the US. One further case reported travel in Asia. The remaining paratyphoid case's travel history was unknown.

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3.7 Less common gastroenteric infections

Listeriosis

Ten cases of human listeriosis were notified in 2010, the same number as in 2009. This equates to a crude incidence rate of 0.24 (95% CI 0.09-0.38) per 100,000, below the EU average of 0.36 per 100,000 in 2009.

Among these, there were three pregnancy-related and one neonatal case reported. This is an increase on the number of pregnancy-associated cases reported relative to 2009 (Figure 1).

There were also six adult cases. Five were female and one male, and ages ranged from 42 to 81 years of age. Three cases were reported as elderly (>65 years); and all six were reported as suffering from an underlying illness that predisposed them to listeriosis.

There were no reported deaths due to listeriosis this year.

Since 2007, the National Salmonella Reference Laboratory (now the National Salmonella, Shigella and Listeria Reference Laboratory) in Galway has offered a national service for typing of *Listeria* strains. Between 2007 and 2009, isolates for 77% of the notified listeriosis cases were referred. In 2010, isolates from only four of the ten notified cases were referred. The serotypes for these four cases are listed in table 1 below.
Listeriosis in Ireland remains a hazard for the elderly, persons with underlying illness, and other vulnerable groups such as pregnant women and neonates.

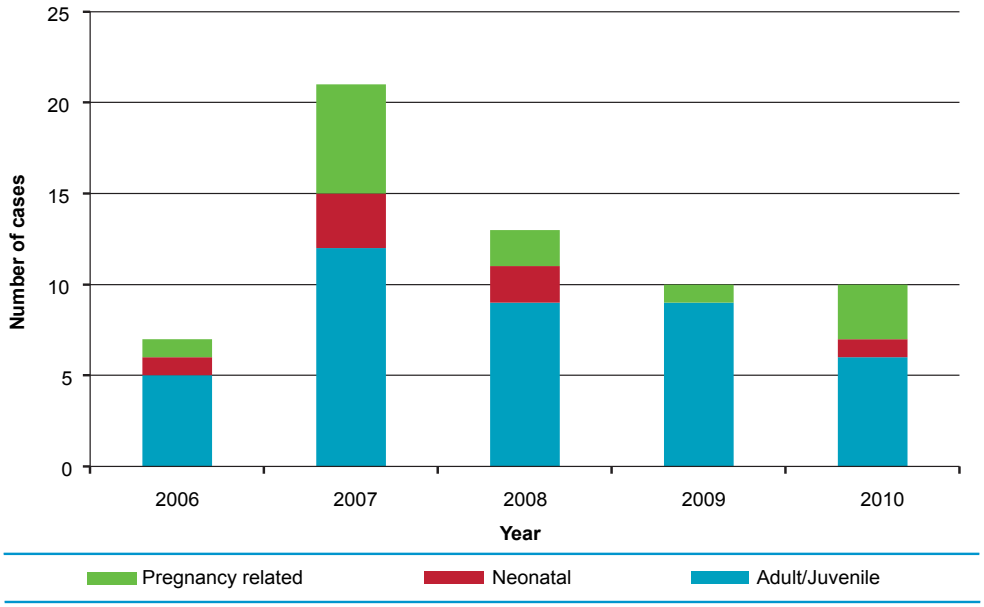

Figure 1. Number Listeriosis Notifications by Case Type, Ireland 2006-2010

Table 1. Listeriosis Notifications by Case Type and Serotype, Ireland 2010 -typing data provided courtesy of Prof Martin Cormican and staff at the NSSLRL

Type	Serotype 1/2	Serotype 4b	Not referred for sero-typing	Total
Adult or juvenile	0	2	4	**6**
Pregnancy-related	1	0	2	**3**
Neonatal	1	0	0	**1**
Total	**2**	**2**	**6**	**10**

Giardiasis

In 2010, there were 57 cases of giardiasis notified, a slight decrease on the number notified in 2009 (n=61) and in 2008 (n=71). This equates to a crude incidence rate of 1.34 (95% CI 1.00-1.69) per 100,000.

Cases ranged in age from 0-84 years (median age=31 years) with only 12 paediatric cases reported. Similar numbers of males (n=26) and females (n=31) were affected. Hospitalization rates were low with four cases admitted out of 48 (8%) for which this information was available.

The number of cases for which travel status was reported has increased markedly over the last five years from 11% of cases in 2006 to 53% of cases this year (Figure 2). Twenty-three cases (40%) were reported as being associated with foreign travel: the countries of infection reported were India (n=7), Ethiopia (n=5), Spain (n=3), and there was one case each reported associated with travel to Egypt, South Africa, Uganda, Bangladesh, Pakistan, Cuba, Haiti and Peru. Seven cases were reported as being acquired in Ireland, and for the remaining 27 cases, country of infection was unknown or not specified.

In 2010, there was one small family outbreak with two persons ill reported associated with foreign travel.

Giardiasis in Ireland appears to be largely an adult disease. And if the travel histories of those with known *Country of infection* are representative of all reported giardiasis cases in Ireland, then as many as three-quarters may be related to foreign travel. Among these cases, Asia and Africa figure most prominently as travel destinations.

Yersiniosis

In 2010, there were three cases of yersiniosis, the same as in 2009 and 2008. All were adult males. Two cases were reported as *Y. enterocolitica* and one as *Yersinia pseudotuberculosis*. The reported incidence of yersiniosis in Ireland is low relative to the EU as a whole, and to Northern Europe in particular.

Yersiniosis is commonly associated with consumption of pork products however, in Spring 2011, an outbreak was reported in Norway associated with salad leaves. [1]

[1] E MacDonald et al. 2011. *Yersinia enterocolitica* O:9 infections associated with bagged salad mix in Norway, February to April 2011. Eurosurveillance, Volume 16, Issue 19, 12 May 2011

Foodborne intoxications

Notifications of foodborne intoxications in Ireland are uncommon. In 2010, there were no cases or outbreaks of *Clostridium perfringens* (type A) food-borne disease, staphylococcal food poisoning, *Bacillus cereus* food-borne infection/intoxication or botulism notified.

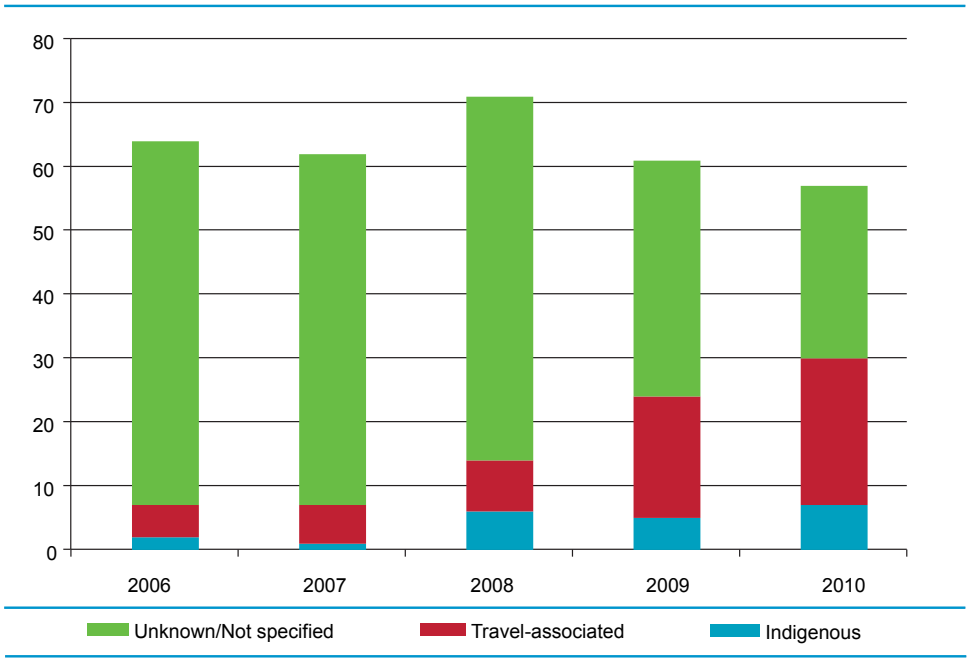

Figure 2. Number Giardiasis Notifications by Travel Status, Ireland 2006-2010
Note: Travel status is inferred from *Country of Infection* variable on CIDR

3.8 Shigellosis

Summary

Number of cases, 2010: 60
Number of cases, 2009: 70
Crude incidence rate, 2010: 1.42/100,000

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 1). 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]

Sixty cases of shigellosis were notified in Ireland in 2010 (CIR 1.42 per 100,000), all of which were laboratory confirmed. This compares to 70 cases in 2009 and 75 in 2008 (Figure 1). Of 45 cases where hospitalisation status was recorded, 12 (27%) were reported as hospital in-patients.

Cases ranged in age from 8 months to 76 years (median age=32 years). Like 2009, more males (n=35) than females (n=25) were notified. This differs to the previous three years when there were more females than males reported each year. The increase in male cases was particularly notable in the 15-44 year age group (Figure 2).

Information on travel history is very valuable when

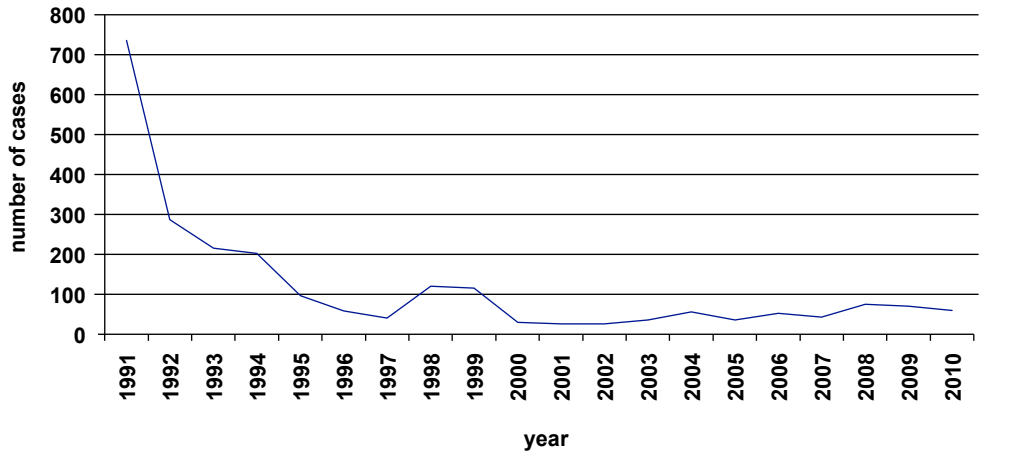

Figure 1. Annual number of notifications shigellosis, Ireland 1991-2010

Table 1. Number of notifications shigellosis by species and country of infection, Ireland 2010

	Ireland	Africa	Asia	Other	Not known/ not reported	Total
S. boydii	2	0	0	0	0	**2**
S. dysenteriae	0	0	0	0	0	**0**
S. flexneri	9	0	3	2	7	**21**
S. sonnei	9	4	8	4	7	**32**
Species not specified/not known	0	2	2	0	1	**5**
Total	20 (33%)	6 (10%)	13 (22%)	6 (10%)	15 (25%)	**60**

(Data source: CIDR)

reviewing surveillance data for possible indigenous clusters, and data on country of infection in the national dataset is improving being available this year for 75% of shigellosis notifications. 25 cases (42%) were reported associated with foreign travel (Table 1). The countries of infection reported were India (n=7), Spain (n=4), Egypt (n=3), with one case associated each with travel to Cameroon, Nigeria, Zambia, Bangladesh, Indonesia, Jordan, Kazakhstan, Nepal, Pakistan, Costa Rica and Haiti. Twenty infections (33%) were reported as being acquired in Ireland, while no country of infection information was provided for 15 (25%) cases. Unsurprisingly, travel-associated cases were more common in summer and later in the year, while indigenous case numbers remained similar year round (Figure 3).

Shigella sonnei was the most common species reported (53%), followed by *S. flexneri* (35%). There were also two *S. boydii* (3%), and five confirmed cases (8%) 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*, *Shigella* and *Listeria* Reference Laboratory (NSSLRL) 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 2010, 40 human *Shigella* isolates were referred to the NSSLRL, two-thirds of the isolates from all confirmed cases. The species/serotype distribution of these isolates is reported in Table 2.

There were three shigellosis outbreaks notified in 2010, details of which are provided in Table 3.

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

Table 2. Species/serotypes of Shigella isolates referred to NSSLRL in 2010 (Data courtesy of Prof. Martin Cormican and staff at NSSLRL)

Strain	Number of isolates
Shigella boydii	3
Shigella flexneri 1a	1
Shigella flexneri 1b	3
Shigella flexneri 1c	1
Shigella flexneri 2a	2
Shigella flexneri 3a	3
Shigella flexneri 3b	2
Shigella flexneri 4c	3
Shigella flexneri 6	3
Shigella sonnei	17
Shigella unidentifiable	1
(blank)	1
Total	**40**

[Data source: NSSLRL]

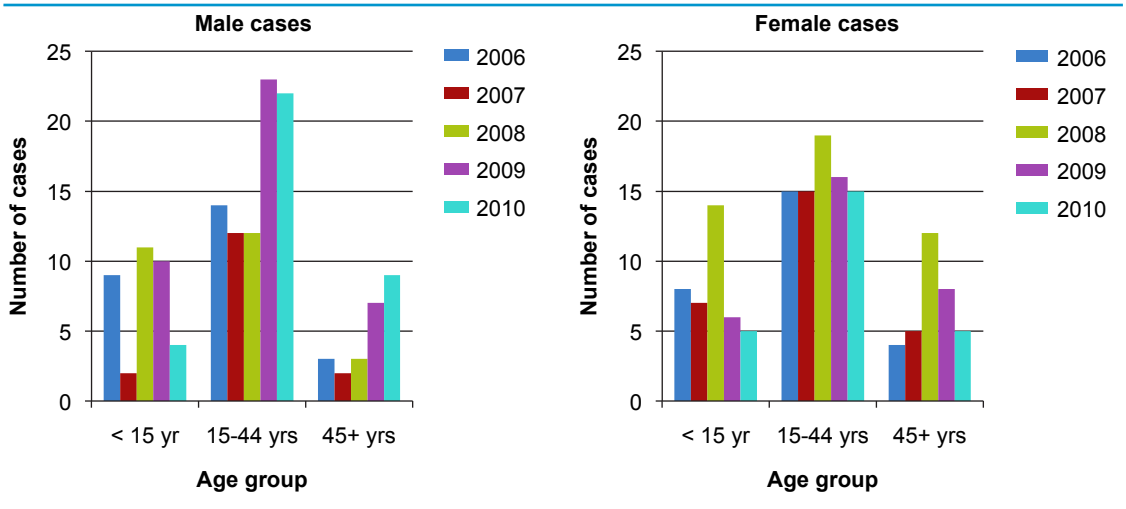

Figure 2. Age-sex distribution shigellosis notifications, Ireland 2010 relative to 2006-2009

abroad), and from food as demonstrated by the Scandinavian outbreaks associated with imported foods in recent years.

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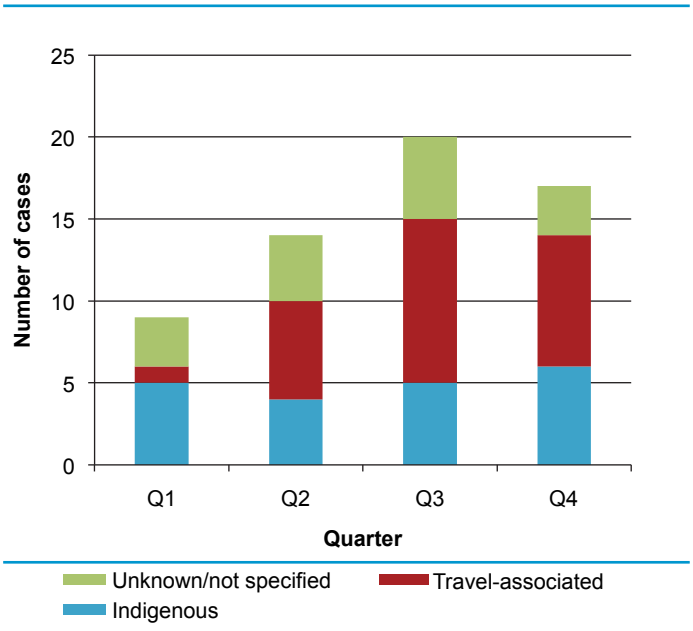

Figure 3. Number shigellosis notifications by travel and quarter of notification, Ireland 2010

Note: For the purposes of this figure, shigellosis notifications were categorised as indigenous if the *country of infection* was reported on CIDR as Ireland, whereas notifications where a *country of infection* other than Ireland was reported were categorised as travel-associated.

Table 3. Shigellosis outbreaks, Ireland 2010

Month	HSE-area	Transmission Route	Location	Type	Number ill
Apr	E	Person-to-person	Community	General	6
Aug	MW	Waterborne	Private house	Family	3
Sep	S	Unknown	Private house	Family	4

04

Vectorborne and Zoonotic Diseases

4.1 Other Non-IID Zoonotic Diseases

Toxoplasmosis

During 2010, 37 cases of toxoplasmosis were notified compared to 37 in 2009 and 49 in 2008.

One congenital case was reported. The remaining 36 cases ranged in age from 15 years to 58 years (median, 33 years). As in previous years, female cases dominated (65%). The high number of cases reported among women of child-bearing age may reflect enhanced testing during pregnancy (Table 1).

Q Fever

Nine cases of Q fever were notified during 2010, two of which were reported to have been hospitalized (22%). This is a decrease compared to 17 notifications in 2009 and 13 notifications in 2008.

Three cases occurred in males and six in females (Table 2). The cases ranged in age from 19 to 75 years (median age, 44 years). All cases were classified as confirmed.

Seven cases were reported from HSE-S and two from HSE-MW. This distribution may reflect a regional difference in risk or variation in diagnostic policy/ practice in different parts of the country.

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

Over the last 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. [1]

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

Table 1. Toxoplasmosis notifications by age and sex, Ireland 2010

Age group	Male	Female	Total
<1 yr	1	0	**1**
1-4 yrs	0	0	**0**
5-14 yrs	0	0	**0**
15-24 yrs	3	3	**6**
25-44 yrs	6	19	**25**
45-64 yrs	3	2	**5**
65+ yrs	0	0	**0**
Total	**13**	**24**	**37**

Table 2. Q fever notifications by age and sex, Ireland 2010

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

Brucellosis

During 2010, two cases of brucellosis were notified compared to zero in 2009 and 3 notifications in 2008. Both cases were adult males. One was reported as chronic.

The age and sex distribution for brucellosis in recent years in Ireland suggests that occupational exposure is likely to be the main transmission route for this disease.

The case definition permits inclusion of acute and chronic cases. In previous years, many cases were reported as chronic cases with only small numbers of acute cases reported.

Echinococcosis

In 2010, there was one notification of echinococcosis in an adult. This is the fourth case of echinococcosis notified in Ireland since the disease became notifiable in 2004; in 2008, two adult cases were notified, and in 2009, one adult case was notified.

Because of the long incubation period for this disease, it is possible that infection occurred many years ago.

Trichinosis

No cases of trichinosis were notified in Ireland in 2010.

4.2 Malaria

Summary

Number of cases, 2010: 82
Number of cases, 2009: 90
Crude incidence rate, 2010: 1.9/100,000

Among EU Member States reporting malaria data to the European Centre for Disease Control, Ireland had the third highest incidence rate for imported malaria in 2008, third only to France and the United Kingdom.[1] Compared to the number of cases of malaria notified prior to 2006 (Figure 1), malaria notifications in Ireland in 2010 remained at elevated levels with 82 cases notified. Moreover, one Irish resident died as a result of their illness, a woman of African origin who was resident in Ireland for several years but who was exposed on a return visit to Africa.

The group most affected in Ireland continued to be African immigrants and their families who were exposed while returning to their countries of origin to visit family and friends. This almost certainly reflects the greater frequency with which this group travels to malarious areas, and reflects also Ireland's increasing importance as a destination for those emigrating from English speaking West Africa. Seventy per cent of cases with a known reason for travel in 2010 cited 'visiting family in country of origin', with at least 83% of these being of African origin (Table 1).

Unusually, the second most common reason for travel this year was being an 'Irish citizen living abroad' (10 cases -15% of cases with known reason for travel). This compares with a total of 6 cases listing this as their reason for 'travel' over the previous four years. At least six of these ten cases had been living in an endemic country for one year or more. There were only two

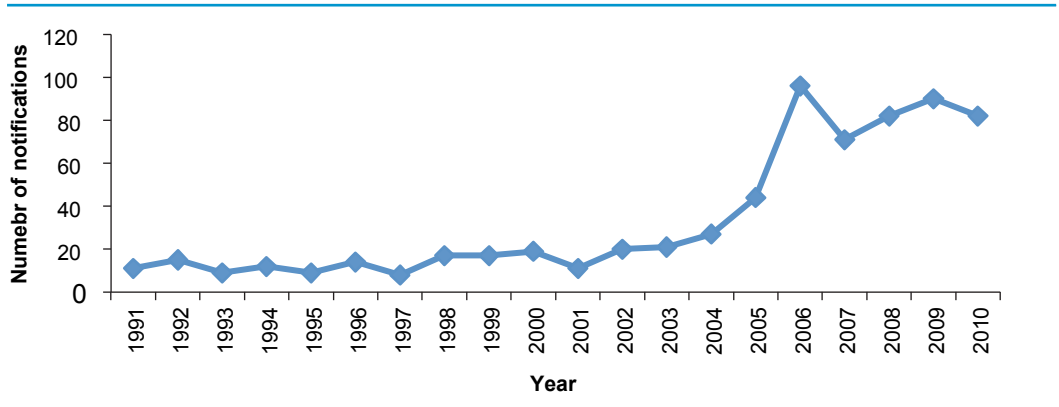

Figure 1. Annual number of notifications malaria, Ireland 1991-2010

Table 1. Number of cases malaria by reason for travel and country of birth, Ireland 2010

Reason for travel	Country of birth						
	Nigeria	Other Africa	Asia	Ireland	Other	Not specified	Total
Visit family country origin	28	10	0	5	2	1	**46**
Irish Citizen Living Abroad	0	0	1	7	1	1	**10**
Holiday travel	0	1	0	1	0	0	**2**
Other	1	0	0	2	2	3	**8**
Not specified	2	0	0	0	0	14	**16**
Total	**31**	**11**	**1**	**15**	**5**	**19**	**82**

cases associated with holiday travel in 2010, down from between five and thirteen annually reported in the period 2006-2009.

Other reasons for travel includes: business/professional travel (n=2), new entrants (n=2), aid/volunteer workers (n=3), and foreign visitors ill while in Ireland (n=1)

Nigeria remained the country most frequently visited -50% of cases (Table 2). Ghana was reported as the country of infection for eight cases (10%). The remaining cases reporting travel to other parts of Sub-Saharan Africa or to Asia. And as in previous years, *P. falciparum* was responsible for the majority of malaria cases reported in Ireland in 2010 (Table 2), most likely because *P. falciparum* is the most common form of malaria acquired in Africa and the majority of Irish cases are acquired there.

In recent years in Ireland, there has been concern about the reported number of paediatric malaria cases. In 2010, 11 paediatric malaria cases were notified compared to between 16 and 26 cases annually in the previous four years. Eight of these reported 'visiting family in country of origin as their reason for travel, while one was a new entrant.

The small decline in case numbers in 2010 (9% decrease compared to 2009) in particular among children is welcome, however, efforts should continue in the education of the travelling public about the steps that can be taken to minimise their risk of contracting malaria while overseas.

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Table 2. Number of cases malaria by infecting species and country of infection, Ireland 2010.

Species	Country of infection					
	Nigeria	Ghana	Other Africa	Asia	Not specified	Total
P. falciparum	34	7	13	3	10	**67**
P. falciparum/ P. vivax	2	0	0	0	0	**2**
P. ovale	2	1	1	0	2	**6**
P. vivax	0	0	0	1	1	**2**
P. malariae	0	0	0	0	0	**0**
Not Specified	3	0	1	0	1	**5**
Total	**41**	**8**	**15**	**4**	**14**	**82**

4.3 Leptospirosis

Summary

Number of cases, 2010: 17
Number of cases, 2009: 24
Crude incidence rate, 2010: 0.4/100,000

Seventeen cases of leptospirosis were notified in Ireland in 2010, a 29% reduction compared to the 24 cases notified in 2009 (Figure 1). This equates to a crude incidence rate of 0.40 per 100,000 (95% CI 0.21-0.59). The last year for which data is available across the European Union is 2008. 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 0.15 per 100,000.

The leptospirosis notification dataset is typically dominated by adult males, and this year is no exception (Table 1). Sixteen cases (94%) were male and the age range was 19-82 (mean age =41 years, median age=37 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 16 cases for which hospital admission status was reported, 15 (94%) required hospitalization. No deaths were reported.

Six cases (35%) were believed to have acquired their illness occupationally –all were either farmers or reported contact with farm environments. Five (29%) cases were reported as being associated with recreational activities: two with travel to a tropical destination, and one each with kayaking, diving and fishing. No risk factor information was available for the remaining six (35%) 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 on CIDR for only two cases in 2010–one each *Leptospira interrogans hardjo* and *Leptospira interrogans icterohaemorrhagiae*. Both were reported as occupationally acquired. Species was not reported for the remaining 15 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 and other tropical destinations has emerged as a risk factor for leptospirosis. In general the incidence of leptospirosis is much higher in tropical climates than in temperate areas like Ireland.

Table 1. Leptopirosis notifications by age and sex, Ireland 2010

Age group	Male	Female	Total
<5 yr	0	0	**0**
5-14 yrs	0	0	**0**
15-24 yrs	5	0	**5**
25-44 yrs	4	1	**5**
45-64 yrs	5	0	**5**
65+ yrs	2	0	**2**
Total	**16**	**1**	**17**

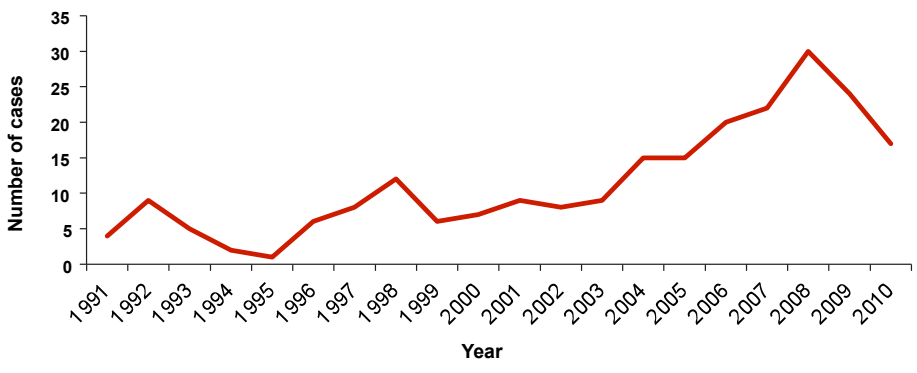

Figure 1. Annual number of leptospirosis notifications, Ireland 1991-2010
(data source: CIDR)

05

Blood-borne and Sexually Transmitted Infections

5.1 Hepatitis B

Summary

Number of cases, 2010: 645
Crude notification rate, 2010: 15.2/100,000
Number of cases, 2009: 803

Hepatitis B is a vaccine preventable disease caused by the hepatitis B virus. It is transmitted through percutaneous or mucocutaneous contact with the blood or body fluids of an infected person. Over 90% of people infected in late childhood and adulthood 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 (approx. 90%) or when aged under five years (approx. 30%).[1] Between 15 and 40% of people with chronic infection ultimately develop cirrhosis, liver failure or hepatocellular carcinoma (liver cancer).[2]

The prevalence of hepatitis B in the general population in Ireland is low (less than 1%) and most cases fall into defined risk groups such as people with multiple sexual partners, household or sexual contacts of known cases, injecting drug users and people who were born in countries with intermediate (2-7%) or high (≥8%) hepatitis B endemicity.

The number of hepatitis B cases reported in Ireland decreased by 20% in 2010, with 645 cases (15.2/100,000 population) notified compared to 803 in 2009 (figure 1). Sixty four percent (n=412) of notifications were from the HSE-E, corresponding to a notification rate of 27.5/100,000 population.

All cases were laboratory confirmed and 93% contained information on acute/chronic status. Where status was known, 8% of cases were acute (n=49) and 92% were chronic (n=554).

Acute cases (recent infections)
Of the 49 acute cases notified in 2010, 90% (n=44) were male and 10% (n=5) were female. The highest notification rates were in young to middle aged adults, and 71% (n=35) of acute cases were aged between 20 and 44 years when notified (figure 2). Female cases were younger than males overall, with a median age of 27 years compared to 36.5 years for males.

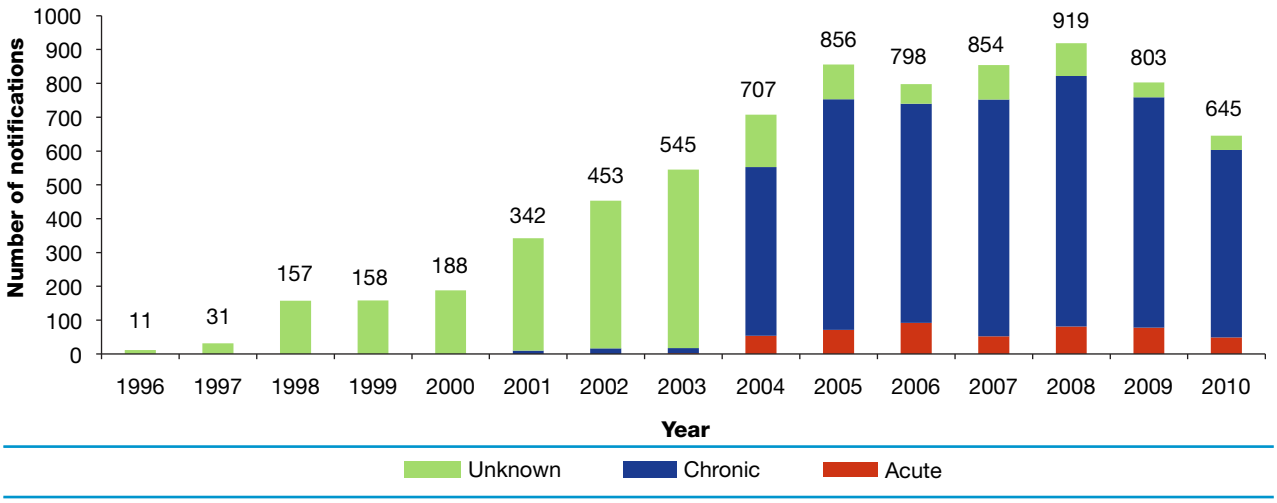

Figure 1. Number of hepatitis B notifications by acute/chronic status, 1996-2010

Information on risk factor was available for 84% (n=41) of acute cases. Of these, 66% (n=27) were likely to have been sexually acquired. Fourteen were men who have sex with men, eleven were heterosexual and sexual orientation was not known for two cases. No risk factors were identified for twelve cases (29%) despite follow up being carried out.

Country of birth was known for 92% (n=45) of acute cases. Seventy three percent (n=33) were born in Ireland and 16% (n=7) were born in Eastern or Central European countries. Where country of infection was known, 80% (n=24) of acute cases were infected in Ireland. Information on reason for testing was available for 47 acute cases. Most were identified because they were symptomatic (75%, n=35) or through STI screening (17%, n=8).

The number of acute cases of hepatitis B notified in Ireland is generally relatively low and decreased by 37% in 2010 (n=49) compared to 2009 (n=78). The decrease is mostly attributable to decreases in sexually acquired cases of acute hepatitis B in both men who have sex with men and heterosexuals.

Chronic cases (long-term infections)

Of the 554 chronic cases notified in 2010, 50% (n=276) were male, 49% (n=272) were female and sex was not known for 1% (n=6). Eighty five percent (n=468) of chronic cases were aged between 20 and 44 years when notified (figure 2). The median age at notification for female cases was 28 years and the median age for males was 33 years.

Some data on risk factor, country of birth or asylum seeker status were available for 47% (n=261) of the chronic cases notified in 2010. Of these, 66% (n=172) were born in hepatitis B endemic countries or were identified as asylum seekers. Data on country of birth was available for 42% (n=233). The most common regions of birth were Eastern or Central Europe (31%, n=73), Sub-Saharan Africa (30%, n=69) and Asia (29%, n=67). Other risk factors included sexual acquisition (14%, n=37), vertical acquisition (5%, n=13), household contact with a known case (4%, n=10) and being a resident of an intellectual disability institution (3%, n=8).

Reason for testing was known for 64% (n=357) of chronic cases. Thirty six percent (n=130) were identified through antenatal screening programmes, 15% (n=54)

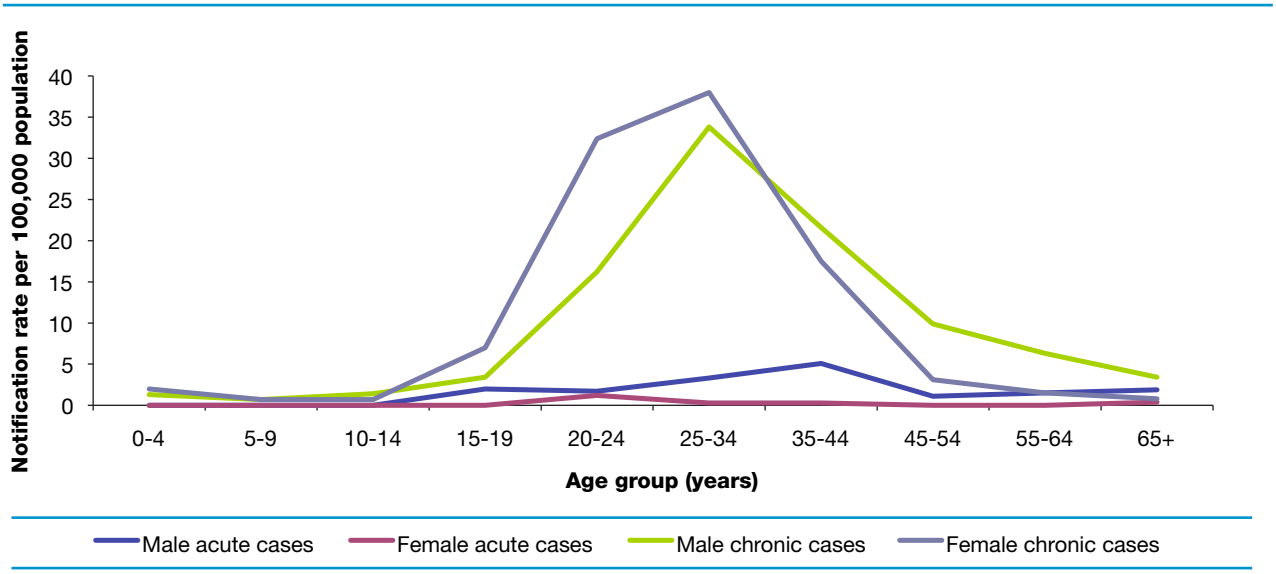

Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis B by acute/chronic status, 2010

were identified through asylum seeker screening programmes, 10% (n=36) were tested in STI settings, 9% (n=32) were cases that were previously diagnosed but not notified and 9% (n=31) were diagnosed as a result of routine health screens.

The dramatic increases in hepatitis B notifications between 1998 and 2008 were mostly attributable to large numbers of people immigrating to Ireland from hepatitis B endemic countries. Between 2000 and 2010, 95% of asylum applicants, and 73% of new work permit recipients, were from countries with intermediate or high hepatitis B endemicity. Immigration to Ireland has decreased in recent years and this is likely to have contributed to the 19% decrease in chronic hepatitis B notifications in 2010. (Data on work permits and asylum applications received via personal communications from Department of Enterprise, Trade and Innovation and the Office of the Refugee Applications Commissioner).

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 13th October 2011. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

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5.2 Hepatitis C

Summary

Number of cases, 2010: 1,239
Crude notification rate, 2010: 29/100,000
Number of cases, 2009: 1,241

Hepatitis C is a major cause of liver disease worldwide. 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 most cases, but approximately 75% of those infected fail to clear the virus and develop chronic infection. Between 5 and 20% of chronically infected individuals develop cirrhosis of the liver after 20 years of infection. Of those with cirrhosis, 1.5 to 2.5% will go on to develop hepatocellular carcinoma (liver cancer) each year.[1] Effective treatment, which eradicates the virus in over 50% of cases, is available for hepatitis C.[2]

The overall prevalence of chronic hepatitis C in Ireland is comparable to other Northern European countries and is estimated to be between 0.5 and 1.2%. The prevalence in the general population is low and most cases fall into defined risk groups such as injecting drug users, people who received unscreened blood or blood products in the past and people who were born in hepatitis C endemic countries.[3]

The number of cases of hepatitis C reported in 2010 was very similar to 2009, with 1,239 notifications (29/100,000 population) compared to 1,241 in 2009 (figure 1). There was a strong predominance of males: 67% (n=833) of cases were male, 32% (n=396) were female and sex was not known for 10 cases (figure 1). The highest notification rates were in young to middle aged adults. Seventy two percent (n=896) of cases were aged between 25 and 44 years (figure 2). The median age for females was younger (33 years) than that for males (36 years).

The geographic distribution of cases was skewed, with the HSE-E reporting 76% of all cases notified in 2010. The highest notification rates were in the HSE-E

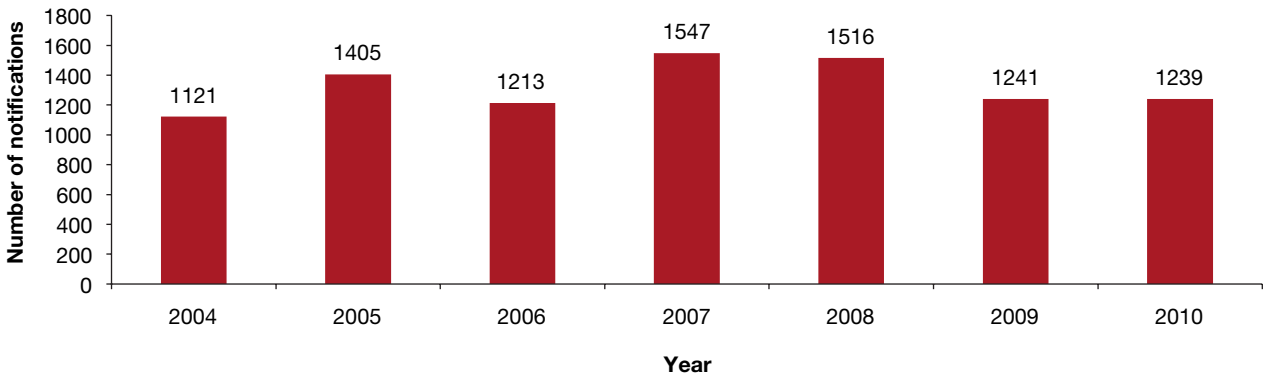

Figure 1. Number of hepatitis C notifications, 2004-2010

(63/100,000 population, n=940) and the HSE-M (28/100,000 population, n=71) (figure 3).

Data on most likely risk factor were available for 59% of cases (n=728). The most common risk factors reported were injecting drug use (76%, n=550), being an asylum seeker/born in an endemic country (9%, n=63), sexual exposure (5%, n=38) and receipt of blood or blood products (3%, n=19).

Of the nineteen cases acquired through blood or blood products, seven were infected in Ireland, five were infected outside Ireland and country of infection was not known for seven. All cases acquired in Ireland were infected many years in the past, but were notified for the first time in 2010.

The number of cases of hepatitis C notified in 2010 remained high and, where risk factor data were available, injecting drug use was the predominant mode of transmission. Although information on risk factor was not available for 41% of cases, the age and sex profile of these cases did not differ significantly from those for whom information was available.

Data on country of birth and country of infection were too incomplete to allow for reporting.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 13th October 2011. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

References:

1. Global Burden of Hepatitis C Working Group. Global burden of disease (GBD) for hepatitis C.J Clin Pharmacol. 2004 Jan;44(1):20-9.
2. National Institute for Clinical Excellence. NHS. Interferon alpha (pegylated and non-pegylated) and ribavirin for the treatment of chronic hepatitis C. Technology appraisal 75. London:NICE;2004.
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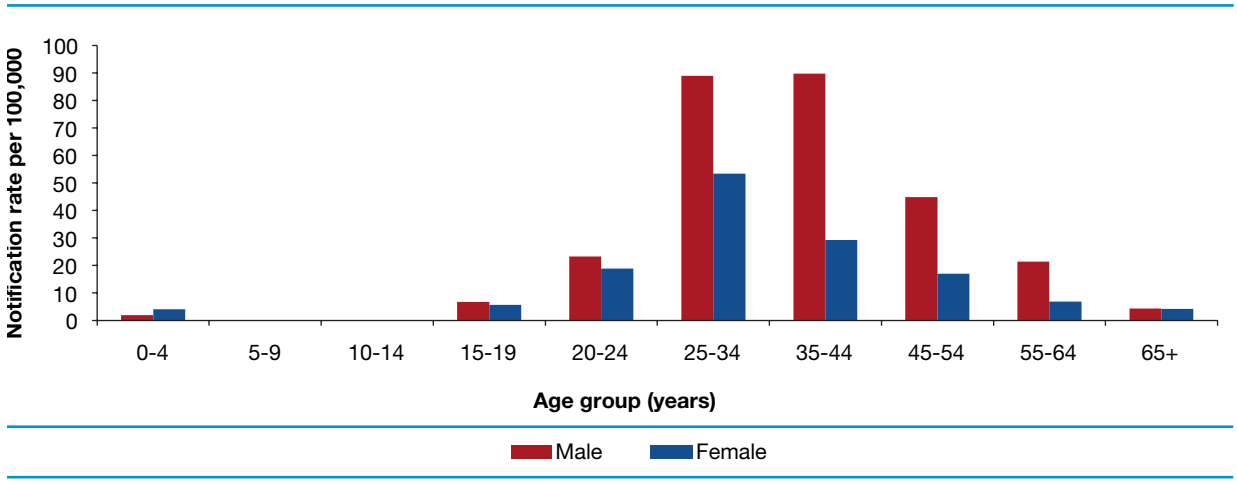


Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis C, 2010

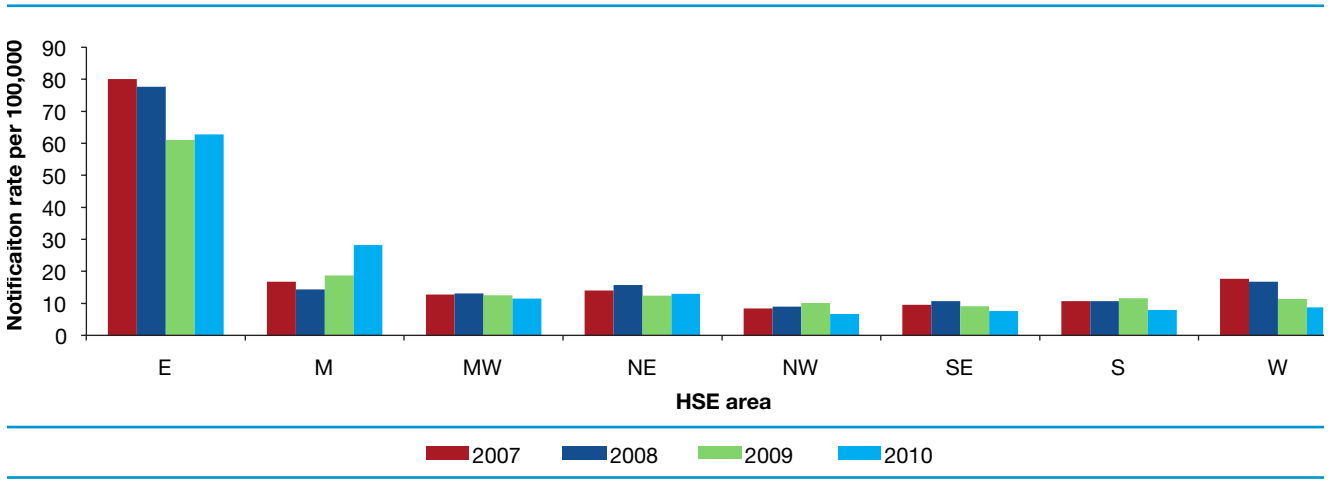


Figure 3. Notification rates/100,000 population for hepatitis C by HSE area, 2007-2010

5.3 HIV and AIDS

Summary

Number of HIV cases: 331
Crude HIV incidence rate: 7.8/100,000 population
Number of AIDS cases: 54
Number of deaths in AIDS cases: 10

A total of 331 new HIV diagnoses (240 men and 89 women) were reported to HSPC during 2010. This compares to 395 in 2009 and represents a 16.2% decrease. The rate of newly diagnosed HIV infection in Ireland in 2010 was 7.8 per 100,000 population (11.3 per 100,000 men and 4.2 per 100,000 women).

Completed surveillance forms were received for 290 (87.6%) of the newly diagnosed cases.

There were 54 new AIDS diagnoses reported to HPSC during 2010. There were 10 deaths among AIDS cases reported during 2010. 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 cases diagnosed annually in Ireland from 2000 to 2010, in males and females.

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 1994 and 2010.

Men who have sex with men (MSM)

- The highest proportion of new HIV diagnoses in 2010 was among MSM (40.5%).
- The number of new cases among MSM (134) is very similar to 2009 (138). Between 2005 and 2009, the annual number of new diagnoses in MSM have more than doubled from 60 to 138.
- The median age of new cases among MSM in 2010 was 34.0 years (range 20-62 years).
- 67.9% (91) were born in Ireland, 11.2% (15) were born in Latin America, 6.7% (9) were born in Western Europe and 6.0% (8) were born in Central and Eastern Europe.
- Of the new cases among MSM at the time of HIV diagnosis, 100 were asymptomatic, 11 were diagnosed with AIDS and four had acute HIV infection.

Heterosexual transmission

- 37.2% of new diagnoses were attributed to heterosexual transmission.
- The number of cases attributed to heterosexual transmission decreased from 160 in 2009 to 123 in 2010.
- Since 2002 when the number of heterosexual cases peaked at 232, there has been a general trend downwards among this group.
- Of the 123 heterosexual cases in 2010, 52.0% (64) were from a country with a generalised HIV epidemic,

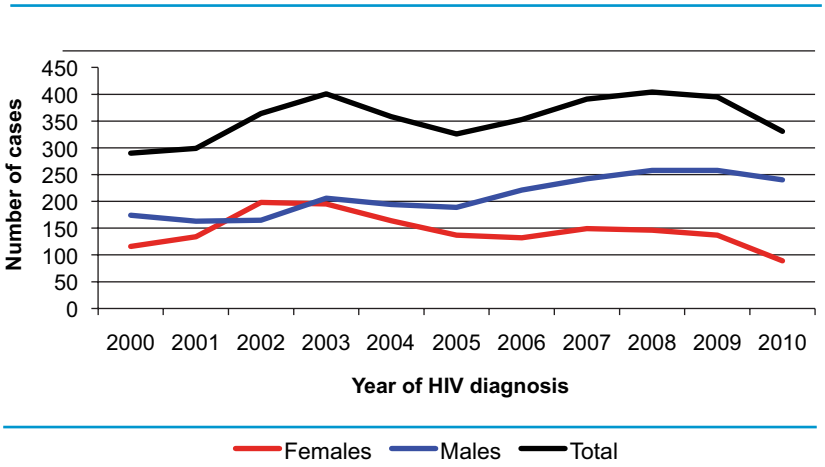


Figure 1. New HIV and AIDS diagnoses by year of diagnosis (1990 to 2010)

7.3% (9) had a sexual partner from a country with a generalised HIV epidemic and 4.0% (5) had a high risk sexual partner. No further information was available for the remaining 45 cases.
- 69 of the new heterosexual cases were female and 54 were male.
- The median age among heterosexual cases was 34.0 years (range 18-62 years), 32.0 in females (range 18-53) and 37.0 in males (range 22-62).
- 50.4% (36 female and 26 male) were born in sub-Saharan Africa and 25.2% (13 female and 18 male) were born in Ireland.
- Of the new heterosexual cases at the time of HIV diagnosis, 83 were asymptomatic, 11 had AIDS and five had acute HIV infection.

Injecting Drug Users (IDUs)
- 6.6% of new infections were among IDUs.
- The annual number of new cases among IDUs has decreased every year since 2004 (72 cases).
- 18 of the new cases were male and four were female.
- The median age among IDUs was 32.5 years (range 19-50 years).
- 36.4% (8 cases) were born in Ireland and 36.4% (8 cases) were born in Central and Eastern Europe.
- Of the new cases in IDUs at the time of HIV diagnosis, 11 were asymptomatic, two had AIDS and two had acute HIV infection.

Mother to Child Transmission (MTCT)
- There were nine new diagnoses of HIV infection in children (younger than 16 years). The probable route of transmission was mother to child transmission (MTCT) for eight of the nine cases and was unknown for one. There were a further two cases among adults where the probable route of transmission was MTCT giving a total of 10 MTCT cases in 2010. Of the ten MTCT cases, six were born in sub-Saharan Africa, two in Central Europe and two in Ireland. The mothers of the two Irish born cases were from sub-Saharan Africa.
- In addition, there were 107 babies born to HIV positive mothers in Ireland during 2010. Based on serial HIV PCR testing; 73 are not infected, 34 remain of indeterminate status (i.e. do not meet the criteria for HIV infection and are <18 months at time of test) and none are infected.

Discussion
HIV infection is of major public health importance with evidence of continuing transmission in Ireland and Europe. In 2010, a total of 331 individuals were newly diagnosed, corresponding to a crude rate of 7.8 per 100,000 population. This compares to a rate of 6.7 in the WHO European West region. In addition, there were 54 cases of AIDS and 10 deaths among AIDS cases also reported to the HPSC during 2010.

The total number of HIV diagnoses in 2010 represents a 16.2% decrease compared to 2009 and is largely due to fewer diagnoses among people infected heterosexually (from 160 in 2009 to 123 in 2010). Of the 123 new cases among heterosexuals, 64 were diagnosed in individuals originating from countries with generalised HIV epidemics compared to 94 cases in 2009.

While the number of new diagnoses among people infected heterosexually has declined, new diagnoses among MSM remain high and sex between men is now the predominant mode of transmission in Ireland. Increasing number of HIV infections among MSM has been observed in many other Western European countries and sex between men is now the predominant mode of transmission in the EU/EEA (European Union/ European Economic Area). A recent report from ECDC recommended that interventions to control HIV among MSM should be the cornerstone of HIV prevention strategies in countries in Western Europe[1].

The number of cases among IDUs has declined in recent years and in 2010 represented less than 7% of the newly diagnosed cases.

During 2010, 29 cases presented with an AIDS defining illness at the time of their HIV diagnosis. It has been estimated that 30% of individuals infected with HIV in Europe are unaware of their infection are at risk of severe complications and possibly death, as they cannot benefit from treatment.[1] In order to decrease the number of late presenters, and to ensure early diagnosis and access to treatment and counselling for all, ECDC recommended in a recent report that HIV testing and counselling should be promoted. In addition, they recommended equal access to HIV treatment and care for all population groups.

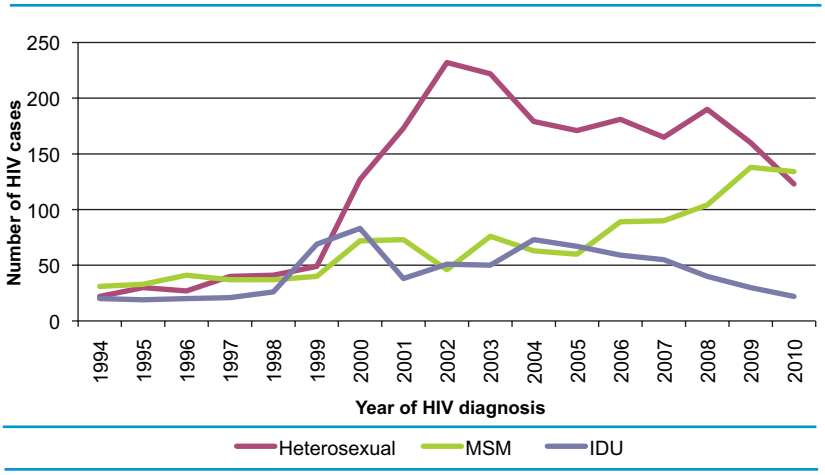


Figure 2. New HIV diagnoses in Ireland by probable route of transmission (1994 to 2010)

References:

1. European Centre for Disease Prevention and Control/WHO Regional Office for Europe. HIV/ AIDS surveillance in Europe 2009. Stockholm: European Centre for Disease Prevention and Control; 2010.

5.4 Voluntary antenatal HIV testing in Ireland: 2009 & 2010

Key Points

- 19 of 20 maternity hospitals provided data on HIV antenatal screening for 2009 and 2010
- Uptake of antenatal screening among the participating hospitals was 99.0% in 2009 and 2010
- The number of HIV positive cases diagnosed at antenatal screening was 140 in 2009 and 118 in 2010. This is a decrease from a peak of 157 in 2002.
- Between 2002 and 2010, 1,133 antenatal HIV screening tests were positive. Of the 1,133 women identified as HIV positive, 446 were not previously known to be HIV positive and were first diagnosed at antenatal screening.
- The number of newly diagnosed HIV cases (i.e. not previously known) has decreased by 81% from 112 in 2002 to 21 in 2010.

Background

A HIV infected mother can transmit the virus to her baby during pregnancy, delivery, or breastfeeding. It has been clearly shown that the risk of mother-to-child transmission (MTCT) of the virus can be dramatically reduced by treatment of the mother, management of the delivery and avoidance of breastfeeding. The combined effect of these interventions is reported in some studies to reduce the transmission risk from 15-30% to 2% or less.[1, 2, 3] However, measures to prevent transmission of HIV from mother to child can only be offered if HIV infection is diagnosed prior to delivery.

In April 1999, the Department of Health and Children (DoHC), on the advice of the National AIDS Strategy Committee (NASC), introduced a policy of voluntary antenatal HIV testing in Ireland. As part of this programme, it is recommended that antenatal screening for HIV be offered routinely to all pregnant women. Antenatal HIV testing commenced in all health boards during 1999, with the exception of the North Western Health Board where it commenced in 2000. On a recommendation from NASC, as outlined in the AIDS Strategy 2000 report,[4] a system for monitoring and evaluating the routine antenatal testing programme was established by the Health Protection Surveillance Centre (HPSC) in July 2001. The voluntary testing replaced an anonymous unlinked testing scheme.

Methods

HPSC collect aggregate data on a quarterly basis from 20 maternity hospitals. Forms are completed on paper or electronically, usually by a clinic midwife, and are then posted, faxed or emailed to HPSC. In the HSE-

Table 1. Results of the antenatal screening programme, 2002 to 2010

Parameter	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of hospitals participating	20/22	21/22	20/22	21/22	19/21	19/20	18/20	19/20	19/20
Number of live births per year (from CSO)	60,503	61,529	61,972	61,372	65,425	71,389	75,065	74,728	na
Number of women booked	51,777	45,259	40,171	44,874	52,434	60,111	66,558	68,378	70,024
Number offered test	51,777	45,259	40,171	44,874	52,434	60,052	66,558	68,026	69,615
Number tested	48,922	43,815	39,049	44,292	51,649	59,522	66,210	67,694	69,292
Uptake of HIV antenatal test (%)	94.5	96.8	97.2	98.7	98.5	99.0	99.5	99.0	99.0
Number HIV positive	157	144	103	118	113	117	123	140	118
Number new HIV positive (not previously diagnosed)	112	93	39	43	34	38	34	32	21
HIV prevalence among pregnant women (%)	0.32	0.33	0.26	0.27	0.22	0.20	0.19	0.21	0.17
HIV prevalence - East (%)	0.43	0.43	0.51	0.46	0.33	0.31	0.25	0.34	0.23
HIV prevalence - non East (%)	0.20	0.24	0.13	0.12	0.09	0.09	0.14	0.10	0.12

Northwest and HSE-Southeast, data are collated at regional level prior to sending on to HPSC.

Results
Nineteen maternity hospitals (of twenty) were able to provide data on their antenatal screening program in 2009 and 2010. No data were available from Sligo General Hospital for 2009 or 2010. Some hospitals are unable to provide data for their private patients. Table 1 describes the data collected from maternity hospitals between 2002 and 2010.

Discussion
HIV antenatal screening is vital to identify pregnant women who are HIV positive and to ensure they can avail of appropriate treatment and care, to decrease the risk of mother to child transmission and to help prevent transmission of HIV to sexual partners of pregnant women. In 2009 and 2010, the uptake of antenatal screening among the participating hospitals was 99.0%.

Between 2002 and 2010, 1,133 antenatal HIV screening tests were positive. Of the 1,133 women identified as HIV positive, 446 were not previously known to be HIV positive and were first diagnosed at antenatal screening.

The number of cases newly diagnosed through antenatal screening decreased from 112 in 2002 to 21 in 2010. Data from the national HIV case based reporting system shows that there were reports of 25 new diagnoses in pregnant women in 2010.[5]

The prevalence rate in 2010 (0.17%), is the lowest prevalence rate since the screening program began. Prevalence of HIV infection among pregnant women varies among different hospitals ranging from 0.00% to 0.36% in 2010. Throughout Europe, pockets of higher prevalence among pregnant women have been reported in major urban areas.[6]

Limitations of the current surveillance system
Data are incomplete as one hospital was unable to provide data and other hospitals were unable to provide data on private patients. In addition, it is not possible to validate the data provided and currently there is no standardised systematic way of collecting the data at local or regional level.

Some of the maternity hospitals have difficulty accurately completing and returning data, in particular data on the number of women booked, number offered HIV screening and the number who accept. Particularly in hospitals without a computerised information system, the process can be tedious and time consuming and some hospitals can only provide estimates or proxy measures (see technical notes).

Differences between the number of women reported through the HIV case based reporting system and through the HIV antenatal surveillance system are not unexpected and highlight the fact that they are stand alone surveillance systems.

Every year, a number of women refuse the antenatal HIV screening test. The current surveillance system does not capture information on the reasons for declining screening or on the profile of women who refuse screening.

References:

1. European Collaborative Study. Mother-to-child transmission of HIV infection in the era of highly active antiretroviral therapy. CID 2005: 40
2. Sharland M, Gibb DM, Tudor-Williams G. Advances in the prevention and treatment of paediatric HIV infection in the United Kingdom. Sex Transm Infect 2003; 79 (1)
3. Duong T, Ades AE, Gibb DM, Tookey PA, Masters J. Vertical transmission rates for HIV in the British Isles: estimates based on surveillance data. BMJ 1999; 319
4. Department of Health and Children. AIDS Strategy 2000, Report of the National AIDS Strategy Committee (NASC).
5. HIV & AIDS in Ireland 2010. HPSC. Available at http://www.hpsc.ie/hpsc/A-Z/HepatitisHIVAIDSandSTIs/HIVandAIDS/SurveillanceReports/File,12651,en.pdf
6. Giraudon I, Forde J, Maguire H, Permalloo N. Antenatal screening and prevalence of infection: Surveillance in London, 2000-2007. Eurosurveillance 2009; 14 (9)

Technical notes:
1. Uptake was calculated as the number of women tested divided by the number of women booked.
2. Prevalence of HIV infection was calculated as the number of women testing positive divided by the number of women tested.
3. For one hospital. the number of rubella screens was used as a proxy for the number of women booked for antenatal care and the number of women tested for Rubella and HIV are not exclusively antenatal patients.
4. For one hospital, estimates were provided for 2008 and 2009.

5.5 Sexually Transmitted Infections (STIs), 2009

Summary

Total number of STI notifications in 2009: 10,834

Three most common STIs reported in 2009:

1. *Chlamydia trachomatis* infection: 5,781 cases (136.3/100,000)
2. Ano-genital warts: 2,283 cases (53.8/100,000)
3. Non-specific urethritis: 1,209 cases (28.5/100,000)

Clinicians and laboratories notify their respective Medical Officer of Health probable and confirmed cases of sexually transmitted infections (STIs). These notifications are then reported to HPSC on a quarterly basis. STI notification data should be interpreted with caution: quarterly and annual data are not reported in a complete or timely manner; data are reported in an aggregate format which makes detailed analysis of the epidemiological trends difficult. This report focuses on STIs notified to HPSC in 2009. Regarding notification data for ano-genital warts, it is important to note that additional efforts were made improve data completeness of the 2009 notification data. These data will be used as baseline data in assessing the effectiveness of the HPV vaccination programme introduced in 2010.

In 2009, 10,834 STIs were reported in Ireland, a decrease of 4.1% compared to 2008 when 11,294 STIs were reported (table 1). Between 2008 and 2009, notifications of syphilis, herpes simplex, trichomoniasis and ano-genital warts increased, while there was a reduction in notifications of infectious hepatitis B, non-specific urethritis, *C. trachomatis* infection and gonorrhoea (table 1). Two infectious diseases accounted for almost three-quarters (74.5%) of all STI notifications in 2009: ano-genital warts and *Chlamydia trachomatis*.

Males accounted for 51.7% of all notifications and females for 47.1% (table 2). The number of notifications was greater among men than women for non-specific urethritis (94.4%), gonorrhoea (78.6%), syphilis (71.0%) and hepatitis B (66.7%). However, trichomoniasis, herpes simplex and *C. trachomatis* infection were reported more frequently among women than men (96.2%, 62.9% and 58.6% respectively).

Almost two-thirds (61.4%) of notifications were among those aged 20 to 29 years (table 2). This age group accounted for the majority of notifications for each STI, except syphilis and trichomoniasis. The proportion of notifications among those aged less than 20 years increased to 12.7% of all STI notifications compared

Table 1. Notifications of sexually transmitted infections in Ireland, 2000 -2009

Sexually Transmitted Infection	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Ano-genital warts	3735	3993	3932	3981	4174	3456	3494	3283	2134	2283
Chancroid	16	1	1	0	1	0	1	1	0	0
Chlamydia trachomatis infection	1343	1649	1922	2258	2803	3353	3144	5023	6290	5781
Gonorrhoea	290	349	214	186	270	342	431	417	444	434
Granuloma inguinale	0	0	0	0	1	0	0	0	0	0
Herpes simplex (genital)	269	331	358	375	411	441	455	988	394	469
Infectious hepaitis B	15	39	57	112	85	80	20	25	14	9
Lymphogranuloma venereum	0	0	1	0	0	1	0	2	0	0
Non-specific urethritis	1726	1634	2025	2332	2746	2106	2161	1870	1636	1209
Syphilis	46	279	303	235	144	282	134	212	312	570
Trichomoniasis	78	64	73	59	60	83	52	94	70	79
Total	**7518**	**8339**	**8886**	**9538**	**10695**	**10144**	**9892**	**11915**	**11294**	**10834**

with 10.3% in 2008 and 10.0% in 2007. Most notably, the proportion of notifications of gonorrhoea among those less than 20 years old more than doubled to 16.1% in 2009 (table 2) compared with 7.0% in 2008 and 6.7% in 2007.

During 2009, the crude incidence rate (CIR) for all STI notifications was 255.5 per 100,000 population. The rates in the HSE East (389.9/100,000), South East (326.1/100,000) and North West (260.2/100,000) were all greater than the national rate (table 3). However, this is likely to be a reflection of the areas in which STIs services are located as well as differences in reporting practices by clinics, clinicians and laboratories from one area to another.

Summary Statistics on Selected STIs, 2009

Ano-genital warts

The small increase (+7.0%, table 1) in notifications of ano-genital warts in 2009 (53.8/100,000) is most likely attributable to the additional efforts made to identify cases. However, since this is a clinical diagnosis and notifications are outstanding for two large STI clinics, the figures presented here are probably an under estimation of the true number of cases. There were slightly more notifications among men (n=1,236, 54.1%) than women (n=1,029, 45.1%), and almost three-quarters of notifications (n=1,685, 73.8%, table 2) were among people aged less than 30 years.

Chlamydia trachomatis infection (genital)

Chlamydia was the most commonly reported STI in Ireland in 2009, with a CIR of 136.3 per 100,000 population. It was reported more frequently among women (n=3,388, 58.6%) and those aged 20-29 years (n=3,869, 66.9%; table 2).

Gonorrhoea

There was a small decrease (-2.3%, table 1) in the number of notifications of gonorrhoea in 2009 (10.2/100,000). However, the proportion of notifications of gonorrhoea among those aged less than 20 years more than doubled to 16.1% in 2009 (table 2). There were also slightly more notifications among women in 2009 (n=88, 20.3%, table 2) compared with 2008 (16.4%). Just over seventy-one percent (n=309, 71.2%, table 2), of notifications were among people aged less than 30 years.

Hepatitis B

The data presented here for hepatitis B reflects only those cases notified through STI services. Only 9 cases, from two HSE areas, were reported in total. This is unlikely to represent the true incidence of sexually-acquired hepatitis B in the population. Of the nine cases reported, six were in men and 5 were aged 20-29 years (table 2). Further information on the epidemiology can be found in the hepatitis B chapter of this report.

Herpes simplex (genital)

The increase in notifications of herpes simplex (19.0%, table 1) resulted in a higher crude incidence rate of 11.1 per 100,000 population, compared with 9.3/100,000 in 2008. There were more cases among women (n=295, 62.9%) and almost half of cases (n=232, 49.5%) were in the age group 20-29 years (table 2).

Non-specific urethritis

The crude incidence rate of non-specific urethritis (NSU) dropped to 28.5 per 100,000 population compared to 38.6/100,000 in 2008. This decrease is probably explained by the outstanding data from two large STI clinics, as this is a clinical diagnosis. While the case

Table 2. Notifications of sexually transmitted infections by gender and age group, 2009

Sexually Transmitted Infection	Male	Female	Gender Unknown	0-19 yrs	20-29 yrs	30-39 yrs	40+ yrs	Age Unknown	Total
Ano-genital warts	1236	1029	18	287	1398	410	168	20	2283
Chancroid	0	0	0	0	0	0	0	0	0
Chlamydia trachomatis infection	2303	3388	90	862	3869	845	186	19	5781
Gonorrhoea	341	88	5	70	239	81	44	0	434
Granuloma inguinale	0	0	0	0	0	0	0	0	0
Herpes simplex (genital)	171	295	3	56	232	110	70	1	469
Infectious Hepatitis B	6	3	0	1	5	0	3	0	9
Lymphogranuloma venereum	0	0	0	0	0	0	0	0	0
Non-specific urethritis	1142	65	2	87	735	269	115	3	1209
Syphilis	405	156	9	9	158	218	184	1	570
Trichomoniasis	1	76	2	8	20	34	17	0	79
Total	**5605**	**5100**	**129**	**1380**	**6656**	**1967**	**787**	**44**	**10834**
% of Total STIs	***51.7***	***47.1***	***1.2***	***12.7***	***61.4***	***18.2***	***7.3***	***0.4***	**-**

definition for NSU specifies a "clinically compatible case in a male", NSU continues to be reported among women (n=65, 5.4%, table 2).

Syphilis

Case-based information on the epidemiology of syphilis can be found in the syphilis chapter of this report.

Further information on STIs in Ireland in 2009, including trends in STI notifications from 1995, is available from http://www.hpsc.ie/hpsc/A-Z/HepatitisHIVAIDSandSTIs/SexuallyTransmittedInfections/Publications/STIAnnualandQuarterlyReports/2009/.

Note: Crude incidence rates calculated for 2008 and 2009 based on Census 2006 denominator data.

Table 3. Notifications and crude incidence rate of sexually transmitted infections by HSE area, 2009

Sexually Transmitted Infection	East	Midlands	Mid West	North East	North West	South East	South	West	Ireland
Ano-genital warts	847	37	0	4	322	563	506	4	2283
Chancroid	0	0	0	0	0	0	0	0	0
Chlamydia thrachomatis infection	3260	163	577	178	143	691	344	425	5781
Gonorrhoea	235	8	42	18	10	69	27	25	434
Granuloma inguinale	0	0	0	0	0	0	0	0	0
Herpes simplex (genital)	323	3	0	0	10	47	52	34	469
Infectious Hepatitis B	0	0	0	0	3	0	6	0	9
Lymphogranuloma venereum	0	0	0	0	0	0	0	0	0
Non-specific urethritis	735	0	0	0	125	83	266	0	1209
Syphilis	409	10	36	5	3	36	16	55	570
Trichomoniasis	38	3	5	11	1	14	7	0	79
Total	**5847**	**224**	**660**	**216**	**617**	**1503**	**1224**	**543**	**10834**
Crude incidence rate per 100,000 population	**389.9**	**89.0**	**182.8**	**54.8**	**260.2**	**326.1**	**197.1**	**131.1**	**255.5**

5.6 Syphilis, 2009

Summary

Number of case-based syphilis reports, 2009: 283
Number of early syphilis cases, 2009: 165
Crude incidence rate of early syphilis, 2009: 3.9 per 100,000

Case-based syphilis records are collated nationally since 2000. Case based surveillance is a subset of aggregate syphilis notifications. 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 case-based reports received on syphilis which are held on a national database at HPSC. The syphilis figures presented 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 (570 aggregate syphilis cases reported in 2009; see STI chapter for more details).

The first section of this report focuses on 2009 data and the second part on the main syphilis trends between 2000 and 2009.

Syphilis case reports, 2009
In 2009, case-based reports were received on 283 syphilis notifications, an increase of 27.5% compared with 2008 (n=222). One-hundred-and-sixty-five (3.9/100,000 population) cases were diagnosed with early, infectious syphilis (i.e. primary, secondary and early latent stages) and 98 cases were latent, late latent or tertiary, syphilis. The stage of infection was not recorded for 20 cases.

The 165 cases of early syphilis were analysed in more detail since the disease is infectious at this stage and therefore has the greatest public health implications. Cases ranged in age from 18 to 64 years of age (median 33 years). The majority of cases were diagnosed in the HSE-E (91.5%, n=151/165) and the majority of the cases were also resident in HSE-E (80.6%, n=133/165). Ireland was recorded as the country of birth for 72.7% of early cases (n=120/165), while 82.4% of early cases (n=136/165) were acquired in Ireland.

Eighty-three percent of early syphilis cases (n=137/165) were men who had sex with men (MSM). These cases ranged in age between 19 and 64 years (median 34 years), with the 25-29 years age group having the highest number of cases (n=27). Among MSM diagnosed with early syphilis, almost two thirds (62.7%) were primary syphilis or secondary while the remainder (n=51) were early latent.

Just over fifty percent (51.1%, n=70/137) of early syphilis MSM cases had between 1 and 9 sexual

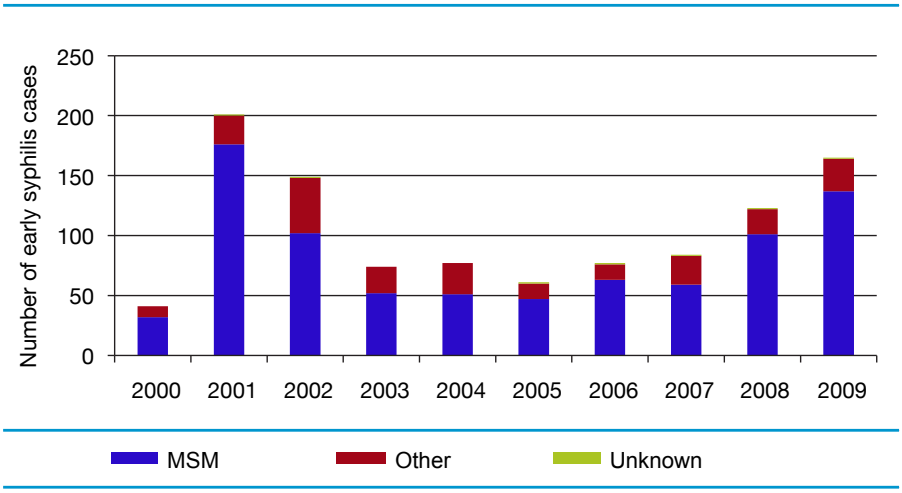


Figure 1. Number of early syphilis cases diagnosed in Ireland by sexual orientation, 2000-2009, based on completed case-based surveillance forms

contacts in the 12 months prior to diagnosis; 18.2% (n=25) had 10-19 sexual contacts; 19.7% (n=27) had 20 or more sexual contacts, while the number of contacts was not recorded for 10.9% (n=15) of cases. Oral sex was reported as the mode of transmission in 42.3% of early syphilis MSM cases (n=58).

Syphilis case reporting trends, 2000-2009

Between 2000 and 2009, a total of 2,282 case-based reports were received on syphilis. Most cases were reported among males (73.8%; n=1,684) while females accounted for 25.5% of cases (n=581); gender was not recorded for 17 cases (0.7%). 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: 450 and 462 cases respectively. Just over fifty percent (50.7%, n=1,158) were classified as early, infectious syphilis. The other stages reported were: congenital (n=4), late (n=438) and unknown (n=682).

Surveillance forms were completed for 70.1% (n=1,599/2,282) of individual case-based reports and 1,060 (66.3%) of these 1,599 cases were reported as early syphilis. Where surveillance forms were completed (n=1,599), the majority of cases were male (80.3%; n=1,284). Most male cases occurred in the 30-34 years age group (20.9%, n=268/1,284) while most of the cases among females were in the 25-29 years age group (30.1%, n=92/306).

Self-referral was the most frequent reason for attending (30.9%, n=494/1,599), followed by GP referral (13.0%, n=208/1,599) and contact referral (10.9%, n=174/1,599). While self-referral was also the most frequent reason for attending among MSM cases (39.4%, n=390/989), the next most frequent reason was contact referral (11.0%, n=109/989), followed by GP referral (10.2%, n=101/989). Antenatal referrals accounted for 25.4% (n=148/582) of all other cases. The other most frequently reported reasons for attending among this group were GP referral (17.5%, n=107/610) and self referral (17.0%, n=104/610).

Early syphilis is common among MSM (figure 1, table 1). Between 2000 and 2009, 989 cases of syphilis were reported among MSM, of these 82.9% (n=820) were staged as early syphilis cases. Among MSM, almost 13% (n=103/820) of early syphilis cases were re-infections. In contrast, only 3.3% (n=8/240) of all other cases were reported as re-infections.

A significant proportion of early syphilis cases were found to be co-infected with HIV, particularly among MSM (20.6% compared with 8.3% among all other cases). There was no difference between these groups in relation to concurrent STIs, which were relatively common among all early syphilis cases, with 18.7% of cases (n=198/1,060) having an STI other than HIV. A history of STIs was more frequent among early syphilis MSM cases (40.6%, n=333/820) than among all other early syphilis cases (18.8%, n=45/240).

Table 1. A breakdown of early syphilis cases by sexual orientation in Ireland, 2000-2009, based on completed surveillance forms.

Diagnosis	Heterosexual			MSM	Unknown	Total
	Male	Female*	Unknown	Male**	Male	
Primary	48	21	2	305	6	382
Secondary	37	34	1	289	2	363
Early latent	37	43	0	215	5	300
Other	0	2	0	11	2	15
Total	**122**	**100**	**3**	**820**	**15**	**1060**

*Includes one bisexual female
**Includes 69 male bisexual cases

06

Other infections

6.1 Viral Encephalitis

Summary

Number of cases, 2010: 22
Number of cases, 2009 5
Number of cases, 2008: 5
Crude incidence rate, 2010: 0.5/100,000

Encephalitis due to viruses not otherwise specified in the Irish Infectious Disease (Amendment) (No. 3) Regulations 2003 (SI No. 707 of 203) are notifiable under the disease viral encephalitis. Clinicians and laboratories (the latter since 2004) are legally obliged to notify all cases of viral encephalitis.

In 2010, 22 cases of viral encephalitis were notified in Ireland (0.5/100.000 population). This was the highest annual number of cases to be notified since 2006 when 16 cases (0.4/100,000) were reported (figure 1). Compared with 2008 or 2009 (5 cases each, 0.1/100,000) there was over a four-fold increase in viral encephalitis notifications in 2010.

Varicella zoster virus and herpes simplex virus tend to be the two main causative agents of viral encephalitis notifications in Ireland. Notifications due to both of these pathogens increased in 2010, 11 cases of varicella zoster virus and 10 of herpes simplex virus were notified, accounting for 50% and 45% of the cases, respectively. Of the 10 herpes simplex virus (HSV) encephalitis cases notified, seven were reported as HSV type 1, for the remaining three cases HSV type was not reported.

In 2010, all eight HSE areas notified cases of viral encephalitis (range 1-5 cases per area), indicating that cases were geographically distributed. More viral encephalitis cases occurred in females (n=13) than males (n=9), giving a male to female ratio of 1.0:1.4. Cases ranged in age from 1 week to 86 years. The majority of the notifications occurred in the elderly aged 65 years and over (41%; n=9) followed by the 45-64 years age group (27%; n=6) (table 1). However, the highest age specific incidence rate was in infants < 1 year of age (3.3 cases per 100,000 population) where two cases due to herpes simplex virus were notified.

No viral encephalitis deaths relating to 2010 notifications were reported via the notification system. However, since this system does not have a process in place to actively follow up on the outcome of all viral encephalitis notifications, the true mortality rate due

Table 1. Number, age-specific incidence rates and proportion of viral encephalitis notifications by age group, 2010

Age group (years)	Number by causative pathogen				ASIR	Proportion (%)
	Herpes simplex	Varicella zoster	Unknown	Total		
<1	2	0	0	**2**	3.3	9.1
1-4	0	0	0	**0**	-	-
5-14	0	1	0	**1**	0.2	4.5
15-24	0	0	0	**0**	-	-
25-44	1	3	0	**4**	0.3	18.2
45-64	4	1	1	**6**	0.6	27.3
65+	3	6	0	**9**	1.9	40.9
All ages	**10**	**11**	**1**	**22**	0.5	100

ASIR, age specific incidence rate per 100,000 population of total cases

to this disease cannot be determined from notification data.

In summary there was an increase in viral encephalitis notifications in Ireland in 2010. Improved and more consistent reporting by the laboratories are considered to be the main contributory factors for this increase.

The figures presented in this report are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 30th August 2010. These figures may differ from those published previously due to ongoing updating of notification data in CIDR.

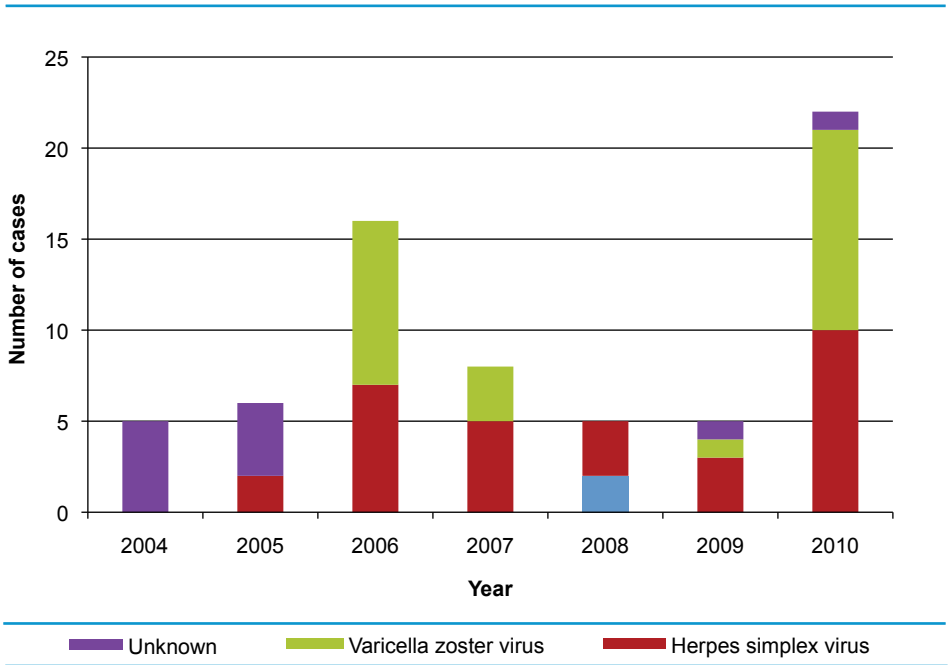


Figure 1. Annual number of viral encephalitis notifications by causative pathogen, 2004-2010

6.2 Viral Meningitis

Summary

Number of cases, 2010: 169
Number of cases, 2009 142
Number of cases, 2008: 97
Crude incidence rate, 2010: 4.0/100,000

Meningitis due to viruses not otherwise specified in the Irish Infectious Disease (Amendment) (No. 3) Regulations 2003 (SI No. 707 of 203) are notifiable under the disease viral meningitis. Clinicians and laboratories (the latter since 2004) are legally obliged to notify all cases of viral meningitis.

In 2010, 169 cases of viral meningitis were notified in Ireland (4.0/100,000). This was a 16% increase compared with 2009 when 142 cases were notified (3.3/100,000). As in previous years there was a seasonal peak in 2010 with notifications at their highest during July and August. However, the distinct seasonal peak seen particularly in 2006 and also in 2008 and 2009 was not as pronounced in 2010; instead the summer upsurge of cases was more prolonged, spanning a four-month period (figure 1).

Of the 169 cases notified, 149 were classified as confirmed (88.2%), eight as probable (4.7%), 11 as possible (6.5%) and for one the case classification was not reported (0.6%). A similar number of cases occurred in males (n=82) and as in females (n=87), giving a male to female ratio of 1.0:1.06. Cases ranged in age from 2 weeks to 81 years with both an average and a median age of 16 years. Unlike viral encephalitis where the highest proportion of cases occurred in those aged 45 years of age and older (see previous chapter), the majority of viral meningitis cases occurred in children and young adults. Over two-thirds (67%) of the cases occurred in those 25 years of age and younger (table 1). The highest age specific incidence rate was by far in infants <1 year of age at 86.8 per 100,000 total population. For all other age groups the age specific incidence rates ranged between 0.2 and 5.2 per 100,000 population (table 1).

In 2010, enterovirus was the most common pathogen associated with viral meningitis, accounting for 64% (n=108) of the notifications. Herpes simplex virus (HSV) was the causative pathogen for 11% of the notifications (n=19), with HSV type 6 accounting for 12 of these 19 notifications (table 1).

In 2010, the incidence of viral meningitis in HSE areas ranged between 1.2 per 100,000 population in HSE-M and 9.7 per 100,000 population in HSE-NW. Incidence in HSE-NW (9.7/100,000; 95% CI 5.7-13.6/100,000) was significantly higher than the national rate (4.0/100,000;

Table 1. Number, age-specific incidence rates and proportion of viral meningitis notifications by age group, 2010

Age group (years)	Number by causative pathogen						ASIR	Proportion (%)
	Enterovirus	Herpes simplex	Parechiovirus	Varicella zoster	Unknown	**Total**		
<1	39	9	1	0	4	**53**	86.8	31.4
1-4	3	3	0	0	2	**8**	3.3	4.7
5-14	15	1	0	1	2	**19**	3.4	11.2
15-24	15	2	0	6	10	**33**	5.2	19.5
25-44	35	2	0	4	10	**51**	3.8	30.2
45-64	1	1	0	1	1	**4**	0.4	2.4
65+	0	1	0	0	0	**1**	0.2	0.6
All ages	**108**	**19**	**1**	**12**	**29**	**169**	**4.0**	**100**
% of total cases	63.9	11.2	0.6	7.1	17.2	100		

ASIR, age specific incidence rate per 100,000 population of total cases

95% CI 3.4-4.6/100,000), while in HSE-M (1.2/100,000; 95% CI -0.16-2.5/100,000) it was significantly lower than the national rate (figure 2). For all other HSE areas the incidence rate was not considered statistically different from the national rate.

Two viral meningitis deaths relating to 2010 notifications were reported through the notification system. One was in an adult with HSV and the other in an infant with enterovirus. However, information is not available as to whether viral meningitis was the primary cause of death or not in these two cases.

The figures presented in this report are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 30th August 2010. These figures may differ from those published previously due to ongoing updating of notification data in CIDR.

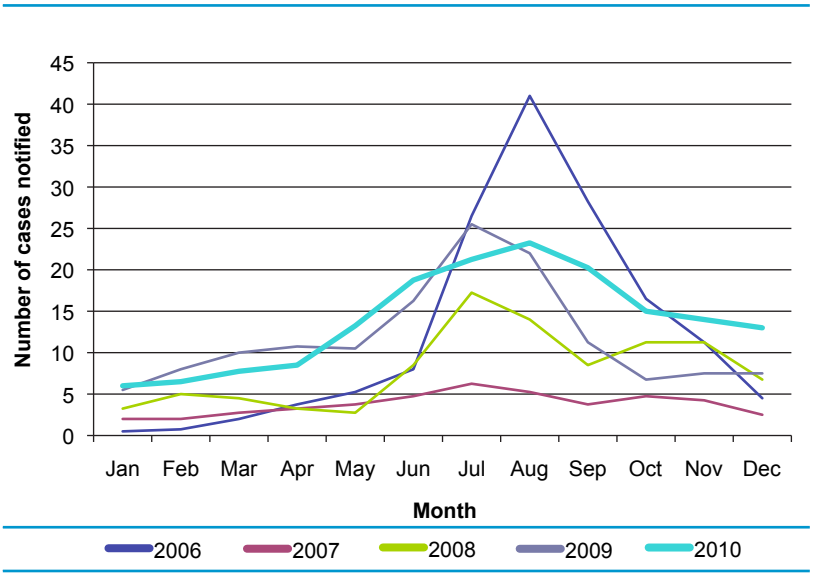


Figure 1. Three-month moving average of the number of viral meningitis notifications, 2006-2010

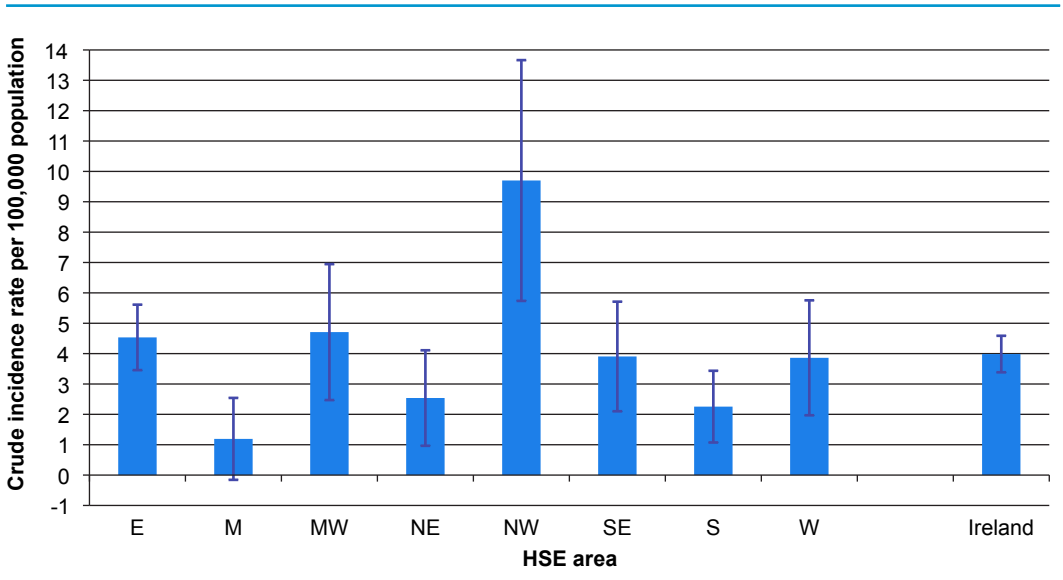


Figure 2. Crude incidence rates per 100,000 population with 95% confidence intervals for viral meningitis notifications by HSE area, 2010

6.3 Creutzfeldt-Jakob disease

Summary

Number of cases, 2010: 3
Number of cases, 2009: 5

Three cases of Creutzfeldt-Jakob disease (CJD) were notified in 2010 compared to five cases in 2009. All cases in 2010 were aged greater than 50 years and were sporadic CJD cases. Two cases were male and one was female.

In total, 51 cases of CJD were notified since CJD was first specified as a notifiable disease in December 1996. Figure 1 shows the 51 CJD notifications by age group. The majority (n=43, 84%) of the cases were aged greater than 54 years. Of the 51 cases, 29 were male and 22 were female. Forty-eight 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 2010. 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. Annual figures published here are based on the year the notification was entered on the Computerised Infectious Disease Reporting (CIDR) system and consequently may differ from annual figures published by the Irish National Creutzfeldt-Jakob Disease Surveillance Unit.

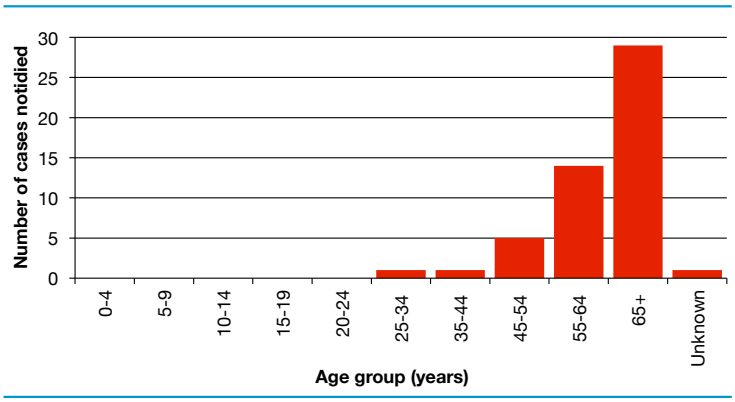


Figure 1. Number of CJD notifications (n=51) from December 1996 to 2010 by age group

07

Infectious Disease Outbreaks

7. Outbreaks

Summary

Number of outbreaks: 369
Number of IID outbreaks: 286
Number of non-IID outbreaks: 83

During 2010, 369 outbreaks of infectious diseases were reported with 5,222 associated cases of illness, including 1,054 (20.2%) cases hospitalised and eight deaths. Regional variation in outbreaks was observed between HSE areas with the highest rate observed in HSE-NW at 16.9 per 100,000 population while the lowest rate was observed in HSE-NE at 4.3 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 69.1% (n= 255) of all outbreaks notified during 2010. The remaining outbreaks (30.9%, n= 114) 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 2010 (81.8%, n=2,302). Most of these outbreaks were due to norovirus, AIG and measles.

Private houses were the most frequently reported outbreak location in 2010, accounting for 24.7% (n=91) of all outbreaks while residential institutions were the second most common outbreak location, accounting for 20.9% (n=77) of all outbreaks. The highest numbers ill were reported from outbreaks in hospitals (n=2,133), residential institutions (n=1,210) and community hospital/long stay units (n=857). Table 2 details the number of IID and non-IID outbreaks and numbers ill by outbreak location for outbreaks reported during 2010.

Infectious intestinal disease (IID) outbreaks:
IID outbreaks accounted for 77.5% (n=286) of all outbreaks reported during 2010. This was a 7% increase compared to the number of IID outbreaks reported during 2009 (n=266).Table 3 details the regional distribution of outbreaks of infectious intestinal disease (IID)

Norovirus/ suspect viral outbreaks, accounted for 67.5% of all IID outbreaks reported in 2010. Figure 1 compares norovirus/suspect viral outbreaks with non-norovirus IID outbreaks by year from 2001 to 2010. Norovirus was also responsible for the 10 largest outbreaks during 2010, all of which occurred in hospitals. Numbers ill ranged from 461 cases to 75 cases.

Table 1. Number of outbreaks by HSE area, 2010

HSE area	Number of outbreaks	Outbreak rate per 100,000	Number ill	Number hospitalised	Number of deaths	Number of IID outbreaks	Number of Non-IID outbreaks
HSE-E	106	7.1	2,274	580	4	69	37
HSE-M	27	10.7	269	10	0	23	4
HSE-MW	25	6.9	216	131	0	22	3
HSE-NE	17	4.3	87	17	1	17	0
HSE-NW	40	16.9	404	81	0	36	4
HSE-SE	37	8.0	673	6	0	34	3
HSE-S	68	10.9	690	50	2	45	23
HSE-W	46	11.1	568	158	1	37	9
HPSC	3	-	41	21	0	3	0
Total	**369**	**8.7**	**5,222**	**1,054**	**8**	**286**	**83**

* Including 70 outbreaks reported as person to person and airborne transmission

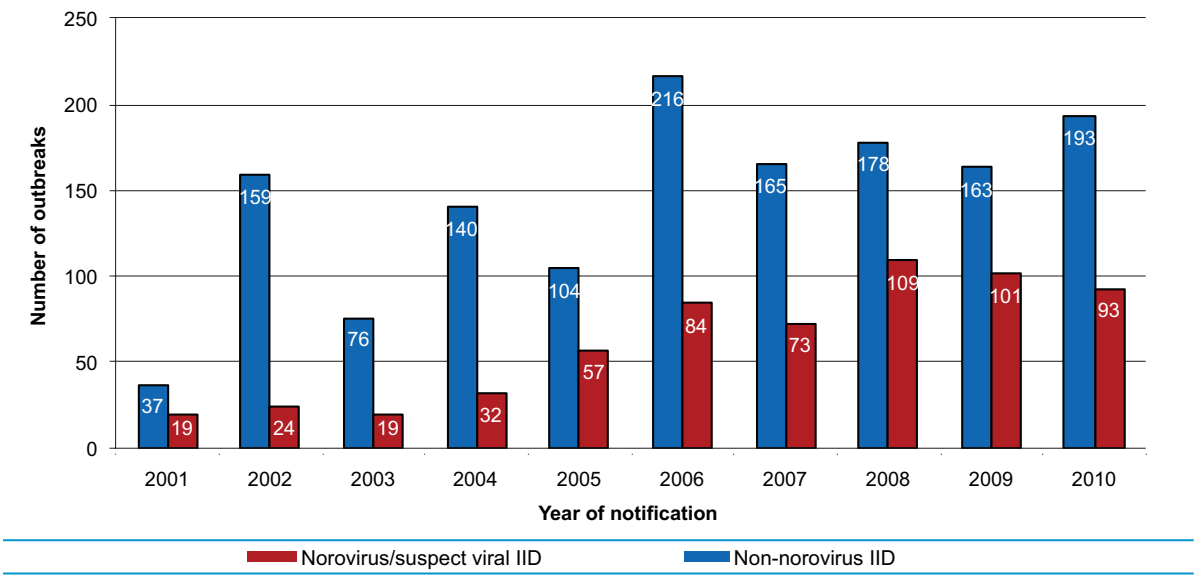


Figure 1. Number of norovirus/suspect viral outbreaks and number of non-norovirus IID outbreaks‡ by year, 2001-2010

Table 2. Number of IID and non-IID outbreaks and number ill by outbreak location, 2010

Outbreak location	IID		Non-IID		Total outbreaks	
	Number of outbreaks	Number ill	Number of outbreaks	Number ill	Number of outbreaks	Number ill
Private house	62	152	29	83	91	235
Residential institution	73	1160	4	50	77	1210
Hospital	55	2085	6	48	61	2133
Comm. Hosp/Long-stay unit	53	857	0	0	53	857
School	0	0	17	183	17	183
Extended family	11	44	5	27	16	71
Other	9	76	3	20	12	96
Creche	4	44	7	48	11	92
Community outbreak	4	46	7	97	11	143
Hotel	6	123	1	2	7	125
Travel related	5	11	1	3	6	14
Restaurant / Cafe	3	45	0	0	3	45
University/College	0	0	1	3	1	3
Workplace	0	0	1	2	1	2
Coach tour	1	11	0	0	1	11
Not Specified	0	0	1	2	1	2
Total	**286**	**4654**	**83**	**568**	**369**	**5222**

Table 3. IID outbreak summary by HSE area 2010

HSE area	Number of outbreaks	Outbreak rate per 100,000	Number ill	Number hospitalised	Number of deaths
HSE-E	69	4.6	2,096	551	4
HSE-M	23	9.1	261	8	0
HSE-MW	22	6.1	205	129	0
HSE-NE	17	4.3	87	17	1
HSE-NW	36	15.2	329	78	0
HSE-SE	34	7.4	618	6	0
HSE-S	45	7.2	530	21	2
HSE-W	37	8.9	487	146	1
HPSC	3	-	41	21	0
Total	**286**	**6.7**	**4,654**	**977**	**8**

‡Includes all norovirus outbreaks and AIG outbreaks where organism was suspected norovirus, suspected viral or not specified

After norovirus (n=130), the next most commonly reported IID outbreaks during 2010 were acute infectious gastroenteritis (n=74), EHEC (n=48), salmonellosis (n=16) and cryptosporidiosis (n=8). The number of general and family outbreaks of IID and numbers ill, are outlined in Table 4.

The most frequently reported locations for IID outbreaks were residential institutions (n=73), private houses (n=62) and hospitals (n=55). The most commonly reported outbreaks in residential institutions were of norovirus (n=43) and AIG (n=30). In private homes the most commonly reported outbreaks were of Enterohaemorrhagic *E. coli* (n=40), salmonellosis (n=7) and cryptosporidiosis (n=6). In hospitals the most commonly reported outbreaks were norovirus (n=46) and AIG (n=9).

Person-to-person (P-P) spread[†] was the most frequently reported mode of transmission implicated in IID outbreaks during 2010 (80.4%, n=230).

The number of IID outbreaks peaked during the first three months of 2010. This peak is due to high numbers of norovirus outbreaks, with 40 norovirus outbreaks reported during January, 39 during February and 24 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 2010.

Non-IID outbreaks:
During 2010, 83 outbreaks of non-IID diseases were reported, representing 22.5% of all outbreaks notified nationally. The most common non-IID outbreak disease was measles accounting for 48.2% (n=40) of all non-IID outbreaks reported. After mumps, the next most commonly reported non-IID outbreaks during 2010 were tuberculosis (n=7) and chicken pox/suspected chicken pox (n=6). Table 5 details the regional distribution of non-IID outbreaks while the number of general and family outbreaks of non-IID disease and numbers ill are outlined in Table 6.

The number of non-IID outbreaks also peaked during the first three months of 2010. This peak was due to high numbers of measles outbreaks, with 13 measles outbreaks reported during January, seven during February and 10 during March (figure 2).

The most frequently reported locations for non-IID outbreaks were private houses (n=29), schools (n=17), crèches (n=7) and community settings (n=6), as shown in table 2. Non-IID outbreaks in these locations were most frequently caused by measles.
Person-to-person (P-P) spread[§] was the most frequently reported mode of transmission implicated in non-IID outbreaks during 2010 (86.7%, n=72).

Table 4. Number of general and family IID outbreaks by disease, 2010

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	7	26	67	846	**74**	**872**
Campylobacteriosis	1	15	1	5	**2**	**20**
Cryptosporidiosis	8	15	0	0	**8**	**15**
Enterohaemorrhagic *E. coli*	45	97	3	10	**48**	**107**
Giardiasis	1	2	0	0	**1**	**2**
Hepatitis A (acute)	1	3	2	13	**3**	**16**
Noroviral infection	1	36	129	3484	**130**	**3520**
Salmonellosis	11	28	5	59	**16**	**87**
Shigellosis	2	7	1	6	**3**	**13**
Typhoid	1	2	0	0	**1**	**2**
Total	**78**	**231**	**208**	**4423**	**286**	**4654**

Table 5. Non-IID outbreak summary by HSE area, 2010)

HSE area	Number of outbreaks	Outbreak rate per 100,000	Number ill	Number hospitalised	Number of deaths
HSE-E	37	2.5	178	29	0
HSE-M	4	1.6	8	2	0
HSE-MW	3	0.8	11	2	0
HSE-NE	0	0.0	0	0	0
HSE-NW	4	1.7	75	3	0
HSE-SE	3	0.7	55	0	0
HSE-S	23	3.7	160	29	0
HSE-W	9	2.2	81	12	0
Total	**83**	**2.0**	**568**	**77**	**0**

[†]Including 46 IID outbreaks reported as person to person and airborne transmission
[§] Including 24 non-IID outbreaks reported as person to person and airborne transmission

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 6. Number of family and general non–IID outbreaks by disease, 2010

Outbreak disease/pathogen	Family outbreak		General outbreak		Total Non-IID outbreaks	
	Number outbreaks	Number ill	Number outbreaks	Number ill	Number outbreaks	Number ill
Measles	24	73	16	76	**40**	**149**
Tuberculosis	2	17	5	24	**7**	**41**
Varicella /suspected varicella	1	2	5	51	**6**	**53**
Mumps	3	11	2	6	**5**	**17**
Pertussis	3	7	1	65	**4**	**72**
Influenza-like illness	0	0	4	74	**4**	**74**
Influenza	0	0	3	63	**3**	**63**
Scabies /suspected scabies	0	0	3	55	**3**	**55**
Hepatitis B	1	2	1	2	**2**	**4**
MRSA	0	0	2	10	**2**	**10**
Legionellosis	0	0	1	2	**1**	**2**
Malaria	1	3	0	0	**1**	**3**
Meningococcal disease	1	2	0	0	**1**	**2**
Impetigo	0	0	1	9	**1**	**9**
Respiratory Illness	0	0	1	5	**1**	**5**
Hand, foot & mouth disease	0	0	1	6	**1**	**6**
Parvovirus B19	0	0	1	3	**1**	**3**
Total	**36**	**117**	**47**	**451**	**83**	**568**

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%

At 24 months (based on available data) uptake of:
D_3, T_3, P_3, Hib_3 and $Polio_3$ was 94%
$HepB_3$ (Quarters 3 and 4 data only) was 94%
MMR_1 was 90%
PCV_3 (Quarters 3 and 4 data only) was 88%
$MenC_3$ was 86%
Hib_b was 85%

Compared to previous quarters, there was a large decline in $MenC_3$ and a decline in Hib_b uptake at 24 months in Quarters 3 and 4 2010. This decline coincided with the introduction of the new childhood immunisation schedule. Under the new immunisation schedule there is a change in timing of the MenC and Hib_b vaccines (table 1). A collaborative study was carried out by the HSE (HSE Areas, NIO and HPSC) to identify reasons for the decline in uptake so that targeted remedial actions could be undertaken. A key finding of this study was that most parents did not know their children were incompletely vaccinated and were unaware of the need for their child to visit the GP at 13 months for MenC and Hib_b vaccinations. The study findings have been used to inform communication to GPs and practice nurses as well as the development of new information materials for parents which highlight the importance of completing five GP visits to ensure children are fully vaccinated.

In 2010, 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 2010 quarterly data. The proportion of children who completed the recommended childhood immunisation schedule by 12 months (born between 01/01/2009 and 31/12/2009) and 24 months (born between 01/01/2008 and 31/12/2008) of age in 2010 are reported. This report refers to children vaccinated under the two recommended immunisation schedules described below.

The Irish childhood immunisation schedule recommended that babies born from 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 dose of Hib (Hib_b). Children born between September 2nd 2006 and June 30th 2008 were recommended pneumococcal conjugate vaccine (PCV) as part of a catchup campaign carried out between September 2008 and July 2009.

Since September 1st 2008 the new primary childhood immunisation schedule has been implemented for children born on or after July 1st 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_3) given at two, six and 12 months of age and three doses of meningococcal group C ($MenC_3$) vaccine given at four, six and 13 months of age. 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.

In children who reached 12 months of age in 2010 (born between 01/01/2009 and 31/12/2009) uptake of BCG, D_3, T_3, P_3, Hib_3, $Polio_3$, $HepB_3$ and two doses of PCV (PCV_2) and MenC ($MenC_2$) were measured. In children who reached 24 months of age in 2010 (born between 01/01/2008 and 31/12/2008) uptake of D_3, T_3, P_3, Hib_3, $Polio_3$, $MenC_3$, MMR_1 and Hib_b were measured. As

the new primary childhood immunisation schedule was implemented for children born on or after July 1st 2008, uptake of $HepB_3$ and PCV_3 were measured in those who reached 24 months of age in Quarters 3 and 4 2010 (born between 01/07/2008 and 31/12/2008).

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

Caveats to data

As a new childhood immunisation schedule was introduced in 2008, for those born on or after July 1st 2008, the 2010 $HepB_3$ and PCV_3 data at 24 months are for those born between July 1st and December 31st 2008 (i.e. Quarters 3 and 4 2010 data) only. As not all HSE Areas were able to provide data for each quarter a number of figures presented in this report are incomplete. For both these reasons some figures for 2010 may reflect data from less than four quarters and in some cases reflect data from one quarter only.

The 2010 data for those at 12 months are incomplete as the following were unavailable: the Quarter 1 2010 HSE-M and HSE-S data and the HSE-MW $MenC_2$ data; the Quarter 2 2010 HSE-M data and HSE-S data and; the Quarter 4 2010 HSE-NE data. The available 2010 national 12 month D_3, T_3, P_3, Hib_3, $HepB_3$, $Polio_3$ and PCV_2 cohort data may be around 87% (this figure is an estimate only) of the 2010 national birth cohort and the available $MenC_2$ cohort may be around 85% (this figure is an estimate only) of the 2010 national birth cohort. BCG uptake data were available for the HSE-MW, HSE-NW, and HSE-SE Areas in Quarters 1-4 2010, for the HSE-M Area in Quarters 3 and 4 2010 and the HSE-SA Area in Quarter 4 2010. The available 2010 national BCG cohort data may be around 31% (this figure is an estimate only) of the national birth cohort.

The 2010 data for those at 24 months are incomplete as the following were unavailable: the Quarter 1 2010 HSE-M and HSE-S data and the HSE-E Dublin North Hib_b data; the Quarter 2 2010 HSE-M data and; the Quarter 4 2010 HSE-NE data. The available 2010 national 24 month cohort data may be around 89-90% (this figure is an estimate only) of the 2010 national birth cohort.

Data in 2010 are compared here to data in 2009. The 2009 data (at 12 and 24 months) were incomplete; the caveats were detailed in the 2009 annual report. 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 and $HepB_3$, $MenC_2$ 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 available 2009 national BCG cohort data may be around 27% (this figure is an estimate only) of the national birth cohort. 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).

Immunisation uptake rates at 12 months

National immunisation uptake rates (based on available data), in children 12 months of age in 2010, were 89% for D_3, P_3, T_3, Hib_3, $HepB_3$, $Polio_3$, $MenC_2$ and PCV_2 and 95% for BCG (table 2). Compared with 2009, the uptake rates were unchanged.

Among the HSE Areas, uptake rates for D_3, P_3, T_3, Hib_3, $HepB_3$ and $Polio_3$ ranged from 87% to 93% (table 2). Among the LHOs, uptake rates for D_3, P_3, T_3, Hib_3, $Polio_3$, $MenC_2$ and PCV_2 ranged from 78% to 96% and $HepB_3$ ranged from 78% to 95% (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 and reached in Cavan/Monaghan (combined Quarters 1-3 data only) for D_3, P_3, T_3, Hib_3 and $Polio_3$ (appendix 2.1). The target uptake of 95% was reached or exceeded for BCG in nine LHOs reporting data (appendix 2.1).

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

Immunisation uptake rates at 24 months

National immunisation uptake rates (based on available data), in children 24 months of age in 2010, were 94% for D_3, T_3, P_3, Hib_3, $Polio_3$ and $HepB_3$, 88% for PCV_3, 86% for $MenC_3$ and 85% for Hib_b (table 2). Compared with 2009, the uptake rates for $MenC_3$ declined by seven percent, Hib_b declined by two percent, D_3, T_3, P_3 and $Polio_3$ were unchanged and Hib_3 increased by one percent (figure 1).

$MenC_3$ uptake was 93% in Quarter 1 2010 but declined to 80% in Quarter 3 2010 and was 82% in Quarter 4 2010. Hib_b was 87% in Quarters 1 and 2 2010 but declined to 84% in Quarters 3 and 4 2010 (figure 2). There was also low uptake of PCV_3 (88% combined Quarters 3 and 4 data). Since September 1st 2008 the new primary childhood immunisation schedule has been implemented for children born on or after July 1st 2008 (table 1); children who were 24 months of age in Quarters 3 and 4 2010 were born between July 1st and December 31st 2008 and were the first children recommended the new immunisation schedule. Under the new immunisation schedule children are now recommended HepB vaccine and PCV. In addition, there is a change in timing of the MenC and Hib_b vaccines (table 1). The changes to the schedule mean that three injections (6 in 1, PCV and MenC vaccines) are now recommended at six months of age and two GP visits are required after 12 months; the first dose of MMR and the third dose of PCV should be given at 12 months of age and at 13 months of age the third dose of MenC vaccine and Hib_b should be given (table 1). These quarterly uptake data indicated children were not receiving their MenC, PCV and Hib_b vaccinations as recommended.

Among the HSE Areas, uptake rates for 2010 for D_3, P_3, T_3 and $Polio_3$ ranged from 93% to 96%, Hib_3 ranged from 93% to 95%, $HepB_3$ ranged from 92% to 95%, PCV_3 ranged from 85% to 92%, $MenC_3$ ranged from 82% to 92% and Hib_b ranged from 80-93% (table 2). The target uptake of 95% was reached or exceeded during 2010 in the HSE-MW for $HepB_3$, in the HSE-NE for D_3, T_3, P_3, Hib_3, $Polio_3$ (combined Quarters 1-3 data only) and $HepB_3$ (Quarter 3 2010 data only) data and for D_3, T_3, P_3, Hib_3, $Polio_3$ and $HepB_3$ in the HSE-NW (table 2).

D_3, Hib_b and $MenC_3$ uptake rates are mapped by LHO in figure 3. Among the LHOs the uptake rates ranged from 88% to 99% for D_3, T_3, P_3 and $Polio_3$, 89% to 98% for Hib_3, 87% to 98% for $HepB_3$, 75% to 96% for PCV_3, 74% to 96% for $MenC_3$ and 71% to 95% for Hib_b (appendix 2.2). Uptake rates of ≥90% were reported in 30 LHOs for D_3, T_3, P_3, Hib_3, $Polio_3$ and $HepB_3$, 15 LHOs for PCV_3, 11 LHOs for Hib_b and in five LHOs for $MenC_3$ (figure 3, appendix 2.2).

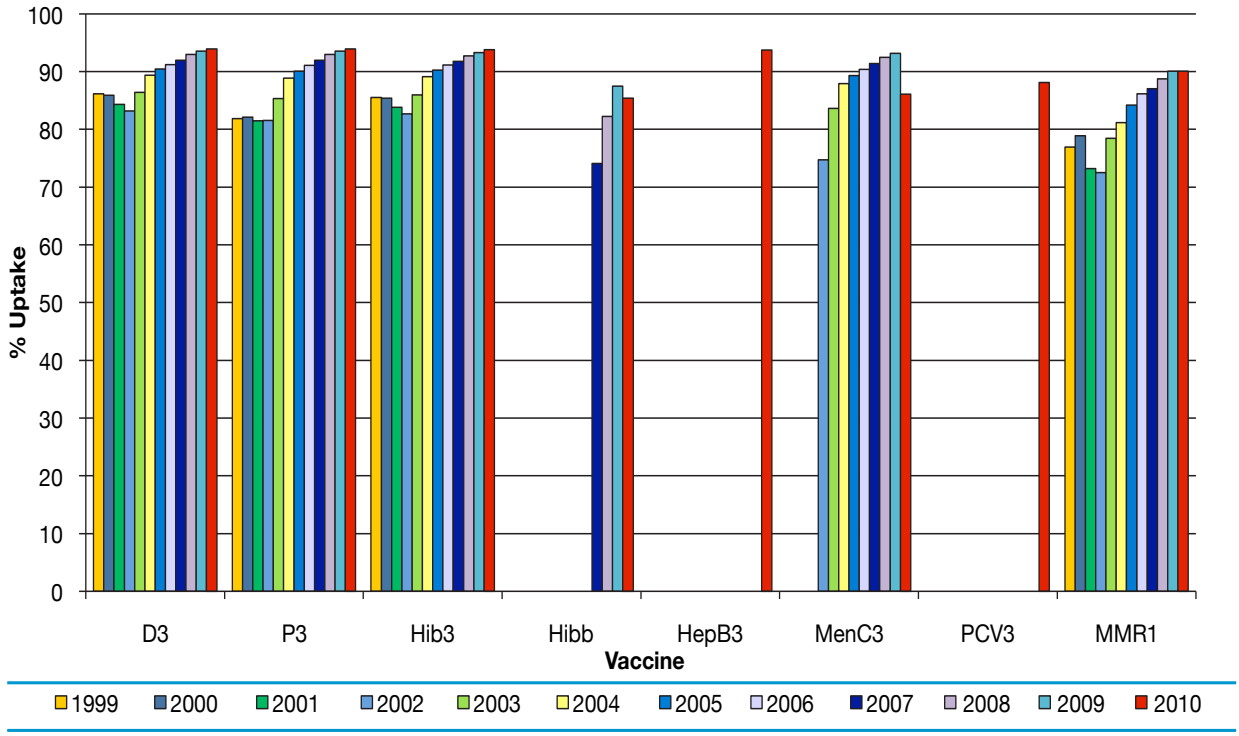


Figure 1. National annual immunisation uptake rates (based on available data) at 24 months, 1999-2010

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 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 2010 data are incomplete, please see text for details of caveats.

The target uptake of 95% was reached or exceeded in 15 LHOs for D_3 (figure 3a), T_3, P_3, Hib_3, $Polio_3$ and $HepB_3$ and in one LHO (Roscommon) for Hib_b (figure 3b), $MenC_3$ (figure 3c) and PCV_3 (appendix 2.2).

During 2010 MMR_1 uptake was 90% nationally; unchanged when compared to 2009 (figure 1). Among the HSE Areas, uptake rates for MMR_1 ranged from 88% to 93%, with five HSE Areas reporting uptake of ≥90% (table 2). Uptake rates for MMR_1 ranged from 79% to 96% among the LHOs, with 20 LHOs reporting uptake of ≥90% and one LHO (Roscommon) reaching and exceeding the target uptake of 95% (figure 3d, appendix 2.2).

There was a large decline in $MenC_3$ and a decline in Hib_b uptake at 24 months in Quarters 3 and 4 2010 i.e. children who were born between July 1st and December 31st 2008 and were the first recommended the new immunisation schedule. There is a change in timing of the MenC and Hib_b vaccines under the new immunisation schedule (table 1). MenC and Hib are serious, potentially life threatening illnesses. The majority of illnesses caused by these infections can be prevented by vaccination but for maximum protection requires that all children receive their recommended doses of vaccines, at the recommended ages. The National Immunisation Advisory Committee has recommended certain vaccines be given at specific ages to make sure babies are protected from serious diseases at the age when they are most vulnerable. A collaborative study was carried out in four of the HSE Areas to determine whether the local immunisation databases accurately reflected immunisation uptake

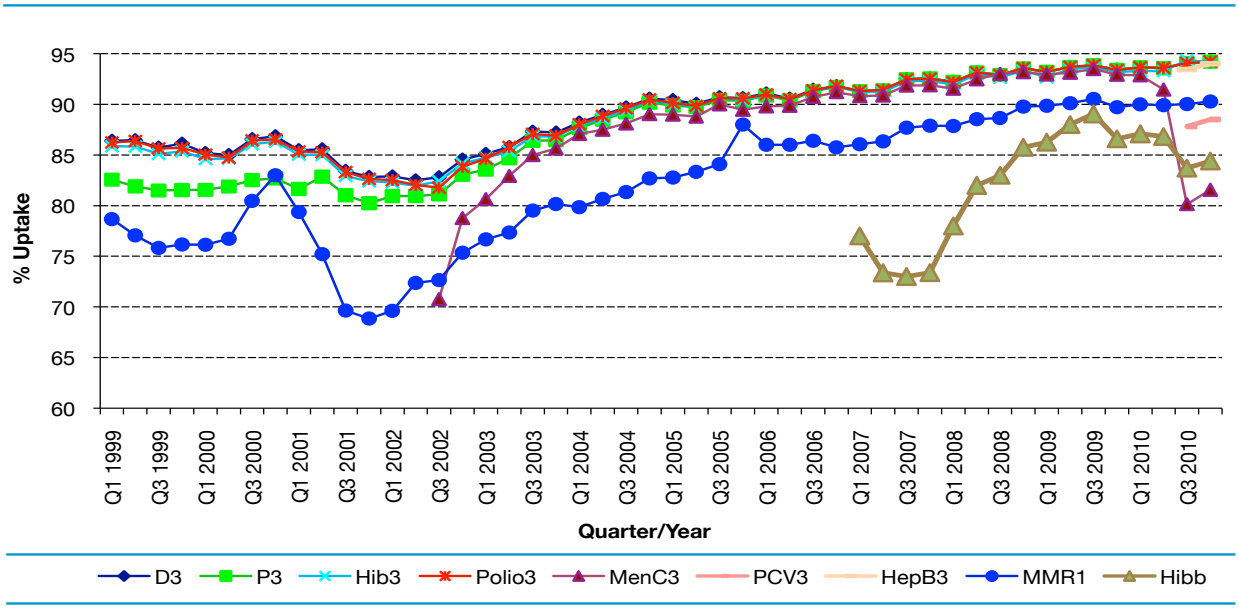


Figure 2. National quarterly immunisation uptake rates at 24 months

Note scale ranges from 60-95%
The Q4-2005 MMR_1 figure is based on data from seven of the eight HSE-Areas. The Q1-2006 MMR_1 figure includes the HSE-E figure that is an estimate only. The Q1-2007, Q3-2007, Q2-2008 and Q3-2008 Hib_b figures are based on data from seven of the eight HSE Areas. In Q1-2008 the HSE-SE changed their Hib_b data extraction method compared to previous quarters; in Q1-2008 the uptake of Hib_b in the HSE-SE was 83% compared to 53% in Q4-2007. The Q3-2008 $MenC_3$ figure is based on data from six of the eight HSE Areas. The Q1-2009 HSE-E D_3, P_3, T_3, $Polio_3$ and MMR_1 uptake figures exclude those born on the 31/03/2007. The Q2-2009 HSE-E Hib_b uptake figures exclude uptake figures from Dublin North. The Q4-2009 figures are based on data from seven of the eight HSE Areas. The Q4-2009 Hib_b figures also exclude uptake figures from Dublin North. The Q1-2010 figures are based on data from six of the eight HSE Areas. The Q1-2010 Hib_b figures also exclude uptake figures from Dublin North. The Q2-2010 and Q4-2010 figures are based on data from seven of the eight HSE Areas.

Table 2. Annual immunisation uptake rates (based on available data) by HSE Area for children 12 and 24 months of age in 2010

	% Uptake at 12 months Cohort born 01/01/2009 - 31/12/2009					% Uptake at 24 months Cohort born 01/01/2008 - 31/12/2008*						
	D_3	Hib_3	$MenC_2$	PCV_2	BCG	D_3	Hib_3	Hib_b	$HepB_3$	$MenC_3$	PCV_3	MMR_1
HSE-E	87	87	87	87	na	93	93	83	94	85	87	89
HSE-M	89	89	89	89	93	93	93	84	93	82	89	90
HSE-MW	92	92	92	92	97	94	94	89	95	88	91	92
HSE-NE	93	93	91	91	na	95	95	92	95	92	92	93
HSE-NW	93	93	93	93	95	96	95	90	95	88	88	92
HSE-SE	90	90	90	90	96	94	94	93	94	88	90	93
HSE-S	87	88	86	86	88	93	94	80	92	83	87	89
HSE-W	88	88	88	89	na	93	93	80	93	85	85	88
Ireland	**89**	**89**	**89**	**89**	**95**	**94**	**94**	**85**	**94**	**86**	**88**	**90**

na=not available
The 2010 data are incomplete, please see text for details of caveats
** $HepB_3$ and PCV_3 uptake data presented here for those at 24 months are only for those born between 01/07/2008 and 31/12/2008*
At 12 months, since T_3, P_3, $Polio_3$ and $HepB_3$ uptake identical to D_3 uptake only D_3 uptake figures presented
At 24 months, since T_3, P_3 and $Polio_3$ uptake identical to D_3 uptake only D_3 uptake figures presented

for the group of children who were 24 months of age in Quarter 3 2010 as well as to identify potential reasons for missing those vaccines so that more targeted remedial actions could be undertaken.[1] A key finding of this study was that most parents did not know their children were incompletely vaccinated and were unaware of the need for their child to visit the GP at 13 months for the MenC and Hib_b vaccination. The findings have been used to inform communication to GPs and practice nurses as well as the development of new information materials for parents which highlight the importance of completing five GP visits to ensure children are fully vaccinated.

In 2010, national uptake rates at 24 months for all vaccines were below the target rate of 95%. However, among the HSE Areas (based on available data) the target uptake of 95% was reached or exceeded for those at 24 months during 2010 in two HSE Areas for D_3, T_3, P_3, Hib_3 and $Polio_3$ and in three HSE Areas for $HepB_3$. Among the LHOs (based on available data), the target uptake of 95% was reached or exceeded for those at 24 months during 2010 for D_3, T_3, P_3, Hib_3, $Polio_3$ and $HepB_3$ in 15 LHOs and for all vaccines in one LHO (Roscommon). Roscommon reached or exceeded the target of 95% and had the highest uptake 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.

The 2010 immunisation uptake rates for each LHO are presented in appendix 2. The immunisation reports for Quarters 1 to 4 2010 are available on the HPSC website in *Topics A-Z* under the heading *vaccination*.

1. **Rebolledo J, Cotter S, Gee S, Corcoran B (on behalf of the HSE $MenC_3$ decline investigation team).** Study examines decline in $MenC_3$ and Hib booster vaccination uptake. *Epi-Insight 2011*; 12(10). Available on-line: http://ndsc.newsweaver.ie/epiinsight/1vgnwz0l64n1cyivlh5r33?a=1&p=17742945&t=17517774

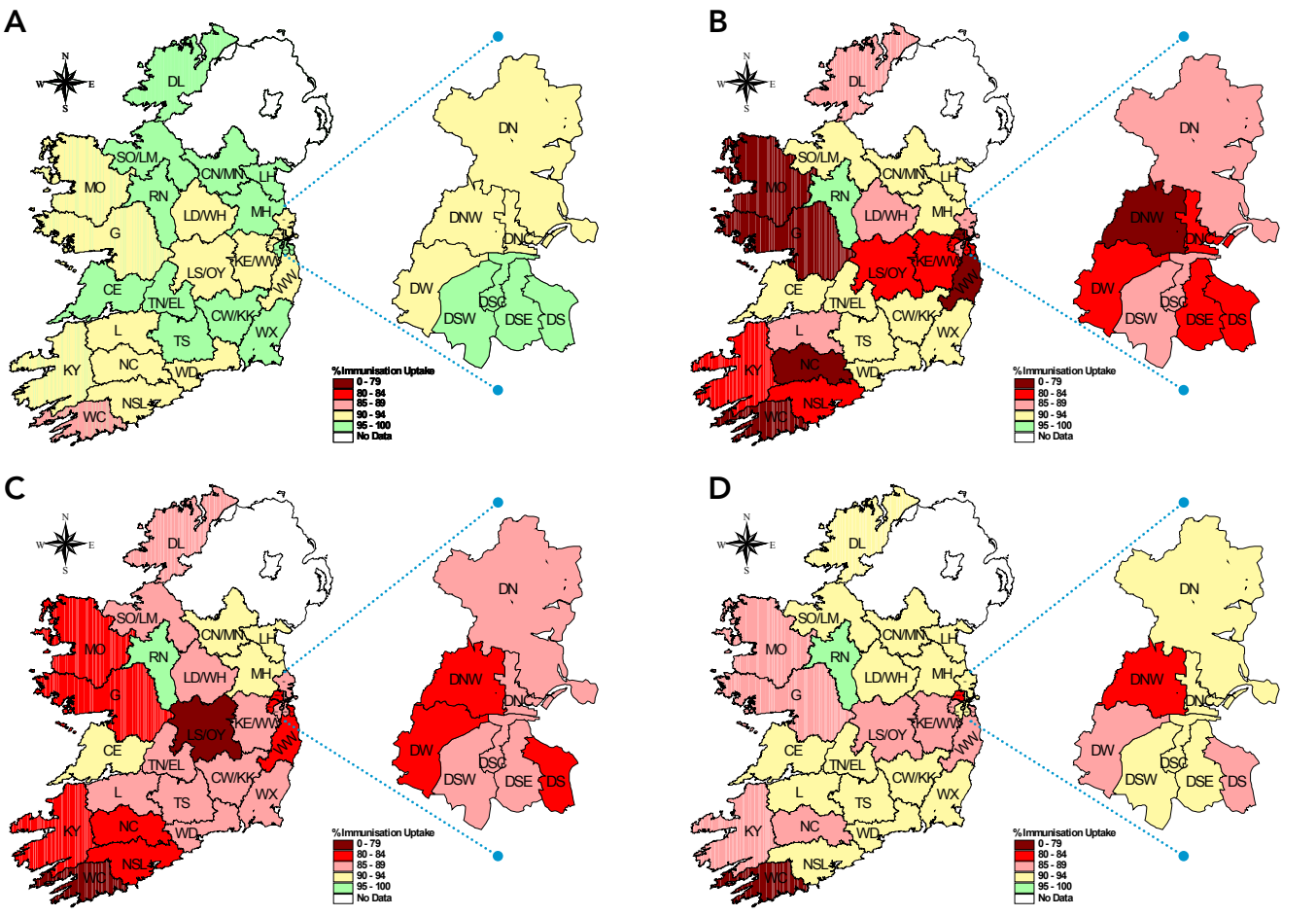


Figure 3. D_3 (A), Hib_b (B), $MenC_3$ (C) and MMR_1 (D) immunisation uptake rates (%) in those 24 months of age in 2010 by Local Health Office (LHO)
2010 data are incomplete, please see text for details
LHOs in Dublin are highlighted separately for ease of viewing
North Lee and South Lee are separate 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

Healthcare-Associated Infections
Antimicrobial Consumption
Antimicrobial Resistance

9.1.0 Healthcare-associated infections (HCAI)

Key Points

- In 2010, 1,696 new cases of Clostridium difficile-associated disease (CDAD) were notified. This represents a national crude incidence rate of 40.0 new cases per 100,000 population, a decrease of 10.6% from 2009
- Of the 1,696 new CDAD cases, 1,191 (70%) were reported from patients aged over 65 years
- In the voluntary enhanced surveillance scheme, 1,185 CDAD cases [1,094 (92%) new and 91 (8%) recurrent] were reported from 33 hospitals. The national CDAD incidence rate was 2.8 cases per 10,000 bed days used. Twenty percent of all CDAD cases were associated with the community, an increase from 13% in 2009. As in 2009, 10% of CDAD cases were associated with nursing homes. While the majority of patients experienced onset of symptoms in healthcare facilities, 27% had onset of symptoms in the community, an increase from 23% in 2009
- Of the 49 specimens for which ribotyping data were available (from five hospitals), the most common ribotypes reported were; 078 (n=8, 16%) followed by 013, 014, 015, 027 and 106 (n=4, 8% each)

9.1.1 *Clostridium difficile*-associated Disease

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

There were 4,290 notifications of acute infectious gastroenteritis (AIG) in 2010, of which 1,696 (39.5%) were new CDAD cases. All cases were laboratory confirmed. This represents a national crude incidence rate (CIR) of 40.0 new CDAD cases per 100,000 population, a decrease of 10.5% from 44.7 cases per 100,000 population reported in 2009 (Table 1). Regional variation was observed in the incidence of CDAD (Table 1). However, this most likely reflects differences in laboratory diagnosis and reporting rather than true variation in disease incidence. Identification of seasonal patterns in the CIDR data is hindered by late and batch notifications from laboratories.

As in 2009, the majority of new cases were in female patients (59%) and in older age groups. The mean age of cases was 69 years (range 2-103 years) (Figure 1) with 1,191 cases (70%) reported in patients over 65 years. Of note, the 75-84 year age group had the highest number of cases (n=479), representing 40% of the over 65 year age group.

The majority of CDAD cases (67%) were notified by healthcare facilities. Patients classified as 'hospital inpatient' accounted for 73% of all such cases notified, 12% were classified as general practice patients, 3% as hospital outpatients or day patients, 3% as Emergency Department patients, 2% as 'other' and 7% 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 the time of CDAD diagnosis. Information on the origin and onset of CDAD cases is collected as part of the enhanced surveillance system.

***C. difficile* outbreaks**
In 2010, five *C. difficile* outbreaks, all healthcare-associated and involving 31 patients, were notified (Table 2). One was linked to a hospital, three to nursing homes and one to a long-term care facility.

C. difficile enhanced surveillance

Although the notifiable CDAD data provides important preliminary information on the burden of new cases of CDAD in Ireland, it represents an underestimate of the true burden of CDAD, as recurrent CDAD cases are not captured and it does not capture information on the origin or onset of CDAD. National collation of *C. difficile* enhanced surveillance commenced on a voluntary basis on 1st August 2009. Information on case type, origin, onset and severity of CDAD is collected using European Centre for Disease Control (ECDC) case definitions. By the end of 2010, 33 hospitals participated in the voluntary enhanced surveillance scheme, comprising 30 acute public hospitals (seven tertiary, 21 general, two specialist hospitals) and three private hospitals.

In 2010, 1,185 cases of CDAD were reported to the enhanced surveillance scheme. Of these, 1,094 (92%) were classified new CDAD cases (representing 65% of all the new CDAD cases reported through the notifiable AIG category) and 91 (8%) recurrent. Sixty percent (n=711 cases) originated within the reporting healthcare facility which corresponds to an overall national CDAD incidence rate of 2.8 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 data from the Business Intelligence Unit, Corporate Planning and Corporate Performance (CPCP) at the Health Services Executive for acute public hospitals and directly from acute private hospitals. There was a wide range in the incidence of CDAD among participating hospitals (range, 0 – 9.1 cases per 10,000 bed days used; median, 2.3). Tertiary hospitals showed a higher median incidence rate (CDAD rate = 2.8, n=7) compared to general hospitals (CDAD rate = 1.7, n=26). These differences may reflect differences in patient case mix, *C. difficile* ribotypes, laboratory testing protocols, antimicrobial policies and surveillance resources between hospitals. No obvious seasonal trend is distinguishable at present.

Severe CDAD

As for notifiable CDAD, most cases reported through the enhanced surveillance scheme were female (56%) and in the over 65 age group (72.5%). Seventeen (1.6%) severe cases were reported: four patients requiring surgery and intensive care unit (ICU) admission, one requiring surgery only and 12 requiring ICU admission without surgery. Forty-nine deaths were reported, of which three were directly attributed to CDAD and 33 were not directly attributed to CDAD. The cause of death for the remainder was either unknown or not specified.

Onset & origin of CDAD

Onset: Patient location when symptoms of CDAD commenced

Seventy-three percent (n=862) had onset of CDAD symptoms in a healthcare facility – healthcare onset (HCO), with 82% (n=707) of these occurring in the reporting hospital, 5% (n=46) in another hospital and 10% (n=85) in a nursing home. The remainder (n=22) had onset in another unspecified healthcare facility or unknown. However, 27% (n=321) of all CDAD cases had onset of symptoms in the community, an increase from 23% in 2009.

Origin

The majority of cases, 77% (n=911), were healthcare-associated:

- 90% (n=824) of these patients experienced onset of CDAD symptoms at least 48 hours following admission to a healthcare facility (healthcare-onset, healthcare-associated)

- 9% (n=86) patients experienced symptom onset in the community within four weeks of discharge from a healthcare facility (community-onset, healthcare-associated)

Of the 911 healthcare-associated CDAD cases, 80% (n=725) CDAD originated in the reporting hospital, 7% (n=66) in other hospitals and 10% (n=91) in nursing homes, with the remainder (n=29) in another unspecified healthcare facility or unknown.

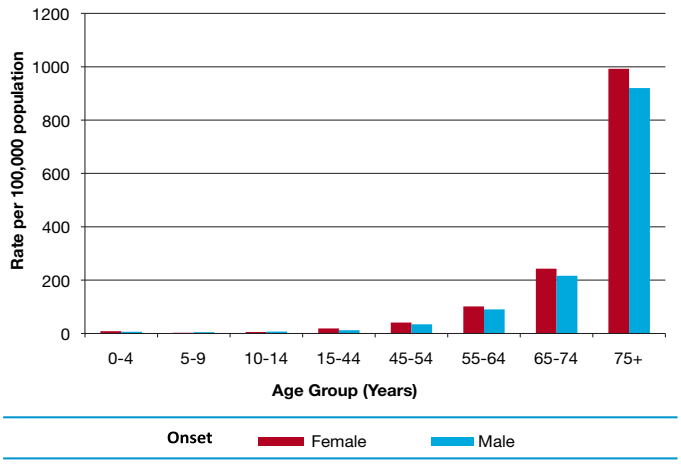


Figure 1. Age and Sex distribution of CDAD in Ireland, 2010
(Source, CIDR)
*Rates calculated using 2006 census data

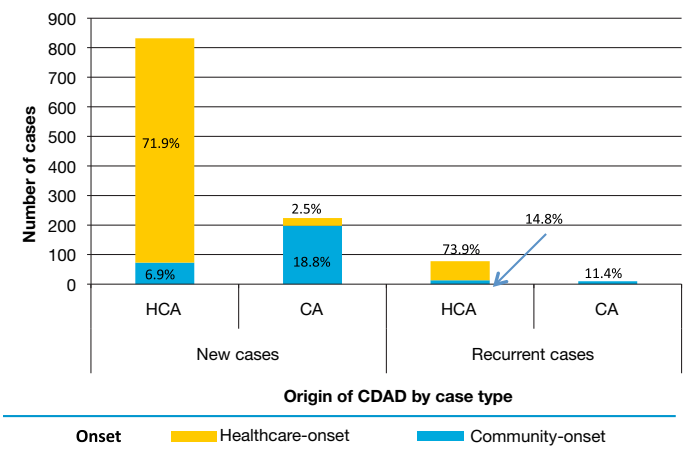


Figure 2. Origin and Onset of CDAD Cases, 2010
(Source, C. difficile Enhanced Surveillance System)
(HCA: Healthcare-Associated, CA: Community-Associated)

Of the 20% (n=234) CDAD cases classified as community-associated:

- 89% (n=208) patients experienced onset of CDAD symptoms while outside a healthcare facility and without a history of discharge from a healthcare facility within the previous 12 weeks

- 11% (n=26) patients experienced symptom onset within 48 hours of admission to a healthcare facility, without residence in a healthcare facility within the previous 12 weeks

The origin of 3% (n=40) of cases was unknown, where onset of symptoms occurred within 4-12 weeks of a patient being discharged from a healthcare facility.

***C. difficile* PCR ribotyping**

Of the 49 samples (from five hospitals) for which ribotyping data were available, the most common ribotypes reported were: 078 (n=8, 16%) and 013, 014, 015, 027 and 106 (n=4, 8% each). In one hospital, all isolates of healthcare-associated CDAD from Q2 to Q4 2010 were typed. The most common ribotypes were 078 (n=5), 013 and 014 (n=4 each), and 015 (n=3).

In March 2009, national *C .difficile* ribotype data was collected for the first time as part of a one month pilot study. In addition to highlighting the burden of CDAD outside acute care facilities, this study demonstrated the overall predominance of ribotype 027 at this time (with over 40% of these originating from one hospital).

Conclusion

The collation of national data on *C. difficile* through notification of new CDAD and the enhanced CDAD surveillance system of both new and recurrent case has provided a valuable insight into the burden of CDAD in Ireland. There was decline in the number of new CDAD cases reported in 2010 compared to 2009.
In 2010, 8% of all CDAD cases reported through the enhanced surveillance scheme were recurrent infections compared with 14% in 2009. This may represent an improvement in infection prevention and control strategies and management of patients with CDAD. However, it may also reflect changes in laboratory testing protocols. Recurrent CDAD is difficult to manage clinically and can result in severe infection, places a burden on limited isolation resources and results in significant patient morbidity. Therefore, knowledge of the burden of recurrent CDAD in Ireland is essential to help guide preventative strategies.

During 2010, 20% of all CDAD cases were associated with the community, an increase from 13% in 2009 (70 of 522 cases) and 8% were associated with nursing homes, which is the same as in 2009 (42 of 522 cases). Moreover, 27% of all cases had onset of symptoms in the community compared with 23% in 2009. This indicates that *C. difficile* is not confined to hospitals and is increasingly common in community and nursing home settings. It is essential that CDAD is considered in the differential diagnosis of all patients presenting with diarrhoea and that specimens are sent in a timely fashion for laboratory diagnosis. Patients with CDAD in healthcare facilities must be isolated with contact precautions as outlined in national guidelines: http://www.hpsc.ie/hpsc/A-Z/Gastroenteric/Clostridiumdifficile/Publications/File,2936,en.pdf.

All healthcare professionals must promote practices known to reduce the incidence of CDAD including; compliance with infection prevention and control measures, awareness of local CDAD surveillance data and prudent use of antimicrobials. The national guidelines for antimicrobial stewardship in hospitals in Ireland are available at: http://www. hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/gyforthecontrolofAntimicrobialResistanceinIrelandSARI/AntimicrobialStewardship/Publications/

Table 1. Number of notified cases, crude incidence rate of CDAD in Ireland by HSE area, 2010, and total number with crude incidence rate for 2009 (Source, CIDR)

HSE Area	No. of cases	*CIR incl. 95% C.I.
East	681	45.4 (42.1-48.9)
Midlands	47	18.7 (13.4-24.0)
Mid West	95	26.3 (21.0-31.6)
North East	50	12.7 (9.2-16.2)
North West	90	38 (30.5-46.3)
South East	252	54.7 (48.1-61.7)
South	269	43.3 (38.1-48.5)
West	212	51.2 (44.5-58.3)
Total 2010	1696	40.0 (38.1-41.9)
Total 2009	1895	44.7 (42.8-46.8)

* Rates calculated using 2006 census data

Table 2. C. difficile outbreaks reported in Ireland in 2010 by HSE area (Source, CIDR)

HSE Area	Outbreak location	Total number ill
East	Residential Home	11
Midlands	Residential Home	2
South	Residential Home	6
South	Hospital	2
North West	Community Hospital/ Long Stay Unit	10

9.1.2 HCAI Surveillance

9.1.2.1 National Pilot Study on Catheter-Related Infection in Irish Critical Care Units

Ongoing surveillance of catheter-related infection (CRI) has been carried out in many countries, such as the United States for several years. Interventions such as use of central venous catheter (CVC) insertion checklists, CVC maintenance care bundles and ongoing promotion of strict adherence to Standard Precautions, including hand hygiene compliance, have been implemented and shown to impact positively on reduction of CRI. There is currently no national CRI surveillance programme in Ireland.

A multidisciplinary steering group convened in 2010 to plan a three-month pilot study of CRI in critical care units in Ireland. This was a collaborative study between the Intensive Care Society of Ireland (ICSI), Health Protection Surveillance Centre, the Irish Critical Care Trials Group (ICCTG) and the Health Service Executive Critical Care Programme (HSE-CCP). Funding was provided by HSE for a 0.5 whole time equivalent local CRI audit nurse to collect data in each participating unit, and jointly by the ICSI and MSD Pharmaceuticals for a national data manager to collate the study results. Following completion of the study, all participating critical care units were issued with a local unit report and a national report was also prepared. The complete national report is available on the HPSC website: http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/InfectionControlandHAI/Surveillance/20102011NationalCatheter-RelatedInfectionPilotStudy/File,12711,en.pdf

In 2010, the Strategy for the Control of Antimicrobial Resistance in Ireland (SARI) published national guidelines for prevention of intravascular catheter-related infection in Ireland. These are available at http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/InfectionControlandHAI/IntravascularIVlines/Publications/File,4115,en.pdf

Ongoing surveillance of CRI is a key recommendation of the Irish national guidelines.

Key Points

- This three-month pilot study took place between November 1st 2010 and January 31st 2011 with nine participating hospitals incorporating 11 critical care units
- Valid surveillance forms were received for 614 patients incorporating 1209 temporary CVCs
- The percentage of patients who had a CVC inserted varied greatly between the units (49% - 96%) with a national CVC utilisation figure of 71%
- The median age of patients was 66 years with a male predominance (60%)
- The majority of CVCs were inserted in the ICU (63%), followed by the operating theatre (22%) and other location (15%)
- The most common anatomical site of CVC insertion was the internal jugular vein (72%), followed by the femoral (17%) and subclavian (11%) veins
- 84% of CVCs were inserted electively compared with 13% of CVCs which were inserted under emergency circumstances
- Nationally, there were seventeen CRIs identified in the 1209 CVCs, denoting a national CRI rate of 2.2 infections per 1000 CVC days (95% CI: 1.3 - 3.5). CRI rates for individual units ranged from 0.0 to 8.1 CRIs per 1000 CVC days
- The most common causative pathogen of CRI was coagulase-negative staphylococci, which was associated with six CRIs (35%), followed by *Candida albicans* which was associated with four CRIs (24%)
- Development of a CRI was associated with a longer ICU stay and patients who developed a CRI had more CVCs inserted and more CVC days than the patients without a documented CRI
- The CRI rate for CVCs inserted in emergency circumstances was 3.9 per 1000 CVC days compared to a rate of 2.0 for CVCs that were inserted electively

9.1.2.2 MRSA in Intensive Care Units Prevalence Study

The meticillin-resistant *Staphylococcus aureus* (MRSA) in intensive care unit (ICU) prevalence study began in April 2008. The primary objective of the study has been to provide a weekly snapshot of MRSA in the critical care setting using methodology requiring minimal additional resources. Participants complete and return a weekly questionnaire to capture data on MRSA prevalence, transmission, bed occupancy and isolation capabilities, with quarterly feedback of results to participants. Participating ICUs were stratified according to ICU type. The complete national report is available on the HPSC website: http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/peanAntimicrobialResistanceSurveillanceSystemEARSS/ReferenceandEducationalResourceMaterial/SaureusMRSA/MRSAinICUPrevalenceStudy/Reports/File,12638,en.pdf

Key Points

- In 2010, 33 ICUs participated in the study
- Level 2/3 ICUs (n = 19) having both ICU and high dependency unit patients or a variable combination of these groups
- Level 3 ICUs (n=14) having ICU patients only
- ICU bed occupancy and isolation room occupancy rates were high in both the level 2/3 (87% and 84%, respectively) and level 3 ICU groups (90% and 87%, respectively)
- Large differences were reported in single room resources; four of the ICUs did not have any single rooms and 36% fell below the recommendation of one single room to every four ICU beds as set out in the 2005 national MRSA guidelines. While all single rooms were equipped with hand wash basins, only 45% had anterooms
- Only four of the ICUs (12%) could successfully isolate all of their MRSA patients when surveyed. Level 2/3 ICUs could isolate on average 61% of MRSA patients surveyed while level 3 ICUs could isolate 82%
- All participating ICUs screened patients for MRSA colonisation on admission
- The prevalence of MRSA in level 2/3 ICUs was 8.2% (range = 1.9% – 22.4%, median = 10.2%) and in level 3 ICUSs was 9.3% (range = 1.8% - 18%, median = 10.1%). The prevalence of MRSA was significantly higher in level 3 ICUs compared to the level 2/3 group in 2008 and 2009 but no significant difference was reported in 2010
- Due to difference in patient case-mix, level 3 ICUs tend to care for a more complex patient population with a higher risk of acquiring MRSA prior to ICU admission and post admission through increased intensity of care. The weekly proportion of MRSA that were ICU-acquired was 0.7% in level 2/3 ICUs in 2010 (range = 0 - 3.9%, median = 0.64%) and 0.7% in level 3 ICUs (range = 0 – 1.4%, median = 0.9%). The majority of ICUs (88%) reported a proportion of MRSA acquisition of <1.5%, therefore figures on MRSA acquisition were low in the majority of ICUs

9.1.2.3 Alcohol Hand Rub Surveillance

Hand hygiene is one of the most important ways to prevent HCAI. Alcohol hand rubs (AHR) are an effective and rapid method of hand hygiene, and recommended as the primary means of hand hygiene in national and international guidelines. Measurement of hospital-level consumption of AHR, 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 & Prevention (CDC).

HPSC has collated data on AHR consumption in acute public hospitals in Ireland since 2006. The data collected represent the total volume of AHR delivered or dispensed to wards, clinics and other hospital areas per quarter, excluding that used for pre-operative surgical hand hygiene. The rate of usage per hospital is calculated as the total volume of AHR consumed in litres per 1,000 bed-days used (Table 1).

Further information may be found at: http://www.hpsc.ie/hpsc/A-Z/Gastroenteric/Handwashing

Table 1. National data on AHR consumption in acute public hospitals in Ireland by year, 2006 – 2010.

	2006	2007	2008	2009	2010
Number of participating hospitals	52	50	50	49	42
National consumption rate*	10.5	15	18.7	22.1	20.3
Range for participating hospitals in litres per 1,000 bed-days used	0.5 - 29.0	5.2 - 47.1	5.9 - 52.5	7.8 - 48.0	7.6 - 36.4

* The consumption rate is the total volume of AHR 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

Key Points

- In 2010 the median rate of AHR consumption decreased to 20.3 litres per 1,000 bed-days used, from 22.1 in 2009. This represents an 8% drop in national consumption since 2009 but is still a 94% overall rise in consumption since surveillance began in 2006 (Table 1)
- The 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 Strategy for the Control of Antimicrobial Resistance in Ireland (SARI) Infection Control Subcommittee in 2005, local hospital initiatives (including participation in the WHO 'Clean Hands Save Lives' campaign), and national information campaigns aimed at the public and healthcare workers. The overall level of AHR consumption is comparable to other successful hand hygiene campaigns internationally
- In 2010, 42 hospitals submitted data, a decrease from 49 in 2009 (Table 1) which may be a factor in the decrease in consumption. However, the reason for the decrease in consumption seen in 2010 is unclear. Ongoing surveillance is required to see if this trend continues
- The wide variation in levels of AHR consumption between hospitals (7.6 - 36.4 litres per 1,000 bed-days used)) may, in part, be explained by differences in methodologies for collecting and reporting the data, and difference in types and range of hand hygiene agents used. The main limitation of this surveillance system is that the data refer to the use of AHR only, and do 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 do 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 AHR (visitor, patient or healthcare worker)
- There is clearly a need for better standardisation of data collection and reporting. However, even with better standardisation, the volume of AHR consumed remains a crude measure of hand hygiene activity and additional process and outcome measures are required
- With this in mind, HPSC in conjunction with the Infection Prevention Society, developed and piloted a national hand hygiene observation audit tool and standard operating procedure for use in acute hospitals in 2010. This is due to be adapted and rolled out in 2011 with a programme of hospital hand hygiene auditor training in advance of national collation of hand hygiene compliance in hospitals

9.1.2.4 Healthcare-Associated Infections in European Long Term Care Facilities

The European Centre for Disease Prevention and Control (ECDC) coordinated a point prevalence survey on healthcare-associated infection (HCAI) and antimicrobial use in European long term care facilities (LTCFs) in summer 2010 (HALT survey). The HPSC was the national coordinating centre for Ireland. Seven hundred and twenty-two LTCFs in 25 European countries participated. Participating LTCFs were asked to survey residents on one day only, thereby providing a snapshot of HCAI and antimicrobial use on that particular day. ECDC provided the information technology tool that enabled participating LTCFs to receive immediate feedback of their own results so that they could commence evaluating them and plan further preventive programmes. In September 2010, HPSC circulated a summary report to participants.

The national report for the Republic of Ireland was published in November 2010.

http://www.hpsc.ie/hpsc/A-Z/MicrobiologyAntimicrobialResistance/InfectionControlandHAI/Surveillance/HCAIinlongtermcarefacilities/HALTproject2010/Results/File,4723,en.pdf

Summary

Key Points

- In 2010, the total number of LTCFs in Ireland was 598 (453 (75%) private and 145 (25%) public) (Source: HSE and Nursing Homes Ireland). Therefore, 11.3% of all Irish LTCFs (42% public, 1.7% private) participated
- In Ireland 4,170 residents in 69 LTCF (61 in public and eight in private ownership) participated in HALT (Table 2). Thirty-nine percent (n=27) were classified as general nursing homes, 10% (n=7) as catering for intellectually disabled clients and the remaining 51% (n=35) provided a mix of care, including residential, psychiatric, physically disabled, rehabilitation, palliative, sanatorium or other
- The mean number of beds per LTCF was 67 with a range of 10 to 382 beds and a median of 47. Only 27% of the beds were in single rooms
- A third of residents (34.3%) were aged over 85 years and over half were disorientated (50.6%) with impaired mobility (50.4%)
- Ninety-nine residents had 102 infections (HCAI prevalence of 2.4%, range 0% - 14.8%, median 1.7%) as defined by the McGeer definitions. When physician diagnosis was included as a criterion in each category of infection (adapted McGeer), 149 residents were categorised with 156 infections (HCAI prevalence of 3.7%, range 0% - 22.2%, median 2.7%). Seven patients had more than one HCAI type present
- The three most common infection types were urinary (62 residents, 40% of HCAI), respiratory (43 residents, 28%), and skin infections (31 residents, 20%) as shown in Table 3
- Antimicrobials were prescribed for 426 (10.2%) residents. Antimicrobials were prescribed for the treatment of infection in 245 residents, (57.8%), for prophylaxis in 179 residents, (40.2%), and for an unspecified reason in nine residents (2%)
- The most frequently prescribed antimicrobials were trimethoprim (21.6%), co-amoxiclav (19%), nitrofurantoin (13.2%), flucloxacillin (7.7%) and ciprofloxacin (4.6%). For 245 residents (5.9%) on therapeutic antimicrobials, the most common indications included respiratory infection (92), urinary infection (84)) and skin infection (57). Of the 179 (4.3%) residents on prophylactic antimicrobials, the majority were for the prevention of UTI (89% of all prophylactic antimicrobials prescribed). Indeed, of all antimicrobials prescriptions for the urinary tract, 65.9% were for prophylactic use. Trimethoprim was the most frequently prescribed prophylactic antimicrobial. Seventeen residents (10.5%) on UTI prophylaxis had a urinary catheter in situ
- The study provides an important baseline on HCAI and antimicrobial consumption in Irish LTCFs to inform future preventative strategies. The prevalence of HCAI risk factors in the population surveyed reflects a high dependency level in Irish LTCFs. The low rate of pressure sores (2.9%) and urinary catheter use (5.6%) despite a high proportion of incontinent and/or immobile residents reflects high quality nursing and medical care provided within in the facilities
- The antimicrobial use reported in this study (10.2%), corresponds with the 2009 Irish ESAC results (overall prevalence 10.9%) which is higher than the European overall prevalence of 5.9%
- The proportion of antimicrobials that were prescribed for prophylactic use (42%) is of concern, specifically prophylaxis of UTI in catheterised patients highlighting the need for national antimicrobial stewardship guidelines for LCTFs and education of prescribers
- Participation in this study was the first opportunity for Irish LTCFs to undertake HCAI surveillance using a standardised protocol. The level of participation and enthusiasm demonstrated by staff in all participating LTCFs reflects their commitment to evaluating and improving the care delivered to their residents

Table 2. Breakdown of LTCFs by region and ownership

Category	Count of LTCF-s	Total residence surveyed	Median residents surveyed/LTCF (range)	Median single rooms/100 beds (range)	Median bed occupancy
By Ownership					
Public	61	3706	38 (9 - 359)	16 (0 - 80)	93
Private	8	464	54 (42 - 112)	61 (30 - 87)	93
By HSE Region					
Dublin North East	7	520	51 (10 - 159)	17 (9 - 41)	87
Dublin Mid-Leinster	18	1555	60 (12 - 359)	15 (0 -77)	94
South	9	717	60 (19 - 157)	13 (1 - 60)	90
West	35	1378	29 (9 - 148)	19 (0 - 87)	93
National	**69**	**4170**	**42 (9 - 359)**	**17 (0 - 87)**	**93**

Table 3. HCAI prevalence by infection type using the Adapted McGeer definition

HCAI Type	Number of infections	Percent	HCAI Prevalence*
Urinary Tract Infection	**62**	**39.7**	**1.5**
Respiratory Tract Infection	**44**	**28.2**	**1**
Cold	15	9.6	0.4
Flu	0	0	0
Pneumonia	6	3.8	0.1
Other	23	14.7	0.6
Eye, Ear, Nose, Mouth	**11**	**7.1**	**0.3**
Eye	6	3.8	0.1
Ear	2	1.3	0
Nose	0	0	0
Mouth	3	1.9	0.1
Skin	**31**	**19.9**	**0.7**
Cellulitis	29	18.6	0.7
Fungal	2	1.3	0
Herpes	0	0	0
Scabies	0	0	0
Gastrointestinal Infection	**8**	**5.1**	**0.2**
Systemic	**0**	**0**	**0**
Primary Bloodstream Infection	0	0	0
Unexplained febrile episode	0	0	0
Total	**156**	**100**	**3.6**

The HCAI prevalence of infection is calculated as the number of infected residents per total eligible residents. Please note that seven residents had more than one infection.

9.2.0 Antimicrobial Consumption

Key Points

- The overall outpatient antimicrobial consumption in Ireland for 2010 was 20.3 DID, a 2% decrease from 2009. This rate is mid-to-high in comparison with other European countries
- Penicillins accounted for the largest class of outpatient antimicrobials used (52%), followed by macrolides (18%), tetracyclines (13%), cephalosporins 6%), sulphonamides (6%) and fluoroquinolones 5%)
- Forty-three public acute hospitals provided valid data for 2010
- The median rate of hospital antimicrobial consumption in Ireland for 2010 was 79.3 DBD (range 23.6 – 124.9 DBD). This represents a 4% increase on 2009 hospital antimicrobial consumption. This rate is mid-to-high in comparison with other European countries
- Penicillins accounted for the largest class of hospital antimicrobials used (40 DBD), followed by macrolides (10.8 DBD)
- The fluoroquinolones was the only class of antimicrobials where a reduction in hospital consumption of 6% was recorded between 2009 and 2010 to 5.7 DBD
- Twenty-eight hospitals participated in a point prevalence study in 2010, facilitated by the Irish Antimicrobial Pharmacists Group. The median prevalence of antimicrobial use in Irish hospitals was 36.5%, an increase from 34.4% in 2009

Ireland participates in the European Surveillance of Antimicrobial Consumption (ESAC) project which aims to collect systemic antimicrobial 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.

Outpatient Antimicrobial Consumption
The overall outpatient antimicrobial consumption for Ireland in 2010 was 20.3 DID, a 2% decrease from the previous year's rate of 20.8 DID. In the latest ESAC annual yearbook (2009), the reported range of outpatient antimicrobial usage was 10.2 DID (Romania) to 38.6 DID (Greece). The median for all 32 European countries with reliable data was 19.0 DID and the interquartile range was 15.2 to 23.1 DID.

Since outpatient antimicrobial usage in Ireland has been 18.0 – 22.6 DID for the last ten years, the overall rate in Ireland is mid-to-high in Europe. The peak use was in 2007 and the rate has now declined to a level similar to 2004. There is still marked seasonal fluctuation in use, with the higher levels corresponding to increased influenza activity. January of 2010 had the lowest monthly use since July 2001, most likely due to unusually cold weather leading to limited distribution and demand of drug products in community care. Consumption for the rest of the year was in line with expected use, as modelled on previous years' trends and seasonality (Figure 1).

In Ireland in 2010, outpatient consumption of penicillins accounted for the largest class used (52% of total at 10.7 DID), followed by macrolides (18%, 3.7 DID), tetracyclines (13%, 2.6 DID), cephalosporins (6%, 1.2 DID), sulphonamides (6%, 1.1 DID) and fluoroquinolones (5%, 0.9 DID). Other antimicrobial classes accounted for less than 1% of total use.

Penicillin in combination with beta-lactamase inhibitor (such as co-amoxiclav) accounted for the largest proportion of penicillins (52%). There was a dramatic increase in the consumption of this group of antimicrobials between 2000 (3.2 DID) and 2008 (5.6 DID). However, the rate has declined slightly since then (5.5 DID in 2010 and 2009 from 5.6 DID in 2008). Broad-spectrum penicillin (such as amoxicillin) usage was high (3.2 DID) but showed a slight decline.

There was considerable variability in the overall outpatient antimicrobial usage at county level (16.5 to 28.9 DID) as shown in Figure 2.

Hospital Antimicrobial Consumption
Forty-three public acute hospitals provided valid antimicrobial usage data for 2010. The median rate of antimicrobial consumption was 79.3 DBD (range 23.6 –

124.9 DBD). This was a 4% increase from the previous year's revised rate of 76.0 DBD. These levels are again mid-to-high in Europe.

The largest group of antimicrobials, penicillins, which represent 51% of all inpatient antimicrobial usage, showed an increased in consumption by 6% in 2010 to 40.0 DBD. The use of fluoroquinolones such as ciprofloxacin (representing 7% of all inpatient antimicrobial usage) decreased by 6% in 2010 to 5.7 DBD. Fluoroquinolone usage has been decreasing since 2007 and is the only group of antimicrobials used in hospital care that showed a decline. Consumption of cephalosporins, monobactams and carbapenems (representing 9% of all inpatient antimicrobial usage) increased by 4% in 2010 to 6.9 DBD. Consumption of glycopeptides such as intravenous vancomycin, imidazoles such as intravenous metronidazole and nitrofurans (representing 10% of all inpatient antimicrobial usage) increased by 4% in 2010 to 8.1 DBD. Consumption of erythromycin and related agents (representing 14% of all inpatient antimicrobial usage) increased by 3% in 2010 to 10.8 DBD. Other less frequently used agents in hospitals are tetracyclines, sulfonamides/trimethoprim, aminoglycosides and non-J01 systemic antimicrobials; collectively these drugs, representing 10% of all inpatient antimicrobial usage, increased by 1% in 2010 to 7.6 DBD.

Hospital function was the main driver for the differences in the rates of antimicrobial consumption between hospitals. The rates for regional/tertiary and general hospitals (medians 81.5 and 81.3 DBD) centred just above the median for Ireland, while the rate for single specialist facilities (maternity, orthopaedic or paediatric) was much lower (median 33.9 DBD). The lower median consumption in single speciality hospitals probably reflects differences in case-mix, compared to other

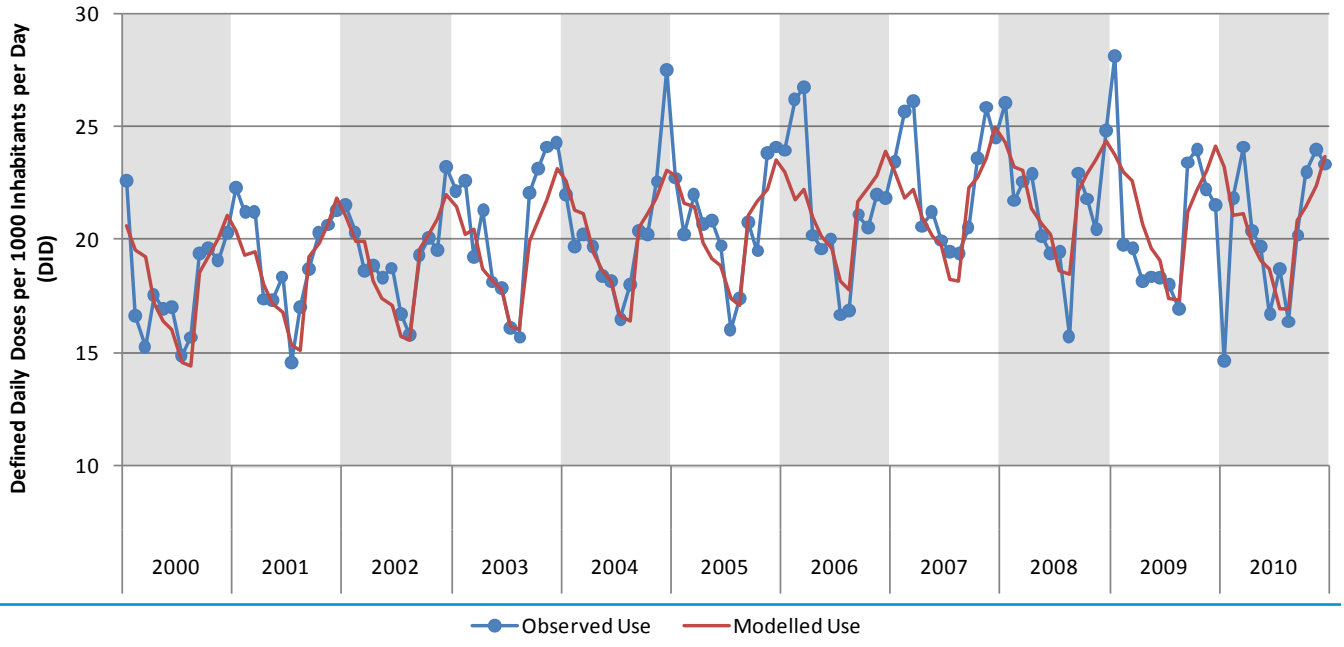


Figure 1. Outpatient antimicrobial consumption in Ireland by month, 2000-2010.

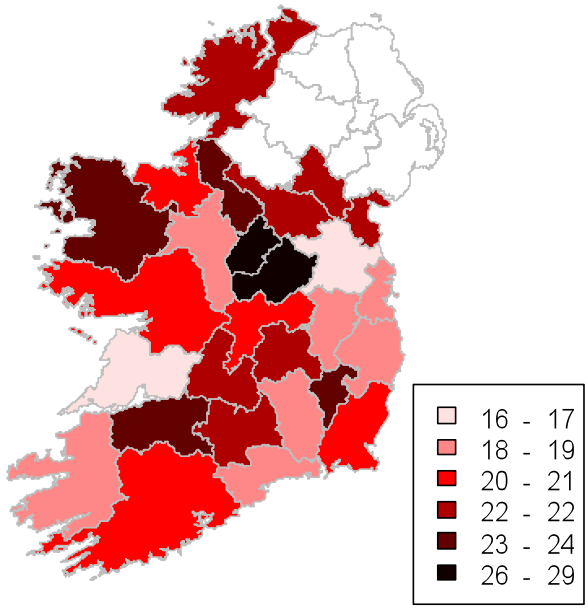


Figure 2. Outpatient antimicrobial consumption in Ireland by county, in DDD per 100 inhabitants per day for 2010.

hospitals. However it may also reflect the fact that DDDs are based on adult dosing and may therefore underestimate antimicrobial consumption in paediatric settings.
There was continued reduction in the proportionate use of intravenously administered specific antimicrobials (those with good oral bioavailability) over total use, from a median of 8.1% in 2009 to 7.5% in 2010. This measure reflects patient acuity and also the hospital function. The change in the level of this measure may reflect local antimicrobial stewardship interventions.

Hospitals Care Point Prevalence Survey 2010
Twenty-eight hospitals participated in a point prevalence study in June and July of 2010 which was facilitated by the Irish Antimicrobial Pharmacists Group (IAPG). Clinical records on 6,414 patients were reviewed, of whom 2,309 received systemic antimicrobial therapy. The median prevalence of antimicrobial use in Irish hospitals was 36.5% compared with 34.4% in 2009.

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 in previous years, though the prevalence of antimicrobial use was higher in 2010. The increase in the number of participating hospitals in the 2010 study is an indication of the value of this methodology to monitor antimicrobial prescribing patterns and to identify targets for antimicrobial stewardship interventions. The IAPG plans to conduct a national point prevalence survey again in 2011.
More detailed analyses of antimicrobial usage data can be found on the www.hpsc.ie website, through "Topics A-Z", under "ESAC". The figures presented in this report may vary from previously published levels owing to methodological changes.

9.3.0 Antimicrobial Resistance

Key Points

- There were 2,170 reports of invasive *E. coli* infection submitted to the European Antimicrobial Resistance Surveillance Network (EARS-Net), an increase of 5% from 2,064 reports in 2009. Resistance to third-generation cephalosporins (3GCs) increased slightly from 7.5% in 2009 to 8.3% in 2010 while extended-spectrum beta-lactamase (ESBL)-production increased from 5.8% to 6.1%. Ciprofloxacin resistance increased slightly from 22.3% to 23.6%. Multi-drug resistant (MDR) *E. coli* also increased from 10.4% to 11.7% over the same period
- There were 1,251 reports of *S. aureus* bloodstream infection (BSI), of which 305 (24.4%) were meticillin-resistant *S. aureus* (MRSA). This represents a significant decrease from 27.1% reported in 2009. Overall, there was a 14% reduction in the number of MRSA BSI reports from 355 in 2009

  For acute hospitals, the rate of MRSA BSI was 0.078 cases per 1,000 patient bed days used, a decrease from 0.089 in 2009. Over the same period, the rate of meticillin-susceptible *S. aureus* (MSSA) stabilised at 0.239 (2009, 0.237)

  Enhanced surveillance data revealed that 23% of the all *S. aureus* BSI isolates were associated with infection of central venous catheters (CVCs) and 6% with infection of peripheral venous catheters
- There were 392 reports of *E. faecium* BSI compared with 397 in 2009. The proportion that was vancomycin-resistant *E. faecium* (VREfm) increased from 38.3% in 2009 to 39.3% in 2010. MDR *E. faecium* decreased from 26.7% to 24.9%
- There were 326 reports of invasive *K. pneumoniae* infections compared to 323 in 2009
- There were 314 reports of invasive *S. pneumoniae* infection compared to 356 in 2009, a decrease of 12%. The national rate of invasive infection was 7.4 compared to 8.4 per 100,000 population in 2009. The biggest reductions in numbers of reports and rates of infection were seen in children 1-4 years, the target population for the conjugate vaccines introduced since September 2008

  The proportion of penicillin-non-susceptible *S. pneumoniae* (PNSP) decreased from 20.2% in 2009 to 18.2% in 2010; the proportion of isolates with high-level resistance to penicillin decreased slightly from 5.6% in 2009 to 4.8% in 2010 while intermediate level resistance decreased from 13.8% to 12.7%
- Serotype data were available on 278 of 314 invasive pneumococcal isolates (86%) and results indicate good coverage for both the 23-valent polysaccharide (PPV23) and 13-valent conjugate (PCV13) vaccines in their target populations
- There were 222 reports of invasive *P. aeruginosa* infections compared to 248 in 2009, a decrease of 10%
- Enhanced surveillance data were provided from 2,562 cases of invasive infection from 14 laboratories, representing 51% of all cases submitted to EARS-Net in 2010
- See http://www.hpsc.ie for further details of EARS-Net, antimicrobial resistance and enhanced BSI 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 2010, all 43 microbiology laboratories (40 by year-end) participated in EARS-Net resulting in complete coverage of the Irish population.

Escherichia coli

There were 2,170 reports of invasive *E. coli* infection (2,163 from blood and seven from CSF) from 2,126 patients, an increase of 5.1% from 2,064 reports in 2009. See Table 1 for the proportion of *E. coli* isolates resistant to the four "indicator" antimicrobials/ antimicrobial 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 increased from 22.3% in 2009 to 23.6% in 2010 (non-significant; Chi^2=1.08, P=0.30). 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 1), but appears to have levelled off at approximately 23% over the past two years. The proportion of isolates with resistance to 3GCs increased slightly from 7.5% in 2009 to 8.3% in 2010, with the proportion of 3GC-resistant isolates increasing significantly between 2002 and 2010 (Chi^2_{trend}=107.1, P<0.0001). Resistance to all aminoglycosides (including gentamicin) increased from 7.7% in 2009 to 9.4% in 2010 (borderline significant; Chi^2=4.2, P=0.041), with the proportion of aminoglycoside-resistant isolates increasing significantly between 2002 and 2010 (Chi^2_{trend}=88.8, P<0.0001).

Extended spectrum beta-lactamases (ESBLs) were detected in 129 (6.1%) of 2,129 isolates tested. Although the increase in ESBLs from 5.8% in 2009 was not found to be significant (Chi^2=0.16, P=0.69), the increasing trend since 2004 (1.1%) is highly significant (Chi^2_{trend}=44.1, 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 antimicrobials and have emerged as important causes of healthcare associated infections.

Of 2,159 isolates tested against all four "indicator" antimicrobials, 253 (11.7%) 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}=118.2, P<0.0001) from 2.4% in 2002 when surveillance began. However, the increase from 10.4% in 2009 was not significant (Chi^2=1.9, P=0.17).

Females were approximately 1.2-times more likely to have an invasive *E. coli* infection than males (z=4.4, P<0.0001). The frequency of invasive *E. coli* infection increased with age with the majority of infections (n=1,581; 73%) occurring in adults over 60 years. The median age was 72 years (95%CI, 71-73).

Staphylococcus aureus

There were 1,251 reports of *S. aureus* bloodstream infection (BSI) from 1,207 patients, of which 305 (24.4%) were meticillin-resistant *S. aureus* (MRSA) (Table 1).

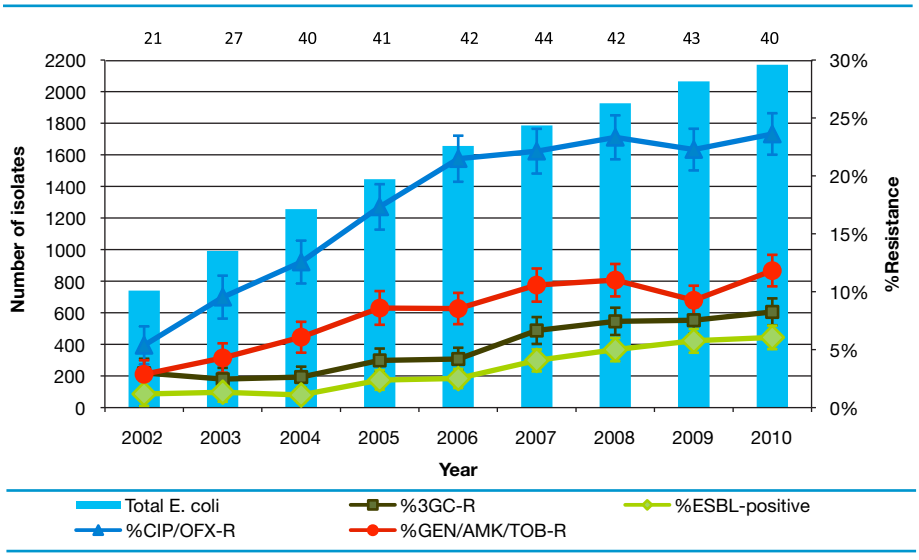


Figure 1. Trends for E. coli – total numbers of E. coli and percentage resistance to 3GCs, ciprofloxacin/ofloxacin (CIP/OFX) and gentamicin/amikacin/tobramycin (GEN/AMK/TOB), and percentage ESBL-positive with 95% confidence intervals.

The numbers of participating laboratories by year-end are indicated above the bars

Table 1. Summary of EARSS data by pathogen and year, 1999-2010

Pathogen	Year											
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number laboratories by year-end				21	27	40	41	42	44	42	43	**40†**
E. coli												
Number of isolates				741	991	1256	1445	1656	1785	1926	2064	2170
Ampicillin-R*				62.2%	61.9%	65.0%	67.6%	70.7%	68.3%	70.4%	68.7%	68.4%
3GC-R*				3.0%	2.5%	2.6%	4.1%	4.2%	6.7%	7.4%	7.5%	8.3%
ESBL-producers*				1.2%	1.3%	1.1%	2.4%	2.5%	4.1%	5.0%	5.8%	6.1%
Ciprofloxacin-R*	*No data*	*No data*	*No data*	5.4%	9.5%	12.6%	17.3%	21.5%	22.1%	23.3%	22.3%	23.6%
Gentamicin-R*				2.7%	3.9%	5.7%	8.5%	7.7%	9.9%	10.2%	7.7%	9.4%
Gentamicin/Amikacin/Tobramycin-R*				2.9%	4.3%	6.1%	8.6%	8.6%	10.6%	11.0%	9.3%	11.8%
Imipenem/meropenem-R*				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
MDR*				2.4%	3.8%	5.6%	7.7%	9.0%	11.4%	12.1%	10.4%	11.7%
Number laboratories by year-end	12	19	20	23	28	41	42	42	44	43	43	**40†**
S. aureus												
Number of isolates	510	639	815	1042	1140	1323	1424	1412	1393	1303	1309	1251
Number Meticillin-R (or MRSA)	198	249	337	445	480	553	592	592	536	439	355	305
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%	24.4%
Number VISA	0	0	0	0	0	0	0	2	1	0	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%	0.0%
Number laboratories by year-end				21	27	40	41	42	44	42	43	**40†**
E. faecium												
Number of isolates				85	135	187	224	265	330	406	397	392
Ampicillin-R*				88.9%	91.0%	95.7%	92.3%	93.9%	93.1%	95.1%	92.9%	95.6%
Vancomycin-R	*No data*	*No data*	*No data*	11.1%	19.4%	23.2%	31.7%	37.1%	33.4%	35.7%	38.3%	39.3%
HLG-R*				16.7%	53.8%	58.0%	51.4%	44.3%	35.2%	28.1%	39.1%	39.6%
MDR*				3.7%	11.4%	18.5%	25.6%	25.6%	22.7%	16.2%	26.7%	24.9%
Number laboratories by year-end								36	39	41	42	**40†**
K. pneumoniae												
Number of isolates								217	244	310	323	326
Ampicillin-R*								97.7%	99.2%	99.7%	99.7%	99.1%
3GC-R*								10.2%	9.9%	11.4%	11.2%	10.5%
ESBL-producers*								8.6%	3.7%	7.7%	8.2%	5.0%
Ciprofloxacin-R*	*No data*	*No data*	*No data*	*No data*	*No data*	*No data*	*No data*	15.3%	18.1%	12.8%	13.0%	10.5%
Gentamicin-R*								7.8%	9.9%	10.7%	11.1%	6.8%
Gentamicin/Amikacin/Tobramycin-R*								9.2%	11.1%	10.7%	11.1%	7.1%
Imipenem/meropenem-R*								0.0%	0.6%	0.0%	0.0%	0.0%
MDR*								11.2%	11.9%	10.6%	11.9%	8.0%
Number laboratories by year-end	12	19	20	23	28	41	42	42	44	42	43	**40†**
S. pneumoniae												
Number of isolates	157	201	245	278	364	400	401	407	438	447	356	314
Penicillin-NS*	19.1%	12.9%	12.2%	11.5%	11.8%	10.3%	11.7%	15.7%	17.4%	23.1%	20.2%	18.2%
of which: HLR	*0.0%*	*3.5%*	*1.6%*	*1.4%*	*2.2%*	*1.8%*	*3.0%*	*2.9%*	*5.7%*	*6.0%*	*5.6%*	*4.8%*
Int	*16.6%*	*8.0%*	*10.6%*	*9.7%*	*8.8%*	*7.0%*	*8.7%*	*12.5%*	*11.0%*	*16.8%*	*13.8%*	*12.7%*
Erythromycin-R*	14.0%	12.0%	12.5%	12.7%	11.6%	14.4%	12.1%	16.1%	16.4%	16.7%	17.3%	15.7%
Number laboratories by year-end				21	27	40	41	42	44	42	43	**40†**
E. faecalis												
Number of isolates				168	218	242	290	294	280	301	289	298
Ampicillin-R*	*No data*	*No data*	*No data*	8.1%	5.1%	0.8%	3.5%	4.5%	2.2%	0.7%	2.1%	2.0%
Vancomycin-R				2.4%	1.4%	1.3%	2.5%	3.7%	2.9%	3.7%	0.7%	0.3%
HLG-R*				38.5%	33.9%	41.3%	44.4%	42.4%	36.9%	30.5%	36.7%	29.7%
Number laboratories by year-end								36	39	41	42	**40†**
P. aeruginosa												
Number of isolates								128	177	199	248	222
Pipericillin/tazobactam-R*								9.4%	12.6%	9.7%	8.9%	10.0%
Ceftazidime-R*								10.6%	11.8%	8.7%	11.8%	9.2%
Imipenem/meropenem-R*	*No data*	*No data*	*No data*	*No data*	*No data*	*No data*	*No data*	11.8%	12.2%	9.3%	10.2%	8.3%
Ciprofloxacin-R*								18.0%	22.9%	21.8%	12.1%	13.2%
Gentamicin-R*								10.2%	13.3%	9.0%	7.7%	8.7%
MDR*								9.5%	12.4%	11.1%	6.4%	6.5%

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
* Not all isolates tested
† In 2010, 3 laboratories stopped processing blood cultures, however coverage of acute hospitals remained at 100%

This represents the lowest annual proportion since surveillance began in 1999. In 2009, the proportion was 27.1%. The decrease observed between 2009 and 2010 was not significant (Chi^2=2.5, P=0.11). This is the fourth successive year in which a decrease has been observed and the overall downward trend over this time period is highly significant (Chi^2_{trend}=129.4, P<0.0001) (Figure 2). Overall, there was a 14.1% reduction in the number of MRSA BSI reports compared with 2009 (305 vs. 355). The total number of meticillin-susceptible *S. aureus* (MSSA) BSI reports levelled off in 2010 compared to 2009 (946 vs. 954).

Despite the decrease in numbers and proportion of MRSA, Ireland still had one of the higher proportions of MRSA in Europe in 2010 (see http://ecdc.europa.eu/en/activities/surveillance/EARS-Net/Pages/Database.aspx for European data, including EARS-Net tables, charts and maps), but 2010 marked the first time that Ireland and the UK appeared in orange (with MRSA ≤25%) on the EARS-Net map (Figure 3).

No MRSA isolates with reduced susceptibility to vancomycin were detected at the National MRSA Reference Laboratory.

The MRSA rate for all acute hospitals in 2010 was 0.078 cases per 1,000 patient bed days used, representing a decrease from 0.089 in 2009, while the MSSA rate remained relatively stable at 0.239 (2009, 0.237) [Note: the rates are 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].

In patients with laboratory-confirmed *S. aureus* BSI, the probability that the infecting organism was MRSA as compared to MSSA was over 2-times greater in patients aged ≥65years than in those aged <65 years (RR=2.2, Chi^2=58.9, P<0.0001).

Table 2. Age and gender breakdown of patients by organism with major resistance profiles (data from 16 laboratories participating in enhanced surveillance). Proportion of isolates detected <48 hours and >5 days post-admission is also shown.

	Total for 2010	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	**174**	36%	66.4	2%	64%	36%	53%
MSSA	**496**	35%	57.5	4%	45%	59%	25%
PNSP	**34**	44%	65.6	3%	59%	91%	6%
PSSP	**138**	48%	58.6	9%	51%	88%	9%
FQREC	**274**	49%	70.4	0%	70%	59%	31%
FQSEC	**863**	57%	67.5	1%	63%	68%	23%
VRE	**85**	45%	59.8	0%	44%	8%	87%
VSE	**251**	43%	63.0	2%	55%	35%	53%
KPN	**151**	47%	61.9	1%	46%	44%	43%
PAE	**96**	36%	67.3	0%	59%	49%	43%

Abbreviations used:
FQREC, Fluoroquinolone-resistant Escherichia coli; FQSE, Fluoroquinolone-sensitive Escherichia coli; KPN, Klebsiella pneumoniae; MRSA, Meticillin-resistant Staphylococcus aureus; MSSA, Meticillin-sensitive Staphylococcus aureus; PAE, Pseudomonas aeruginosa; PNSP, Penicillin-non-susceptible Streptococcus pneumoniae; PSSP, Penicillin-susceptible Streptococcus pneumoniae; VRE, Vancomycin-resistant Enterococci; VSE, Vancomycin-sensitive Enterococci

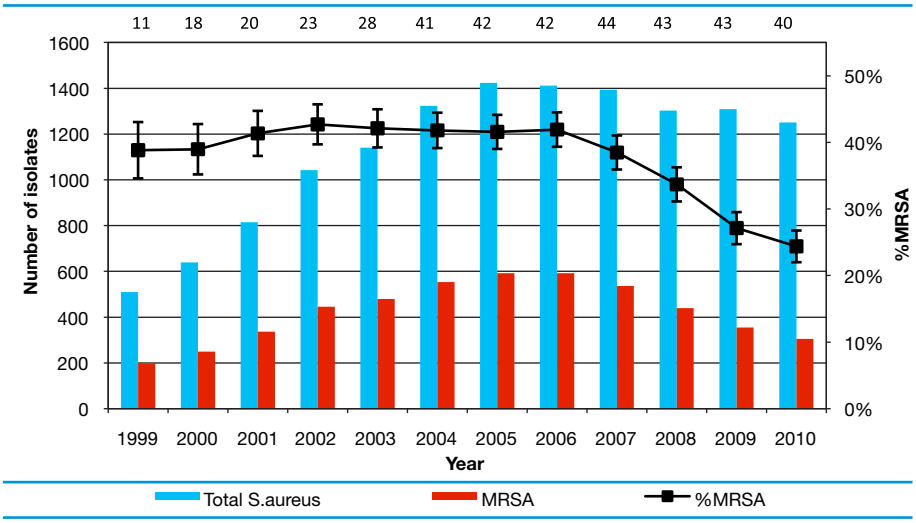


Figure 2. Trends for S. aureus – total numbers of S. aureus/MRSA and percentage MRSA with 95% confidence intervals
The numbers of participating laboratories by year-end are indicated above the bars

Males were approximately 1.7-times more likely to get an invasive *S. aureus* infection (1.8-times for MRSA, z=5.1, P<0.0001; 1.7-times for MSSA, z=8.8, P<0.0001) than females (z=10.0, P<0.0001). The frequency of invasive *S. aureus* infection increased with age, with the majority of infections (n=703; 56%) occurring in adults over 60 years. The median age for patients with an MRSA infection was 72 years (95%CI, 70-74) while the median age for patients with MSSA was 59 years (95%CI, 57-61). This was considered to be a significant difference as the confidence intervals did not overlap.

Enterococcus faecium

There were 392 reports of *E. faecium* BSI from 382 patients, a decrease of 1.3% from 397 reports in 2009. See Table 1 for the annual proportions of *E. faecium* isolates resistant to the three "indicator" antimicrobials by year since 2002. Vancomycin-resistant *E. faecium* (VREfm) accounted for 38.3% of isolates. This represents a slight increase from 37.3% in 2009. 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 4). Since

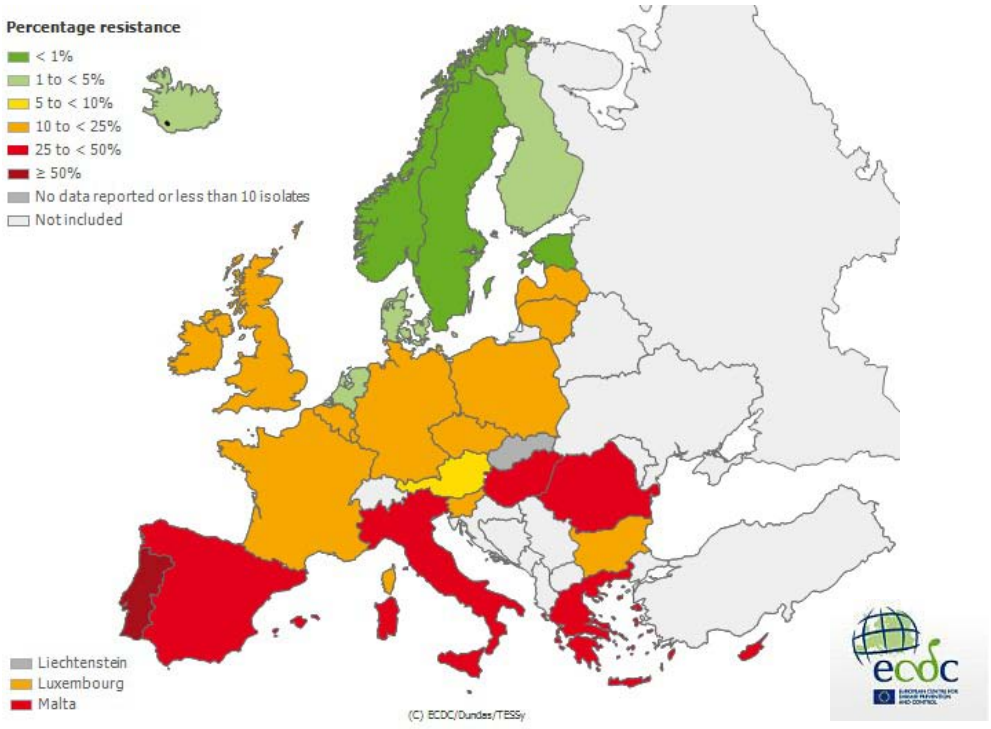


Figure 3. Distribution of MRSA in EARS-Net countries in 2010

Map downloaded from ECDC's TESSy database on 8/11/2011:
http://ecdc.europa.eu/en/activities/surveillance/EARS-Net/Pages/Database.aspx

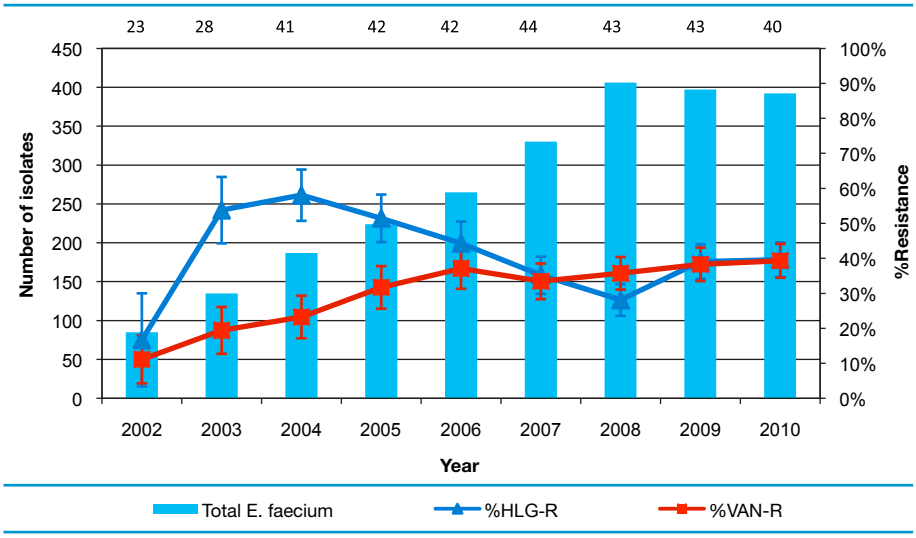


Figure 4. Trends for E. faecium – total numbers of E. faecium and percentage resistance to high-level gentamicin (HLG) and vancomycin (VAN) with 95% confidence intervals

The numbers of participating laboratories by year-end are indicated above the bars

2008, Ireland has had the highest proportion of VREfm in Europe. This remained the case in 2010 (38.3%), with the next highest proportions reported by Portugal (23.9%) and Greece (22.5%) (Figure 5).

Resistance to high-level gentamicin increased marginally from 39.1% in 2009 to 39.6% in 2010 (Figure 3).

Of 377 isolates tested against all three "indicator" antimicrobials, 94 (24.9%) were resistant to all three and therefore classed as multi-drug resistant (MDR). This represents a decrease from 26.7% in 2009 (non-significant; Chi^2=0.29; P=0.59).

Males were approximately 1.3-times more likely to have an invasive *E. faecium* infection than females (z=2.75, P=0.006). The frequency of invasive *E. faecium* infection increased with age with the majority of infections (n=250; 65%) occurring in adults over 60 years. The median age was 66 years (95%CI, 63-67).

Klebsiella pneumoniae

There were 326 reports of invasive *K. pneumoniae* infection (all from blood) from 318 patients compared to 323 reports in 2009. See Table 1 for the proportion of *K. pneumoniae* isolates resistant to the four "indicator" antimicrobials (as for *E. coli* above), plus imipenem/meropenem, since 2006.

There were no significant changes in the resistance proportions in 2010 compared to 2009. No invasive isolates with resistance to imipenem/meropenem were reported in 2010.

Three isolates were reported as ampicillin-susceptible, which either represents an isolate that was misidentified as *K. pneumoniae* or misclassified as ampicillin-susceptible, as all *Klebsiella spp.* are inherently resistant to this antimicrobial.

ESBLs were detected in 16 (5.0%) of 317 isolates tested, representing a decrease from 8.2% in 2009.

Twenty-six, or 8.0%, of 324 isolates tested against all four "indicator" antimicrobials were identified as MDR, including eight with resistance to all four, a decrease from 11.9% in 2009.

Males were approximately 1.2-times more likely to have an invasive *K. pneumoniae* infection than females (z=1.67, P=0.095). The frequency of invasive *K. pneumoniae* infection increased with age with the majority of infections (n=198; 61%) occurring in adults over 60 years. The median age was 63 years (95%CI, 62-66).

Streptococcus pneumoniae

There were 314 reports of invasive *S. pneumoniae* infection (303 from blood and 11 from CSF) from 310 patients, a decrease of 11.8% from 356 reports in 2009. 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 18.2% (n=57) of all isolates tested against penicillin (n=313) in 2010. Of the 57 PNSP isolates, 40 were intermediately-resistant (Int; MIC=0.1-1.0mg/L) and 15 were high-level resistant (HLR; MIC >1.0mg/L) to penicillin. No penicillin MICs were available for two non-susceptible (NS) isolates. The proportion of PNSP in Ireland increased significantly over the four years from 10.3%

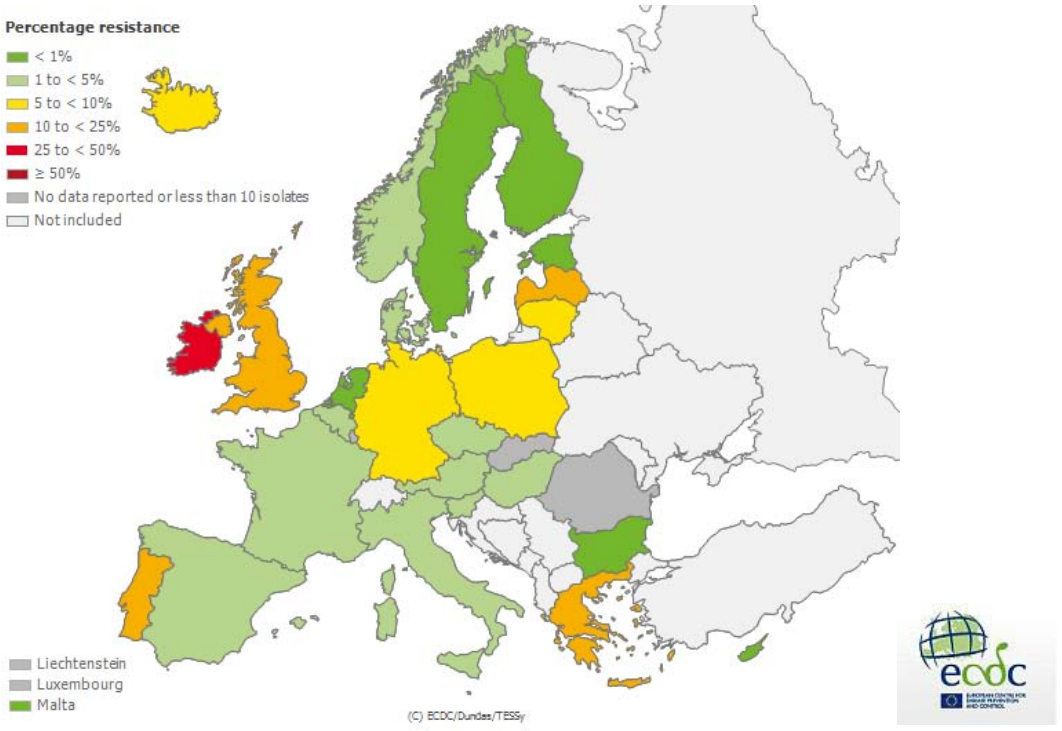


Figure 5. Distribution of vancomycin-resistant E. faecium in EARS-Net countries in 2010

Map downloaded from ECDC's TESSy database on 8/11/2011:
http://ecdc.europa.eu/en/activities/surveillance/EARS-Net/Pages/Database.aspx

in 2004 to 23.1% in 2008 (Chi^2_{trend}=31.5, P<0.0001) but has decreased over the past two years (Figure 6). The proportion of isolates that were HLR to penicillin decreased slightly from 5.6% in 2009 to 4.8% in 2010. Forty-six (15.7%) of 293 isolates were resistant to erythromycin, a decrease from 17.3% in 2009.

In 2010, Ireland once again had one of the highest proportions of PNSP, and high-level resistance 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=293), 37 (12.6%) were simultaneously PNSP (25 Int, 11 HLR, 1 NS) and erythromycin-resistant in 2010 compared with 11.9% in 2009.

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 the Royal College of Surgeons in Ireland (RCSI), Beaumont Hospital, Children's University Hospital, Temple St and HPSC with the aim of providing baseline serotyping data on invasive *S. pneumoniae* isolates. Thirteen valent pneumococcal conjugate vaccine (PCV13) replaced PCV7 as of September 2010. Serotype data were available on 278 pneumococcal isolates from 30 laboratories (of 31 that reported pneumococcal isolates to EARS-Net in 2010) representing 86% of all pneumococcal isolates reported in 2010. Overall, 237 (85%) isolates belonged to serotypes covered by the pneumococcal polysaccharide vaccine (PPV23; target population: adults ≥65 years and at risk groups), while 74 (27%) and 150 (54%) were covered by the conjugate vaccines (PCV7 and PCV13; target population: children <2 years), respectively. From adults ≥65 years, 114 of 139 (82%) isolates were covered by PPV23, while from children <2 years, 4 of 21 (19%) isolates were covered by PCV7 and 15 of 21 (71%) isolates were covered by PCV13. Of the 50 PNSP isolates for which serotyping data were available, 25 of 32 (78%) from adults ≥65 years were covered by PPV23 while the one isolate from a children <2 years was covered by both PCV7 and PCV13. 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.

The rate of invasive pneumococcal disease (IPD) in Ireland in 2010 was estimated to be 7.4 per 100,000 population compared with 8.4 in 2009 (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 (24.6 per 100,000) and adults aged 75-79 years (33.5) and ≥80 years (59.3) (Figure 7). The rates in all age groups decreased compared with the data for 2009 with the exception of the ≥80 years group, which increased from 53.1 to 59.3. The biggest drops were seen in the 75-79 and the 2-4 year age groups,

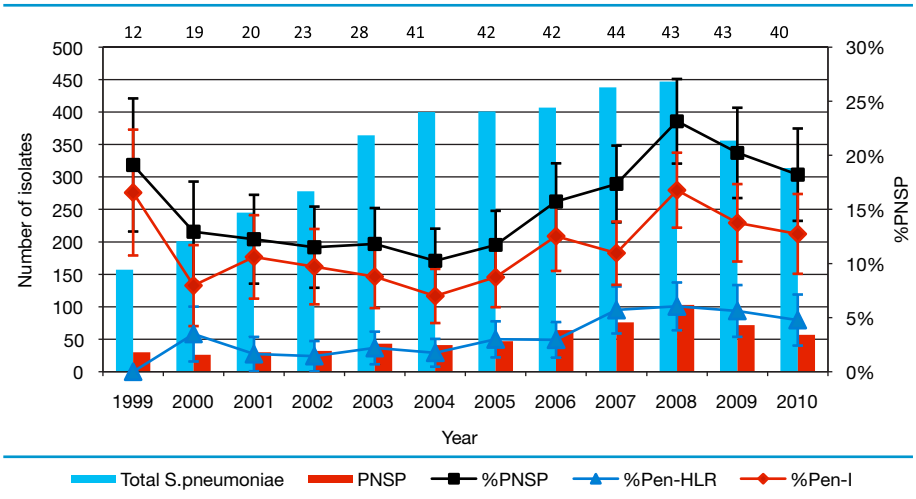


Figure 6. Trends for S. pneumoniae – total numbers of S. pneumoniae/PNSP and percentage PNSP with 95% confidence intervals

HLR, High-level resistant; I, Intermediately resistant

The numbers of participating laboratories by year-end are indicated above the bars

which decreased from 44.3 to 33.5 and 11.6 to 4.4, respectively.

Males were approximately 1.2-times more likely to have an invasive *S. pneumoniae* infection [0.9-times for PNSP, z=0.4, P=0.69; 1.3-times for penicillin-susceptible *S. pneumoniae* (PSP), z=1.89, P=0.06] than females (z=1.47, P=0.14). None of these findings were significant. The median age was 62.5 years (95%CI, 59-65).

Enterococcus faecalis

There were 298 reports of *E. faecalis* BSI from 288 patients, an increase of 3.1% from 289 reports in 2009. See Table 1 for the annual proportions of *E. faecalis* isolates resistant to the three "indicator" antimicrobials (ampicillin, vancomycin and high-level gentamicin) by year since 2002 when surveillance began. Vancomycin-resistant *E. faecalis* (VREfa) accounted for 0.3% of isolates, a decrease from 0.7% in 2009 (non-significant; Chi^2=0.37; P=0.54).

Six isolates were reported as 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 1.3-times more likely to have an invasive *E. faecalis* infection than females (z=1.96, P=0.054). The frequency of invasive *E. faecalis* infection increased with age with the majority of infections (n=182; 65%) occurring in adults over 60 years. The median age was 66 years (95%CI, 64-71).

Pseudomonas aeruginosa

There were 222 reports of invasive *P. aeruginosa* infection (220 from blood and two from CSF) from 219 patients, a decrease of 10.5% from 248 reports in 2009. See Table 1 for the proportion of *P. aeruginosa* isolates resistant to the five "indicator" antimicrobials/antimicrobial classes [piperacillin-tazobactam, ceftazidime, carbapenems (meropenem or imipenem), fluoroquinolones (ciprofloxacin or ofloxacin) and gentamicin] since 2006. There were no significant changes in the resistance proportions in 2010 compared to 2009.

Fourteen (6.5%) of 215 isolates tested against all five "indicator" antimicrobials were MDR, including one with resistance to all five (2009, 6.4%).

Males were approximately 1.2-times more likely to have an invasive *P. aeruginosa* infection than females (non-significant; z=1.21, P=0.23). The frequency of invasive *P. aeruginosa* infection increased with age with the majority of infections (n=143; 64%) occurring in adults over 60 years. The median age was 68 years (95%CI, 65-71).

Enhanced Surveillance

The enhanced surveillance programme involves voluntary participation by hospitals that provide additional demographic, risk factor and clinical data on invasive pathogens causing BSI. The enhanced surveillance programme was established in 2004. In 2010, there were 2,562 individual records (cases or isolates under the EARS-Net definition) submitted from 14 participating laboratories (compared to 2,228 submitted in 2009). The total number of records thus far for 2010 represents 51% of the total core EARS-Net dataset. Demographic and other basic data for the major resistance profiles of EARS-Net pathogens are shown in Table 2.

A detailed analysis of the changes over time of the factors affecting *S. aureus* BSI showed that the decrease in clinically significant MRSA BSI acquired in the reporting hospital (representing 75% of all MRSA isolates) over the previous three years was predominantly among older age groups. The decrease in MRSA BSI was also among cases in which central venous catheters (CVCs) or respiratory tract infections were primary sources. There was a corresponding increase in MSSA rates over the same time. The rates of change for both MRSA and MSSA stabilised in 2010.

Enhanced surveillance can offer input into future infection control measures both nationally and in those

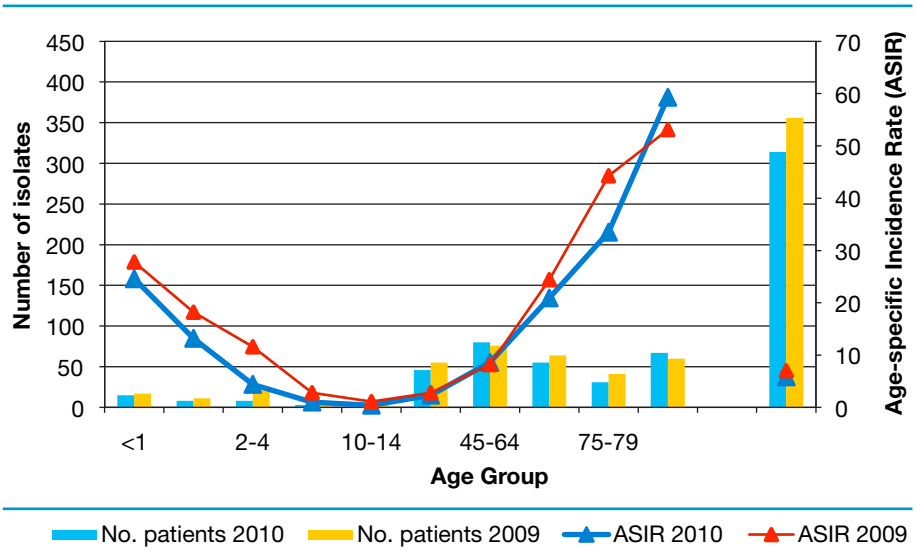


Figure 7. Numbers and age-specific incidence rates of patients with invasive S. pneumoniae infection in 2010 compared with 2009

hospitals that participate in the surveillance scheme. One aspect of participation in enhanced surveillance is that it can help to put into context levels of preventable infections. For example, in 2010, 23% of the all *S. aureus* BSI isolates were associated with infection of CVCs and 6% with infection of peripheral venous catheters.

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

Conclusion

Improvements in infection prevention and control resources and interventions, along with hospital antimicrobial stewardship programmes, may have contributed to reducing the burden of MRSA BSI 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, antimicrobial resistance remains a major problem in this country. Of particular concern, are the high numbers and proportions of vancomycin resistant *E. faecium* as Ireland has by far the highest level of resistance in the EU. In addition, the proportion of *E. coli* isolates that exhibit resistance to fluoroquinolones has increased. ESBL production has increased in *E. coli* and *K. pneumoniae*.

AMR is also an issue in other bacterial species as well as in sites other than blood and/or CSF for which national surveillance data are not currently available in Ireland. There are continued threats posed by emerging resistance mechanisms in these and other bacterial pathogens (e.g. carbapenemases in 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 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 antimicrobial 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 September 2011. 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

10

Computerised Infectious Disease Reporting System (CIDR)

10. Computerised Infectious Disease Reporting (CIDR)

Summary

- 2010 represented the 7th year of continued CIDR live operation
- Although the number of notifications in 2010 was lower than previous two years an increased amount of information was collected on a number of these diseases as increased enhanced surveillance was implemented on CIDR
- CIDR implementations continued through 2010 at lab and public health levels as well as including TB notifications from the beginning of 2011
- The CIDR application software was significantly upgraded during the year to improve the usability of the system and to increase performance. The efficiency of software development was much improved by relocating this within HPSC
- ISO 27001 accreditation for Information Security Management was retained following a full re-certification audit

Nearly 13,000 notifications were recorded in CIDR in 2010. This was a significant drop on 2009 when figures peaked due to the H1N1 influenza pandemic in that year. On the other hand the enhanced surveillance dataset on a number of diseases was extended, requiring work to enable this to be captured through the CIDR application but also to allow it to be retrieved through reporting.

CIDR training

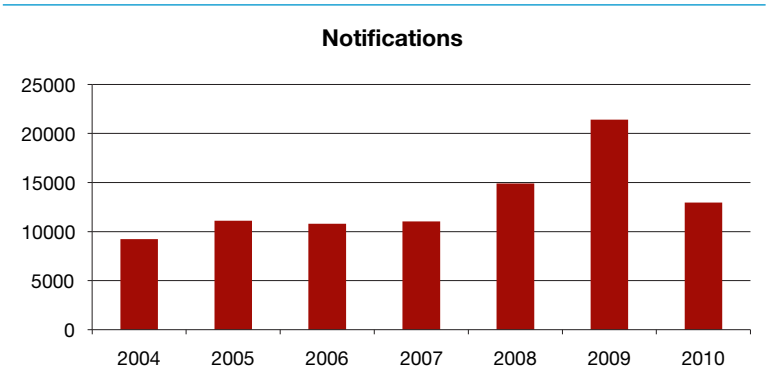
In parallel with continuing CIDR operations and additional implementations, the CIDR training programme continued through the year with a number of sessions for 29 Public Health and laboratory users through the year.

New developments through the year

2010 saw the development and deployment of a major upgrade to the CIDR application software. CIDR release 2.3 included a number of significant enhancements to the CIDR application including breaking up enhanced surveillance datasets into sections / pages to improve usability but also to reduce the volume of network traffic that had proved problematic towards the latter stages of the containment phase of the H1N1 influenza pandemic in 2009. The validation process for laboratory data uploaded to CIDR was also improved. This release also provided improved compatibility for the use of web browsers other than Internet Explorer 6 (including IE7 and 8 as well as Firefox). There were also changes to the CIDR 'History' database to potentially facilitate future archiving of data as well a number of bugfixes.

CIDR Impementations

Three areas of significant CIDR implementation activity through 2010 included the ongoing effort to complete implementation in the laboratories. Three clinical microbiology hospital laboratories went 'live' on CIDR



in 2010 (Naas, Loughlinstown and Limerick Regional Hospitals). The CIDR implementation in the National Salmonella Reference Laboratory in Galway needed to be revisited when that laboratory moved from a MS Access-based system to the iSOFT Laboratory Information Management System. The TB laboratory in St James's Hospital was set up on CIDR as a new reference laboratory as part of the preparation for TB notifications on CIDR.

CIDR implementation in the Department of Public Health in the Mid West continued to be held up by resourcing difficulties in that region but a partial implementation was agreed that allowed the clinical microbiology lab in the Regional Hospital to begin to upload their notifications from October. Designated staff within HPSC managed this surveillance / notification data in CIDR on behalf of the Department of Public Health in the Mid West pending resolution of their local issues.

The partial CIDR go-live in the Mid West allowed the work to proceed on preparing for TB notifications to be included on CIDR from the beginning of 2011. In addition to the work already mentioned with the TB Reference Laboratory, this involved setting up TB as a disease within CIDR together with the enhanced surveillance questions associated with this disease and the reporting changes to enable this information to be retrieved.

As well as preparing enhanced surveillance data questions for TB, 2010 also saw the implementation of enhanced surveillance on CIDR for cryptosporidiosis, brucellosis and botulism. It also saw the 'normalisation' of influenza enhanced surveillance on CIDR for the 2010/2011 influenza season after the particular challenges of the H1N1 influenza pandemic in 2009. A further significant development in 2010 was the implementation of a reporting solution to allow salmonella laboratory results uploaded to CIDR from the National Salmonella Reference Laboratory to be retrieved through reporting. Although CIDR was originally designed and built to record and retrieve information about cases / events of infectious disease, there has been an increasing need to be able to retrieve lab data at lab test / result level.

CIDR Information Governance

A major achievement in 2010 was the retention of ISO 27001 certification for Information Security Management following a full 3 yearly accreditation audit. This accreditation underscores the recognition of the need to protect the sensitive health information in CIDR and it has proved useful in reassuring patient groups and health professionals that the confidentiality of this information is appropriately managed.

Communications

The CIDR National Steering Group and the CIDR User Group continued to convene by teleconference through 2010 to provide governance and user feedback to the CIDR team. 2010 saw the retirement of Dick McMahon from the Steering Group after 8 years of valuable contribution to CIDR. Niall Sinnott from the HSE ICT Programme Management Office took up Dick's position on the Steering Group from the beginning of 2011.

11

Appendix 1
Notifiable Infectious Diseases in Ireland

Notes:

Figures for the year 2010 presented in this appendix were extracted from the Computerised Infectious Disease Reporting (CIDR) system in September 2011. 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, since these diseases were not reported via the CIDR system during 2010. Separate databases are used to collate data on these diseases. Details on the epidemiology of these diseases can be found in separate chapters in this document.

Table A1.1. List of notifiable infectious diseases and their respective causative pathogens (relevant to 2010) 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
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, 2008-2010 and crude incidence rates of diseases, 2010

Infectious Disease	2008	2009	2010	CIR* 2010
Acute infectious gastroenteritis	4169	4357	4290	101.18
Bacillus cereus food-borne infection or intoxication	0	1	0	0.00
Bacterial meningitis (not otherwise specified)	40	40	42	0.99
Botulism	7	0	0	0.00
Brucellosis	3	0	2	0.05
Campylobacter infection	1736	1807	1661	39.18
Clostridium perfringens (type A) food-borne disease	1	1	0	0.00
Creutzfeldt Jakob disease	2	5	3	0.07
Cryptosporidiosis	415	445	294	6.93
Echinococcosis	2	1	1	0.02
Enterohaemorrhagic *Escherichia coli*	238	255	224	5.28
Giardiasis	71	61	57	1.34
Haemophilus influenzae disease (invasive)	22	43	28	0.66
Hepatitis A (acute)	42	50	46	1.08
Hepatitis B (acute and chronic)	919	803	645	15.21
Hepatitis C	1516	1241	1239	29.22
Influenza	473	484**	210	4.95
Legionellosis	48	9	11	0.26
Leptospirosis	29	24	17	0.40
Listeriosis	13	10	10	0.24
Malaria	82	90	82	1.93
Measles	55	162	403	9.51
Meningococcal disease	168	147	114	2.69
Mumps	1380	3620	293	6.91
Noroviral infection	1768	1634	1927	45.45
Pandemic H1N1 (2009)†	0	4571	65	1.53
Paratyphoid	8	10	5	0.12
Pertussis	104	78	114	2.69
Q fever	13	17	9	0.21
Rubella	40	19	24	0.57
Salmonellosis	449	333	356	8.40
Shigellosis	75	70	60	1.42
Staphylococcal food poisoning	1	1	0	0.00
Streptococcus group A infection (invasive)	70	60	68	1.60
Streptococcus pneumoniae infection (invasive)	465	432	391	9.22
Tetanus	2	0	0	0.00
Toxoplasmosis	49	37	37	0.87
Typhoid	5	9	8	0.19
Viral encephalitis	5	5	22	0.52
Viral meningitis	97	142	169	3.99
Yersiniosis	3	3	3	0.07
Total	**14585**	**20593**	**12930**	

*Crude incidence rate per 100,000 total population
** 134 of these influenza cases in 2009 were possibly due to 2009 pandemic influenza as they occurred between weeks 17 and 52, 2009, but were reported as influenza.
†The influenza A (H1N1) 2009 pandemic was declared over by the WHO on 10/08/2010. Any new influenza A (H1N1) 2009 cases since that time are notified under the disease Influenza. The disease Pandemic (H1N1) 2009 was only relevant for the pandemic period, 25/04/2009 – 10/08/2010.

Table A1.3 Number of notifiable infectious diseases by HSE area, 2010

Infectious Disease	HSE-E	HSE-M	HSE-MW	HSE-NE	HSE-NW	HSE-SE	HSE-S	HSE-W	Total
Acute infectious gastroenteritis	1132	391	205	218	330	741	670	603	4290
Bacterial meningitis (not otherwise specified)	13	2	4	1	6	6	4	6	42
Brucellosis	*	*	*	*	*	*	*	*	2
Campylobacter infection	534	126	159	106	92	208	242	194	1661
Creutzfeldt Jakob disease	*	*	*	*	*	*	*	*	3
Cryptosporidiosis	18	24	31	15	31	55	51	69	294
Echinococcosis	*	*	*	*	*	*	*	*	1
Enterohaemorrhagic *Escherichia coli*	28	20	44	8	39	18	40	27	224
Giardiasis	19	1	4	6	0	4	14	9	57
Haemophilus influenzae disease (invasive)	9	1	2	2	1	5	7	1	28
Hepatitis A (acute)	19	3	3	1	1	1	16	2	46
Hepatitis B (acute and chronic)	412	24	36	43	11	34	53	32	645
Hepatitis C	940	71	41	51	16	35	49	36	1239
Influenza	98	17	13	10	22	8	13	29	210
Legionellosis	7	0	1	1	0	2	0	0	11
Leptospirosis	6	0	0	0	1	3	4	3	17
Listeriosis	2	1	0	1	0	3	2	1	10
Malaria	40	6	3	7	6	7	7	6	82
Measles	150	6	51	6	12	12	117	49	403
Meningococcal disease	42	4	10	10	11	18	15	4	114
Mumps	141	12	34	14	10	25	17	40	293
Noroviral infection	725	109	250	173	67	121	222	260	1927
Pandemic H1N1 (2009)†	16	6	9	4	3	8	12	7	65
Paratyphoid	2	0	1	0	0	0	2	0	5
Pertussis	25	1	5	4	67	3	9	0	114
Q fever	0	0	2	0	0	0	7	0	9
Rubella	13	0	1	0	1	5	2	2	24
Salmonellosis	129	46	28	30	16	33	40	34	356
Shigellosis	21	2	7	5	2	4	15	4	60
Streptococcus group A infection (invasive)	22	2	6	7	8	5	12	6	68
Streptococcus pneumoniae infection (invasive)	110	21	33	16	14	113	57	27	391
Toxoplasmosis	13	4	3	2	2	0	8	5	37
Typhoid	7	0	0	0	0	0	1	0	8
Viral encephalitis	5	1	1	2	2	3	3	5	22
Viral meningitis	68	3	17	10	23	18	14	16	169
Yersiniosis	*	*	*	*	*	*	*	*	3

*Data not reported to HSE area level when total number in Ireland <5 cases
†The influenza A (H1N1) 2009 pandemic was declared over by the WHO on 10/08/2010. Any new influenza A (H1N1) 2009 cases since that time are notified under the disease Influenza. The disease Pandemic (H1N1) 2009 was only relevant for the pandemic period, 25/04/2009 – 10/08/2010.

Table A1.4 Number of notifiable infectious diseases by age group (years), 2010

Infectious Disease	0-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Unknown	Total
Acute infectious gastroenteritis	2497	69	21	22	23	84	88	99	178	1204	5	4290
Bacterial meningitis (not otherwise specified)	21	2	1	2	3	1	3	0	3	6	0	42
Brucellosis	0	0	0	0	0	1	0	1	0	0	0	2
Campylobacter infection	418	109	72	61	150	233	185	154	107	166	6	1661
Creutzfeldt Jakob disease	0	0	0	0	0	0	0	1	2	0	0	3
Cryptosporidiosis	182	56	20	5	8	12	2	3	3	3	0	294
Echinococcosis	0	0	0	0	0	0	1	0	0	0	0	1
Enterohaemorrhagic *Escherichia coli*	97	24	15	8	7	19	21	9	13	11	0	224
Giardiasis	9	2	1	1	4	17	7	10	2	3	1	57
Haemophilus influenzae disease (invasive)	4	1	1	1	2	3	2	2	0	12	0	28
Hepatitis A (acute)	5	7	4	4	6	6	7	2	3	2	0	46
Hepatitis B (acute and chronic)	6	3	3	20	95	292	151	41	20	14	0	645
Hepatitis C	9	0	0	18	72	521	375	165	58	20	1	1239
Influenza	19	10	15	15	25	60	23	23	11	8	1	210
Legionellosis	0	0	0	0	1	0	0	3	2	5	0	11
Leptospirosis	0	0	0	2	3	3	2	3	2	2	0	17
Listeriosis	1	0	0	0	0	3	1	0	2	3	0	10
Malaria	2	6	3	3	3	19	28	15	3	0	0	82
Measles	201	72	49	41	8	24	4	4	0	0	0	403
Meningococcal disease	74	8	4	12	1	4	0	1	3	7	0	114
Mumps	31	30	29	45	41	47	29	21	9	8	3	293
Noroviral infection	215	24	24	13	29	83	52	94	137	1224	32	1927
Pandemic H1N1 (2009)†	7	3	5	5	5	15	10	9	3	3	0	65
Paratyphoid	0	0	1	0	3	0	1	0	0	0	0	5
Pertussis	62	7	16	6	2	6	7	3	5	0	0	114
Q fever	0	0	0	1	0	1	3	2	0	2	0	9
Rubella	22	2	0	0	0	0	0	0	0	0	0	24
Salmonellosis	75	17	24	10	40	57	33	31	29	40	0	356
Shigellosis	8	1	0	2	3	21	11	8	4	2	0	60
Streptococcus group A infection (invasive)	6	4	0	2	1	5	13	7	7	22	1	68
Streptococcus pneumoniae infection (invasive)	37	2	1	7	4	18	26	42	53	201	0	391
Toxoplasmosis	1	0	0	2	4	15	10	3	2	0	0	37
Typhoid	0	0	0	0	0	6	1	1	0	0	0	8
Viral encephalitis	2	0	1	0	0	2	2	3	3	9	0	22
Viral meningitis	61	12	7	20	13	36	15	3	1	1	0	169
Yersiniosis	0	0	0	0	0	1	0	1	0	1	0	3
Total	**4072**	**471**	**317**	**328**	**556**	**1615**	**1113**	**764**	**665**	**2979**	**50**	**12930**

†The influenza A (H1N1) 2009 pandemic was declared over by the WHO on 10/08/2010. Any new influenza A (H1N1) 2009 cases since that time are notified under the disease Influenza. The disease Pandemic (H1N1) 2009 was only relevant for the pandemic period, 25/04/2009 – 10/08/2010.

Table A1.5 Number of notifiable infectious diseases by gender, 2010

Infectious Disease	Male	Female	Unknown	Total
Acute infectious gastroenteritis	2055	2230	5	4290
Bacterial meningitis (not otherwise specified)	21	21	0	42
Brucellosis	2	0	0	2
Campylobacter infection	882	773	6	1661
Creutzfeldt Jakob disease	2	1	0	3
Cryptosporidiosis	143	151	0	294
Echinococcosis	0	1	0	1
Enterohaemorrhagic *Escherichia coli*	114	110	0	224
Giardiasis	26	31	0	57
***Haemophilus influenzae* disease (invasive)**	16	12	0	28
Hepatitis A (acute)	24	22	0	46
Hepatitis B (acute and chronic)	341	297	7	645
Hepatitis C	833	396	10	1239
Influenza	94	115	1	210
Legionellosis	6	5	0	11
Leptospirosis	16	1	0	17
Listeriosis	2	8	0	10
Malaria	43	38	1	82
Measles	203	200	0	403
Meningococcal disease	68	46	0	114
Mumps	158	133	2	293
Noroviral infection	893	1032	2	1927
Pandemic H1N1 (2009)†	35	29	1	65
Paratyphoid	4	1	0	5
Pertussis	52	62	0	114
Q fever	3	6	0	9
Rubella	11	13	0	24
Salmonellosis	182	174	0	356
Shigellosis	35	25	0	60
Streptococcus group A infection (invasive)	36	32	0	68
***Streptococcus pneumoniae* infection (invasive)**	215	176	0	391
Toxoplasmosis	13	24	0	37
Typhoid	4	4	0	8
Viral encephalitis	9	13	0	22
Viral meningitis	82	87	0	169
Yersiniosis	3	0	0	3
Total	**6626**	**6269**	**35**	**12930**

†The influenza A (H1N1) 2009 pandemic was declared over by the WHO on 10/08/2010. Any new influenza A (H1N1) 2009 cases since that time are notified under the disease Influenza. The disease Pandemic (H1N1) 2009 was only relevant for the pandemic period, 25/04/2009 – 10/08/2010.

Table A1.6 Number of notifiable infectious diseases by case classification, 2010

Infectious Disease	Confirmed	Probable	Possible	Not Specified	Total
Acute infectious gastroenteritis	4196	92	0	2	4290
Bacterial meningitis (not otherwise specified)	21	7	14	0	42
Brucellosis	1	1	0	0	2
Campylobacter infection	1659	0	0	2	1661
Creutzfeldt Jakob disease	3	0	0	0	3
Cryptosporidiosis	294	0	0	0	294
Echinococcosis	1	0	0	0	1
Enterohaemorrhagic *Escherichia coli*	222	2	0	0	224
Giardiasis	57	0	0	0	57
***Haemophilus influenzae* disease (invasive)**	26	0	2	0	28
Hepatitis A (acute)	40	3	3	0	46
Hepatitis B (acute and chronic)	645	0	0	0	645
Hepatitis C	1239	0	0	0	1239
Influenza	191	0	19	0	210
Legionellosis	11	0	0	0	11
Leptospirosis	17	0	0	0	17
Listeriosis	10	0	0	0	10
Malaria	82	0	0	0	82
Measles	299	0	104	0	403
Meningococcal disease*	98	0	16	0	114
Mumps	109	11	173	0	293
Noroviral infection	1841	86	0	0	1927
Pandemic H1N1 (2009)†	65	0	0	0	65
Paratyphoid	5	0	0	0	5
Pertussis	45	11	58	0	114
Q fever	9	0	0	0	9
Rubella	1	0	23	0	24
Salmonellosis	349	7	0	0	356
Shigellosis	60	0	0	0	60
Streptococcus group A infection (invasive)	65	3	0	0	68
***Streptococcus pneumoniae* infection (invasive)**	302	2	87	0	391
Toxoplasmosis	37	0	0	0	37
Typhoid	8	0	0	0	8
Viral encephalitis	21	0	1	0	22
Viral meningitis	149	8	11	1	169
Yersiniosis	3	0	0	0	3
Total	**12181**	**233**	**511**	**5**	**12930**

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.

†The influenza A (H1N1) 2009 pandemic was declared over by the WHO on 10/08/2010. Any new influenza A (H1N1) 2009 cases since that time are notified under the disease Influenza. The disease Pandemic (H1N1) 2009 was only relevant for the pandemic period, 25/04/2009 – 10/08/2010.

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Appendix 2
Immunisation Uptake in Ireland

Table A2.1 Immunisation uptake (%) at 12 months of age in 2010 (i.e. cohort born 01/01/2009-31/12/2009), based on available data

HSE Area	Local Health Office/HSE Area	Number in cohort for BCG *	Number in cohort for D_3 & T_3*	Immunisation Uptake (%)*						
				BCG	D_3	Hib_3	$Polio_3$	$HepB_3$	$MenC_2$	PCV_2
HSE-E	Dublin South	na	1700	na	87	87	87	87	87	87
	Dublin South East	na	1529	na	89	89	89	89	89	89
	Dublin South City	na	1767	na	92	92	92	92	92	92
	Dublin South West	na	2705	na	91	91	91	91	91	91
	Dublin West	na	2965	na	87	87	87	87	87	87
	Dublin North West	na	3910	na	78	78	78	78	78	78
	Dublin North Central	na	1775	na	90	90	90	90	90	90
	Dublin North	na	4499	na	90	90	90	90	90	90
	Kildare/West Wicklow	na	4304	na	88	88	88	88	88	89
	Wicklow	na	2081	na	85	85	85	85	85	85
	HSE-E Total	**na**	**27235**	**na**	**87**	**87**	**87**	**87**	**87**	**87**
HSE-M	Laois/Offaly	1497	1497	93	88	88	88	88	88	88
	Longford/Westmeath	1137	1137	93	89	89	89	89	89	89
	HSE-M Total	**2634**	**2634**	**93**	**89**	**89**	**89**	**89**	**89**	**89**
HSE-MW	Clare	1916	1927	98	93	93	93	93	93	93
	Limerick	2161	2133	97	92	92	92	92	92	92
	Tipperary NR/East Limerick	2058	2086	97	92	92	92	92	92	92
	HSE-MW Total	**6135**	**6146**	**97**	**92**	**92**	**92**	**92**	**92**	**92**
HSE-NE	Cavan/Monaghan	na	1625	na	95	95	95	94	93	93
	Louth	na	1607	na	92	92	92	92	90	90
	Meath	na	2733	na	92	92	92	92	91	91
	HSE-NE Total	**na**	**5965**	**na**	**93**	**93**	**93**	**93**	**91**	**91**
HSE-NW	Donegal	2523	2523	95	94	93	94	93	93	93
	Sligo/Leitrim	1501	1501	96	92	93	93	92	92	93
	HSE-NW Total	**4024**	**4024**	**95**	**93**	**93**	**93**	**93**	**93**	**93**
HSE-SE	Carlow/Kilkenny	2091	2091	95	88	88	88	88	88	88
	South Tipperary	1563	1563	96	91	91	91	91	90	90
	Waterford	2127	2127	95	91	91	91	91	91	92
	Wexford	2395	2395	96	91	91	91	91	90	91
	HSE-SE Total	**8176**	**8176**	**96**	**90**	**90**	**90**	**90**	**90**	**90**
HSE-S	North Cork	396	787	74	87	87	87	87	86	86
	North South Lee	1485	3048	91	88	88	88	88	86	86
	West Cork	195	426	87	81	82	81	81	78	78
	Kerry	535	1075	90	88	89	88	88	86	86
	HSE-S Total	**2611**	**5336**	**88**	**87**	**88**	**87**	**87**	**86**	**86**
HSE-W	Galway	na	4076	na	88	88	88	88	88	89
	Mayo	na	1844	na	84	84	84	84	84	85
	Roscommon	na	978	na	96	96	96	95	96	96
	HSE-W Total	**na**	**6898**	**na**	**88**	**88**	**88**	**88**	**88**	**89**
Ireland		**23580**	**66414**	**95**	**89**	**89**	**89**	**89**	**89**	**89**

na=not available

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

*The 2010 data for those at 12 months are incomplete as the following were unavailable: the Quarter 1 2010 HSE-M and HSE-S data and the HSE-MW $MenC_2$ data; the Quarter 2 2010 HSE-M data and HSE-S data and; the Quarter 4 2010 HSE-NE data. The available 2010 national 12 month D_3, T_3, P_3 (n=66,415), Hib_3 (n=66,421), $HepB_3$ (n=66,414), $Polio_3$ (n=66,414) and PCV_2 (n=66,418) cohort data may be around 87% (this figure is an estimate only) of the 2010 national birth cohort and the available $MenC_2$ (n=64,895) cohort may be around 85% (this figure is an estimate only) of the 2010 national birth cohort. BCG uptake data were available for the HSE-MW, HSE-NW, and HSE-SE Areas in Quarters 1-4 2010, for the HSE-M Area in Quarters 3 and 4 2010 and the HSE-SA Area in Quarter 4 2010. The available 2010 national BCG cohort data may be around 31% (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 2010 (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 D_3 & T_3†	Immunisation Uptake (%)†						
			D_3	Hib_3	Hib_b	$HepB_3$	$MenC_3$	PCV_3	MMR_1
HSE-E	Dublin South	1605	95	95	84	94	83	84	89
	Dublin South East	1461	96	96	81	95	85	89	92
	Dublin South City	1669	96	96	85	95	88	90	92
	Dublin South West	2612	96	95	87	95	88	90	93
	Dublin West	2818	92	92	81	92	83	86	87
	Dublin North West	3882	91	91	78	92	81	83	84
	Dublin North Central	1672	94	93	84	94	86	86	90
	Dublin North	4396	94	94	87	94	88	90	91
	Kildare/West Wicklow	4397	93	93	83	96	87	91	89
	Wicklow	2095	92	92	79	92	81	82	85
	HSE-E Total	**26607**	**93**	**93**	**83**	**94**	**85**	**87**	**89**
HSE-M	Laois/Offaly	1457	93	93	82	93	79	88	89
	Longford/Westmeath	1100	93	93	86	93	85	91	91
	HSE-M Total	**2557**	**93**	**93**	**84**	**93**	**82**	**89**	**90**
HSE-MW	Clare	1835	95	95	91	95	90	90	93
	Limerick	2111	94	94	88	95	86	91	91
	Tipperary NR/East Limerick	2053	95	95	90	95	89	92	92
	HSE-MW Total	**5999**	**94**	**94**	**89**	**95**	**88**	**91**	**92**
HSE-NE	Cavan/Monaghan	1723	95	95	93	95	93	94	94
	Louth	1695	95	95	92	95	92	92	93
	Meath	2749	95	95	91	95	92	90	92
	HSE-NE Total	**6167**	**95**	**95**	**92**	**95**	**92**	**92**	**93**
HSE-NW	Donegal	2480	96	96	89	95	88	90	91
	Sligo/Leitrim	1464	96	95	91	94	87	86	94
	HSE-NW Total	**3944**	**96**	**95**	**90**	**95**	**88**	**88**	**92**
HSE-SE	Carlow/Kilkenny	2197	95	95	92	94	87	89	93
	South Tipperary	1463	95	94	94	96	89	91	93
	Waterford	2242	93	93	93	93	88	89	93
	Wexford	2532	95	95	94	95	89	91	94
	HSE-SE Total	**8434**	**94**	**94**	**93**	**94**	**88**	**90**	**93**
HSE-S	North Cork	1203	92	93	79	92	81	86	86
	North South Lee	4493	94	95	82	92	84	88	91
	West Cork	609	88	89	71	87	74	75	79
	Kerry	1592	93	94	81	93	84	87	89
	HSE-S Total	**7897**	**93**	**94**	**80**	**92**	**83**	**87**	**89**
HSE-W	Galway	4245	92	92	79	91	83	84	86
	Mayo	1904	94	93	77	95	82	84	86
	Roscommon	1000	99	98	95	98	96	96	96
	HSE-W Total	**7149**	**93**	**93**	**80**	**93**	**85**	**85**	**88**
Ireland		**68754**	**94**	**94**	**85**	**94**	**86**	**88**	**90**

Since T_3, P_3 and $Polio_3$ 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 and introduction of pneumococcal conjugate vaccine given at 2, 6 and 12 months of age. Therefore, $HepB_3$ and PCV_3 uptake data presented here are only for those born between 01/07/2008 and 31/12/2008.

†The 2010 data for those at 24 months are incomplete as the following were unavailable: the Quarter 1 2010 HSE-M and HSE-S data and the HSE-E Dublin North Hib_b data; the Quarter 2 2010 HSE-M data and; the Quarter 4 2010 HSE-NE data. The available 2010 national 24 month D_3, T_3, P_3 (n=68,754), Hib_3 (n=68,760), Hib_b (n=67,726), $HepB_3$ (n=36,602), $Polio_3$ (n=68,753), $MenC_3$ (n=68,688), PCV_3 (n=36,551) and MMR_1 (n=68,788) cohort data may be around 89-90% (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 A2.3 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. During 2010, 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 and published on the HPSC website, www.hpsc.ie. 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 October 2011. 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 2009 were collated in the regional Departments of Public Health, where data were entered on the Epi2000 NTBSS database. Each HSE Area provided finalised 2009 data (with outcome information) and provisional 2010 data to HPSC in mid-2011. Data were validated and cleaned with each area and the national data were collated. Validation of the 2009 TB data was concluded during September 2011.

Sexually Transmitted Infections (STIs)

Clinicians and laboratories notified their respective Departments of Public Health of probable and confirmed cases of STIs. Notifications were anonymised prior to notification. Data for 2-009 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 NVRL, the ICGP and the Departments of Public Health on the influenza sentinel surveillance project. Sixty general practices (located in all HSE-Areas and representing 6.2% of the population) were recruited to report electronically, on a weekly basis, the number of patients who consulted with influenza-like illness (ILI). ILI is defined using the EU case definition for ILI which is sudden onset of symptoms AND at least one of the following four systemic symptoms: fever, malaise, headache, myalgia; AND at least one of the following three respiratory symptoms: cough, sore throat, shortness of breath.

Sentinel GPs were requested to send a combined nasal and throat swab on one to two ILI patients per week to the NVRL. The NVRL also tested respiratory non-sentinel specimens, referred mainly from hospitals. Other surveillance systems set up to monitor ILI/influenza activity include a network of sentinel hospitals reporting admissions data 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 confirmed influenza in 0-14 year olds. HPSC was notified of all registered deaths on a daily basis from the General Register Office.

Several surveillance projects that were initiated/augmented during the 2009 influenza pandemic were continued during the 2010/2011 influenza season:

- Surveillance of all calls to GP out-of-hours (OOHs) centres were monitored for self-reported influenza.
- Surveillance of all confirmed influenza notifications, including hospitalisation status.
- Surveillance of all confirmed influenza adult and paediatric cases admitted to critical care.
- Enhanced surveillance of all confirmed influenza deaths.

At HPSC, data were collated from the various sources, analysed and weekly reports were produced. Influenza surveillance reports were posted on the HPSC website www.hpsc.ie. Aggregated clinical and virological data and anonymised data on confirmed influenza cases admitted to ICU and influenza-associated deaths were reported weekly to the European Centre for Disease Prevention and Control (ECDC).

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 2010, 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 2010, 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.

European Antimicrobial Resistance Surveillance Network (EARS-Net)
Data were collected by participating EARS-Net (formerly the European Antimicrobial Resistance Surveillance System, EARSS) laboratories in 2010 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.

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
Data were collected by participating general ICUs on MRSA colonisation/infection in the critical care setting. Data were reported monthly to the HPSC and stored in an MS Access database. Quarterly and annual reports were produced. Data were also collected on the total volume of alcohol-based hand rub used per hospital per year/quarter, excluding that used for pre-operative surgical "scrub". 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, and quarterly and annual reports were produced for publication on the HPSC website.

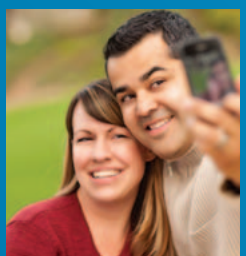
Denominator Data
To calculate disease incidence rates, Census of Population data were used as the denominator (available from the Central Statistics Office, http://www.cso.ie). Population figures were applied as follows: Census 2006 for analysis of 2004 2010 data, Census 2002 for 2000-2003 data and Census 1996 for 1999 data.

Monthly population changes were estimated between 1993 and 2010 using a curve interpolation method for the calculation of outpatient antibiotic consumption rates. These are based on April 2011 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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