# Health Protection Surveillance Centre

## Annual Report 2007

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

hpsc

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# Health Protection Surveillance Centre

## Annual Report 2007

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# Introduction

The Health Protection Surveillance Centre celebrates ten years in existence this year. It was established as the National Disease Surveillance Centre in November 1998. This, our 9th annual report, clearly demonstrates the huge improvements in communicable disease surveillance over the past ten years and sets out the challenges for the future.

In 2007 we saw a welcome decline in the number of *Haemophilus Influenzae* B (Hib) cases following the successful Hib catch-up campaign during 2005-2006 and the addition of a routine booster for all children over 12 months of age in September 2006. Non-capsular strains of *H. influenzae* are now responsible for the majority of invasive *H. influenzae* cases.

Measles notifications continued to fall in 2007 with 53 cases notified, 20 of which were confirmed. While the number of mumps cases fell in 2007, we have already seen an increase in 2008. The reported complications in 2007 include nine cases of orchitis, six cases of deafness and one case each of meningitis, encephalitis and mastitis. The planned MMR catch-up programme in schools in 2009 should prevent these mumps outbreaks and help Ireland to meet the European goal of eliminating measles in Europe by 2010.

The most welcome change in the past ten years has been the big reduction in cases of meningococcal meningitis from over 500 cases in 1999 to less than 200 in 2007. This decrease is largely due to the MenC vaccination programme. 88% of our current cases are now caused by serogroup B disease and sadly six deaths were caused by this strain in 2007. However, trials of a new serogroup B vaccine are currently taking place and we look forward to the results with interest.

On September 1st 2008 a new vaccine against pneumococcal disease was introduced into the Irish infant immunisation schedule. In 2007 five children under two year of age died from invasive pneumococcal disease so this new vaccine will provide important protection for children. It is essential that a permanently resourced reference laboratory is provided to monitor the impact of this new vaccine and inform future public health policy in this area.

The 2007/2008 influenza season saw the emergence of resistance to oseltamivir (Tamiflu) in 11% of influenza A H1N1 specimens tested by the National Virus Reference Laboratory (NVRL). While the current Irish national guidance on the use of antivirals remains in place it will be kept under review as specimens are tested in the upcoming influenza season.

Sixteen cases of legionnaires' disease were reported to HPSC in 2007. While the numbers were small this was the highest annual number recorded to date. We can expect an increase in the number of notified cases in future years due to the greater use of newer diagnostic methods such as urinary antigen testing.

There were 465 cases of tuberculosis notified in 2006 and provisionally 478 cases in 2007. In 2006, 35% of cases were born outside of Ireland. New updated guidelines on the prevention and management of tuberculosis are being finalised following a consultation process.

There were increases in many infectious intestinal diseases in 2007, including a large waterborne outbreak of cryptosporidiosis in HSE West. This was the largest *Cryptosporidium* outbreak notified in Ireland since surveillance of outbreaks began. In April 2008 the Environmental Protection Agency (EPA) published a Remedial Action List of public water supplies and the work arising from this prioritisation exercise should lead to a reduction in waterborne illness in Ireland in the coming years. However, as in previous years,

drinking water from untreated private water supplies remains a very important risk factor for verotoxigenic *E. coli* (VTEC) infection in Ireland. Private well owners are reminded of the need to maintain their wells adequately. In line with other EU countries there has been an increase in listeriosis cases in Ireland in 2007. The increase was seen particularly in pregnant women and neonatal cases. An information leaflet on ways to minimise the risk of listeriosis is available from Safefood.

Bloodborne and sexually transmitted infections (STIs) remain high. The number of hepatitis C cases notified continued to rise with 1,558 cases notified in 2007, up 28% from 2006. However, hepatitis C notification rates may not accurately reflect incidence trends as it is likely that a significant proportion of notified cases do not represent newly acquired infections. As infection is often asymptomatic at first, a large proportion of cases are diagnosed through screening of at-risk groups such as injecting drug users. Three hundred and sixty two cases of HIV infection were reported to HPSC during 2007. Trends within risk groups should be interpreted with caution as information on risk was not available for 21% of cases. Unfortunately, delays in the reporting of STIs mean that annual data are often not available as quickly as they should be. Adequate resourcing of STI surveillance is vital if we are to improve control of STIs and HIV infections. Additionally, the introduction on 1st September 2008 of universal infant hepatitis B vaccination into the childhood immunisation schedule is to be welcomed.

It was good to see a continued rise in immunisation uptake figures. In 2007, the 24 month uptake of the 5 in 1 vaccine was 92% and the uptake of the first dose of MMR was 87%. However, we need to enhance national and regional monitoring of the school-based vaccination programmes to add to these improvements.

Antimicrobial consumption in both hospital and community settings increased in 2007, with community consumption rising steadily at 3% per year since 2000. However, on a positive note, the proportion of *Staphylococcus aureus* bacteraemia reports that were meticillin resistant (MRSA) submitted to HPSC as part of the European Antimicrobial Resistance Surveillance System (EARSS) has fallen from 42.0% in 2006 to 38.5% in 2007. Despite this encouraging trend, antimicrobial resistance continues to be a growing problem in other pathogens such as enterococci and *E. coli*. Measures to promote prudent antibiotic use in both hospital and community settings are required to reduce the burden of antimicrobial resistance in Ireland.

Once again, I'd like to thank the Scientific Advisory Committee and the HPSC sub-committees for all their hard work throughout the year. Special thanks also to the staff at HPSC whose commitment and professionalism is reflected throughout this report.

**Dr Darina O'Flanagan**
Director
Health Protection Surveillance Centre

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# 01

# Vaccine Preventable Diseases

# 1.1 *Haemophilus influenzae* (invasive)

## Summary

Number of cases, 2007: 31
Number of cases, 2006: 38
Number of cases, 2005: 34
Crude incidence rate, 2007:0.7/100,000

In 2007, 31 cases of invasive *Haemophilus influenzae* disease were notified in Ireland (0.7/100,000 total population). This was similar to previous years when 38 and 34 cases were notified in 2006 and 2005, respectively (figure 1).

The main changes in 2007, when compared to 2006, is the decline by half of the number of *H. influenzae* type b (Hib) cases and a decrease by a quarter of the number of invasive *H. influenzae* cases due to non-capsular strains (figure 1). No other noteworthy change in the number of cases due to other serotypes has been observed in recent years.

Non-capsular strains accounted for the majority of the invasive *H. influenzae* cases notified in 2007 (48%, n=15/31). The remaining cases were due to Hib (n=7, 23%), type e (n=1), type f (n=3) and five isolates were not typed. The cases ranged in age from one week to 95 years. The incidence rates were highest in infants <1 year (8.2/100,000) and adults ≥65 years of age (2.8/100,000), followed by the 1-4 year old age group (1.7/100,000) (table 1.1).

Cases occurring in children <10 years of age (n=9) and elderly adults ≥65 years (n=13) accounted for 71% of the invasive *H. influenzae* notifications in 2007 (table 1).

The clinical manifestations of invasive *H. influenzae* disease in the nine children <10 years of age in 2007 were meningitis, cellulitis, epiglottitis and pneumonia with one case each and clinical diagnosis not reported (n=5).

Four invasive *H. influenzae* related deaths were reported in 2007, one was associated with a type b strain, one with a non-capsular strain, and two were not typed. One death occurred in a child <1 year of age, one in a 10-14 year old and the remaining two occurred in adults aged >65 years.

*H. influenzae* type b (Hib) accounted for 23% of the invasive *H. influenzae* notifications in 2007, with seven cases being notified (0.2/100,000 total population).

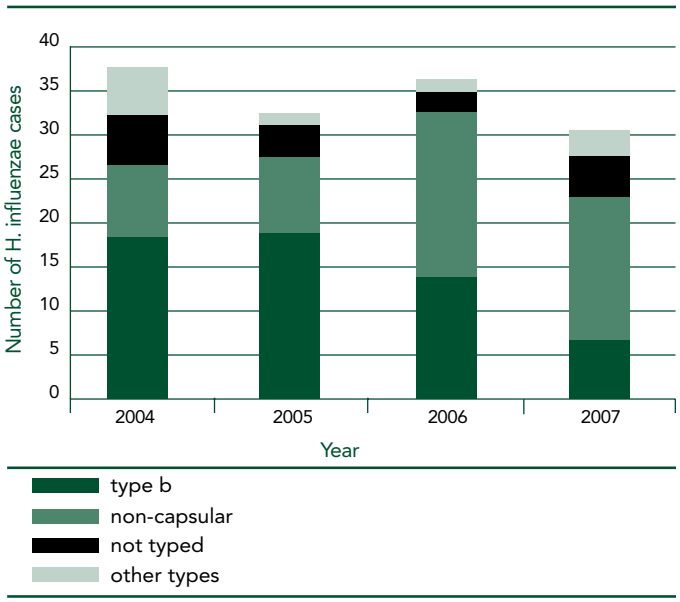



*Figure 1. Annual number of invasive Haemophilus influenzae cases notified in Ireland, 2004-2007*

Three of the seven Hib cases (43%) occurred in children ≤4 years of age, with two cases occurring in infants <1 year and one in the 1-2 years age group.

In contrast, in 2006, 14 Hib cases were notified, with five (36%) occurring in children ≤4 years of age. In 2005 when 18 cases in total were notified, the number of Hib cases in the same age group was 13 (72%). The introduction of a Hib booster catch-up campaign for children under four years of age in November 2005 and a routine Hib booster dose at 12 months in September 2006 has lead to a reduction in the incidence of Hib disease in young children in 2007.

In 2007, two true Hib vaccine failures occurred in children aged 14 years or less, one of whom died from septicaemia. Both children received three doses of Hib vaccine when they were less than one year of age. In contrast, the number of true vaccine failures in 2006 was four, but in 2005 the number was markedly higher at 14; highlighting once more the positive impact the Hib booster catch up campaign has had in Ireland.

Of note in 2007, was the fact that one of the two true vaccine failures occurred in a slightly older child, aged 10-14 years who would not have been targeted by the catch-up programme.

In 2007, there were no apparent Hib vaccine failures, compared to three in 2006 and one in 2005. Apparent failures are defined as cases in children who are incompletely vaccinated.

From September 2008, the, Hib booster dose will be 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.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 19th August 2008. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

*Table 1. Number and incidence rates of invasive Haemophilus influenzae cases by serotype and age group and number of Hib vaccine failures by age group, 2007*

| | Type b | Type e | Type f | Non-capsular | Not Typed | Total | ASIR of Hib | ASIR of all H. influenzae | TVFs |
|---|---|---|---|---|---|---|---|---|---|
| **<1** | 2 | 0 | 0 | 2 | 1 | 5 | 3.3 | 8.2 | 1 |
| **1-4** | 1 | 1 | 0 | 2 | 0 | 4 | 0.4 | 1.7 | 0 |
| **5-9** | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | 0 |
| **10-19** | 1 | 0 | 0 | 0 | 0 | 1 | 0.2 | 0.2 | 1 |
| **20-54** | 1 | 0 | 0 | 2 | 2 | 5 | 0.0 | 0.2 | 0 |
| **55-64** | 0 | 0 | 1 | 2 | 0 | 3 | 0.0 | 0.7 | 0 |
| **65+** | 2 | 0 | 2 | 7 | 2 | 13 | 0.4 | 2.8 | 0 |
| **All ages** | 7 | 1 | 3 | 15 | 5 | 31 | 0.2 | 0.7 | 2 |
| **CIR** | 0.2 | 0.02 | 0.07 | 0.4 | 0.12 | 0.7 | – | – | – |

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

# 1.2 Measles


## Summary

Number of cases, 2007: 53
Number of confirmed cases, 2007: 20
Crude incidence rate, 2007: 1.3/100,000
Crude confirmed incidence rate, 2007: 0.5/100,000


Measles notifications continued to decline in 2007 (figure 1). There were a total of 53 notified cases (1.3/100,000) during 2007 compared to 83 (2.0/100,000) in 2006.

Thirty-three cases in 2007 were classified as possible while 20 were classified as confirmed, giving a crude confirmed incidence rate of 0.5 per 100,000 total population. Fourteen of the confirmed cases were laboratory confirmed while six were epidemiologically linked to a laboratory confirmed case.

Measles cases ranged in age from 8 months to 63 years (age was unknown for one case). Of the 53 total cases the largest number (n=15) was in the age group one to two years while of the 20 confirmed cases the largest number (n=5) was in the age group 5-9 years (figure 2). Of the 53 total cases the highest incidence rate was in those aged less than one year (14.7/100,000) while among the 20 confirmed cases the highest incidence rates were in those aged one to two years (2.5/100,000) and those aged three to four years (2.5/100,000) (figure 3). Of the 53 measles cases 29 were male and 24 were female.

Laboratory results were provided for 25 (47%) cases. Fourteen cases were laboratory positive for measles. Eleven cases were laboratory negative for measles, however, for five of these the oral fluid specimens were not taken at the optimal time following disease onset or the date of specimen collection in relation to disease onset was unknown (the optimal time for collecting oral fluid specimens for measles IgM testing following onset of measles is greater than seven days to two months). All cases reported as laboratory negative for measles were classified as possible measles 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 ($MMR_1$) is routinely recommended at twelve months of age and

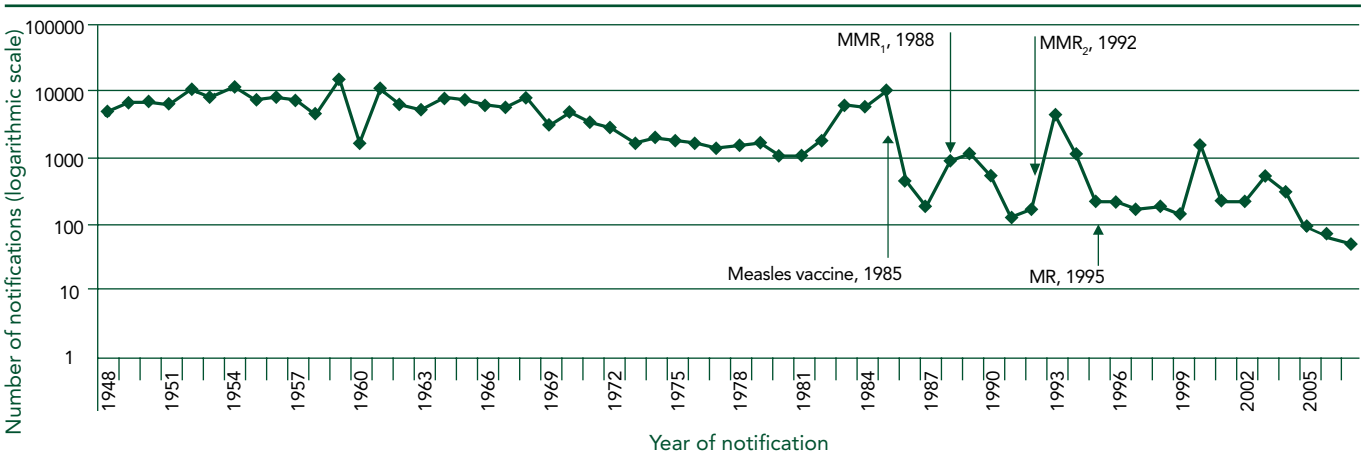



*Figure 1. Annual number (logarithmic scale) of measles notifications in Ireland 1948-2007 and year of introduction of measles vaccine and the measles-mumps-rubella (MMR) vaccine (A measles and rubella (MR) campaign for primary school-age children was conducted in 1995)*
*$MMR_1$-first dose of MMR*
*$MMR_2$-second dose of MMR*
*1948-June 2000 data collated by DoHC*
*July 2000-2007 data collated by HPSC*

the second dose ($MMR_2$) at four to five years of age.

Vaccination status was reported for 39 (74%) cases in 2007. Eighteen cases (n=18/39, 46%) were unvaccinated; eight of these were less than 12 months of age.

Fourteen cases (n=14/39, 36%) had one dose of MMR vaccine. Only three of these were classified as confirmed cases. Ten of these cases were known to be less than six years of age. The date of vaccination in relation to disease onset was reported for 10 cases, all 10 were vaccinated ≥ 2 months prior to onset. An additional case, aged 20 months, received at least one dose of MMR. This case was classified as a possible case.

Six cases were reported as having received two doses of MMR. The dates of vaccination were reported for four of these cases, all four were vaccinated ≥ 3 months prior to onset. Two of the cases vaccinated with two doses of MMR were laboratory confirmed (the dates of vaccination were not provided for one of these).

Two cases were hospitalised representing six percent (n=2/35) of all cases with known hospitalisation status. Both cases were laboratory confirmed for measles. One case was unvaccinated while the second case was reported to have two doses of MMR, however, the vaccination dates were not reported.

None of the 23 cases, where information on measles associated complications was reported, had pneumonia, encephalitis or seizures. No measles deaths were reported.

Three localised outbreaks of measles were notified during 2007, with a total of 13 cases of illness.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 21st August 2008. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

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

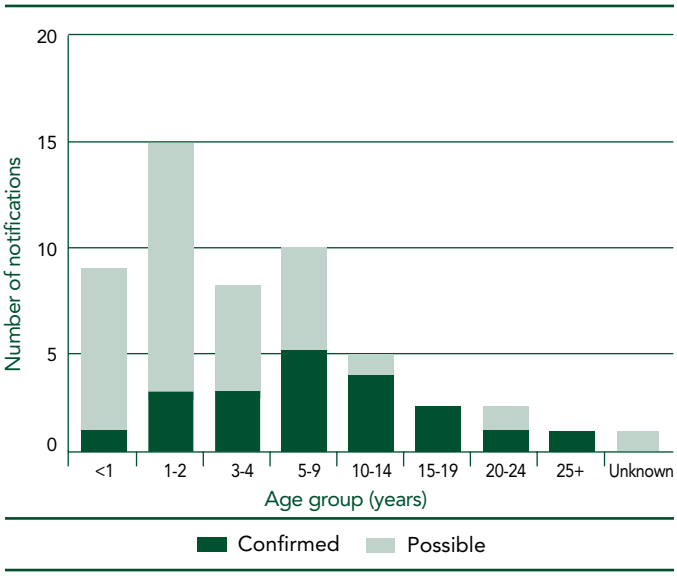



*Figure 2. Number of notified measles cases in 2007 by age group and case classification*

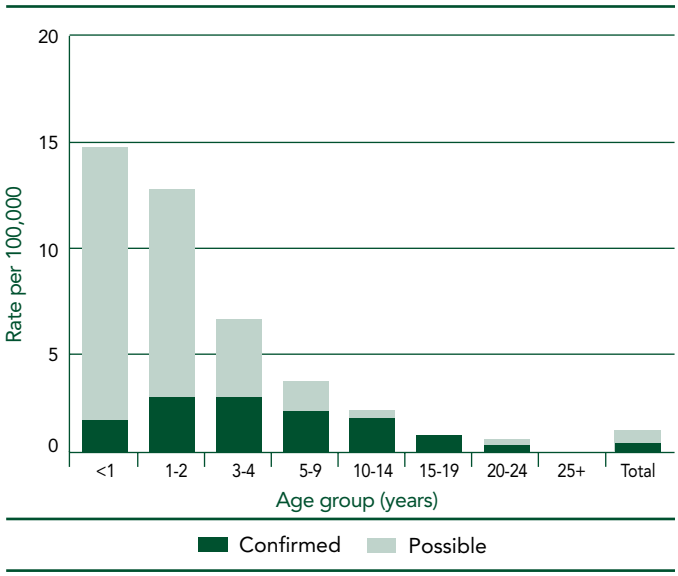



*Figure 3. The age specific incidence rate of notified measles cases by case classification in 2007*

# 1.3 Meningococcal Disease

## Summary

Number of cases, 2007: 179
Number of cases, 2006: 209
Number of cases, 2005: 203
Crude incidence rate, 2007: 4.2/100,000

In 2007, 179 cases (4.2/100,000) cases of invasive meningococcal disease (IMD) were notified in Ireland. This was a notable decrease from the previous two years when 209 cases (4.9/100,000) and 203 cases (4.8 /100,000), were notified in 2006 and 2005, respectively (figure 1). When compared with rates reported in 1999 and 2000, incidence rates have substantially declined in recent years (figure 1).

Based on the meningococcal disease case definition, 161 of the 179 cases (90%) notified in 2008 were classified as definite, one (1%) as presumed and 17 (9%) as possible. Ninety-one percent (162/179) of the cases were laboratory confirmed. Most cases were confirmed by PCR alone (48.6%, n=87). Confirmation of the remaining 75 cases was by culture only (n=9), by PCR and/or culture (n=66), and none by serology or microscopy exclusively.

In 2007, male cases (n=97) exceeded female cases (n=82), resulting in a male to female ratio of 1.2:1.0. Cases ranged in age from one month to 83 years, with a median age of three years. The incidence of IMD was highest in infants and young children. Age specific incidence rate (ASIR) was highest among infants <1 year of age (78.6 per 100,000), followed by children in the 1-2 year age groups (32.2/100,000), and the 3-4 year age groups (15.8/100,000) (table 1).

*Neisseria meningitidis* serogroup B was the pathogen most commonly associated with IMD in 2007 and accounted for 157 (88%) of the 179 notifications (figure 1). Each year since 2003 serogroup B has accounted for 80% or more of the IMD notifications (figure 1).

IMD due to serogroup C has remained at very low levels over the last five years with no more than five cases occurring annually. In 2007, just two (0.04/100,000) serogroup C cases arose (figure 1). Both cases occurred in adults (age range 17-33 years), one of whom was vaccinated. One MenC vaccine failure also occurred in 2006 and again in 2005, while no failures arose in either 2004 or 2003.

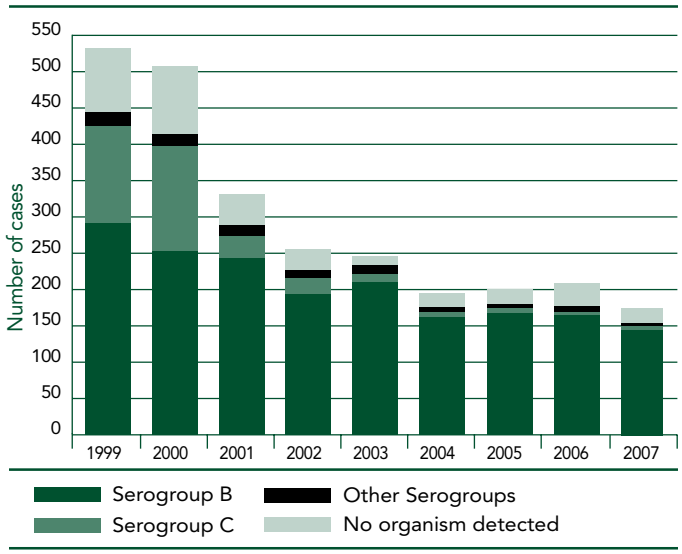



*Figure 1. Number of invasive meningococcal disease notification in Ireland by serogroup, 1999-2007*

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

There were seven IMD related deaths in 2007 (case fatality ratio of 3.9%) compared to six in 2005 and 6 in 2005. The case fatality ratio (CFR) was highest amongst cases 1-2 years of age (10.3%) as a result of four deaths from 39 cases (table 1). The next highest CFR occurred in young adults aged 15-19 years (5%) and adults aged 25 years or more (4.8%). Six of the seven deaths in 2007 were due to serogroup B disease; no organism was identified for the seventh. Five of the deaths (71%) occurred in children <=2 years of age and the remaining two were in adults (age range 18-83 years) (table 1).

No serogroup C deaths occurred between 2005 and 2007, while one occurred in both 2003 and 2004 in adults over 55 year of age. In 2001 one death from serogroup C disease occurred in a child <15 years of age, but since then there have been no deaths reported in Ireland in this age bracket. Thus, the introduction of the MenC vaccine in October 2000 has also substantially reduced mortality due to serogroup C disease in Ireland.

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

Effective vaccination is necessary for the complete prevention and control of meningococcal disease. 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 the disease in Ireland, is not yet available. Until such time that an effective MenB vaccine, suitable for use in infants, is on the market, IMD remains a significant cause of morbidity and mortality in children and young adults in Ireland.

*Table 1. Number of cases, deaths, incidence rates and case fatality ratios, by age group, of invasive meningococcal disease in Ireland, 2007*

| | No. Cases | ASIR | No. Deaths | CFR (%) |
|---|---|---|---|---|
| **<1** | 48 | 78.6 | 1 | 2.1% |
| **1-2** | 39 | 32.2 | 4 | 10.3% |
| **3-4** | 19 | 15.8 | 0 | 0% |
| **5-9** | 14 | 4.9 | 0 | 0% |
| **10-14** | 13 | 4.7 | 0 | 0% |
| **15-19** | 20 | 6.9 | 1 | 5% |
| **20-24** | 5 | 1.5 | 0 | 0% |
| **25+** | 21 | 0.8 | 1 | 4.8% |
| **All ages** | **179** | 4.2 | **7** | **3.9%** |

*ASIR, age specific incidence rate of cases*
*CFR, case fatality ratio*

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 15th August 2008. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

# 1.4 Mumps

## Summary

Number of cases, 2007: 142
Number of cases, 2006: 427
Crude incidence rate, 2007: 3.3/100,000

There were 142 (3.3/100,000) mumps cases notified during 2007. This is a three-fold decrease compared to 2006 (n=427, 10.1/100,000) and a decrease of nearly eight-fold compared to 2005 (n=1,079, 25.4/100,000). Mumps notifications were high in recent years following a national mumps outbreak that started at the end of 2004. In contrast, in the six years prior to 2004 there were on average 43 mumps notifications each year (figure 1).

In 2007, of the 142 mumps cases notified 68 (48%) were classified as confirmed, one (1%) was classified as probable and 73 (51%) were classified as possible.

Sixty-eight cases were laboratory positive for mumps in 2007. For 24 cases the laboratory tests were negative for mumps, however, for 13 (54%) of these cases the specimen was not taken at the optimal time following disease onset or the date of specimen collection in relation to disease onset was not reported. (The optimal time for collecting specimens for mumps IgM testing following onset of symptoms is greater than seven days to two months for oral fluid specimens and greater than four days to two-three months for serum specimens). All cases with laboratory negative mumps tests were classified as possible mumps cases.

In 2007, cases ranged in age from 11 months to 86 years, with a mean age of 25 years and a median age of 22 years. A breakdown of mumps cases by age group and the age specific incidence rates per 100,000 population from 2003 to 2007 are presented in table 1. There were fewer cases in most age groups in 2007 compared to 2006, except among those aged 35-54 years (table 1). Of the 142 mumps cases 84 (59%) were male and 58 (41%) were female.

Of the 90 mumps cases where vaccination status was reported 50% (n=45/90) were unvaccinated, 27%

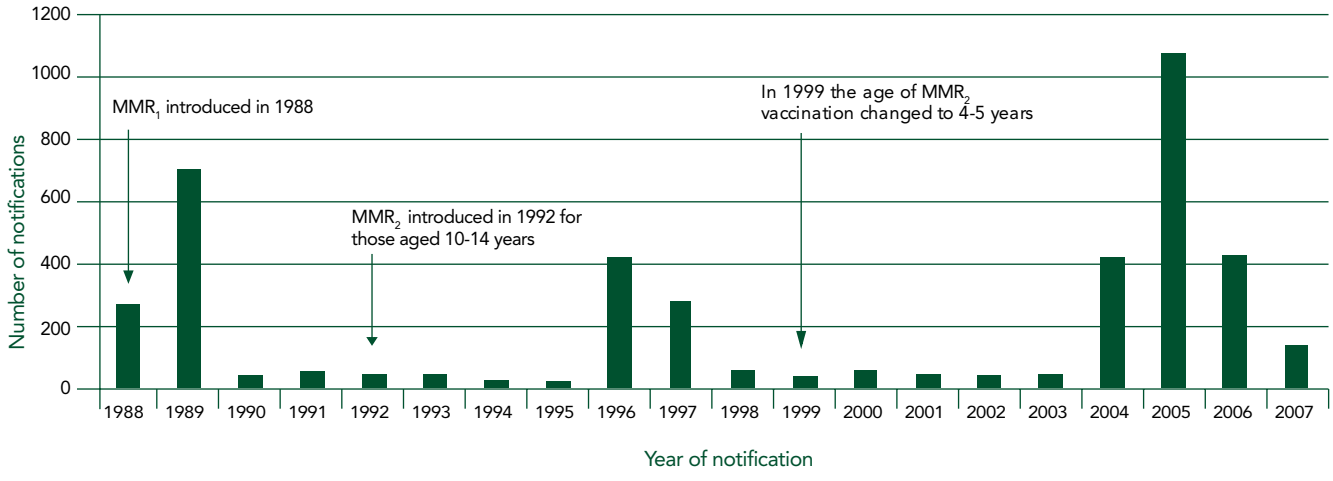



*Figure 1. Number of notified mumps cases by year and year of introduction of the measles-mumps-rubella (MMR) vaccine in Ireland*
*$MMR_1$- first dose of MMR*
*$MMR_2$- second dose of MMR*
*1988-June 2000 data collated by DoHC*
*July 2000-2007 data collated by HPSC*

(n=24/90) had one dose of the measles-mumps-rubella vaccine (MMR) and 21% (n=19/90) were reported to have received two doses of MMR. An additional two percent (n=2/90) had at least one dose of MMR. The vaccination date was reported for 83% (n=20/24) of cases reported to have received one dose of MMR. Both vaccination dates were reported for 63% (n=12/19) of cases vaccinated with two doses of MMR. Only 21% (n=4/19) of the cases reported to have received two doses of MMR were laboratory confirmed.

Information on hospitalisation status was available for 93 cases. Twelve cases were hospitalised, representing 13 percent of all cases with known hospitalisation status.

Reported complications of mumps included orchitis (17%, n=9/54), deafness (7%, n=6/88), meningitis (1%, n=1/91), encephalitis (1%, n=1/91) and mastitis (1%, n=1/89).

Three localised outbreaks of mumps were notified during 2007. The outbreak locations included a school (with three ill), a community (with 5 ill) and a private house (with two ill).

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 4th September 2008. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

*Table 1. Number of mumps cases notified by age group and the age specific incidence rate per 100,000 population (ASIR) by year from 2003-2007*

| Age Group (Years) | 2003 | | 2004 | | 2005 | | 2006 | | 2007 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number | ASIR | Number | ASIR | Number | ASIR | Number | ASIR | Number | ASIR |
| 0-4 | 11 | 4.0 | 23 | 7.6 | 49 | 16.2 | 33 | 10.9 | 24 | 7.9 |
| 5-9 | 8 | 3.0 | 8 | 2.8 | 86 | 29.8 | 33 | 11.4 | 13 | 4.5 |
| 10-14 | 3 | 1.1 | 24 | 8.8 | 108 | 39.4 | 60 | 21.9 | 10 | 3.7 |
| 15-19 | 6 | 1.9 | 115 | 39.6 | 323 | 111.3 | 99 | 34.1 | 16 | 5.5 |
| 20-24 | 3 | 0.9 | 129 | 37.7 | 299 | 87.3 | 89 | 26.0 | 17 | 5.0 |
| 25-34 | 4 | 0.6 | 44 | 6.1 | 135 | 18.7 | 64 | 8.9 | 18 | 2.5 |
| 35-44 | 1 | 0.2 | 17 | 2.7 | 32 | 5.1 | 20 | 3.2 | 22 | 3.5 |
| 45-54 | 1 | 0.2 | 6 | 1.1 | 22 | 4.2 | 11 | 2.1 | 12 | 2.3 |
| 55-64 | 0 | 0.0 | 4 | 1.0 | 8 | 2.0 | 8 | 2.0 | 7 | 1.7 |
| 65+ | 1 | 0.2 | 2 | 0.4 | 5 | 1.1 | 8 | 1.7 | 3 | 0.6 |
| Unknown | 2 | - | 48 | - | 12 | - | 2 | - | 0 | - |
| **Total** | **40** | **1.0*** | **420** | **9.9*** | **1079** | **25.4*** | **427** | **10.1*** | **142** | **3.3*** |

**Crude incidence rate per 100,000 total population*

# 1.5 Other forms of Bacterial Meningitis


## Summary

Bacterial meningitis, Not Otherwise Specified
Number of cases, 2007: 31
Number of cases, 2006: 45
Number of cases, 2005: 29
Crude incidence rate, 2007: 0.7/100,000


Apart from *Neisseria meningitidis*, which is considered the most common cause of bacterial meningitis in Ireland, other forms of the disease do occur. Details of these are presented below. For details on invasive meningococcal disease (which includes *N. meningitidis* meningitis), see a separate chapter within this report.

***Streptococcus pneumoniae***
In 2007, 35 cases of pneumococcal meningitis were notified, compared to 24 in 2006 and 19 in 2005. Cases in 2007 ranged in age from one month to 74 years. There were five pneumococcal meningitis related deaths, all but one were in children under two years of age. See a separate chapter on invasive pneumococcal disease for further details.

***Haemophilus influenzae***
In 2007, two cases of meningitis due to *H. influenzae* were notified, both of whom recovered. One case was in an infant <12 months and due to *H. influenzae* type b. The second case, age 36 years, was due to an untyped *H. influenzae infection*. See a separate chapter on invasive *H. influenzae* disease for further details.

***Listeria monocytogenes***
One case of *L. monocytogenes* meningitis was notified in an elderly patient in 2007.

*Table 1. Annual notifications of bacterial meningitis other than meningococcal disease, in Ireland, 2005-2007*

| Notified under | Causative Pathogen | 2005 | 2006 | 2007 |
|---|---|---|---|---|
| ***Streptococcus pneumoniae* infection (invasive)** | *S. pneumoniae* | 19 | 24 | 35 |
| ***Haemophilus influenzae* disease (invasive)** | *H. influenzae* | 9 | 4 | 2 |
| **Listeriosis** | *L. monocytogenes* | 1 | 1 | 1 |
| **Streptococcus group A infection (invasive)** | *S. pyogenes* | 1 | 1 | 0 |
| **Tuberculosis** | *M. tuberculosis* | 9 | 7 | 7* |
| **Bacterial meningitis NOS (not otherwise specified)** | *E. coli* | 0 | 3 | 0 |
| | *Gamella* species | 0 | 0 | 1 |
| | *K. pneumoniae* | 0 | 1 | 0 |
| | *P. aeruginosa* | 1 | 0 | 0 |
| | *P. mirabilis* | 0 | 0 | 1 |
| | *S. aureus* | 1 | 0 | 0 |
| | Staphylococcus coagulase negative | 0 | 1 | 0 |
| | *S. agalactiae* (Group B streptococcus) | 5 | 4 | 9 |
| | Streptococcus Group C | 1 | 0 | 0 |
| | Unknown | 21 | 36 | 22 |
| | **Total BacMen (nos)** | **29** | **45** | **33** |
| **Other forms of bacterial meningitis** **Total** | | **68** | **82** | **78*** |

** TB meningitis figures for 2007 are provisional*

***Streptococcus pyogenes* (Streptococcus group A infection (invasive) (iGAS)**
There was no reported case of iGAS causing meningitis in 2007, unlike in 2006 and 2005, when one case in each year was notified.

***Mycobacterium tuberculosis***
In 2007, seven *M. tuberculosis* meningitis cases were notified (provisional figure). Cases ranged in age from 38-78 years. One death was reported.

**Group B streptococci**
Nine cases of meningitis due to *Streptococcus agalactiae* were notified in 2007. All but one were neonatal cases. No deaths were reported.

**Other causative pathogens**
Cases of bacterial meningitis due to other pathogens were also notified in 2007. One meningitis notification for each of the following was received: *Gamella* species and *Proteus mirabilis,* both of which were reported in neonates.

**Bacterial meningitis (not otherwise specified)**
In total 33 cases of meningitis under this disease category were notified in 2007. The causative pathogens were identified in 11 of these and are detailed above (see group B streptococci, *Gamella* species and *Proteus mirabilis*). No causative pathogen was identified for 22 of the notifications, a decrease compared to 2006 (n=36) and similarly to that reported in 2005 (n=21).

# 1.6 Pertussis

## Summary

Number of cases, 2007: 78
Number of cases, 2006: 62
Crude incidence rate, 2007: 1.8/100,000

Seventy-eight cases (1.8/100,000) of pertussis were notified in 2007 compared to 62 in 2006. Of the 78 cases in 2007 47 were classified as confirmed, three as probable, 27 as possible while case classification was not specified for one (table 1).

In 2007, the majority of cases (n=46, 59%) and the highest age-specific incidence rate (75.3/100,000) were in children aged less than one year (table 1) with fifty-five percent (n=43) of all cases in children less than six months of age. Forty cases were male and 38 were female.

In Ireland it is recommended that children be vaccinated with a pertussis-containing vaccine at two, four and six months of age and a booster at four to five years of age. An additional booster with low dose acellular pertussis for those 11-14 years of age will be included in the childhood immunisation schedule in the near future. The vaccine provides protection in over 80% of recipients who are fully vaccinated. However, protection declines over time, with little or no protection 10-12 years after primary immunisation, without boosting.

In 2007, the vaccination status was reported for 44 (56%) pertussis cases. Twenty-six (n=26/44, 59%) cases were unvaccinated. Nine (n=9/44, 20%) cases were reported as incompletely vaccinated, but this included six cases who were less than six months of age and were therefore not eligible for three doses of pertussis vaccine in the Irish schedule. Nine (n=9/44, 20%) cases were reported as completely vaccinated, with two of the nine cases reported to have received a booster dose. The two cases vaccinated with the booster dose were aged eight and 15 years.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 20th August 2008. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

*Table 1. Number of notified pertussis cases by age group and case classification and the age specific incidence rate per 100,000 population (ASIR) in 2007*

| Age Group (Year/s) | Case Classification | | | | Total | ASIR |
|---|---|---|---|---|---|---|
| | Confirmed | Probable | Possible | Not Specified | | |
| **<1** | 31 | 1 | 14 | 0 | 46 | 75.3 |
| **1-4** | 8 | 2 | 6 | 1 | 17 | 7.0 |
| **5-9** | 2 | 0 | 1 | 0 | 3 | 1.0 |
| **10-14** | 3 | 0 | 1 | 0 | 4 | 1.5 |
| **15-19** | 2 | 0 | 1 | 0 | 3 | 1.0 |
| **20-24** | 0 | 0 | 2 | 0 | 2 | 0.6 |
| **25-34** | 0 | 0 | 0 | 0 | 0 | 0.0 |
| **35-44** | 1 | 0 | 1 | 0 | 2 | 0.3 |
| **45-54** | 0 | 0 | 1 | 0 | 1 | 0.2 |
| **55+** | 0 | 0 | 0 | 0 | 0 | 0.0 |
| **Total** | **47** | **3** | **27** | **1** | **78** | **1.8*** |

**Crude incidence rate per 100,000 total population*

# 1.7 Rubella

## Summary

Number of cases, 2007: 19
Number of confirmed cases, 2007: 3
Crude incidence rate, 2007: 0.4/100,000
Crude confirmed incidence rate, 2007: 0.1/100,000

In 2007, 19 cases (0.4/100,000) of rubella were notified in Ireland compared to 14 cases in 2006.

Three of the cases in 2007 were classified as confirmed giving a crude confirmed incidence rate of 0.1 per 100,000 total population. Two of these cases were in the age group 30-34 years and one was aged one year (table 1). Sixteen cases in 2007 were classified as possible, 15 of these were less than three years of age (table 1).

Ten of the rubella cases were female and nine were male.

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

Vaccination status was reported for ten of the rubella cases in 2007. Six cases were unvaccinated; five of these were less than 12 months of age and one case was aged 21 months. All six were classified as possible cases. Four cases were reported as completely vaccinated for their age. All four were between one and two years of age and were classified as possible cases.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 19th August 2008. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

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

*Table 1. Number of notified rubella cases by age group and case classification and the age specific incidence rate per 100,000 population (ASIR) in 2007*

| Age Group (Year/s) | Case Classification | | | Total | ASIR |
|---|---|---|---|---|---|
| | Confirmed | Probable | Possible | | |
| **<1** | 0 | 0 | 7 | 7 | 11.5 |
| **1-2** | 1 | 0 | 8 | 9 | 7.4 |
| **3-4** | 0 | 0 | 0 | 0 | 0.0 |
| **5-9** | 0 | 0 | 0 | 0 | 0.0 |
| **10-14** | 0 | 0 | 0 | 0 | 0.0 |
| **15-19** | 0 | 0 | 0 | 0 | 0.0 |
| **20-24** | 0 | 0 | 0 | 0 | 0.0 |
| **25-29** | 0 | 0 | 0 | 0 | 0.0 |
| **30-34** | 2 | 0 | 1 | 3 | 0.9 |
| **35+** | 0 | 0 | 0 | 0 | 0.0 |
| **Total** | **3** | **0** | **16** | **19** | **0.4*** |

**Crude incidence rate per 100,000 total population*

# 1.8 *Streptococcus pneumoniae* (invasive)

## Summary

Number of cases in 2007: 361
Number of cases in 2006: 293
Number of deaths in 2007: 18
Crude incidence rate, 2007: 8.5/100,000

Since 1st January 2004, invasive infections due to *Streptococcus pneumoniae* are notifiable. For the purposes of this report the term invasive pneumococcal disease (IPD) will be used to describe these infections.

In 2007, 361 cases of IPD (8.5/100,000) were notified in Ireland. This is a 19% increase from 2006 (293 cases; 6.9/100,000). Although, the number of IPD notifications has steadily increased each year since 2004 (figure 1), this increase is believed to be a reflection of improved reporting of IPD through the notification system rather than an increase in disease burden. The fact that the number of invasive *S. pneumoniae* isolates reported through the European Antimicrobial Surveillance System (EARSS) has remained relatively stable over these years with between 400-438 cases reported *per annum* would support the above assessment (figure 1).

In 2007, 310 IPD cases were classified as confirmed (86%) and 51 as probable (14%). The clinical diagnosis was reported for 158 of the notifications and the clinical manifestations included pneumonia (51%; n=81), septicaemia (24%; n=38), meningitis or meningitis & septicaemia (22%; n=35), others (3% n=4; 1 each of peritonitis, mastoiditis, muscoskeletal infection and soft tissue infection).

Slightly more cases of IPD occurred in males (52%, n=189) than in females (48%, n=172). Cases ranged in age from 1 week to 98 years, with a median age of 58 years. Sixty percent of the IPD cases notified were in the young and the old; 18.8% (n=68) of cases were in children <5 years of age and 41.6% (n=150) were in elderly adults 65 years of age and older (figure 2).

In children the incidence of IPD was highest in infants <1 year of age (41/100,000) followed by 1 year old children (38/100,000). Thereafter, the incidence declined and it was <10 cases per 100,000 for the age groups between 5-54 years (figure 2). In the elderly the incidence of IPD increased considerably with increasing age; from 22 cases per 100,000 in the 65-74 year olds, to 38 cases per 100,000 in 75-84 year olds and reaching the highest

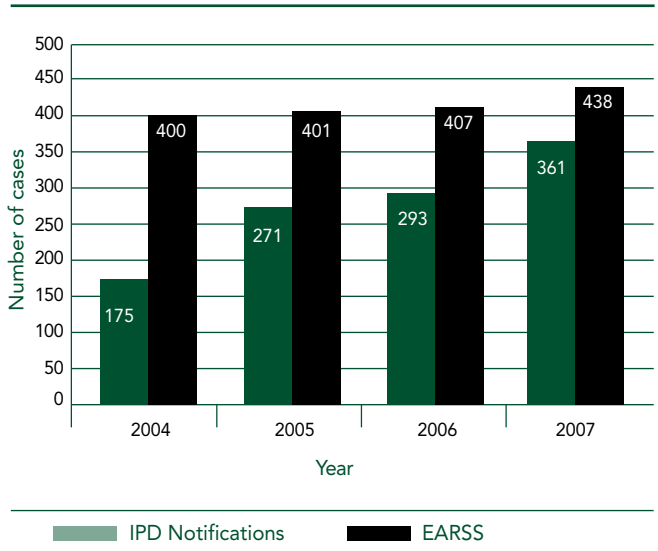



*Figure 1. Annual number of invasive pneumococcal disease cases reported through the infectious disease notification system and EARSS, 2004-2007*

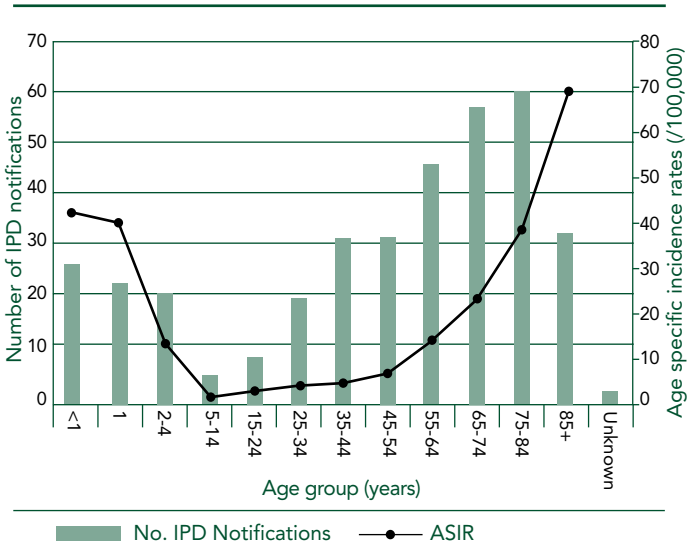



*Figure 2. Number and age specific incidence rates of IPD notifications by age group, 2007*

rate in those 85 years of age and older, at 69 cases per 100,000 population (figure 2).

Outcome was reported for 35% (127/361) of IPD notifications in 2007 and although this is an improvement from the 10% reported in 2006, the figures presented here may underestimate mortality due to IPD in Ireland. In 2007, 18 deaths associated with IPD were reported, involving five children (28%; all <2 years of age) and 13 adults (72%) ranging in age between 38 and 98 years. Cause of death was reported as follows: pneumonia (39%; n=7), meningitis or meningitis & septicaemia (28%; n=5), septicaemia (11%; n=2) and clinical diagnosis not reported (22%; n=4).

In April 2007 a collaborative project commenced between the RCSI Beaumont Hospital, the Children's University Hospital Temple Street and HPSC on the typing of invasive *S. pneumoniae* isolates submitted by Irish microbiology laboratories. A primary objective of this project was to determine the serotype distribution of IPD isolates in circulation in Ireland prior to the introduction of the pneumococcal conjugate 7-valent vaccine (PCV7, Prevenar) to the infant immunisation schedule. Based on data from the first 12 months of the project (April 2007 – March 2008) the most common serotypes in circulation are 14, 4, 9V, 7F, 19A; accounting for 45% of the isolates typed. The seven serotypes contained in PCV7 occur in the top 10 most prevalent serotypes associated with IPD in Ireland. Eighty four percent of isolates from children aged <2 years had serotypes covered by PCV7. Further details and results from this typing project are presented in the August 2008 edition of Epi-Insight, available at www.hpsc.ie.

On 1st September 2008, PCV7 was introduced in Ireland to the infant immunisation schedule, offering three doses at 2, 6 and 12 months of age, to those born on or after 01/07/2008. A catch-up campaign for those born between 02/09/2006 and 30/06/2008 is also being undertaken. The monitoring of *S. pneumoniae* serotype distribution needs to continue in order to assess the impact of introducing PCV7, to investigate vaccine failures and to inform future public health policy regarding immunisation schedules and the value of introducing expanded valency IPD conjugate vaccines as they become available. To ensure this work can continue in the long term, provision of a permanently resourced reference facility is an absolute priority.

The IPD notification figures presented in this report are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 29th August 2008. These figures may differ slightly from those previously published due to ongoing updating of notification data on CIDR. EARSS data were obtained from the Whonet database at HPSC.

# 1.9 Tetanus

## Summary

Number of cases, 2007: 1
Number of cases, 2006: 0

One case of tetanus was notified in 2007. The case was aged greater than 70 years and had received a wound injury 11 days prior to onset of symptoms. A tetanus booster was given at the time of injury, however, information on previous tetanus vaccines, if any, are not known/were not reported.

In total, 10 cases of tetanus were reported since tetanus became notifiable in November 1981. Age was reported for eight of these cases, the mean age was 55.5 years and the median age was 60.5 years (range 15-84 years). The number of tetanus notifications by age group is shown in figure 1. Two deaths were reported in cases aged >60 years.

The childhood immunisation schedule recommends children receive a dose of tetanus-containing vaccine at two, four and six months of age and booster doses at four-five years and 11-14 years of age. The vaccine provides protection in 90-95% of children who are fully vaccinated. However, as protection declines over time up to 50% of 20-year-olds and up to 70% of 70-year-olds may be unprotected if they have not received boosters. Vaccination data were reported for three of the 10 notified cases. One case, in the age group 15-19 years, was reported to have received three doses of tetanus vaccine as a child and a booster at four years and again at five-six years of age. A second case was reported to have received a tetanus vaccine around 40 years prior to infection. The third case (case notified in 2007) received a tetanus vaccine at the time of injury but information on tetanus vaccines prior to injury was not known/not reported.

The following known/suspected wound injuries (n=5) were reported among the 10 notified cases: wound associated with dog bite (n=1), wound from kitchen knife (n=1), gardening associated leg wound (n=1), leg scratches in an avid gardener (n=1), hand wound associated with a clean piece of wood (n=1) and a farming associated hand wound (n=1).

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 20th August 2008. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

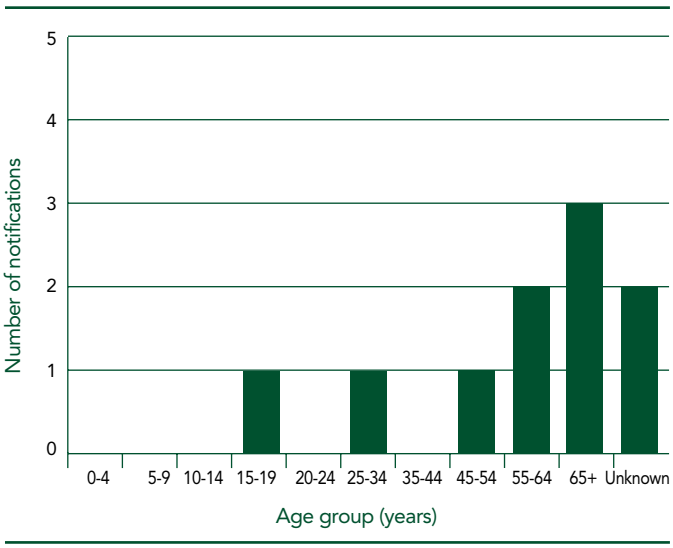



*Figure 1. Tetanus notifications (n=10) from 1982 to 2007 by age group*

# 02

## Respiratory and Direct Contact Diseases

# 2.1 Influenza


## Summary

**2007/2008 Influenza Season**
Number of influenza-like illness cases: 927
% of influenza positive sentinel specimens: 43.9
Dominant circulating (sub)type: A (H1N1) & B
% specimens oseltamivir resistant: 11.1


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

Influenza activity in Ireland peaked slightly earlier in the 2007/2008 season compared to the previous two seasons. Activity was mild, peaking during week 1 2008 at 49.1 per 100,000 population (figure 1). During the peak of activity, the majority of ILI cases reported were in the 15-64 year age group.

The NVRL tested 342 sentinel specimens for influenza virus during the 2007/2008 season. One hundred and fifty (43.9%) sentinel specimens were positive for influenza: 78 influenza A (74 A H1N1, 1 A H3N2 and 3 A unsubtyped) and 72 influenza B.

Influenza A (H1N1) was the predominant subtype detected from week 48 2007 to week 7 2008 and influenza B predominated in the latter part of the season. Influenza A (H1N1), accounted for 98.7% of subtyped positive sentinel specimens. The majority of positive influenza sentinel cases were in the 15-64 year age group (87.9%). The NVRL tested 2,207 non-sentinel respiratory specimens during the 2007/2008 season, 61 (2.8%) of which were positive: 32 influenza A and 29 influenza B. The majority of non-sentinel influenza (56.1%) specimens were in the 15-64 year age group. Based on antigenic or genetic characterisation of 70

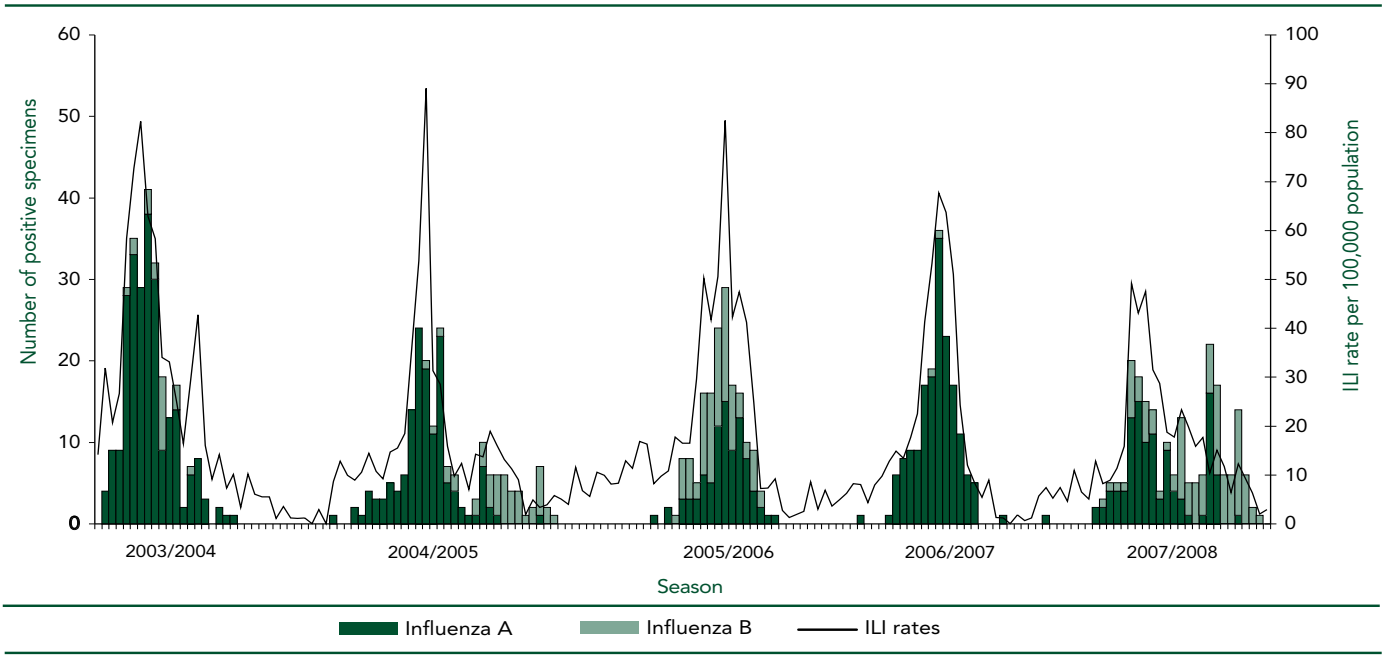



*Figure 1. GP ILI consultation rate per 100,000 population and the number of positive influenza specimens detected by the NVRL by week and season, 2003/2004 - 2007/2008*

influenza viruses, 59 were A/Solomon Island/3/2006 (H1N1)-like, seven were A/Wisconsin/67/2005 (H3N2)-like and four were B/Florida/4/2006-like (B/Yamagata/16/88 lineage).

The NVRL conducted nucleotide sequencing on specimens taken by sentinel GPs between November 2007 and February 2008. Seven of 63 specimens (11.1%) tested were resistant to oseltamivir (brand name Tamiflu). These viruses retain sensitivity to zanamivir, amantadine and rimantadine.

Of the 150 positive influenza virus detections from sentinel specimens, 131 (87.3%) were unvaccinated, 5 (3.3%) were vaccinated and vaccination status was unknown in 14 (9.3%) cases. Of the five vaccinated cases, influenza A (H1N1) was detected in two cases and influenza B in three cases.

Overall, influenza activity was most intense in HSE-E during the 2007/2008 season. Two ILI/influenza outbreaks were reported to HPSC this season, both from HSE-E, one during week 12 2008 in a long term care facility associated with influenza A (H3N2) and one during week 16 2008 on a coach tour from Dublin to Clare associated with influenza B.

Hospital respiratory admissions (as a proportion of total hospital admissions) in sentinel hospitals peaked during week 52 2007 (figure 2), one week prior to the peak in sentinel GP ILI consultation rates. However, ILI visits to GPs are often artificially reduced in Christmas week. Absenteeism in several sentinel schools was also at elevated levels during peaks in ILI consultation rates.

A total of 299 influenza notifications were reported on CIDR during the 2007/2008 influenza season. Fifty-five of these notifications were patients aged between 0 to 14 years and six were hospitalised (between December 2007 and March 2008). Enhanced data were completed for all six cases. One enhanced case was in the 5-14 year age group and five cases were under one year of age. Four cases were notified from HSE-E and two from HSE-M. Three enhanced cases were positive for influenza A and three were positive for influenza B. Symptoms included fever (5/6), cough (6/6), gastrointestinal manifestations (2/6) and fatigue (2/6). Complications included bronchitis, croup and other respiratory complications. The mean number of days hospitalised was 13.6 (ranging from 5-30). One case was in an at-risk category for influenza vaccine. No cases were vaccinated. Outcome was recorded in all cases; four recovered and outcome was unknown in two cases.

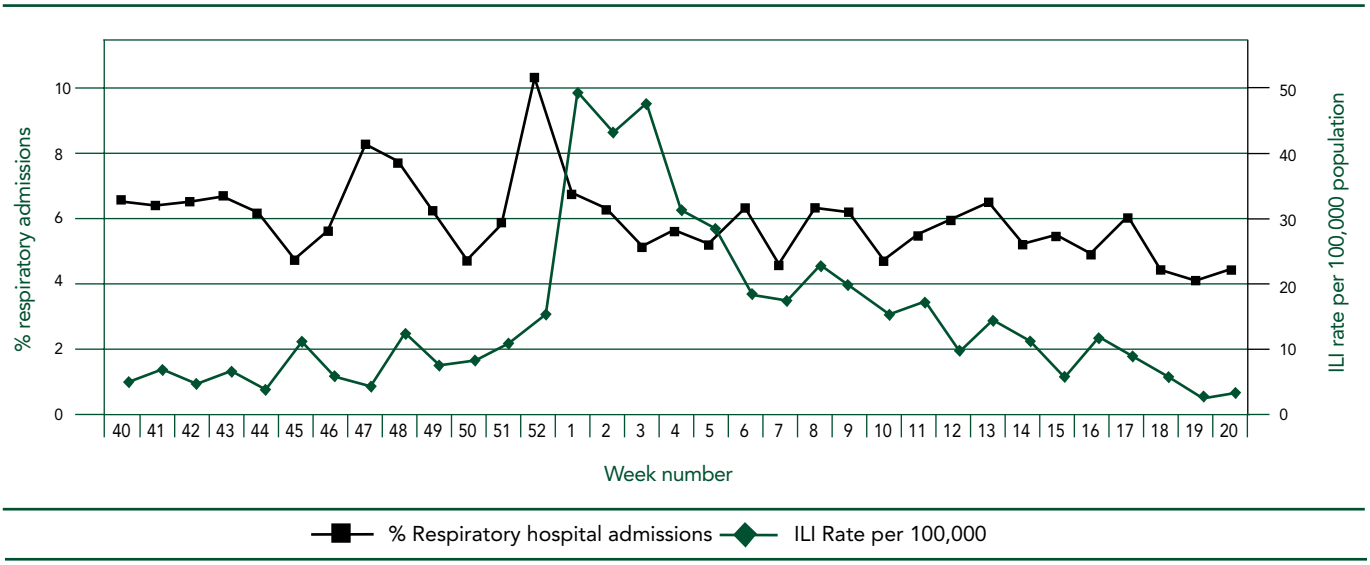



*Figure 2. Respiratory admissions as a percentage of total hospital admissions in ten sentinel hospitals and GP ILI consultation rate per 100,000 population by week for the 2007/2008 influenza season*

During the 2007/2008 influenza season, two deaths attributed to influenza were registered with the General Register Office. These deaths were both in adults over 65 years of age, one in HSE-NW registered in week 8 2008 and one in HSE-S registered in week 14 2008. It should be noted that the death registered in HSE-S was not a laboratory confirmed case of influenza. It should also be noted that deaths caused by influenza are rarely attributed to influenza per se.

For the forthcoming season, a number of additional measures have been put in place in Ireland to improve surveillance of ILI/influenza. The NVRL will undertake further development of genetic characterisation testing to include both influenza A and B strains. They will also continue monitoring oseltamivir resistance. Current Irish national guidance on the use of antivirals for treatment and prophylaxis of influenza remain in place though they are being kept under review in light of increased resistance to oseltamivir. Other activities being developed include surveillance of influenza vaccine uptake in those aged 50 years and older. Baseline threshold levels for influenza activity will be used for the first time in Ireland during the 2008/2009 season. Case based reporting of avian influenza is now operational on CIDR and an interim MS Access database for contacts of avian influenza cases is in the final stages of development. Data from these projects will in turn inform continuing national progress on pandemic preparedness and will be vital in the event of an influenza pandemic for planning and control measures.

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

European data are available at www.eiss.org/index.cgi

# 2.2 Legionellosis


## Summary

Number of cases in 2007: 16
Crude incidence rate: 3.8/million
Number of deaths in 2007: 1


In 2007, 16 cases of legionnaires' disease were notified in Ireland, a rate of 3.8/million population. This was the highest rate recorded to date but the numbers are small (Table 1). One death was recorded in 2007. Ten cases were notified from HSE East, three from HSE Midlands, two from HSE North East and one case from HSE Mid-West.

The majority of cases (56.3%) were male. The median age was 47 years, with a range from 18 to 77 years.

There were fourteen confirmed cases and two probable cases. The organism involved was *Legionella pneumophila* serogroup 1 in fourteen cases while the *Legionella* species was unknown in two cases. Urinary antigen testing was the method of diagnosis in thirteen cases, serology in two cases and culture in one case. With increasing use of urinary antigen testing it can be anticipated that numbers of cases notified will continue to increase.

Of the 16 cases, eleven were travel-associated, four were community-associated and one was hospital-associated. Countries of travel included Italy (3), France (2), Thailand (2), Spain (1), Germany (1), China (1), and USA (1). A case of legionnaires' disease is defined as travel-associated if the patient spent one or more nights away from home in accommodation used for commercial purposes (hotels, holiday apartments) in the 10 days before onset of illness. Travel-associated cases may involve travel within Ireland or abroad.

*Table 1. Number of legionnaires' disease cases per million population notified in Ireland, 2000-2007*

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

# 2.3 Invasive Group A Streptococcal Disease


## Summary

Number of cases, 2007: 57

Crude incidence rate, 2007:1.3 per 100,000 population


**Notifications**

There were 57 cases (1.3 cases per 100,000 population) of invasive Group A streptococcal (iGAS) disease notified in 2007, compared to 61 cases (1.4 per 100,000) in 2006. All 57 cases in 2007 were confirmed, defined as patients with group A Streptococcus (GAS), or *Streptococcus pyogenes*, isolated from a sterile site.

*Patient demographics*

Of the 57 cases, 26 (46%) were males and 31 (54%) were females. The age and sex specific rates of iGAS cases are shown in Figure 1. Children aged up to 4 years and adults aged over 65 years were most affected with smaller peaks in females aged 25-34 years and males aged 35-44 years.

*Geographic spread and seasonal variation*

Table 1 outlines the numbers and crude incidence rates (CIRs) of iGAS disease by HSE area from 2004-2007. Of note, the highest number of cases in 2007 occurred in the HSE-E (n=28) and the highest CIR in the HSE-SE (2.2 per 100,000 population).

Although the numbers of iGAS cases notified to date have been low and it is not possible to discern any distinct seasonal variation, the months with the highest numbers of notifications for each of the four years of surveillance have been either February, March or April (data not shown).

**Enhanced data**

Enhanced data fields were entered for 40 (70%) of the 57 cases reported in 2007. Fifteen laboratories were identified as the source for 39 cases.

*Isolate details*

GAS was isolated from a sterile site from 33 of 40 cases for which enhanced data were available, primarily from blood cultures (30, or 91%) but also joint, bone and deep tissue (one isolate each).

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

*Clinical details*

As in 2006, bacteraemia (32 cases) and cellulitis (10) were the most common clinical presentations, followed by pneumonia (6), streptococcal toxic shock syndrome (STSS) (5), necrotising fasciitis (2), puerperal sepsis (2), peritonitis (1) and myositis (1). Note that cases could have more than one clinical presentation. The following clinical syndromes were associated with 34 cases for which data on clinical presentation were provided:

- bacteraemia, myositis, necrotising fasciitis and STSS (1)
- bacteraemia, pneumonia, necrotising fasciitis and STSS (1)

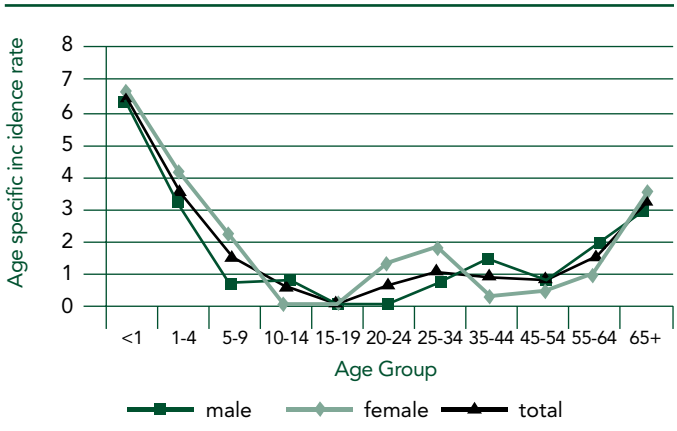



*Figure 1. Age and sex specific rates of iGAS disease in 2007*

- bacteraemia, cellulitis and STSS (2)
- bacteraemia, pneumonia and STSS (1)
- bacteraemia and cellulitis (7)
- bacteraemia and pneumonia (4)
- bacteraemia and puerperal sepsis (1)
- cellulitis (1)
- peritonitis and puerperal sepsis (1)
- bacteraemia without a focus (15)

*Risk factors*
Risk factors associated with iGAS disease included: skin and wound lesions (11 cases), age over 65 years (14), intravenous drug use (IVDU) (5), steroid use (2), alcoholism (2), malignancy (2), non-steroidal anti-inflammatory drugs (1) and varicella infection (1). Note that cases could have one or more associated risk factors. No risk factors were identified for 9 cases. Among the five cases with STSS, IVDU was identified as a risk factor in two cases, alcoholism in one and skin lesions in three. No risk factors were identified for two cases.

*Clinical management*
Surgical intervention was required for two patients and admission to the intensive care unit for five patients.

*Other epidemiological information*
None of the cases were hospital-acquired. No outbreaks were identified in 2007.

*Outcome*
Outcome at 7-days following GAS isolation was reported for 26 cases: 21 were still alive, four died due to iGAS (ages 65, 82, 84 and 90 years) and one died due to an unknown cause (age 72 years). The case fatality rate (CFR) for outcome reported at 7-days was 19%. Of the five STSS cases, three died resulting in a CFR of 60%.

**Conclusion**
The number of cases notified in Ireland is low compared to other Northern European countries and the US. Data reported to the Strep-Euro Program for 2003 and 2004 showed that the highest rates of iGAS disease were in Northern Europe with age-standardised rates of 3.31, 3.10, 2.58 and 2.46 per 100,000 population in the UK, Sweden, Denmark and Finland, respectively. The estimated rate of iGAS disease in the US in 2007 [provisional data from CDC's Active Bacterial Core Surveillance (ABCS) Program] was 3.75 per 100,000 population while the mortality rate was 0.43. Certain serotypes of GAS are more virulent than others, e.g. serotypes M1 and M3, but with the absence of a streptococcal reference laboratory in this country, no serological typing data were available. While enhanced data were available for 70% of cases, improved completion of the enhanced questionnaire for all cases will further augment our understanding of iGAS disease in Ireland.

The figures presented in this summary are based on data extracted from the Computerised Infectious Diseases Reporting (CIDR) System on 22nd August 2008.

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

*Table 1. Numbers (n) and Crude Incidence Rates (CIRs) per 100,000 population of iGAS disease by HSE Area, 2004-2007*

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

# 2.4 Tuberculosis, 2006

## Summary

Number of cases, 2006: 465
Crude incidence rate, 2006: 11.0/100,000
Number of TB deaths, 2006: 10
Number of cases, 2007*: 478
Crude incidence rate, 2007*: 11.3/100,000

In 2006, 465 cases of tuberculosis were notified in Ireland, corresponding to a crude notification rate of 11.0 per 100,000 population. This is slightly higher than the rates reported between 2000 and 2005, which ranged from 9.7/100,000 to 10.6/100,000 population, but is lower than the crude incidence rates reported between 1991 and 1999, which ranged from 11.5/100,000 to 18.2/100,000. A summary of the epidemiology of TB in Ireland during 2006 is shown in table 1. Number of cases and crude incidence rates from 1991 to 2007* with three-year moving averages are also shown in figure 1.

The highest crude incidence rate was reported in HSE S at 15.3 per 100,000 population. The next highest rates were reported in HSE E (12.9) and HSE SE (11.1). HSE NW (3.8) reported rates that were significantly lower than the national incidence rate.

Differences in age-standardised TB incidence rates were also found between HSE areas with HSE S having the highest rate (15.3/100,000) in 2006 followed by HSE E (12.6) and HSE SE (11.1). HSE NW had the lowest rate in 2006 at 4.0/100,000.The highest age-specific rate in 2006 occurred among those aged 65 years and over (17.7/100,000 population). This was similar to the rate observed in this age group between 2001-2005.

Rates among males were higher than females for all age groups except in the 15-24 year age group. The highest rates among males (25.6/100,000) were among those aged 65 years and over while the highest rates in females (16.6/100,000) were in the 25-34 year age group. The male to female ratio (1.5:1) reported in 2006 was consistent with the rate reported in 2005 (1.5:1).

During 2006, 34.6% of TB cases notified were born outside Ireland. This compares to 33.8% in 2005, 30% in 2004, 21.9% in 2003, 30.1% in 2002 and 16.5% in 2001. In 2006, among countries in the EU and Western Europe who reported data to the EuroTB network, 20% of notifications were in foreign-born patients. There was a notable difference in age between those born in Ireland and those born outside Ireland, with a median age of 45 years and 31 years respectively.

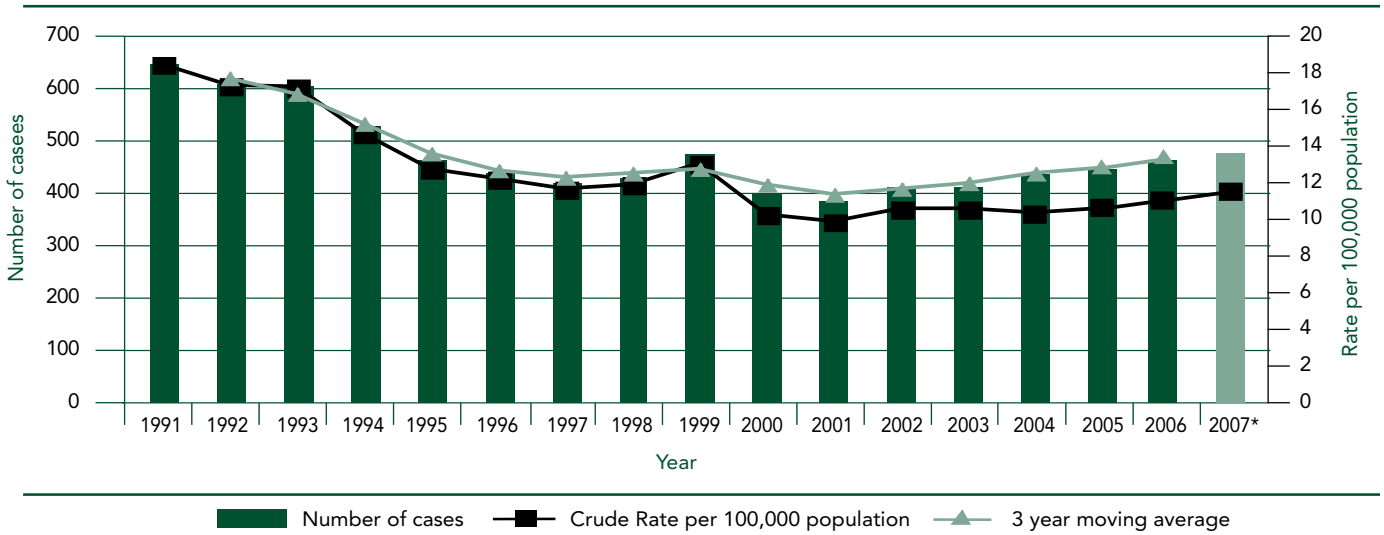



*Figure 1: Notified cases of TB in Ireland with crude rates per 100,000 population, 1991 to 2007* and 3-year moving averages, 1992-2006*

** Provisional data which may change significantly following validation.*

There were seven cases of TB meningitis in 2006, a rate of 0.2/100,000 population (2/million population). Between 1998 and 2006, a total of 57 cases of TB meningitis have been reported with five of the cases reported among 0-4 year olds.

There were 27 drug resistant cases notified in 2006, including four cases of MDR-TB. Mono-resistance to isoniazid was recorded in 14 cases, to rifampicin in two cases, to ethambutol in one case, to pyrazinamide in one case and to streptomycin in four cases. Resistance to isoniazid, ethambutol and streptomycin was also documented in one further case. Nine of the 27 (33.3%) drug resistant cases, including three (75%) of the MDR-TB cases, were born outside Ireland.

In 2006, information on treatment outcome was provided for 78.9% of cases which is a marked decrease on the proportion in 2005 (87.1%). This compares to 84.3% in 2004, 84.8% in 2003, 77.2% in 2002 and 59.8% in 2001. It is of critical importance to TB control in Ireland that surveillance of TB and reporting of outcome data be maintained at a high level especially with the global threat of resistant strains.

The Global Plan to Stop TB 2006-2015 was launched in January 2006 and aims to reduce the global prevalence of, and deaths due to TB by 50% in 2015 relative to 1990. In addition it proposes to eliminate TB as a public health problem (<1 case per million population) by 2050. This strategy calls on countries to strengthen health systems for TB treatment and control and to address MDR-TB, TB/HIV and other challenges e.g. high risk groups and areas where TB rates are high. The importance of good surveillance data cannot be underestimated in this context as they will help guide where resources should be directed in order to ensure the effective prevention and control of TB in Ireland and in order to reach the elimination target by 2050.

**Provisional 2007 data**

There were 478 cases of TB provisionally notified in 2007. It is important to note that these data are provisional and **may change significantly following validation**.

Of the 478 cases provisionally notified in 2007,

- Pulmonary TB was diagnosed in 317 cases (66.3%), extrapulmonary TB in 121 cases (25.3%) and pulmonary and extrapulmonary TB in 30 cases (6.3%)
- Of the 347 cases with a pulmonary disease component, 186 (53.6%) were culture positive and 151 (43.5%) were smear positive
- There were seven cases of TB meningitis provisionally notified corresponding to a rate of 0.2/100,000 population (2/million population)

*Table 1. Summary of the epidemiology of TB in Ireland, 2006*

| Parameter | 2006 |
|---|---|
| Total number of cases | 465 |
| Crude notification rate per 100,000 | 11.0 |
| Cases in indigenous population** | 294 |
| Cases in foreign-born persons** | 161 |
| Culture positive cases | 317 |
| Smear positive pulmonary cases | 155 |
| Multi-drug resistant cases | 4 |
| Mono-resistant to isoniazid | 14 |
| Deaths attributable to TB | 10 |
| Outcomes reported in cases | 367 |
| TB meningitis cases | 7 |

** Provisional data which may change significantly following validation.*
***Country of birth not reported for 10 cases*

- There were 277 (57.9%) cases born in Ireland and 181 (37.9%) were foreign-born. Country of birth was not reported for 20 cases
- There were 293 cases (61.3%) notified in males, 183 cases (38.3%) in females and the mean age of cases was 40.8 years (range 1 to 94 years)
- Resistance was reported in 10 cases, three were mono-resistant to isoniazid and five were MDR-TB. Eight of the 10 resistant cases, including four of the MDR cases, were born outside Ireland

A comprehensive report on 2006 data and a provisional report on 2007 data can be found at www.ndsc.ie/hpsc/A-Z/VaccinePreventable/TuberculosisTB/Publications/AnnualReportsontheEpidemiologyofTBinIreland/

# 03

# Infectious Intestinal Diseases

# 3.1 Campylobacter


## Summary

Number of cases in 2007: 1891
Number of cases in 2006: 1815
Crude incidence rate: 45/100,000


Campylobacter is the commonest bacterial cause of gastroenteritis in Ireland. In 2007, 1891 cases of Campylobacter infection were notified (44.6/100,000 population). There is a continuing increase in the number of cases notified (up by 76 cases in 2007). This is reflected in the crude incidence rate which increased from 42.8 in 2006 to 44.6 in 2007, which is the highest rate reported in Ireland since 1999 (table 1).

Campylobacter became a notifiable disease in Ireland in 2004. Prior to this, data on laboratory-confirmed cases of Campylobacter infection in humans were collected nationally as part of the EU Zoonoses Regulations.

Regionally, the HSE-W and HSE-M continue to experience high incidence rates. The HSE-W region had a rate of 62.7 in 2007, which is an increase of 12.6 over 2006 levels. Similarly the HSE-M region had a rate of 58.0, an increase of 8.6 over 2006 levels. The HSE-NE region reported the lowest rate of 35.8 in 2007 (figure 3).

Campylobacter has a well documented seasonal distribution with a peak in early summer. The highest number of cases were reported in May with 254 in the month. Seventy four cases were notified in December.

In 2007, the highest burden of illness was seen in children less than five years of age, with 25.6 % of cases occurring in this age-category (An age-specific incidence rate of 159.8 cases/100,000 was reported in the 0-4 age group). This is also noted in previous years and is a well-reported feature of campylobacteriosis.

Analysis of age-sex adjusted rates show a predominance of male cases in every age category, except the 15-19 and 25-34 age groups. Males accounted for 53.5% of all cases, females for 45.8% and the gender is unknown in 0.7% of cases.

Due to the absence of a Campylobacter reference facility in Ireland, routine typing of human Campylobacter isolates is not conducted. Information on species type was available for 37% (695/1891) of

*Table 1. Annual number of cases of campylobacteriosis in Ireland, 1999-2007*

| Year | Number of cases | Crude incidence rate (95% CI) |
|---|---|---|
| **1999** | 2085 | 57.5 [55.0 – 60.0] |
| **2000** | 1613 | 41.2 [39.2 – 43.2] |
| **2001** | 1286 | 32.8 [31.0 – 34.6] |
| **2002** | 1336 | 34.1 [32.3 – 35.9] |
| **2003** | 1568 | 40.0 [38.0 – 42.0] |
| **2004*** | 1710 | 40.3 [38.4 - 42.2] |
| **2005*** | 1801 | 42.5 [40.5 - 44.4] |
| **2006*** | 1815 | 42.8 [40.8 - 44.8] |
| **2007*** | 1891 | 44.6 [42.6 - 46.6] |

**rates based on 2006 Census data*

isolates. Of these, 91% (n=630) were reported as *C. jejuni*; 9% (n=62) as *C. coli*, one reported case of *C. fetus* and two reported cases of *C. upsaliensis*. *C. upsaliensis* was not reported in Ireland between 2004 and 2006.

In 2007 there were eight family outbreaks and one general outbreak in a residential home of campylobacteriosis notified. A total of 21 cases of illness were associated with these outbreaks. These were all small clusters of illness with no more than three people reported ill in any outbreak.

Information on country of infection was only provided in 14% (257/1891) of cases. Of these, the majority were reported to have been acquired within Ireland (n=229), with just 11% associated with foreign travel. Spain (n=6) and France (n=3) were the most commonly reported countries. There were 16 different countries (excluding Ireland) cited as a country of infection. However the cases reported with known country of infection is considered to be an underestimate of the true burden of travel-associated cases.

In October 2007, co-ordination of European surveillance of Campylobacter via the Enter-net network ceased. The role was assumed by the European centre for Disease Prevention and Control (ECDC). It is one of the six priority diseases covered by the Food and Water Borne Diseases (FWD) network.

In a community summary report on zoonoses, published by European Food Safety Authority (EFSA) on data submitted in 2006, campylobacteriosis remained the most frequently reported zoonotic disease in humans. Campylobacter was determined to be the causative agent in 6.9% of all reported foodborne outbreaks. The EU incidence rate in humans was 46.1 per 100,000 population, however, there is large variation in the incidence of campylobacteriosis reported between member states.

See www.hpsc.ie for more a detailed Campylobacter epidemiology report for 2007

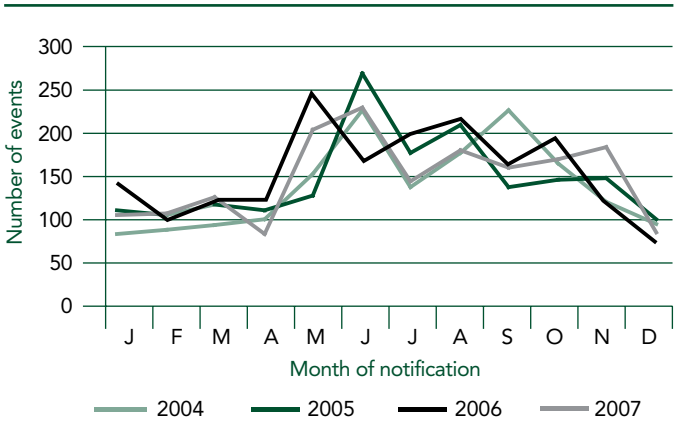



*Figure 1. Seasonal distribution of Campylobacteriosis in Ireland, 2004-2007*

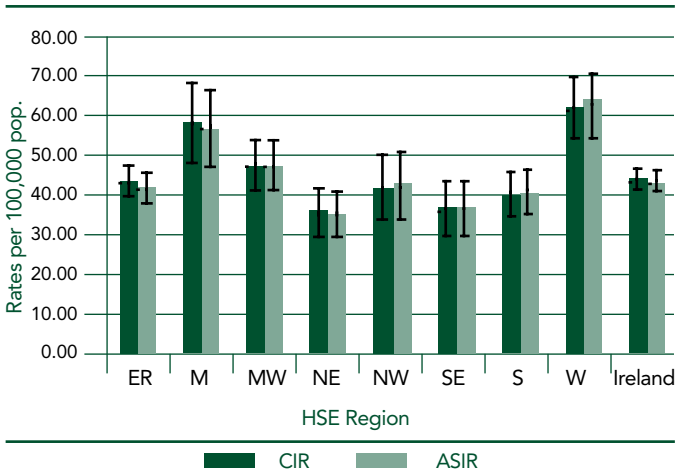



*Figure 2. Age standardised incidence rates (ASIR) of human campylobacteriosis in Ireland, compared to crude incidence rates (CIR) in each health board, 2007.*

# 3.2 Cryptosporidiosis


## Summary

Number of cases, 2007: 609
Number of cases, 2006: 367
Crude incidence rate, 2007: 14.4/100,000


In 2007, 609 cases of cryptosporidiosis were notified in Ireland, a crude incidence rate of 14.4 per 100,000 population (table 1). This was a 66% increase on the number of cases notified in 2006, and was the highest annual number of cases since the disease became notifiable in 2004.

The crude incidence (CIR) and age standardised incidence (ASIR) rates by HSE area for 2007 are reported in table 1. The main reason for the increased incidence in 2007 was the very high number of notifications in the HSE-W associated with a large outbreak in the spring of 2007. As in previous years, the HSE E reported the lowest crude incidence rate.

Disease incidence peaked slightly earlier than in previous years (figure 1), however, this was strongly influenced by the HSE-W outbreak. When notifications from the HSE-W are excluded, the seasonal pattern was comparable to previous years.

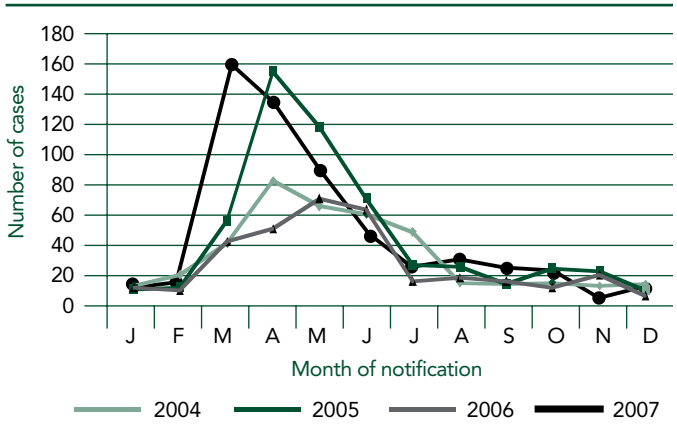



*Figure 1. Seasonal distribution of cryptosporidiosis cases 2004-2007*

Typically, the highest reported incidence rates are in children under 5 years, and this year, the trend was similar. Overall, there were more males (n=327) than females (n=278) reported.

A crude indicator of disease severity can be obtained from reviewing rates of hospitalisation among cases. This information is available for cases reported in those-areas whose data is recorded live on CIDR. Using data from these 6 HSE-areas (244 notifications), 33% of cases were reported as hospital inpatients, 2% as day or outpatients, 52% as GP patients, and this information was unknown or not specified for 11% of cases.

An interesting development in 2007 has been the routine referral of positive *Cryptosporidium* specimens for speciation by a small number of hospital laboratories. Prior to this, typing of positive human specimens was only rarely undertaken except in the event of outbreaks. The results of these studies provide the first systematic evidence of the relative importance of different *Cryptosporidium* species here. In the United Kingdom, speciation of human isolates, in conjunction with case control studies and other surveillance

*Table 1. Number of notified cases, crude incidence rate and age-standardised incidence rate cryptosporidiosis by HSE area, 2007, and annual number of cryptosporidiosis notifications and crude incidence rate, Ireland 2004-2006*

| HSE area | Number of notifications | CIR (95% CI)* | ASIR (95% CI)* |
|---|---|---|---|
| ER | 22 | 1.5 (0.9-2.1) | 1.4 (0.8-2.0) |
| M | 34 | 13.5 (9.0-18.1) | 12.8 (8.5-17.1) |
| MW | 57 | 15.8 (11.7-19.9) | 16.0 (11.9-20.2) |
| NE | 24 | 6.1 (3.7-8.5) | 5.6 (3.3-7.8) |
| NW | 25 | 10.5 (6.4-14.7) | 10.6 (6.4-14.7) |
| SE | 79 | 17.1 (13.4-20.9) | 16.9 (13.1-20.6) |
| S | 60 | 9.7 (7.2-12.1) | 9.9 (7.4-12.4) |
| W | 308 | 74.4 (66.1-82.7) | 75.8 (67.3-84.2) |
| **Total 2007** | **609** | **14.4 (13.2-15.5)** | - |
| **Total 2006** | **367** | **8.7 (7.8-9.5)** | - |
| **Total 2005** | **570** | **13.4 (12.3-14.5)** | - |
| **Total 2004** | **431** | **10.2 (9.2-11.1)** | - |

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

data, has proved invaluable in understanding the epidemiology of cryptosporidiosis.

In 2007, information was available on species for 370 cases, largely from the HSE-SE, HSE-NW and HSE-W areas. There were 131 *C. parvum*, 134 *C. hominis,* four non-typeable and one cervine infections reported, with the species not known/not reported for the remaining 339 cases. The large outbreak in Galway strongly skewed this species distribution data. Over 80% of the *C. hominis* cases were reported from the HSE-W, while for non-HSE-W areas, *C. parvum* was more common, suggesting that *C. parvum* is probably more common among sporadic cases.

Sixteen outbreaks of cryptosporidiosis were reported in 2007: six general outbreaks and ten family outbreaks (table 2). Three hundred and fifty eight people were reported ill as a result of these outbreaks. The suspected mode of transmission for nine outbreaks was person-to-person, and for three outbreaks, water was suspected to have played a role in transmission. Three general outbreaks were community outbreaks and two small general outbreaks were reported in crèches. The waterborne outbreak of cryptosporidiosis in Galway was the largest such outbreak reported in Ireland since surveillance for outbreaks began. In all, 304 laboratory-confirmed cases were reported. A preliminary report on the outbreak showed that it was primarily due to *C. hominis*. Cases were clustered in areas supplied by water treatment plants which used water from Lough Corrib. Boil water notices were issued for four water supplies in March 2007, and were lifted in July and August 2007 following closure of two older plants, and upgrading of the two newer plants. No specific point source of contamination was identified.

In April 2008, the EPA published a Remedial Action List (www.epa.ie/news/pr/2008/april/name,24320,en.html) – a list of public water supplies which they consider require examination from source to consumer to determine whether replacements or upgrades were needed, or whether operational practices should be improved. Several supplies have been placed on the list on the basis that they may have inadequate treatment for *Cryptosporidium*. The work arising from this prioritisation exercise and the ongoing work on upgrading Group Water Schemes under the Rural Water Program (www.nfgws.ie/f/fckeditor/File/RuralWaterNewsautumn08.pdf) should lead to a reduction in waterborne illness in Ireland in the coming years.

See www.hpsc.ie for a more detailed report on Cryptosporidiosis 2007

*Table 2. Cryptosporidiosis outbreaks Ireland 2007*

| Month | HSE-area | Transmission route | Location | Type | No. ill |
|---|---|---|---|---|---|
| Jan | SE | Waterborne | Community outbreak | General | 7 |
| Mar | W | Waterborne | Community outbreak | General | 304 |
| Apr | SE | Unknown | Private house | Family | 3 |
| Apr | SE | Unknown | Private house | Family | 2 |
| May | SE | Person-to-person | Private house | General | 3 |
| May | SE | Person-to-person | Private house | Family | 2 |
| May | SE | Person-to-person | Private house | Family | 2 |
| May | SE | Person-to-person | Private house | Family | 5 |
| Jun | SE | Person-to-person | Community outbreak | General | 14 |
| Jun | S | Person-to-person | Private house | Family | 2 |
| Jul | MW | Unknown | Creche | General | 4 |
| Jul | S | Waterborne | Private house | Family | 2 |
| Aug | NW | Person-to-person | Private house | Family | 2 |
| Oct | E | Not Specified | Private house | Family | 2 |
| Oct | S | Person-to-person | Creche | General | 2 |
| Nov | SE | Person-to-person | Private house | Family | 2 |

# 3.3 Verotoxigenic *E. coli*


## Summary

Number of cases, 2007:167
Number of cases, 2006:158
Crude incidence rate, 2007: 3.9/100,000


In 2007, 167 confirmed and probable cases of VTEC were notified to HPSC, a crude incidence rate (CIR) of 3.9 per 100,000 (table 1). It should be noted however, that this includes 52 probable cases associated with a single outbreak, and that there were only 115 confirmed cases notified this year.

As in previous years, the most common serogroup reported among confirmed cases was VTEC O157 (n=94), followed by VTEC O26 (n=13), and there were eight additional non-O157 cases. One VTEC O157 case was co-infected with a VTEC O103 strain and one VTEC O26 case was co-infected with a VTEC O113 strain. Although not notifiable, an additional (HUS) case was reported as a suspected VTEC case.
Regional variation was noted in the numbers of cases reported (table 2). The highest incidence rate for VTEC overall was reported in the HSE-NW (in part due to the 52 probable cases reported associated with an outbreak during August 2007), however, even when only confirmed cases are included, the incidence rate there was 7.2 per 100,000. The HSE-M also reported a relatively high incidence rate of 7.2 per 100,000. The HSE-E and HSE-NW reported the highest numbers of non-O157 VTEC infections (table 2).

Disease incidence was highest among young children (median age=10 years), which is consistent with previous years, and there were similar numbers of male (n=81) and female (n=86) cases.

Information on symptoms was available for 158 notified cases, of whom 136 (86%) were reported as symptomatic. Reported symptoms included bloody diarrhoea in 40 cases, and haemolytic ureamic syndrome (HUS) in 5 cases. This is a decrease on the number of VTEC-associated HUS cases reported in the last 2 years. HUS cases ranged in age from 1 to 7 years, and notably,

two HUS cases were associated with non-O157 VTEC (one VTEC O145 and one Ungroupable strain).

*Table 1. Number and crude incidence rates confirmed and probable VTEC, Ireland 2004-2007*

| Year | Confirmed cases | Probable cases | Total VTEC | CIR VTEC* (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[l] | 3.7 (3.2-4.3) |
| 2007 | 115 | 52 | 167 | 3.9 (3.3-4.5) |

** Data from the 2006 census were used to calculate rates*

In 2007, 117 human VTEC isolates were referred to the HSE PHL Dublin Mid Leinster, Cherry Orchard Hospital (table 3). As in previous years, PT32 was the commonest phage type reported (n=44), accounting for 47% of the confirmed VTEC O157 reported. The second most common phage type this year was PT51.

The verotoxin profiles of VTEC strains were typical. Eighty-two per cent of VTEC O157 strains carried the genes for VT2 only while 18% carried the genes for both VT1 and VT2 (table 3). In contrast, 61% of non-O157 VTEC isolates carried the genes for VT1 only, 35% for VT2 only, and 4% VT1 and VT2.

Twenty-one VTEC outbreaks were reported this year, comprising 67 of the 115 confirmed cases notified. Four outbreaks were described as general outbreaks and 17 as family outbreaks. Sixteen were due to VTEC O157, three due to VTEC O26, one was caused by an Ungroupable strain and one was a mixed strain outbreak. The suspected modes of transmission reported are listed in table 4.

Person-to-person spread is an important mode of VTEC transmission in households, child-care facilities and institutions, and was suspected to have played a role in nine VTEC outbreaks in 2007. These included two outbreaks associated with crèches.

One general VTEC outbreak in 2007 was linked to a hotel in the HSE-NW. There were four confirmed cases (one from the Republic of Ireland and three from Northern Ireland) and an additional 52 probable cases identified through case finding among hotel guests. Foodborne transmission was suspected although no specific food was implicated during investigations. During this incident, PFGE performed by HSE DML-PHL was invaluable in distinguishing outbreak cases from other sporadic cases reported in Ireland around this time, supporting the results of public health investigations.

For one general outbreak and for one sporadic case in 2007, examination of water from the private wells of the affected households confirmed the presence of the *E. coli* O157. For the general outbreak, the separate

*Table 2. Number of confirmed and probable VTEC cases by quarter and HSE area, crude incidence rate and age-standardised incidence rate by HSE area, Ireland 2007*

| Quarter | E | M | MW | NE | NW | SE | S | W | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Q1** | 2 | 0 | 0 | 2 | 4 | 0 | 0 | 2 | **10** |
| **Q2** | 4 | 5 | 6 | 4 | 1 | 3 | 2 | 0 | **25** |
| **Q3** | 6 | 12 | 9 | 5 | 59‡ | 4 | 9 | 3 | **107‡** |
| **Q4** | 7 | 1 | 2 | 1 | 5 | 2 | 3 | 4 | **25** |
| | | | | | | | | | |
| **VTEC O157** | 11 | 18 | 15 | 11 | 60‡ | 8 | 13 | 9 | **145‡** |
| **Non-O157 VTEC** | 8 | 0 | 1 | 3 | 9 | 1 | 1 | 0 | **20** |
| **Mixed infection** | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | **2** |
| **Total** | **19** | **18** | **17** | **12** | **69‡** | **9** | **14** | **9** | **167** |
| **CIR VTEC* (95% CI)** | **1.3 (0.7-1.8)** | **7.2 (3.9-10.5)** | **4.7 (2.5-7.0)** | **3.0 (1.3-4.8)** | **29.1 (22.2-36.0)‡** | **2.0 (0.7-3.2)** | **2.3 (1.1-3.4)** | **2.2 (0.8-3.6)** | **3.9 (3.3-4.5)** |

**Rates calculated using CSO census 2006*
*‡ Includes 52 probable cases linked to VTEC O157 outbreak*

private wells of adjacent homes were contaminated. Drinking water from untreated private water supplies remains a very important risk factor for VTEC infection in Ireland.

See www.hpsc.ie for a more detailed report on VTEC 2007

*Table 3. Verotoxin and phage typing results for VTEC isolates referred to the PHL HSE Dublin Mid Leinster, Cherry Orchard Hospital in 2007*

| Serogroup | PT | VT1 only | VT2 only | VT1 & VT2 | Total |
|---|---|---|---|---|---|
| **O157** | **2** | 0 | 5 | 0 | **5** |
| | **4** | 0 | 5 | 0 | **5** |
| | **8** | 0 | 0 | 9 | **9** |
| | **14** | 0 | 7 | 0 | **7** |
| | **31** | 0 | 1 | 0 | **1** |
| | **32** | 0 | 37 | 7 | **44** |
| | **33** | 0 | 1 | 0 | **1** |
| | **34** | 0 | 1 | 0 | **1** |
| | **43** | 0 | 1 | 0 | **1** |
| | **51** | 0 | 12 | 0 | **12** |
| | **21/28** | 0 | 5 | 1 | **6** |
| | **RDNC** | 0 | 1 | 0 | **1** |
| | **N/K** | 0 | 1 | 0 | **1** |
| **O26** | - | 12 | 0 | 1 | **13** |
| **O ungroupable** | - | 1 | 4 | 0 | **5** |
| **O103** | - | 0 | 1 | 0 | **1** |
| **O111** | | 1 | 0 | 0 | **1** |
| **O113** | - | 0 | 1 | 0 | **1** |
| **O128** | - | 0 | 1 | 0 | **1** |
| **O145** | - | 0 | 1 | 0 | **1** |
| **Total** | - | **14** | **85** | **18** | **117** |

*Note that for fifty-two probable cases reported on the basis of epidemiological linkage, isolates were not available for typing. Table 3 includes all strains isolated from mixed VTEC infections.*

*Table 4. VTEC outbreaks in Ireland 2007 by suspected mode of transmission*

| Suspected mode of transmission | Number of outbreaks | Number confirmed cases* | Number ill |
|---|---|---|---|
| Animal contact | 1 | 4 | 1 |
| Foodborne | 1 | 4 | 56 |
| Person-to-person | 9 | 34 | 27 |
| Waterborne | 2 | 10 | 8 |
| Unknown/Not specified | 8 | 19 | 11 |
| **Total** | **21** | **71** | **103** |

** Confirmed cases include asymptomatic laboratory confirmed cases.*

# 3.4 Hepatitis A

## Summary

Number of cases in 2007: 32
Crude notification rate: 0.8/100,000
Number of cases in 2006: 39
Number of cases in 2005: 56

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

The incidence of hepatitis A in Ireland has been low in recent years and remained low in 2007, with 32 cases notified. This corresponds to a crude notification rate of 0.8/100,000 population and represents an 18% decrease compared to 2006, when 39 cases were notified (figure 1). Case classification was reported for all cases. Twenty nine cases were laboratory confirmed, one was classified as probable and two were classified as possible.

Fifty three percent of cases were male (n=17) and 47% were female (n=15). All age groups were affected, but the highest rates were in children aged 5-14 years (figure 2). Eleven cases were associated with travel outside of Ireland, nine cases were infected in Ireland and the country of infection was not specified for the remaining 12 cases.

Three family outbreaks were reported in 2007. Each involved two siblings and the ages ranged from three to 11 years. Two were travel associated.

The figures presented in this summary are based on

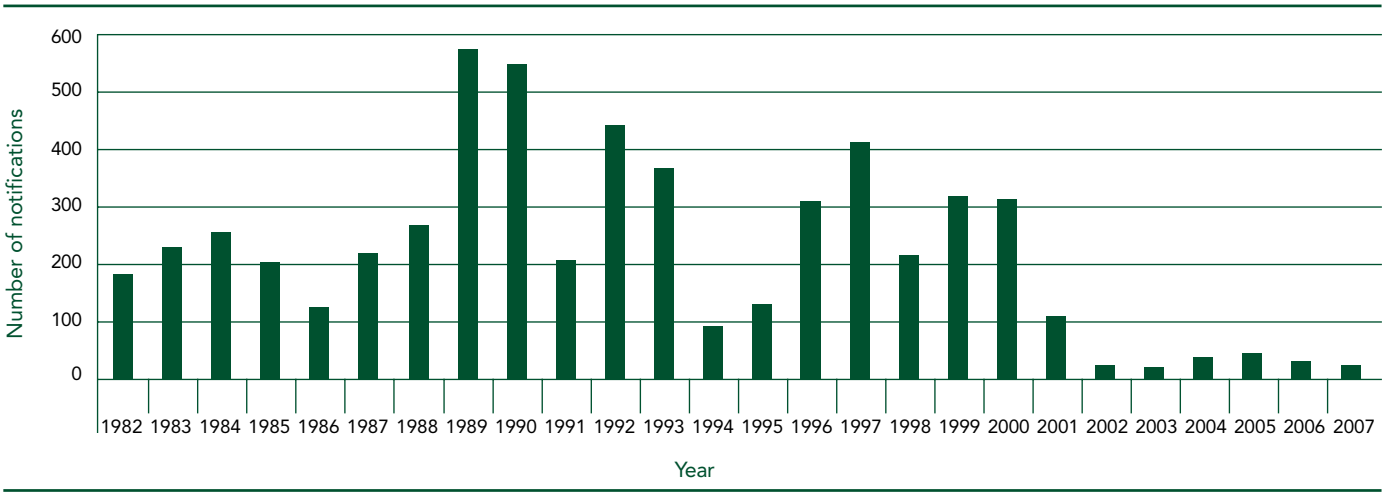
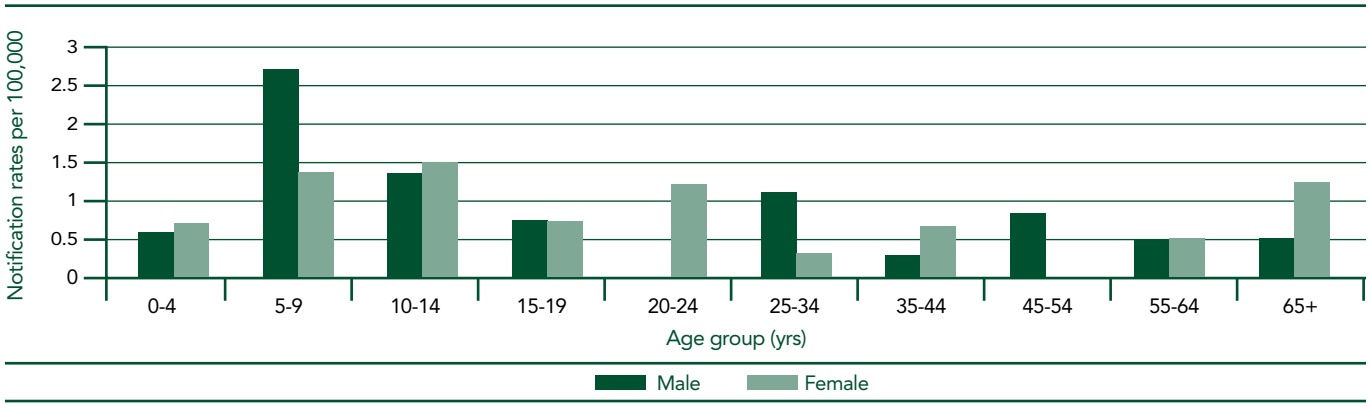



*Figure 1. Number of cases of hepatitis A notified annually, 1982-2007*

data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 1st September 2008. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.



# 3.5 Rotavirus

## Summary

Number of cases in 2007: 2326
Number of cases in 2006: 2112
Number of cases in 2005: 2251
Crude incidence rate: 50/100,000

Rotavirus is the commonest reported cause of acute gastroenteritis in children under five years of age in Ireland. In 2007, there were 2520 notifications of acute infectious gastroenteritis (AIG). Rotavirus was the causative organism identified in 2326 (92%) of these, giving a crude incidence rate (CIR) of 54.9 cases per 100,000 population (table 1). This is the highest rate recorded since rotavirus became notifiable in 2004. The CIR increased to 54.9 in 2007 from 50.0 in 2006.

AIG became a statutorily notifiable disease in 2004. Only cases of rotavirus and 'gastroenteritis unspecified' are notifiable under this disease category. Prior to 2004, rotavirus was only notifiable as a generic disease category of 'gastroenteritis in children less than two years of age'. Data for this report were extracted and analysed from the CIDR system.

*Table 1. Number of notified cases, crude incidence rate of rotavirus infections in Ireland by HSE area, 2007, and total number with crude incidence rate for 2004-2007.*

| HSE Area | No. of cases | *CIR incl. 95% C.I. |
|---|---|---|
| E | 637 | 42.5 [39.2 - 45.8] |
| M | 243 | 96.6 [84.4 - 108.7] |
| MW | 74 | 20.5 [15.8 - 25.2] |
| NE | 106 | 26.9 [21.8 - 32.0] |
| NW | 176 | 74.2 [63.3 - 85.2] |
| SE | 353 | 76.6 [68.6 - 84.6] |
| S | 265 | 42.7 [37.5 - 47.8] |
| W | 472 | 113.9 [103.7 - 124.2] |
| **Total 2007** | **2326** | ***54.9 [52.6 - 57.1]** |
| **Total 2006** | **2112** | ***50.0 [48.0 - 52.0]** |
| **Total 2005** | **2251** | ***53.1 [50.9 – 55.3]** |
| **Total 2004** | **1600** | ***37.8 [35.9 – 39.6]** |

**Rates calculated using 2006 census data and may differ from previously published rates*

Rotavirus is primarily a paediatric illness, with children generally affected in the first 2-3 years of life, with peak incidence of clinical disease in the 6-24 month age group. Examination of the distribution of cases in 2007 and previous years by age group illustrates this. In 2007 the highest burden of illness was in children less than five years, as seen in previous years. The majority of infections (n=1780) occurred in children less the two years of age. There has been a continuous increase in the number of cases affecting this age group over recent years (figure 1).

Regional variation was observed in the number of cases reported (table 1). The HSE-W and HSE-M had the highest incidence rates. The lowest rate reported was by the HSE-MW region. HSE-E, HSE-SE and HSE–W regions noted a decrease in the rate of rotavirus infection compared to 2006. An increased rate was reported in all other regions. Such regional variation almost certainly reflects differences in diagnosis and reporting rather than true variation in disease incidence.

With regard to sex distribution, males accounted for 1186 cases (51%); females 1116 (48%), with 1% of cases unknown. This represented a ratio of males: females of 1.1:1. This was similar to previous years.

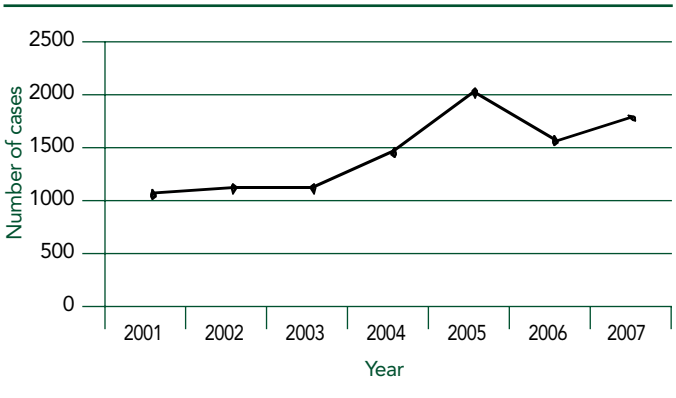



*Figure 1: Number of cases of rotavirus in children less than two years of age by year, 2001 to 2007*

Rotaviral infection has a well documented seasonal pattern with peaks in cases occurring each year in later winter/ early spring. Analysis of the data by week of notification from 2004 to 2007 is shown in figure 2. However in 2007, there was a change to this pattern. The usual upsurge did not appear until week 12, a full four weeks later than is usual, and the plateau continued for a month longer than usual. This delay was also seen in Germany. In 2007, a peak was observed in both weeks 15 and 18 (162 and 176 cases reported). This is different from 2005 and 2006 where in week 17, in both years, a peak occurred. (There is a 'false' second peak seen in 2005 during week 33, which is attributable to bulk uploading of notifications for the HSE-W region).

In 2007, there were seven rotavirus outbreaks and one mixed norovirus/rotavirus outbreak notified on CIDR. These eight outbreaks resulted in 47 cases of illness. The mixed outbreak was the largest rotaviral outbreak reported with 17 people ill. This outbreak occurred within a crèche with spread being from person to person. The second largest outbreak was a pure rotavirus outbreak occurring within a hospital.

Ten patients were affected via a person-to-person transmission route.

See www.hpsc.ie for more a detailed report on the epi-demiology of rotavirus in Ireland in 2007

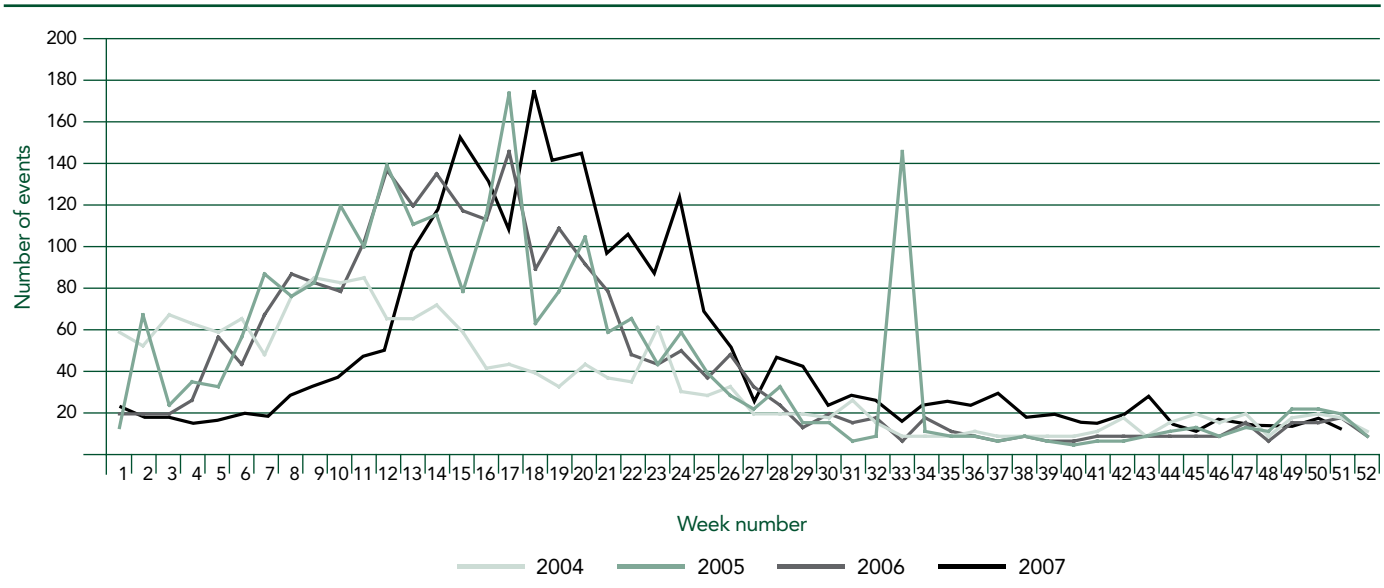



*Figure 2: Seasonal distribution of rotavirus events by week, 2004-2007 (CIDR)*

# 3.6 Salmonella


## Summary

Number of confirmed cases in 2007 (CIDR): 440
Number of probable cases in 2007 (CIDR): 16
Number of cases in 2006 (CIDR): 422
Number of human isolates referred to NSRL (2007): 457
Crude incidence rate: 10.76/100,000


In 2007, 456 cases of salmonellosis were notified in Ireland. Of these, 440 cases were laboratory confirmed. Probable cases are notifiable under the amended Infectious Disease Regulations (2003) if clinical symptoms or epidemiological links are identified. This resulted in 16 probable cases notified in 2007. All probable cases were linked to *Salmonella* outbreaks on CIDR. Four hundred and fifty seven *Salmonella* isolates from humans were referred to the National Salmonella Reference Laboratory (NSRL).

In 2007 there was a slight preponderance of cases in males, unlike 2006. The female: male ratio in 2007 was 1:1.1. In terms of age distribution, the highest number of cases was seen in children under five years of age, with 23.7% of cases occurring in this age category. This is likely to be a reflection of the greater likelihood of clinicians seeking clinical samples in children under five.

An outbreak of *S* Enteritidis involving 52 cases in HSE-S produced a peak in figures in weeks 29 and 30. Analysis of remaining cases not associated with this outbreak showed seasonal trends as seen in previous years, with a plateau from mid-August to early October.

Analysis of serotyping data provided from NSRL in 2007 show 64 different serotypes were identified from the 457 isolates tested by the reference laboratory. As has been the trend in recent years, the predominant serotype causing human illness in 2007 was *S.* Enteritidis (n=179), followed by *S.* Typhimurium (n=114). After *S.* Enteritidis and *S.* Typhimurium, the next most commonly isolated serotypes were *S.* Newport (n=13) and *S.* Kentucky n=9) (table 1).

There were eight cases of *S.* Typhi and five isolates of *S.* Paratyphi A detected in 2007, compared to just one case of *S.* Paratyphi A in 2006. Six of the eight *S.* Typhi cases reported a history travel. Visited countries include Pakistan (n=2), India (n=2), Asia (n=1) and Nepal (n=1). In the seventh case the patient gave no history of travel outside of Ireland. However one relative tested positive and it is likely that person to person spread resulted in acquisition of the disease in Ireland. No travel information was available in the eighth case. All cases of S Paratyphi A reported a history of travel to either India (n=3) or Pakistan (n=2).

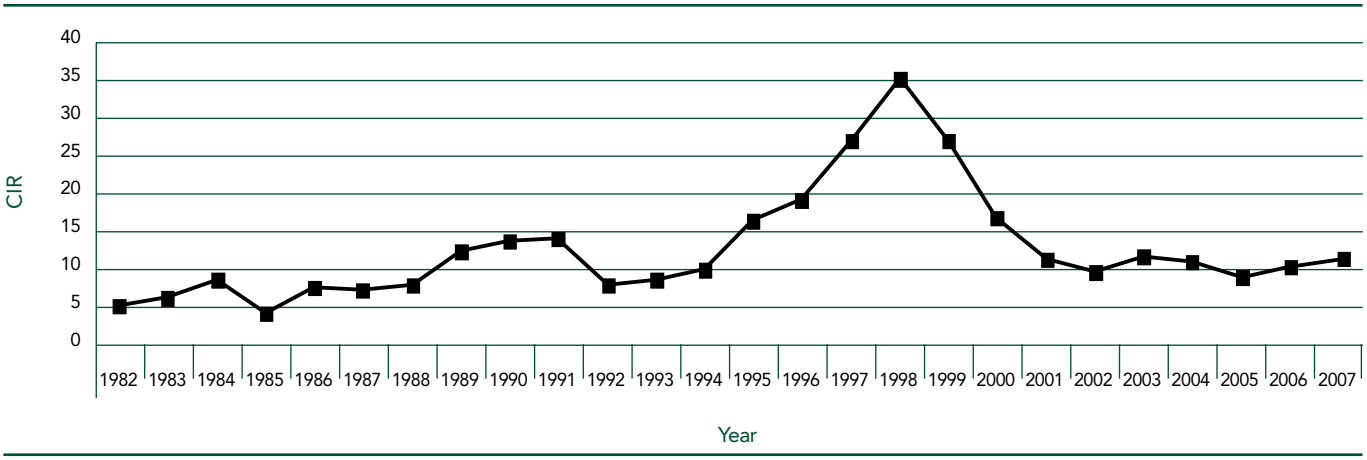



*Figure 1. Crude rate of Salmonellosis Notified in Ireland per 100,000 population, 1982-2007*
*CIR, crude incidence rate per 100,000 population*

Phage typing was conducted by the NSRL on all *S.* Enteritidis and *S.* Typhimurium isolates. Among S. Enteritidis isolates PT4 as the most prevalent phage type identified (n=71), largely due to an outbreak during July. PT8 was the second most widespread *S.* Enteritidis phage type identified (n=35). Among *S.* Typhimurium, DT104 was the most common phage type (n=21), followed by *S.* Typhimurium DT120 (n=19).

One hundred and seventy four out of 457 isolates (38%) reported to NSRL in 2007 have a known history of travel outside of Ireland. This is almost double the number reported during 2006 (21%). The most commonly reported countries were Spain (n=27), Turkey (n=15), Thailand (n=12), Canary Islands (n=11), Portugal (n=10), India (n=10) and Nigeria (n=6). Although in previous years underestimation of foreign history travel was evident, the figures for 2007 shows more detailed information is being reported.

In 2007, there were 10 outbreaks of salmonellosis notified via CIDR to the HPSC; three general and seven family outbreaks. Of the seven family outbreaks, one was travel associated and the remaining six were located in private houses. The three general outbreaks had a total of 65 ill. There were two smaller outbreaks, one located in a crèche and the other in a community with 13 associated cases.

The third outbreak was notified in mid-July of 2007 in HSE-S. There were 52 cases with a 31% hospitalisation rate. The cases were notified from the 2nd week of July until the 1st of August. The peak onset of illness was 6th-9th July. The outbreak phage type was identified as *S* Enteritidis PT4. The outbreak was epidemiologically linked to a local bakery, bakery X. Results from the analytical study indicated a strong statistical association between illness and eating food from bakery X and/or eating food from outlets supplied by bakery X Investigators concluded that it was not possible to definitively state how *Salmonella* Enteritidis was introduced to Bakery X. However, the evidence appeared to support the introduction of *S.* Enteritidis by either pigeons or by foodhandlers. Once introduced, conditions and practices in the premises could then have contributed to the spread of infection within the premises. Department of Agriculture and Food trace back to the supplying flocks revealed no evidence of supply of contaminated raw eggs to the premises. The bakery closed voluntarily.

See www.hpsc.ie for a more detailed Salmonella epidemiology report for 2007

*Table 1. Salmonella serotype distribution 2005-2007 (NSRL)*

| | 2005 | | 2006 | | 2007 | |
|---|---|---|---|---|---|---|
| Rank | Serotype | No. (%) | Serotype | No. (%) | Serotype | No. (%) |
| 1 | Enteritidis | 145 (41%) | Enteritidis | 158 (37%) | Enteritidis | 179 (39%) |
| 2 | Typhimurium | 85 (24%) | Typhimurium | 101 (23%) | Typhimurium | 114 (25%) |
| 3 | Agona | 10 (3%) | Hadar | 11 (3%) | Newport | 13 (3%) |
| 4 | Virchow | 9 (3%) | Infantis | 11 (3%) | Kentucky | 9 (2%) |
| 5 | Hadar | 8 (2%) | Virchow | 10 (2%) | Typhi | 8 (2%) |
| 6 | Goldcoast | 7 (2%) | Newport | 9 (2%) | Java | 8 (2%) |
| 7 | Java | 7 (2%) | Saintpaul | 8 (2%) | Infantis | 8 (2%) |
| 8 | Stanley | 6 (2%) | Typhi | 7 (2%) | Panama | 7 (2%) |
| 9 | Dublin | 5 (1%) | Bredeney | 6 (1%) | Virchow | 5 (1%) |
| 10 | Newport | 5 (1%) | Stanley | 6 (1%) | Paratyphi A | 5 (1%) |
| | Others | 70 (19%) | Others | 103 (24%) | Others | 101 (21)% |
| | | **357 (100%)** | | **430 (100%)** | | **457 (100%)** |

# 3.7 Less common gastrointestinal infections

## Shigellosis

Forty-three cases of shigellosis were notified in 2007 compared to 54 in 2006 and 36 in 2005 (Figure).

Cases ranged in age from less than one year to 60 years (mean age=27 years, median age=26 years), with more females (n=27) than males (n=16).

As in previous years, *Shigella sonnei* was the most common species reported (n=23). There were also 14 *S. flexneri*, three *S. boydii*, one *S. dysenteriae*, and two cases for which the species was not reported.

Information on travel history is improving, with eighteen cases (42%) reported associated with foreign travel. The countries of infection reported were India (n=6), Pakistan (n=3), Egypt (n=2), and there was one case associated with travel to each of Afghanistan, Gambia, Ghana, Mexico, Morocco, occupied Palestine Territories, and United Kingdom. Three cases were reported as being acquired in Ireland, and for the remaining 22 cases, country of infection was unknown or not specified. The number of cases by species and country of infection is reported in the table below.

In the last decade, the number of cases of shigellosis has remained low in comparison to the number of cases notified in the early 1990s.

While no shigellosis outbreaks were notified in Ireland in 2007, typing of *Shigella* isolates can provide useful information on the relatedness of strains which can be used by public health to outrule/include cases during investigations of case clusters. The National Salmonella Reference Laboratory in University College Hospital, Galway can provide services for serotyping, and where appropriate, Pulsed Field Gel Electrophoresis (PFGE) of *Shigella* isolates.

*Table. Number of notifications shigellosis by species and country of infection, Ireland 2007*

| Species | Ireland | Africa | Asia | Other | Not known/ not reported | Total |
|---|---|---|---|---|---|---|
| *S. boydii* | 0 | 1 | 1 | 0 | 1 | 3 |
| *S. dysenteriae* | 0 | 0 | 1 | 0 | 0 | 1 |
| *S. flexneri* | 0 | 2 | 4 | 1 | 7 | 14 |
| *S. sonnei* | 2 | 2 | 5 | 1 | 13 | 23 |
| Not reported/not known | 1 | 0 | 0 | 0 | 1 | 2 |
| **Total** | **3** | **5** | **11** | **2** | **22** | **43** |

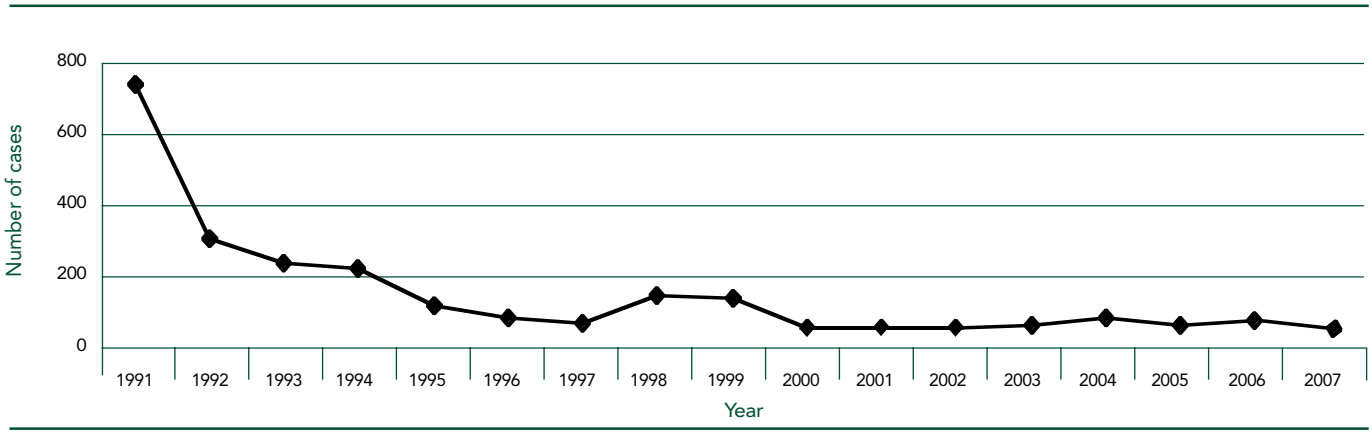



*Figure 1. Annual number of notifications shigellosis, Ireland 1991-2007*

## Giardiasis

In 2007, there were 62 cases of giardiasis notified, a slight decrease on the number notified in 2006 (n=65).

Cases ranges in age from 1-93 years (mean age=24 years, median age=24 years), with more males (n=36) than females (n=23) reported; sex unknown for three cases.

Six cases were reported as being associated with foreign travel: the countries of infection reported were France, Republic of Korea, Russian Federation (n=2), Spain, and the United States. One case was reported as being acquired in Ireland, and for the remaining 55 cases, country of infection was unknown or not specified.

In 2007, there were three small family outbreaks reported. The mode of transmission for one was reported as person-to-person spread, and unknown for the remaining two outbreaks.

## Yersiniosis

In 2007, there were six cases of yersiniosis, compared to one notification in 2006 and three in 2005.

Cases ranged in age from one month to 79 years; four females and three males were notified.

Five cases were reported as *Y. enterocolitica* and one as *Y. pseudotuberculosis*.

# 3.8 Listeriosis


## Summary

Number of cases in 2007: 21
Number of cases in 2006: 7
Crude incidence rate, 2007: 0.5/100,000


Twenty-one listeriosis cases (CIR 0.5 per 100,000 population) were reported in Ireland in 2007, three times the number of cases that were notified in 2006. This is against a backdrop of increased reporting of human listeriosis across the EU over the last eight years. Overall the reported incidence of listeriosis across the EU in 2006 was 0.3 per 100,000 (range 0.0-1.0 per 100,000).

Cases were distributed throughout Ireland, with higher number of cases than usual reported in Quarters 3 and 4 (table 1).

In particular, there was a significant increase in the reported number of pregnancy-associated and neonatal cases. Nine pregnancy-related/neonatal cases were notified in 2007 -an estimated rate of 14.0 notifications per 100,000 live births[a]- compared with five pregnancy-related/neonatal cases for the entire period 2004-2006 (Table 2). Of particular note was the fact that five of the pregnancy-related cases in 2007 were non Irish-born women; three from Eastern Europe, one from Asia and one from Africa. In addition, one of the neonatal cases was born to an Eastern-European mother. This increase in the number of pregnancy-associated cases in Ireland contrasts with recent rises in human listeriosis incidence noted in Germany and in England & Wales, where elevated numbers of non-pregnancy associated adult cases were reported.

There were also 12 non-pregnancy associated adult cases notified in 2007, all except one of which were reported as elderly (>65 years) and/or suffering from an underlying illness which predisposed them to listeriosis; the remaining adult case was >55 years. Seven cases were male (58%) and five were female, age range 30-79 years (median=71 years).

There were no adult fatalities due to listeriosis in 2007, however, two women were reported as having suffered late miscarriages.

*Table 1. Listeriosis notifications by quarter and year, Ireland 2004-2007*

| Quarter | 2004 | 2005 | 2006 | 2007 | Total |
|---|---|---|---|---|---|
| Q1 | 2 | 2 | 5 | 2 | **12** |
| Q2 | 3 | 3 | 0 | 1 | **7** |
| Q3 | 4 | 5 | 1 | 11 | **21** |
| Q4 | 2 | 2 | 1 | 7 | **12** |
| **Total** | **11** | **12** | **7** | **21** | **51** |
| **CIR (CI) per 100,000*** | **0.26(0.11-0.41)** | **0.28(0.12-0.44)** | **0.17(0.04-0.29)** | **0.50(0.28-0.71)** | **-** |

**CSO data from census 2006 as denominator in incidence rates*

[a]Rate was calculated using an the number of births reported by CSO for 2006 as an estimate of the number which occurred in 2007 as data not yet published for 2007.

Isolates for sixteen human cases notified in 2007 were serotyped at NSRL (Table 3). While the predominant serotype from patients was 4b, 1/2 was the predominant *Listeria monocytogenes* serotype isolated from food.

Listeria isolates can be further characterized by molecular typing methods to investigate possible links between cases. During the upsurge in cases in 2007, isolates were examined by the National Salmonella Reference Laboratory (NSRL) using pulsed field gel electrophoresis (PFGE), and by Waterford Regional Hospital (WRH) using ribotyping. Only two isolates were indistinguishable both by ribotyping and PFGE. From these results, it appears that the upsurge in cases was not caused by a single common strain, with evidence for a possible unrecognized common link only between two cases.

Typing of human *Listeria monocytogenes* isolates during the upsurge in cases was invaluable, as it supported the results of public health investigations which suggested an increased incidence of sporadic disease rather than a large common source outbreak.

In consequence of the rise in the number of pregnancy-associated/neonatal cases in 2007, efforts have been made to develop appropriate messages for pregnant women, in particular those whose first language is not English. A leaflet highlighting ways to minimize the risk of listeriosis has been developed for pregnant women by *Safe*food (www.safefood.eu/article.asp?article=2377). This leaflet has been translated into several languages.

*Table 2. Listeriosis notifications by case type, Ireland 2004-2007*

| Case type | 2004 | 2005 | 2006 | 2007 | Total |
|---|---|---|---|---|---|
| Adult or juvenile | 8 | 12 | 5 | 12 | **37** |
| Pregnancy-related | 3 | 0 | 1 | 6 | **10** |
| Neonatal | 0 | 0 | 1 | 3 | **4** |
| **Total** | **11** | **12** | **7** | **21** | **51** |

*Table 3. Serotypes of Listeria monocytogenes isolates from 2007 referred to the NSRL*

| Serotype | Human | Food |
|---|---|---|
| 1/2 | 4 | 15 |
| 4b | 12 | 3 |
| Untypeable | 0 | 1 |
| **Total** | **16** | **19** |

# 04

## Vectorborne and Zoonotic Diseases

# 4.1 Non-IID Zoonotic Diseases

## Leptospirosis

Twenty-two cases of leptospirosis were notified in 2007, compared to 20 in 2006 and 15 in 2005. All except one case this year was male. Age range 20-73 years (mean age =41 years, median age=38 years). Ten cases required hospitalization, four were reported as GP patients, and patient type was not available for the remaining 8 patients. Over three quarter of all cases (n=17) were notified in the last half of the year.

Ten cases were believed to have acquired their illness occupationally –through contact with farm environments. Seven cases were reported as having recent contact with river water including three cases who were exposed in Asia (Laos for one case and Thailand for two cases). No risk factor information was available for the remaining 5 cases.

Four cases in 2007 were infected with *Leptospira interrogans hardjo*, including three farming-related cases. One occupational case who had worked on a farm silage pit was reported as being infected with *Leptospira interrogans icterohaemorrhagiae*. Species was not reported for the remaining 17 cases.

Activities that have been associated with leptospirosis risk include farming, occupations that involve contact with wet rodent-infested environments, recreational activities such as water sports, and flooding.

In the last 2 years, travel to Asia (in particular Thailand) has emerged as a risk factor for leptospirosis in Ireland. This has been noted previously in the United Kingdom.

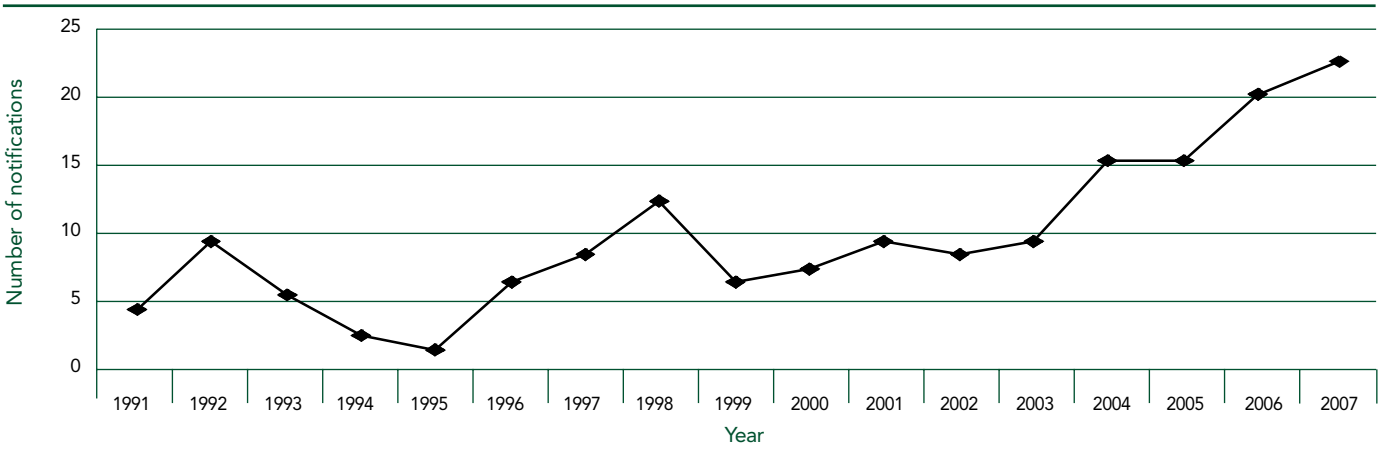



*Figure 1. Annual number of leptospirosis notifications, Ireland 1991-2007 (data source: CIDR)*

## Toxoplasmosis

During 2007, 49 cases of toxoplasmosis were notified compared to 44 in 2006 and 45 in 2005.

Two cases were reported as congenital cases. Congenital cases were identified through a pilot toxoplasmosis screening program which commenced in July 2005, and was coordinated at the Rotunda Hospital in conjunction with the National Newborn Screening Laboratory. The pilot program was completed in July 2007.

The remaining 47 cases ranged in age from 4 years to 63 years (median, 32 years). Of the 47 cases, 32 were female and 15 were male. The high number of cases reported among women of child-bearing age may reflect enhanced testing during pregnancy.

## Brucellosis

During 2007, 28 cases of brucellosis were notified compared 29 in 2006 and 53 notifications in 2005.

Twenty-five cases (89%) were male while three (11%) were female. The cases ranged in aged from 27 years to 80 years (mean age, 53 years; median age, 55 years). 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.

In 2007, seven cases were reported as confirmed, and 21 as were classified as probable. The case definition permits inclusion of acute and chronic cases. In 2007, 22 cases were reported as chronic cases; acute/chronic status was not reported for the remaining 6 cases.

*Table.Toxoplasmosis notifications by age and sex, Ireland 2007*

| Age group | Male | Female | Total |
|---|---|---|---|
| **<1 yr** | 2 | 0 | **2** |
| **1-4 yrs** | 1 | 0 | **1** |
| **5-14 yrs** | 2 | 0 | **2** |
| **15-24 yrs** | 3 | 2 | **5** |
| **25-44 yrs** | 5 | 26 | **31** |
| **45-64 yrs** | 4 | 4 | **8** |
| **65+ yrs** | 0 | 0 | **0** |
| **Total** | **17** | **32** | **49** |

*Table. Brucellosis notifications by age and sex, Ireland 2007*

| Age group | Male | Female | Total |
|---|---|---|---|
| **<5 yr** | 0 | 0 | **0** |
| **5-14 yrs** | 0 | 0 | **0** |
| **15-24 yrs** | 0 | 0 | **0** |
| **25-44 yrs** | 3 | 1 | **4** |
| **45-64 yrs** | 18 | 2 | **20** |
| **65+ yrs** | 4 | 0 | **4** |
| **Total** | **25** | **3** | **28** |

## Q Fever

Seventeen cases of Q fever were notified during 2007 compared to 12 in 2006 and ten in 2005.

Six cases occurred in males and eleven in females. The cases ranged in age from three years to 83 years (mean age, 41 years; median age, 37 years).

Four cases were classified as confirmed and thirteen as probable.

The disease is commonly acquired through occupational exposure to infected sheep, e.g. farmers, veterinarians, and abattoir workers. In 2006, the United Kingdom reported a large outbreak of Q fever associated with a slaughterhouse in Scotland .

**Donaghy M, Prempeh H, Macdonald N.** Outbreak of Q fever in workers at a meat processing plant in Scotland, July 2006. Euro Surveill. 2006;11(34): 3031. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3031

*Table. Q fever notifications by age and sex, Ireland 2007*

| Age group | Male | Female | Total |
|---|---|---|---|
| **<5 yr** | 0 | 1 | **1** |
| **5-14 yrs** | 0 | 0 | **0** |
| **15-24 yrs** | 1 | 0 | **1** |
| **25-44 yrs** | 3 | 6 | **9** |
| **45-64 yrs** | 1 | 2 | **3** |
| **65+ yrs** | 1 | 2 | **3** |
| **Total** | **6** | **11** | **17** |

## Trichinosis

Two linked cases of trichinosis were reported in Ireland in 2007. These were the first cases of trichinosis notified in Ireland since the disease became notifiable in 2004. The cases had travelled to Poland during their incubation period where they consumed lightly smoked sausages.[1] They were linked to a large outbreak which was reported in Poland at that time.[2]

1. **McHugh G, Low J, Healy ML, Clarke S, Kiely D, Hayes C,.** 2007. Two Cases of Trichinosis in Polish Nationals living in Ireland. Epi-insight 8:1

2. **Golab E, Szulc M, Wnukowska N, Rozej W, Fell G, Sadkowska-Todys M.** Outbreak of trichinellosis in north-western Poland – Update and exported cases, June-July 2007. Euro Surveill. 2007;12(29):pii=3238. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3238

# 4.2 Malaria


## Summary

Number of cases, 2007: 71
Number of cases, 2006: 96
Crude incidence rate, 2007: 1.7/100,000


In 2007, 71 cases of malaria were notified (figure 1). This is a decrease of 26% on the number reported in 2006, and equates to a crude annual incidence rate of 1.7 per 100,000 (95% C.I. 1.3-2.1).

Cases ranged in age from 1 to 85 years, and male cases (n=43) were more common than female cases (n=26); for two cases, sex was unknown/unspecified. Notably, there were 17 paediatric cases (24%) and 37 cases (52%) in the 25-44 years age range.

The highest number of cases were reported by the HSE-E (n=32). There were also 8 cases in the HSE-M, 3 in the HSE-MW, 6 in the HSE-NE, 9 in the HSE-SE, 6 in the HSE-S and 7 in the HSE-W.

Species data were reported for 92% of cases in 2007. As in previous years, the most common species reported was *P. falciparum*, accounting for 70% of all cases notified (n=50). There were also seven *P. vivax*, five *P. ovale*, three *P. malariae* and six cases where the species was not specified. This is similar to the species distribution reported by the United Kingdom and in Europe for cases of imported malaria.

Information on patient type was available for 70% of patients (n=50), with 37 cases reported as hospital in-patients, seven as hospital out-patients, three as GP patients, one as a hospital day patient, and two as patient type=other. No deaths due to malaria were reported to HPSC in 2007.

Country of infection was recorded for 54 cases, the majority of whom were exposed in sub-Saharan Africa; a smaller number of cases were associated with exposure in Asia and South America (table 1). One *P. vivax* case was reported as a relapsed infection.

Reason for travel was recorded for 53 cases. The largest subgroup identified in 2007 was people who had travelled to visit family in their country of origin - over half of those for whom the information was available (n=38). New entrants made up a further 6 cases. Other reasons reported for travel were holidays (n=5), business travellers (n=1), armed services (n=1), other (n=2) and not specified (n=18).

Of the 38 cases whose reason for travel was reported

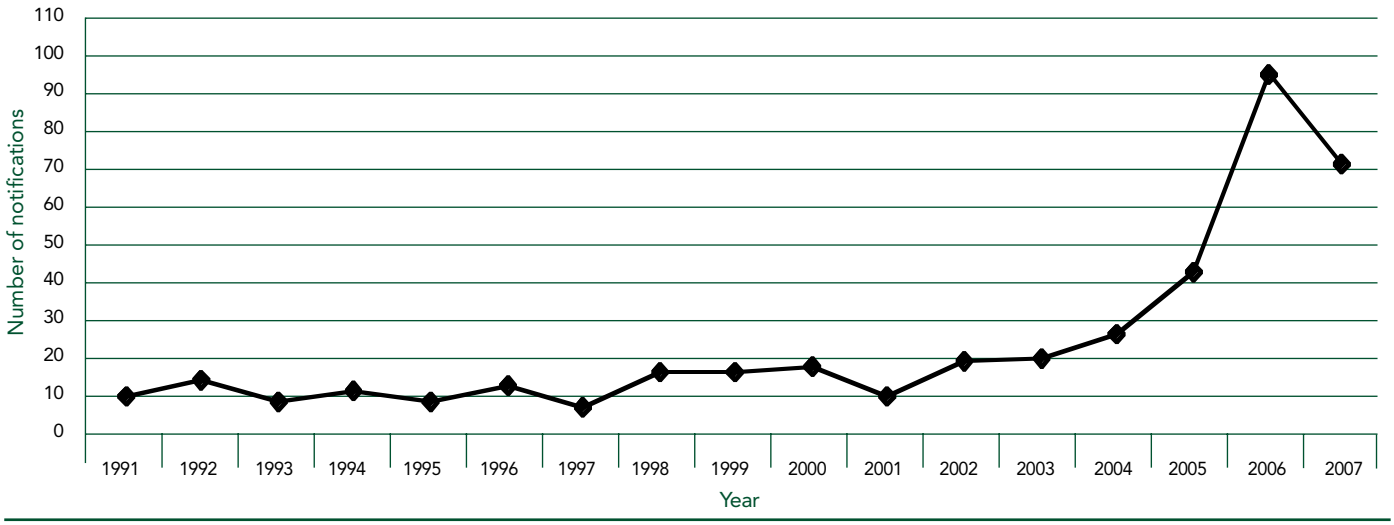



*Figure 1. Number of malaria notifications, Ireland 1982-2007*

as 'visiting family in country of origin', five were born in Ireland and all five were less than six years of age, presumably representing the children of immigrants. In comparison to their parents who may retain some immunity from previous exposure (although this fades when they no longer live in endemic areas), these children are likely to be more susceptible than their parents.

Excluding new entrants (those who had spent their lives to date living in an endemic region would not be expected to be taking chemoprophylaxis), information on malaria prophylaxis was available for 46 of the remaining 65 cases. Of these, 36 took no prophylaxis, and eight took prophylaxis but failed to continue for the required period. Only two cases reported full compliance with prescribed course of prophylaxis.

In two instances, more than one member of the same family was affected after a visit to a malarious region.

With increasing holiday travel to malarious destinations, and a growing immigrant community who regularly travel home, it is now becoming more likely that malarial patients will present to the health services. Given the potential for fatal complications in severe cases, it is important for clinicians to consider malaria as a diagnosis when presented with patients with compatible symptoms who have history of travel to a malaria endemic country within the preceding year.

International information on malaria is available at www.who.int/malaria/

*Table 1. Malaria notifications, Ireland 2007 by country of exposure*

| Country of exposure | Number notifications | % notifications |
|---|---|---|
| **Sub-saharan Africa** | 48 | 68% |
| ***Nigeria*** | *37* | *52%* |
| ***Other than Nigeria*** | *11* | *15%* |
| **Asia** | 5 | 7% |
| **South America** | 1 | 1% |
| **Not reported** | 17 | 24% |
| **Total** | **71** | **100%** |

# 05

# Blood-borne and Sexually Transmitted Infections

# 5.1 Hepatitis B


## Summary

Number of cases in 2007: 863
Crude notification rate: 20.4/100,000
Number of acute cases in 2007: 52
Number of chronic cases in 2007: 705
Number of cases in 2006: 811


Hepatitis B is a vaccine preventable disease which is transmitted through contact with the blood or body fluids of an infected person. The main routes of transmission are mother to baby, sexual contact and unsafe injections. Over 90% of people infected as adults clear the virus, but there is a high probability of developing chronic infection if hepatitis B is acquired in infancy (90%) or early childhood (20-50%).

Notification rates for hepatitis B in Ireland have increased dramatically over the past decade but appear to be levelling off over the past few years. The number of cases reported increased slightly in 2007, with 863 notifications (20.4/100,000 population) compared to 811 in 2006 (figure 1). Sixty percent (n=521) of notifications were from the HSE-E, corresponding to an age-standardised notification rate of 32.6/100,000 population.

All cases were laboratory confirmed. Eighty eight percent contained information on the acute/chronic status. Where status was known, 93% of cases were chronic (n=705) and 7% were acute (n=52).

**Acute cases**

Seventy nine percent (n=41) of acute cases were male, 19% (n=10) were female and sex was not known for one case. The highest rates were among young to middle aged adults, with 73% of cases (n=38) aged between 20 and 44 years (figure 2).

Some risk factor data were available for 83% (n=43) of acute cases. The predominant mode of transmission was sexual, with 63% (n=27) likely to have been sexually acquired. Fifteen of these were heterosexuals, ten were men who have sex with men and sexual orientation was not available for two. A further eight cases (19%) were born in a country of intermediate (2-7%) or high (≥8%) hepatitis B endemicity. Where reason for testing was

known (n=45), 69% (n=31) were tested because they were symptomatic.

Country of birth was known for 45 acute cases and 78% (n=35) were born in Ireland. Where country of infection was known (n=41), 73% (n=30) were infected in Ireland.

**Chronic cases**

Fifty two percent of chronic cases were male (n=364), 43% were female (n=307) and sex was not known for 5% (n=34). Eighty one percent (n=574) were aged between 20 and 44 years. The median age for males (34) was higher than that for females (29.5) (figure 2).

Risk factor data were very limited for chronic cases, but some data were available for 42% (n=297). Of these, 85% (n=252) were identified as asylum seekers or as having been born in a country with high or intermediate hepatitis B endemicity. Where country of birth was known, 34% (n=84) were born in Sub-Saharan Africa, 25% (n=62) were born in Eastern or Central Europe and 23% (n=58) were born in Asia. Only 14% (n=34) of the chronic cases with country of birth data were born in Ireland.

Reason for testing was known for 371 chronic cases. Thirty four percent (n=127) were identified through antenatal screening programmes, 24% (n=89) were identified through asylum seeker screening programmes and 14% (n=52) were diagnosed as a result of testing in sexually transmitted infection settings.

Eight Irish-born chronic cases were residents of intellectual disability institutions. Their ages ranged from 43 to 52 years. Most were diagnosed as a result of routine screening and may have been infected for some time.

**Discussion**

The number of cases of hepatitis B identified is influenced by screening programmes and these have expanded over the past decade. The vast majority of hepatitis B notifications in 2007 were chronic cases. Available data indicate that most were born in countries where hepatitis B is endemic and were infected outside of Ireland. The number of acute cases notified was low and sexual acquisition was the predominant mode of transmission.

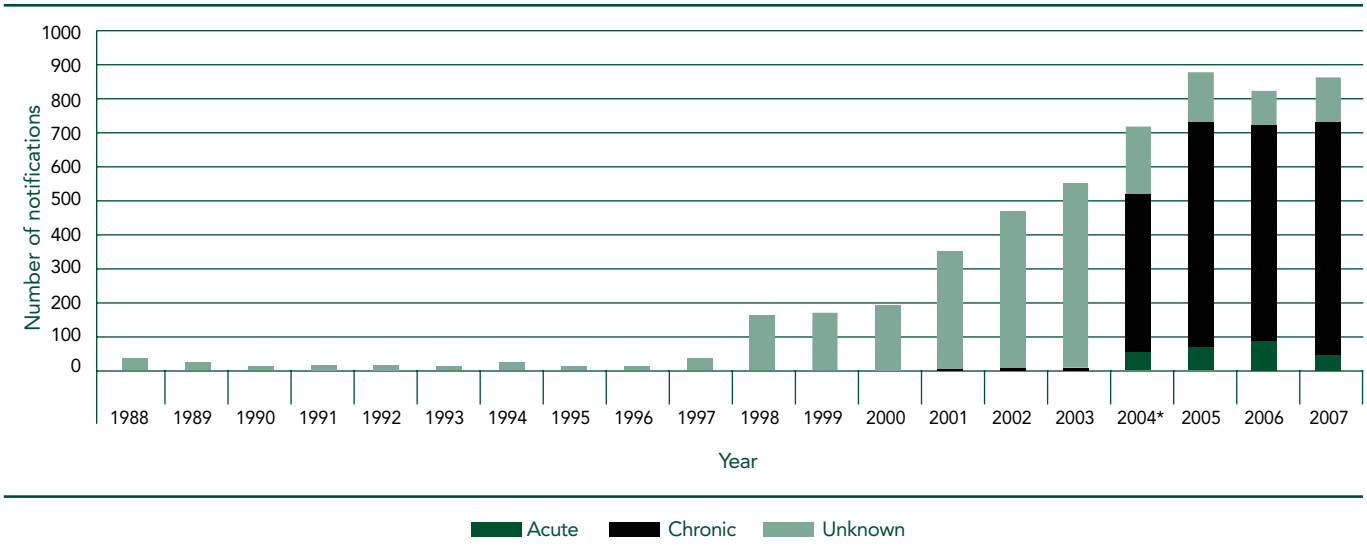



*Figure 1. Number of hepatitis B notifications by accute/chronic status, 1988-2007*

**Case definitions, which differentiate between acute and chronic cases of hepatitis B, and mandatory laboratory reporting of notifiable infectious diseases were introduced in 2004*

Hepatitis B vaccine was added to the routine childhood immunisation schedule in September 2008 (www.ndsc.ie/hpsc/A-Z/VaccinePreventable/Vaccination/Guidance/). This universal infant vaccination programme will be run in parallel with the pre-existing targeted immunisation programme, which recommends hepatitis B vaccination for individuals who are at increased risk of infection because of their lifestyle, occupation or other factors. This includes individuals who change sex partner frequently, injecting drug users, healthcare workers, haemophiliacs, renal dialysis patients and close contacts of cases.

Antenatal screening for hepatitis B is now carried out in all Irish maternity hospitals. Administration of hepatitis B immunoglobulin and vaccine to babies of infected mothers soon after birth can prevent infection being transmitted.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 15th August 2008. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

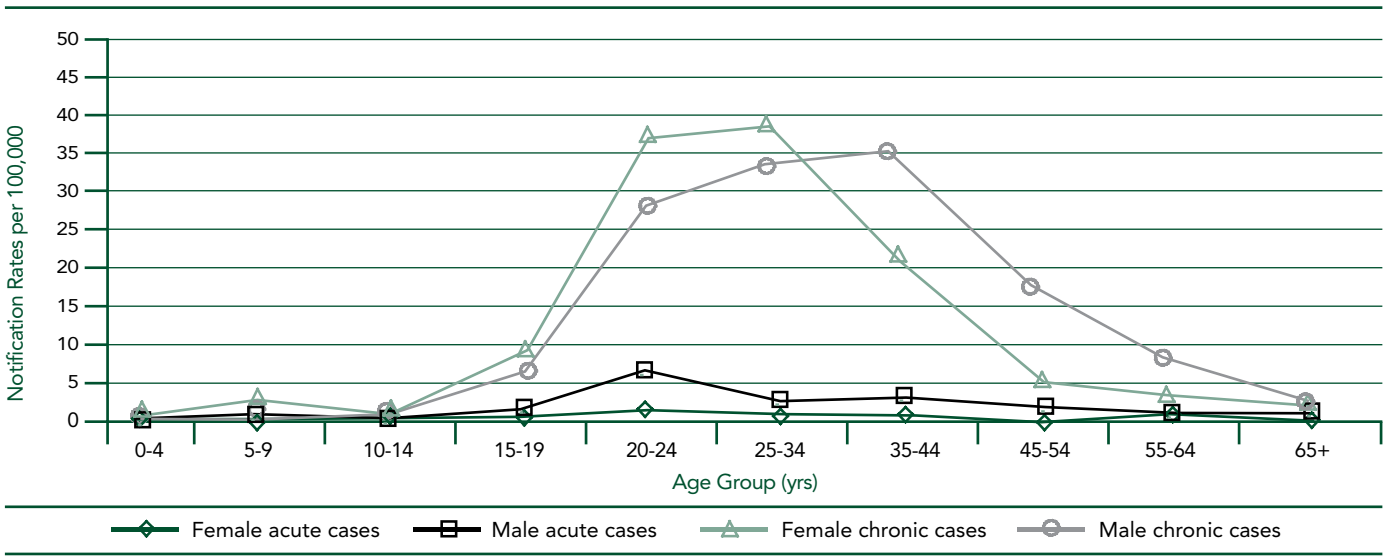



*Figure 2. Age and sex-specific notification rates/100,000 population for hepatitis B by acute/chronic status, 2007*

# 5.2 Hepatitis C


## Summary

Number of cases in 2007: 1,558
Crude notification rate: 36.7/100,000 population
Number of cases in 2006: 1,220


The hepatitis C virus is primarily transmitted through sharing contaminated equipment when injecting drugs or through the receipt of unscreened blood or blood products. Sexual, occupational and perinatal transmission can also occur but are less common. Infection is initially asymptomatic in approximately 90% of cases, but between 60 and 85% of those infected fail to clear the virus and develop chronic infection.

Hepatitis C became a notifiable disease in Ireland in 2004 and the number of cases reported each year since then has been high. Notifications increased by 28% to 1,558 in 2007, compared to 1,220 in 2006 (figure 1). This corresponds to a crude notification rate of 36.7/100,000 population. All cases were laboratory confirmed.

The sex distribution of cases was very similar to previous years with a strong predominance of male cases (figure 1). In 2007, 63% (n=979) of cases were male, 35% (n=551) were female and sex was not known for 28 cases. The age profile was similar for both sexes, with the highest notification rates in young to middle aged adults. Seventy two percent (n=1,124) of cases were aged between 25 and 44 years and 92% (n=1,427) were aged between 20 and 54 years. The median age for females was younger (31) than that for males (34) (figure 1).

The geographic distribution of cases was skewed, with the HSE-E reporting 77% of all cases (n=1,206). Their age-standardised notification rate, of 73.8/100,000 population, was approximately four times that of the next highest area (figure 2).

An enhanced surveillance system for hepatitis C was implemented in 2007 and some risk factor data were identified for 42% of cases (n=658). The most likely risk factor for 75% (n=496) was injecting drug use. A further 3.8% (n=25) were either prison inmates or homeless. Although mode of transmission was not reported for these cases, both groups have high prevalences of injecting drug use.

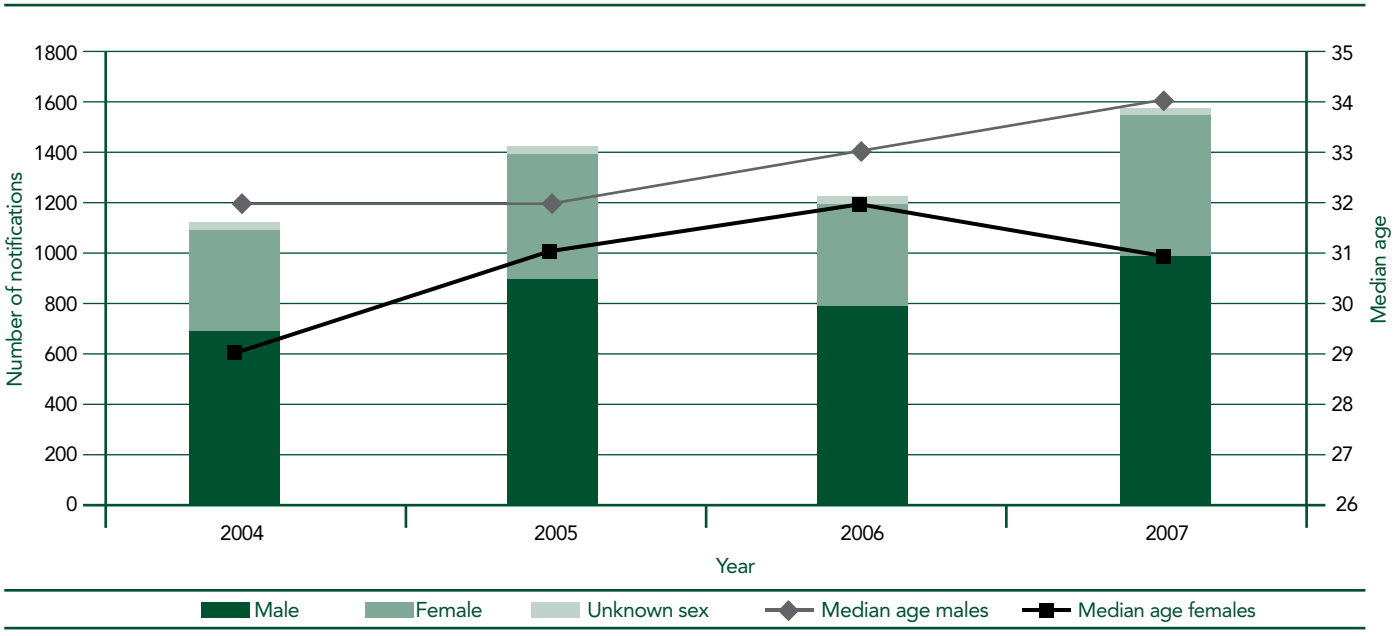



*Figure 1. Number of hepatitis C notifications and median age by sex, 2004-2007*

Thirty four cases (5.2%) were reported as likely to have been infected through receipt of blood or blood products. Of these, 19 were infected in Ireland. There were no further data for one of these 19, but the remainder were all infected through anti-D or blood transfusions acquired many years in the past, but were notified for the first time in 2007.

Hepatitis C notification rates may not accurately reflect incidence trends in Ireland as it is likely that a significant proportion of cases notified do not represent newly acquired infections. Infection is frequently asymptomatic initially and a large proportion of cases are diagnosed as a result of screening of people identified as being at risk. Some may have been infected for years prior to diagnosis.

In addition, current notifications may include some cases that were diagnosed before 2004 (when hepatitis C first became notifiable), for whom repeat testing has been carried out now. Two hundred and thirty four of the cases notified in 2007 were known to have been previously diagnosed.

There is also likely to be some duplication of notifications as Departments of Public Health do not always receive full names and thus cannot always identify if a patient has been notified previously.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) System on 1st September 2008. These figures may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

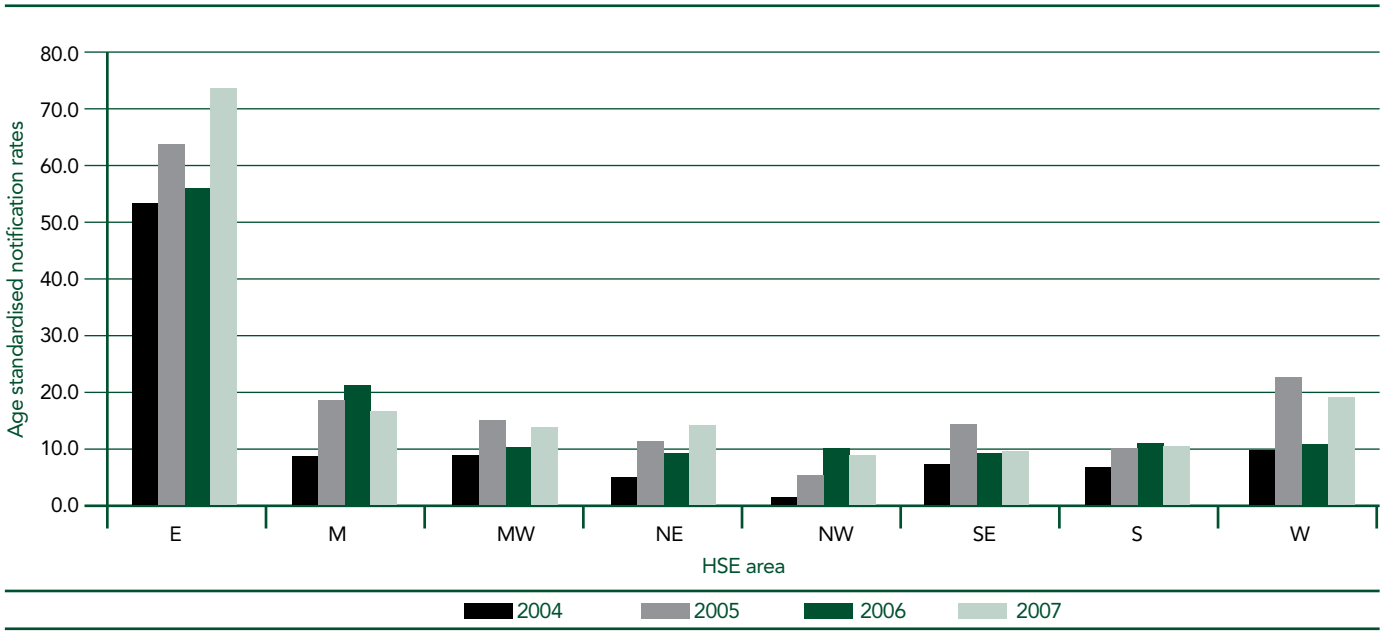



*Figure 2. Age standardised notification rates/100,000 population for hepatitis C by HSE area, 2004-2007*

# 5.3 HIV and AIDS

## Summary

Number of HIV cases: 362
Crude HIV incidence rate: 8.5 per 100,000 population
Number of AIDS cases: 29
Number of deaths in AIDS cases: 5

A total of 362 newly diagnosed HIV infections were reported to the HPSC during 2007. This compares to 337 diagnosed in 2006 and represents a 7.4% increase. The rate of newly diagnosed HIV infection in Ireland in 2007 was 85.4 per million population. The cumulative total number of HIV infections reported in Ireland since surveillance began to the end of December 2007 is 4,781.

No reporting forms were received for 106 of the cases (29.3%) reported in 2007. This makes the analysis of data and interpretation of trends difficult. It is also important to note that the figures do not represent the numbers of people infected with HIV in Ireland but rather provide information on the number of new diagnoses in a given time period. The number of new diagnoses reported is dependent on patterns of testing and reporting.

Of the 362 newly diagnosed cases, 146 were heterosexually acquired. This compares to 176 in 2006, 168 in 2005 and 178 in 2004. There were 75 new diagnoses among MSM (men who have sex with men) during 2007 compared to 85 in 2006, 57 in 2005 and 64 in 2004. There were 54 new diagnoses among IDUs (injecting drug users) during 2007 compared to 57 in 2006, 66 in 2005 and 71 in 2004.However, these data should be interpreted with caution as information on risk group is unavailable for 75 (20.7%) of the cases newly diagnosed in 2007. Figure 1 shows probable route of transmission for newly diagnosed cases among the three major risk groups since 1994.

HIV infection was newly diagnosed in eight children in 2007. The probable route of transmission for six cases was mother to child transmission (MCT), transfusion related in one case (transfusion received in sub-Saharan Africa) and heterosexually acquired in one case. Of the six MCT cases, five of the mothers were born in

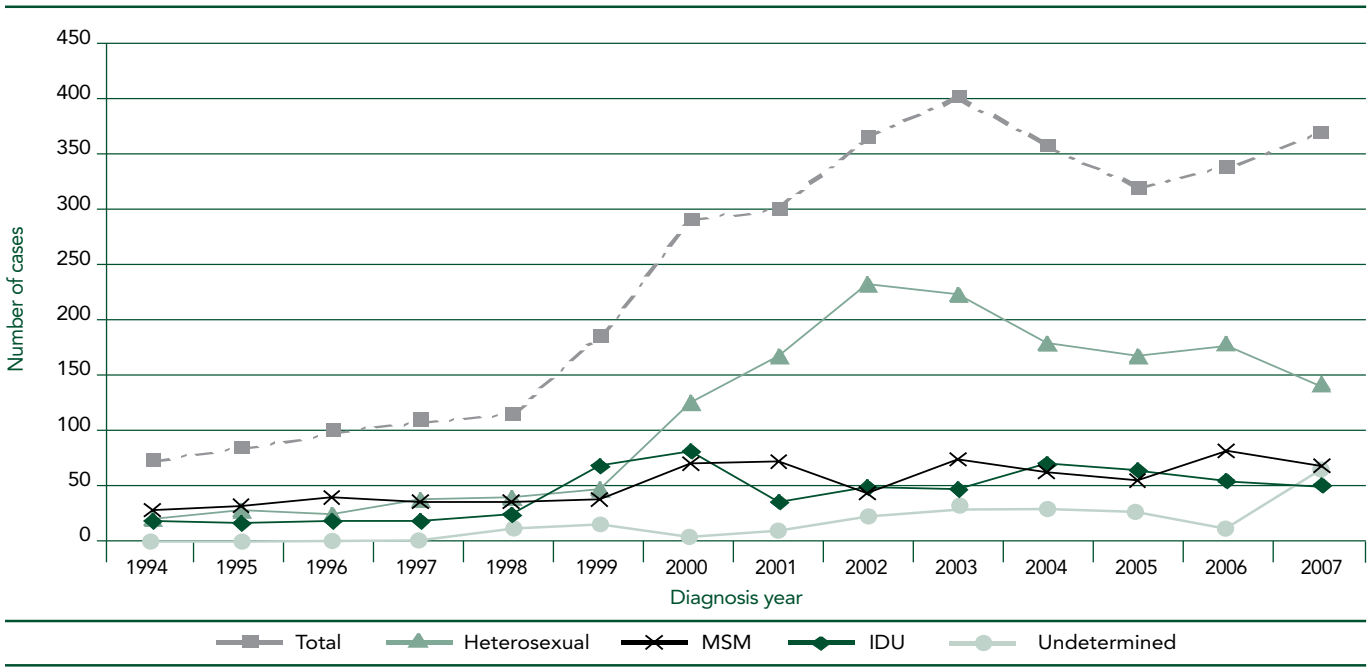



*Figure 1: Newly diagnosed HIV infections in Ireland among heterosexuals, MSM and IDUs (1994 to 2007)*

countries with generalised HIV epidemics. Two of the mothers were diagnosed after the birth of the children and one was diagnosed while pregnant with the child. In addition, there were 117 babies born to a HIV infected mother in Ireland during 2007: 91 are not infected, 25 remain of indeterminate status (i.e. do not meet the criteria for HIV infection and are <18 months at time of test) and one was infected. The country of birth for the mother of the infected baby was not known. The mother tested negative during the pregnancy and later tested positive post-natally.

Most of the newly diagnosed cases (75.4%) were aged between 20 and 39 years. The mean age at HIV diagnosis was 32.5 years. The mean age among females was 30.4 years and among males was 33.9 years, a difference of 3.5 years. The mean age at HIV diagnosis was 30.7 years in IDUs, 31.7 years in heterosexuals and 35.5 years in MSM.

Of the 362 cases, 209 (57.7%) were male and 130 (35.9%) were female. Gender was unknown for 23 (6.4%) cases. Of the 130 newly diagnosed cases among females, the majority (66.2%) were acquired heterosexually and 29 (22.3%) were reported to be pregnant at HIV diagnosis. Of the newly diagnosed cases among males, 35.4% were among MSM and 23.9% were among heterosexuals.

Of the 251 cases where geographic origin* was known, 107 were born in Ireland, 96 were born in sub-Saharan Africa and 17 were born in other countries in Western Europe (figure 2). Information on geographic origin is unavailable for 111 (30.7%) of the newly diagnosed cases. Of the 146 cases acquired through heterosexual contact, 87 were born in sub-Saharan Africa (58 female, 22 male and seven cases where sex was unknown) and 28 were born in Ireland (10 female, 17 male and one case where sex was unknown). Information on stage of infection at time of HIV diagnosis was available for 244 of the 362 cases. Of the 244 cases, 187 were asymptomatic and 28 were diagnosed with AIDS at the time as HIV diagnosis. Of the 28 late diagnoses, 14 were heterosexual (seven male, five female and two cases where sex was unknown), four were MSM, eight were IDUs (five female, two male and one where sex was

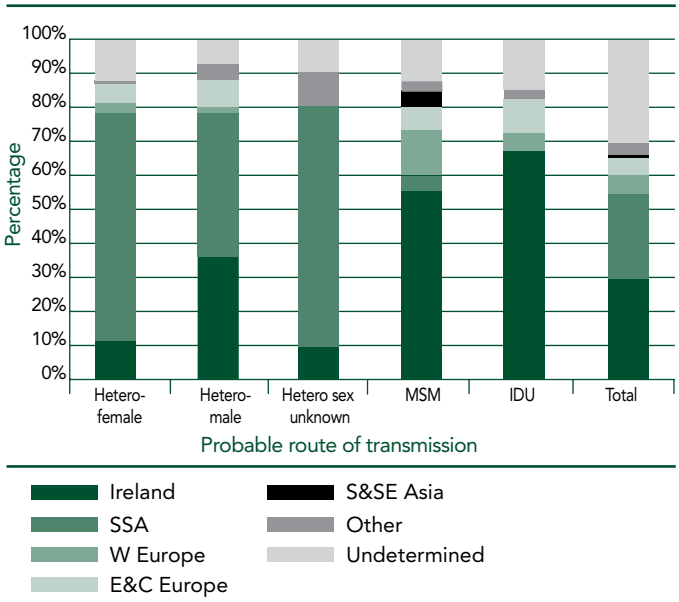



*Figure 2: Newly diagnosed HIV infections in Ireland by probable route of transmission and geographic origin (2007)*
** Geographic origin is based on country of birth as used by EuroHIV. "Other" includes "East Asia and Pacific" and "Latin America"*

not known), one was due to MCT and for one route of transmission was unknown.

By the end of 2007, 957 cases of AIDS were reported in Ireland since surveillance began. Of these, 405 are reported to have died. A total of 461 deaths have been reported in HIV infected individuals in Ireland since surveillance began. Information on cause of death has been supplied since the introduction of HIV case based reporting in 2001. Of the 37 deaths that occurred among AIDS cases between 2002 and 2007, the cause of death was reported as AIDS in 31 cases (83.8%), HIV/AIDS related in three cases (8.1%), non-AIDS in two cases (5.4%) and unknown in one case (2.7%). Five deaths in AIDS cases were reported during 2007.

A more detailed report on the epidemiology of HIV and AIDS in Ireland in 2007 is available on the HPSC website www.hpsc.ie under Topics A-Z.

# 5.4 Sexually Transmitted Infections (STIs), 2006


## Summary

Total number of STI notifications in 2006: 9,892

Three most common STIs reported in 2006:
1. Ano-genital warts: 3,494 cases (82.4/100,000)
2. *Chlamydia trachomatis* infection (genital): 3,144 cases (74.2/100,000)
3. Non-specific urethritis: 2,161 cases (51/100,000)


Clinicians and laboratories notify their respective departments of public health of anonymised probable and confirmed cases of sexually transmitted infections (STIs). These notifications are then reported to HPSC in aggregate form on a quarterly basis. Because of delays in STI reporting, annual data are not always available nationally in a timely manner. Consequently, this report focuses on STIs notified to HPSC in 2006. The figures presented in this chapter are based on those in the Annual STI Report for 2006, published in April 2008.

In 2006, 9,892 STIs were reported in Ireland, a 3% decrease compared to 2005 when 10,144 STIs were reported (table 1). This decline is largely attributable to a drop in the number of *Chlamydia trachomatis* notifications between 2005 and 2006. In addition, figures were further reduced by the fact that one STI clinic in the HSE-MW Area was unable to provide returns. Three infectious diseases accounted for 89% of all STI notifications in 2006: ano-genital warts, *C. trachomatis* and non-specific urethritis. Between 2005 and 2006, notifications for chlamydia, trichomoniasis, syphilis and hepatitis B (acute or chronic) decreased by 6%, 37%, 53% and 75%, respectively. However, notifications of ano-genital warts, non-specific urethritis, herpes simplex (genital) and gonorrhoea increased by 1%, 3%, 3% and 26%, respectively (table 1).

STIs in males accounted for 62.7% of all notifications; 36.9% were in females. Gender data were not reported for 0.4% of notifications (table 2). The number of notifications among males generally exceeded that of females for all STI diseases with the exception of

*Table 1. Notifiable sexually transmitted infections from 1999 to 2006*

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

*C. trachomatis*, herpes simplex and trichomoniasis. In 2006, the highest number of notifications was in the 20-29 year age group, accounting for 64.5% of all STIs notified. This age group also had the highest number of notifications for each of the STI diseases except syphilis and trichomoniasis (table 2).

During 2006, over 50% (n=4,992) of all STI notifications were from the HSE-E. Four areas (HSE-E, HSE-SE, HSE-S and HSE-W) accounted for 90% of the STI notifications in 2006 (table 3). The breakdown of STI data by geographical area should, however, be interpreted with caution, as figures are largely a reflection of the area where cases availed of STI services rather than a reflection of the burden of STIs in the population in that area.

## Summary Statistics on Selected STIs, 2006

### Ano-genital warts

In 2006, 3,494 cases of ano-genital warts were notified (82.4/100,000 population) which accounted for 35% of all STI notifications reported. This number represents an increase of 1% since 2005. More cases were notified among males than females (1,993 versus 1,498) and in the 20-29 year old age group which had 66% of all such cases reported.

### *Chlamydia trachomatis* infection (genital)

The crude incidence rate in 2006 for *C. trachomatis* infection was 74.2/100,000 (3,144 notifications). Chlamydia notifications constituted 32% of all STI notifications reported in 2006 and represent a decrease of 6% since 2005. More cases were notified among females than males (1,659 versus 1,454) and 70% of cases were reported in the 20-29 year old age group.

### Non-specific urethritis

In 2006, 2,161 cases of non-specific urethritis were notified (51.0/100,000), an increase of 2.6% since 2005. These notifications constituted 22% of all STI notifications reported. Considerably more cases were notified among males than females (2,044 versus 115). Sixty percent of cases were reported in the 20-29 year old age group.

*Table 2 . Notified sexually transmitted infections by age group and gender, 2006*

| Sexually Transmitted Infection | 0 - 19 | 20 - 29 | 30 - 39 | 40+ | Age Unknown | Male | Female | Gender Unknown | Total |
|---|---|---|---|---|---|---|---|---|---|
| Ano-genital warts | 425 | 2320 | 548 | 198 | 3 | 1993 | 1498 | 3 | 3494 |
| Chancroid | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| *Chlamydia trachomatis* infection (genital) | 434 | 2193 | 415 | 95 | 7 | 1454 | 1659 | 31 | 3144 |
| Gonorrhoea | 42 | 254 | 86 | 48 | 1 | 380 | 48 | 3 | 431 |
| Granuloma inguinale | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hepatitis B (acute or chronic) | 0 | 10 | 8 | 2 | 0 | 11 | 9 | 0 | 20 |
| Herpes simplex (genital) | 51 | 232 | 109 | 63 | 0 | 210 | 244 | 1 | 455 |
| Lymphogranuloma venereum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Non-specific urethritis | 148 | 1297 | 493 | 218 | 5 | 2044 | 115 | 2 | 2161 |
| Syphilis | 1 | 51 | 51 | 30 | 1 | 102 | 30 | 2 | 134 |
| Trichomoniasis | 5 | 18 | 18 | 11 | 0 | 3 | 49 | 0 | 52 |
| **Total** | **1106** | **6376** | **1728** | **665** | **17** | **6198** | **3652** | **42** | **9892** |
| **(% of Total)** | **11.2** | **64.5** | **17.5** | **6.7** | **0.2** | **62.7** | **36.9** | **0.4** | **100** |

**Herpes simplex (genital)**
The crude incidence rate for genital herpes in 2006 was 10.7/100,000 (455 notifications). The notifications constituted 5% of all STI notifications reported in 2006 and represent an increase of 3% since 2005. More cases were notified among females than males (244 versus 210) and in the 20-29 year old age group (51% of all such cases notified).

**Gonorrhoea**
In 2006, 431 cases of gonorrhoea were notified (10.2/100,000), an increase of 26% since 2005. These notifications constituted 4% of all STI notifications reported in 2006. More cases were notified among males than females (380 versus 48) and most frequently in the 20-29 year old age group (59% of all such cases reported).

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

A more detailed report on STIs is available at www.hpsc.ie under the disease name in Topics A- Z.

*Table 3. Notified sexually transmitted infections by HSE area, 2006*

| Sexually Transmitted Infection | HSE-E | HSE-M | HSE-MW* | HSE-NE | HSE-NW | HSE-SE | HSE-S | HSE-W | Total |
|---|---|---|---|---|---|---|---|---|---|
| Ano-genital warts | 1445 | 0 | 0 | 3 | 199 | 508 | 605 | 734 | 3494 |
| Chancroid | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| *Chlamydia trachomatis* infection (genital) | 1598 | 164 | 189 | 90 | 80 | 321 | 402 | 300 | 3144 |
| Gonorrhoea | 320 | 8 | 14 | 6 | 10 | 25 | 18 | 30 | 431 |
| Granuloma inguinale | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hepatitis B (acute or chronic) | 0 | 0 | 0 | 0 | 1 | 0 | 17 | 2 | 20 |
| Herpes simplex (genital) | 277 | 2 | 0 | 0 | 9 | 24 | 57 | 86 | 455 |
| Lymphogranuloma venereum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Non-specific urethritis | 1262 | 0 | 0 | 0 | 181 | 244 | 290 | 184 | 2161 |
| Syphilis | 74 | 7 | 0 | 1 | 1 | 11 | 26 | 14 | 134 |
| Trichomoniasis | 16 | 3 | 5 | 12 | 0 | 0 | 12 | 4 | 52 |
| **Total** | **4992** | **184** | **208** | **112** | **481** | **1134** | **1427** | **1354** | **9892** |
| **% of Total** | **50.5** | **1.9** | **2.1** | **1.1** | **4.9** | **11.5** | **14.4** | **13.7** | **100.0** |

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

# 06

# Other infections

# 6.1 Viral Encephalitis


## Summary

Number of cases, 2007: 8
Number of cases, 2006:16
Number of cases, 2005: 6
Crude incidence rate, 2007: 0.2/100,000


In 2007, eight cases of viral encephalitis were notified in Ireland, which is a crude incidence rate of 0.2 per 100,000 total population. The number of viral encephalitis notifications in 2007 is half that which was reported in 2006, but comparable to the six cases notified in 2005 and five in 2004. The decrease in viral encephalitis in 2007, compared to 2006 is particularly related to a decrease in varicella zoster virus associated encephalitis notifications.

Of the eight cases notified in 2007, more cases occurred in males (n=6) than in females (n=2) giving a ratio of 3.0:1.0.

Cases ranged in age from two to 83 years (table 1). One quarter of the cases (n=2) occurred in children <10 years of age and 63% were in adults ≥45 years of age (table 1). The highest incidence rates were in children aged 1-4 years and also in elderly adults ≥65 years of age (0.4/100,000 each) (table 1).

The causative agent was identified in all eight cases of viral encephalitis notified; herpes simplex virus (n=5) and varicella zoster virus (n=3). Two of the cases due to herpes simplex occurred in children under 10 years of age while the remaining three cases occurred in adults aged ≥45 years. All three cases due to varicella zoster occurred in adults ≥15 years of age. No deaths from viral encephalitis were reported between 2004 and 2007.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 21st August 2008.

*Table 1. Number, crude incidence rates and proportion of viral encephalitis cases by age group, 2007*

| | Number | Proportion (%) | ASIR |
|---|---|---|---|
| <1 | 0 | 0 | 0.0 |
| 1-4 | 1 | 13 | 0.4 |
| 5-9 | 1 | 13 | 0.3 |
| 10-44 | 1 | 13 | 0.0 |
| 45-64 | 3 | 38 | 0.3 |
| 65+ | 2 | 25 | 0.4 |
| All ages | 8 | 100 | 0.2 |

*ASIR, age specific incidence rate per 100,000*

# 6.2 Viral Meningitis


## Summary

Number of cases, 2007:46
Number of cases, 2006:148
Number of cases, 2005: 35
Crude incidence rate, 2007: 1.1/100,000


In 2007, 46 cases (1.1/100,000 total population) of viral meningitis were notified in Ireland. Most of the cases were classified as confirmed (76%, n=35), 10 (22%) as probable and for one (2%) the case classification was possible. More cases occurred in males (n=28) than in females (n=18) giving a ratio of 1.6:1.0. One death due to viral meningitis was notified in a 33 year old man.

Cases ranged in age from 1 month to 59 years with a median age of 7 years. Eighty percent (n=37) of all cases were <35 years of age. Children <1 year of age had the highest incidence rate: 27.8 per 100,000, followed by the 1-4 year olds, 1.7/100,000 (table 1). Of the 46 cases reported in 2007 the causative agent was identified as enterovirus (n=27;59%), herpes simplex virus (n=4;9%), varicella zoster virus (n=2;4%), echovirus (n=1;2%), parechovirus (n=1;2%) and unknown (n=11; 24%) (table 1).

In Ireland, viral meningitis activity tends to be highest from June to October. In 2007 the numbers of cases peaked in July (n=9) and again in October (n=7) with an average of five cases per month (n=22) between June and October. In contrast, viral meningitis was low during the rest of the year with a monthly average of three cases (n=21).

The number of cases notified in 2007 represents a substantial return to the yearly average since 1997 during which the annual number of notifications ranged from 23-161 (figure 1). In 2006, there were 148 cases reported, but in 2005 and 2004, the numbers were 35 and 23, respectively.

High numbers of cases occurred in 2000 (n=98), 2001 (n=161) and 2006 (n=148). These upsurges in notifications coincided with an increase in reports by the National Virus Reference Laboratory (NVRL) of laboratory confirmed non-polio enterovirus isolates. The predominant strains were echovirus type 13 in 2000 and echovirus type 30 in 2001.

Towards the end of 2005 NVRL introduced PCR testing of CSF samples for enteroviral nucleic acid. This was in addition to the routine method of viral isolation from

*Table 1. Number and age specific incidence rates of viral meningitis notifications, 2007*

| | Enterovirus | Herpes simplex virus | Varicella zoster virus | Echovirus | Parechovirus | Unknown | Total | ASIR |
|---|---|---|---|---|---|---|---|---|
| <1 | 12 | 0 | 0 | 1 | 1 | 3 | **17** | 27.8 |
| 1-4 | 2 | 0 | 0 | 0 | 0 | 2 | **4** | 1.7 |
| 5-9 | 1 | 0 | 0 | 0 | 0 | 2 | **3** | 1.0 |
| 10-14 | 1 | 0 | 0 | 0 | 0 | 1 | **2** | 0.7 |
| 15-19 | 3 | 0 | 0 | 0 | 0 | 0 | **3** | 1.0 |
| 20-24 | 2 | 0 | 0 | 0 | 0 | 1 | **3** | 0.9 |
| 25-34 | 2 | 1 | 0 | 0 | 0 | 2 | **5** | 0.7 |
| 35-44 | 4 | 1 | 1 | 0 | 0 | 0 | **6** | 1.0 |
| 45+ | 0 | 1 | 1 | 0 | 0 | 0 | **2** | 0.1 |
| **All ages** | **27** | **4** | **2** | **1** | **1** | **11** | **46** | **1.1** |

*ASIR, age specific incidence rate per 100,000*

stool samples. The number of viral meningitis cases attributable to enterovirus isolates in 2006 was 117, compared to 27 cases reported in 2007. No single strain predominated in 2007, as was also the case in 2006. However, in 2007 Coxsachie B4 and Echovirus type 11 were the strains most commonly isolated.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 21st August 2008.

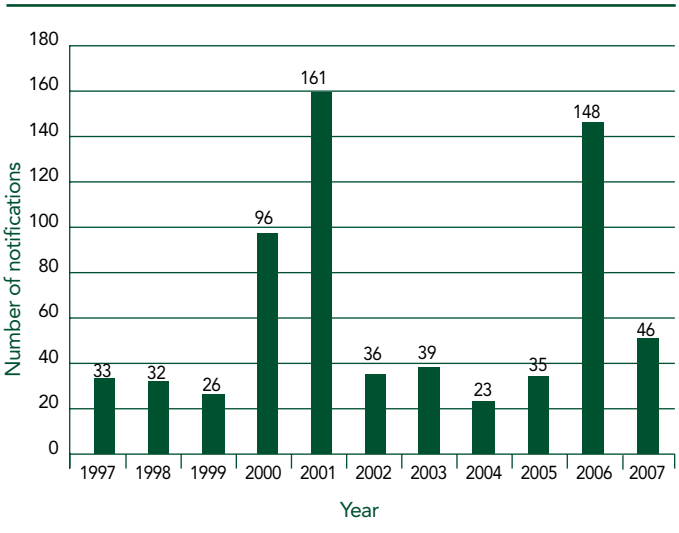



*Figure 1. Annual number of viral meningitis notifications in Ireland, 1997-200*

# 6.3 Creutzfeldt-Jakob disease

## Summary

Number of cases, 2007: 3
Number of cases, 2006: 6

Three cases of Creutzfeldt-Jakob disease (CJD) were notified in 2007 compared to six cases in 2006. All three cases in 2007 were aged greater than 54 years and two cases were female. All three were reported as sporadic CJD.

In total, 41 cases of CJD were notified since CJD was first specified as a notifiable disease in December 1996, giving an average of approximately four notifications each year. Figure 1 shows the 41 CJD notifications by age group. Over 80% (n=34) of the cases were aged greater than 54 years. Of the 41 cases, 22 were male and 19 were female. Thirty-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 2007. Four cases of vCJD were notified since vCJD became notifiable in December 1996. A summary of these four cases was provided in the 2006 HPSC annual report.

Data presented in this summary are based on notifications from HSE Areas and from the Irish National Creutzfeldt-Jakob Disease Surveillance Unit. The figures were extracted from the Computerised Infectious Disease Reporting (CIDR) system on 13th August 2008 and may differ slightly from those published previously due to ongoing updating of notification data on CIDR.

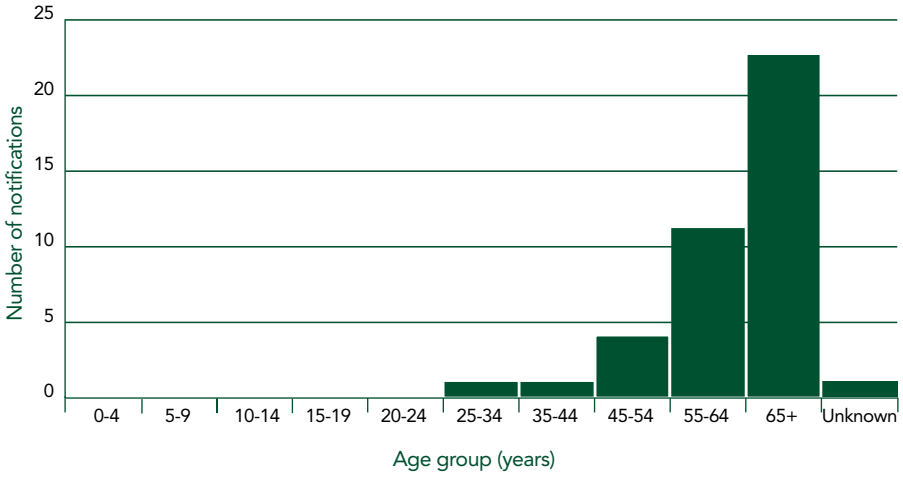



*Figure 1. Number of CJD notifications (n=41) from December 1996 to 2007 by age group*

# 07

## Infectious Disease Outbreaks

# 7. Outbreaks


## Summary

Number of outbreaks in 2007: 260
Number of IID outbreaks: 238
Number of non-IID outbreaks: 22


disease notified on CIDR. These outbreaks resulted in 4715 associated cases of illness. Eight hundred and ninety cases were reported to have been hospitalised.

The regional distribution of all outbreaks of infectious disease in 2007, and those specifically infectious intestinal disease (IID), are detailed in table 1. HSE-SE had the highest outbreak rate of 10.4 per 100,000. HSE-S reported the greatest number of outbreaks (n=56). Of note, in 2006 HSE-M had an outbreak rate of 13.9 per 100,000. In 2007 this rate significantly decreased to 5.2 per 100,000.

General outbreaks accounted for 73.9% (n= 192) of all outbreaks notified. The remaining outbreaks were considered family/household outbreaks (26.1%, n= 68). One hundred and seventy eight (or 68.5%) of outbreaks were gastrointestinal/ infectious intestinal disease (IID). These resulted in at least 4595 people becoming ill. Norovirus/suspected viral outbreaks continue to be the most prevalent cause of IID outbreaks, continuing the trend observed in previous years. Figure 1 shows the causative origin of outbreaks by year since 1998. The number of general and family outbreaks of IID by pathogen and numbers ill are outlined in Table 2. Norovirus/ suspect viral outbreaks, accounted for 60.7% of all IID outbreaks reported in 2007 (figure 1). Norovirus was responsible for the largest outbreak of 2007. This occurred within a hospital with approximately 407 cases of illness.

After norovirus (n=111), the next most commonly reported IID outbreaks were acute infectious gastroenteritis (n=53), EHEC (n=21), cryptosporidiosis (n=16), salmonellosis (n=10) and campylobacter (n=9).

There were 21 EHEC outbreaks reported in 2007, 10 less than 2006. These outbreaks can be subdivided into 17 family outbreaks and four general (two in crèche, one in a hotel and one in a private house). Sixteen outbreaks were due to VTEC O157, three due to

*Table 1. All outbreaks of ID, number of IID and non-IID outbreaks, and total numbers ill in all outbreaks reported by health region (2007)*

| HSE Region | No. of Outbreaks | Outbreak Rate | No. ill in all outbreaks | No. of IID outbreak | No. of Non IID outbreaks |
|---|---|---|---|---|---|
| E | 71 | 4.7 | 1627 | 67 | 4 |
| M | 13 | 5.2 | 136 | 13 | 0 |
| MW | 14 | 3.9 | 192 | 12 | 2 |
| NE | 21 | 5.3 | 442 | 21 | 0 |
| NW | 22 | 9.3 | 315 | 20 | 2 |
| SE | 48 | 10.4 | 862 | 44 | 4 |
| S | 56 | 9.0 | 840 | 50 | 6 |
| W | 14 | 3.4 | 412 | 10 | 4 |
| HPSC | 1 | ~ | 8 | 1 | 0 |
| **Total** | **260** | **6.1** | **4833** | **238** | **22** |

VTEC O26, one was caused by an un-groupable strain and one was a mixed strain outbreak. One general VTEC outbreak in 2007 was linked to a hotel, with 56 associated cases of illness. Foodborne transmission was suspected as a mode of transmission in this outbreak although no specific food was implicated during investigations. *E. coli* O157 was isolated from the private water supplies associated with one outbreak and one sporadic case in 2007.

In 2007, there were 10 outbreaks of salmonellosis reported via CIDR to the HPSC; three general and seven family outbreaks. Of the seven family outbreaks, one was travel associated and the remaining six were located in private houses. The three general outbreaks resulted in a total of 65 persons ill. One of these general outbreaks had 52 associated cases with a 31% hospitalisation rate This was notified in mid-July of 2007 in HSE-S. Results from the analytical study indicated a strong statistical association between illness and eating food from bakery X and/or eating food from outlets supplied by bakery X. Investigators concluded that it was not possible to definitively state how *Salmonella* Enteritidis was introduced to Bakery X. The bakery closed voluntarily. In the two smaller general outbreaks, one involved a crèche while the other was a more generalised community outbreak resulting in thirteen cases.

In 2007, there were nine campylobacteriosis outbreaks, eight family outbreaks and one general, resulting in 21 cases of illness. These were all small clusters of illness with no more than three people reported ill in any one outbreak.

Sixteen outbreaks of cryptosporidiosis were reported in 2007: six general outbreaks and ten family outbreaks. Three hundred and fifty eight people were reported ill as a result of these outbreaks. The suspected mode of transmission for nine outbreaks was person-to-person, and for three outbreaks, water was suspected to have played a role in transmission. The Galway outbreak of cryptosporidiosis had 304 laboratory confirmed cases associated. A preliminary report on the outbreak showed that it was primarily due to *C. hominis*. Cases were clustered in areas supplied by water treatment plants which used water from Lough Corrib. Boil water notices were issued for four water supplies in March

*Table 2. Number of general and family outbreaks of IID by pathogen, 2007*

| Disease | No General Outbreaks | No Family Outbreaks | Total No Outbreaks | No ill |
|---|---|---|---|---|
| Noroviral Infection | 107 | 4 | 111 | 3307 |
| Acute Infectious Gastroenteritis | 49 | 4 | 53 | 719 |
| Campylobacter infection | 1 | 8 | 9 | 21 |
| Clostridium difficile | 3 | 0 | 3 | 60 |
| Cryptosporidiosis | 6 | 10 | 16 | 358 |
| EHEC | 4 | 17 | 21 | 104 |
| Giardiasis | 0 | 3 | 3 | 4 |
| Hepatitis A (acute) | 0 | 3 | 3 | 6 |
| Norovirus & Rotavirus | 1 | 0 | 1 | 17 |
| Rotavirus | 4 | 3 | 7 | 30 |
| Salmonellosis | 3 | 7 | 10 | 85 |
| Trichinosis | 0 | 1 | 1 | 2 |
| **Total** | **178** | **60** | **238** | **4781** |

*Table 3. Non–IID outbreaks notified in 2007*

| Disease | Total No Outbreaks | No ill |
|---|---|---|
| Hepatitis B (acute & chronic) | 4 | 10 |
| Influenza | 1 | 13 |
| Measles | 3 | 13 |
| Meningococcal disease | 1 | 2 |
| MSSA (methicillin sensitive staph aureus) | 1 | 4 |
| Mumps | 3 | 10 |
| Outbreak | 1 | 20 |
| Suspected Scarlet Fever | 1 | 3 |
| Suspected Varicella | 1 | 4 |
| Tuberculosis | 2 | 25 |
| Varicella | 4 | 16 |
| **Total** | **22** | **120** |

2007 and were lifted in July and August 2007 following closure of two older plants and upgrading of two newer plants. No specific point source of contamination was identified.

Twenty-two outbreaks of non-IID/gastroenteric diseases were notified in 2007. Table 3 outlines the responsible pathogens and numbers ill. Tuberculosis was the most common cause of non-IID outbreaks notified. The most significant outbreak of tuberculosis reported in Ireland in recent years was notified by HSE South in March 2007. The outbreak resulted in 21 cases of tuberculosis (18 children and 3 adults) and involved two crèches. The vast majority of child cases were toddlers (children aged 2 to 3 years). A symptomatic crèche worker (index case) was diagnosed with sputum positive pulmonary TB in March 2007. This case had worked in two large crèches and worked primarily with toddler children at both locations. None of the 18 paediatric cases had BCG vaccination. The *M. tuberculosis* strain isolated from the index case was reported as being pan-sensitive.

Similar to previous years, person-to-person spread was the mode of transmission reported for the majority (49%) of outbreaks of IID in 2007 (n=117). Most of these outbreaks were due to norovirus/ suspect viral. Person-to-person was also cited in 14% of IID outbreaks (n=34) as a associated mode of transmission. Healthcare settings were the commonest location for outbreaks - 54.6% of all reported IID outbreaks occurred in hospitals and residential institutions. A further 22.2% occurred in private homes, 5.5 % occurred in hotels and 5.5% in crèches.

When the IID outbreaks are analysed by month of onset the majority occurred in the first three months of the year. This peak is attributable to the number of norovirus outbreaks that occurred at this time. This seasonality was also evident in 2006.

The information gathered from this National Outbreak Surveillance Systems 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.

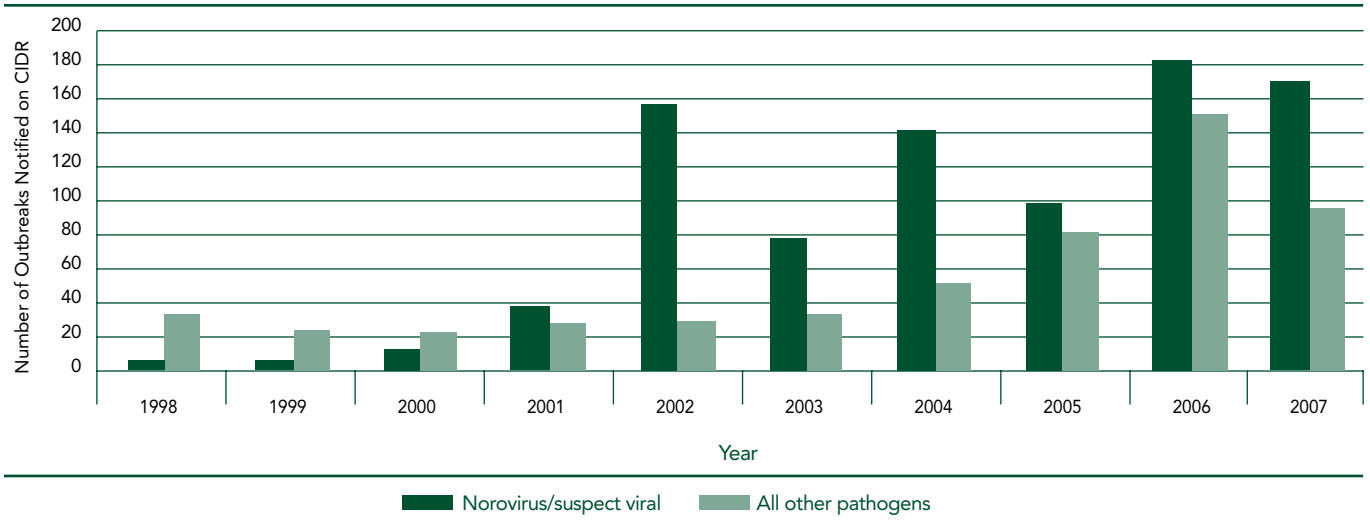



*Figure 1. Number of outbreaks by year and by pathogen, 1998-2007 (Data prior to 2001 provided by FSAI outbreak surveillance system)*

# 08

# Immunisation Uptake

# 8. Immunisation Uptake


## Summary

At 12 months uptake of:
$D_3$, $T_3$, $P_3$, $Hib_3$, $Polio_3$ and $MenC_3$ was 87%

At 24 months uptake of:
$D_3$, $T_3$, $P_3$, $Hib_3$ and $Polio_3$ was 92%
$MenC_3$ was 91%
$MMR_1$ was 87%


In 2007, each HSE Area provided HPSC with quarterly immunisation uptake data for their Area and for each of the Local Health Offices (LHOs) in their Area. HPSC collated these data and quarterly reports were produced which are available on the HPSC website. The annual immunisation uptake rates presented here represent the collation of the 2007 quarterly data. The proportion of children who completed the recommended childhood immunisation schedule by 12 months (born between 01/01/2006 and 31/12/2006) or 24 months (born between 01/01/2005 & 31/12/2005) of age in 2007 is reported.

The Irish childhood immunisation schedule during the years 2005-2007 recommended that babies 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 children were recommended to receive the first dose of the measles-mumps-rubella vaccine ($MMR_1$) and from September 18th 2006 a Hib booster ($Hib_b$) was recommended at the same time as $MMR_1$, this followed the national Hib campaign from November 2005 to May 2006 among children less than four years of age. A booster dose of DTaP/Polio was scheduled for children at four to five years of age, as was a second dose of MMR vaccine. A booster dose of tetanus and diphtheria was recommended for children at 11 to 14 years of age. To effectively control these vaccine preventable diseases at least 95% of children should complete the childhood immunisation schedule.

The immunisation uptake rates were reported by LHO for the first time in 2007. While there are 32 LHOs the immunisation uptake rates for the LHOs of North Lee and South Lee are reported as a combined figure.

*Table 1. Annual immunisation uptake rates by HSE Area for children 12 and 24 months of age in 2007*

| HSE Area | % Uptake at 12 months Cohort born 01/01/2006 - 31/12/2006 | | | | | | % Uptake at 24 months Cohort born 01/01/2005 - 31/12/2005 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $D_3$ | $P_3$ | $Hib_3$ | $Polio_3$ | $MenC_3$ | BCG | $D_3$ | $P_3$ | $Hib_3$ | $Hib_b$ | $Polio_3$ | $MenC_3$ | $MMR_1$ |
| **HSE-E** | 86 | 86 | 86 | 86 | 86 | na | 89 | 89 | 89 | 69 | 89 | 89 | 84 |
| **HSE-M** | 92 | 92 | 92 | 92 | 92 | 91 | 97 | 97 | 97 | 90 | 97 | 97 | 94 |
| **HSE-MW** | 89 | 89 | 89 | 89 | 89 | 97 | 92 | 92 | 92 | 85 | 92 | 92 | 90 |
| **HSE-NE** | 90 | 90 | 90 | 90 | 88 | na | 93 | 93 | 93 | 88 | 93 | 93 | 90 |
| **HSE-NW** | 92 | 92 | 91 | 92 | 90 | 94 | 97 | 97 | 95 | 87‡ | 97 | 93 | 92 |
| **HSE-SE** | 86 | 86 | 86 | 86 | 85 | 92 | 91 | 91 | 90 | 62‡ | 91 | 90 | 86 |
| **HSE-S** | 84 | 84 | 84 | 84 | 84 | 90* | 94 | 94 | 94 | 74 | 94 | 94 | 88 |
| **HSE-W** | 86 | 86 | 86 | 86 | 87 | na | 93 | 93 | 93 | 68‡ | 93 | 93 | 85 |
| **Ireland** | **87** | **87** | **87** | **87** | **87** | **93†** | **92** | **92** | **92** | **74‡** | **92** | **91** | **87** |

*Since $T_3$ uptake identical to $D_3$ uptake only $D_3$ uptake figures presented*
**HSE-S part coverage of neonatal BCG (i.e. Kerry only)*
*†Based on data from five of the eight HSE Areas*
*‡The 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 national $Hib_b$ figure also includes the HSE-SE data which are an underestimate due to data extraction methods*

**Immunisation uptake rates at 12 months**
National immunisation uptake rates for $D_3$, $T_3$, $P_3$, $Hib_3$, $Polio_3$ and $MenC_3$ in children 12 months of age in 2007 were 87%. Compared to 2006 this was an improvement of one percent for $D_3$, $T_3$, $P_3$, $Hib_3$ and $Polio_3$ uptake and an improvement of two percent for $MenC_3$ uptake.

Uptake rates for $D_3$, $T_3$, $P_3$, $Hib_3$, $Polio_3$ and $MenC_3$ ranged from 84% in the HSE-S to 92% in the HSE-M (table 1). Three HSE Areas had uptake rates of ≥90% for $D_3$, $T_3$, $P_3$, $Hib_3$ and $Polio_3$ while two had uptake rates of ≥90% for $MenC_3$ (table 1).

Among the LHOs, uptake rates for $D_3$, $T_3$, $P_3$, $Hib_3$ and $Polio_3$ ranged from 79% to 93% and the uptake rate for $MenC_3$ ranged from 79% to 94%. Ten of the LHOs had uptake rates of ≥90% for $D_3$, $T_3$, $P_3$, $Hib_3$ and $Polio_3$ while eight had uptake rates of ≥90% for $MenC_3$.

BCG uptake data were available from five of the eight HSE Areas (table 1). These five areas represent approximately a third of the national birth cohort. Where data were available national BCG uptake was 93% in 2007, unchanged compared to 2006. Among the 12 LHOs that reported BCG data, uptake rates ranged from 90% to 98%. The target uptake rate of 95% was reached or exceeded in three of the 12 LHOs.

**Immunisation uptake rates at 24 months**
National immunisation uptake rates, in children 24 months of age in 2007, for $D_3$, $T_3$, $P_3$, $Hib_3$ and $Polio_3$ were 92% and 91% for $MenC_3$. Compared with 2006 the uptake rates for these vaccines increased by one percent in 2007 (figure 1).

Uptake of $D_3$, $T_3$, $P_3$, $Hib_3$, $Polio_3$ and $MenC_3$ ranged from 89% in the HSE-E to 97% in the HSE-M (table 1). Seven HSE Areas had uptake rates of ≥90% for these vaccines (table 1). The target uptake of 95% was reached or exceeded for $D_3$, $T_3$, $P_3$, $Hib_3$, $Polio_3$ and $MenC_3$ in the HSE-M and for $D_3$, $T_3$, $P_3$, $Hib_3$ and $Polio_3$ in the HSE-NW during 2007 (table 1).

Among the LHOs, uptake rates for $D_3$, $T_3$, $P_3$, $Hib_3$, $Polio_3$ and $MenC_3$ ranged from 82% to 98%. $D_3$ immunisation uptake rates, in those 24 months of age in 2007, are mapped by LHO in figure 2a. Only nine of the LHOs reached/exceeded the target uptake rate of 95% for $D_3$ (figure 2a), $P_3$, $T_3$ and $Polio_3$. Only eight LHOs reached/exceeded the target uptake rate of 95% for $Hib_3$ and

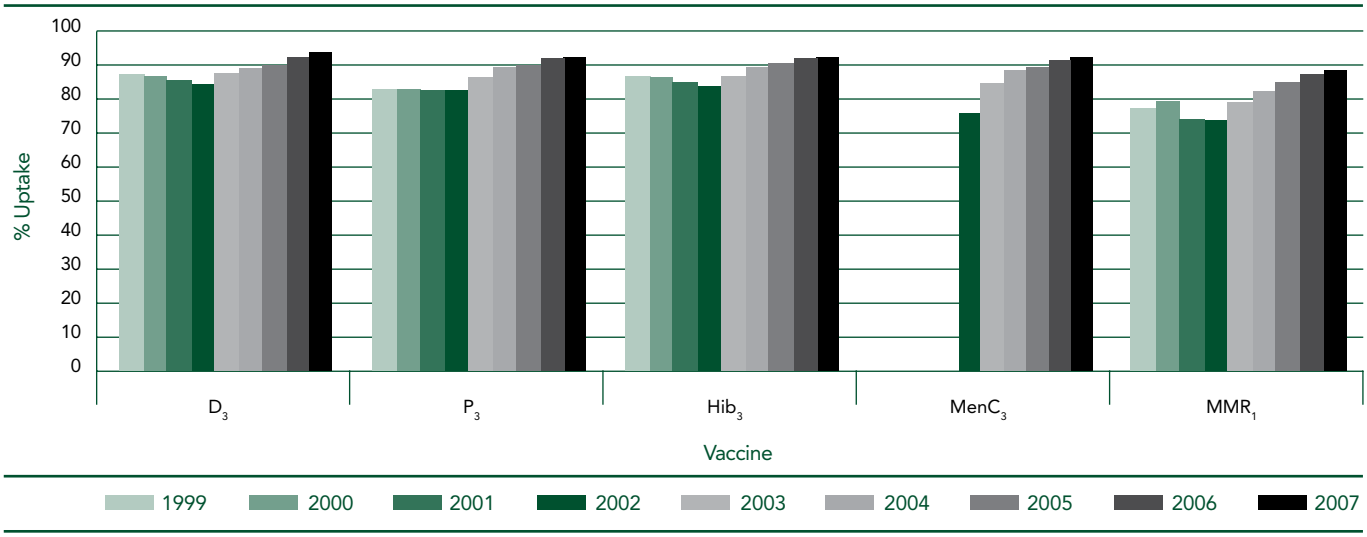



*Figure 1. National annual immunisation uptake rates at 24 months, 1999-2007*

*Since $T_3$ uptake identical to $D_3$ uptake only $D_3$ uptake figures presented and since $Polio_3$ uptake almost identical to $Hib_3$ uptake only $Hib_3$ figures presented.*
*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 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.*

only five reached/exceeded the target for $MenC_3$.

During 2007 $MMR_1$ uptake was 87% nationally; an increase of one percent when compared to 2006 (figure 1). In 2007, uptake rates for $MMR_1$ ranged from 84% in the HSE-E to 94% in the HSE-M with just four HSE Areas reporting uptake of ≥90% (table 1). None of the HSE Areas achieved the target uptake of 95% for $MMR_1$ for all of 2007; however, in Quarter 1 and Quarter 3 2007 $MMR_1$ uptake was 95% in the HSE-M.

Among the LHOs, uptake rates for $MMR_1$ ranged from 76% to 95%. Fourteen LHOs had uptake rates of ≥90%; however, only one reached the target uptake of 95% (figure 2b).

$Hib_b$ national uptake statistics were reported for the first time in 2007. These figures relate to children who received a dose of Hib after 12 months of age. In 2007 national uptake of $Hib_b$, in those 24 months of age, was 74% (table 1). However, the $Hib_b$ 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 figure also includes the HSE-SE data which are an underestimate due to data extraction methods.

Further improvements in uptake are necessary so that the 95% target rate is achieved nationally for all vaccines. In 2007, national uptake rates at 24 months for $D_3$, $T_3$, $P_3$, $Hib_3$, $Polio_3$ and $MenC_3$ were three to four percent below the target rate while $MMR_1$ was eight percent below the target rate.

A new routine childhood immunisation programme is effective from September 1st 2008. Changes include the addition of pneumococcal vaccine and hepatitis B vaccine and a change in the recommended age of Hib booster and MenC vaccine.

The 2007 immunisation uptake rates for each LHO are presented in tables in a separate report. This LHO report and the immunisation reports for Quarters 1 to 4 2007 are available on the HPSC website www.hpsc.ie in *Topics A-Z* under the heading vaccination.

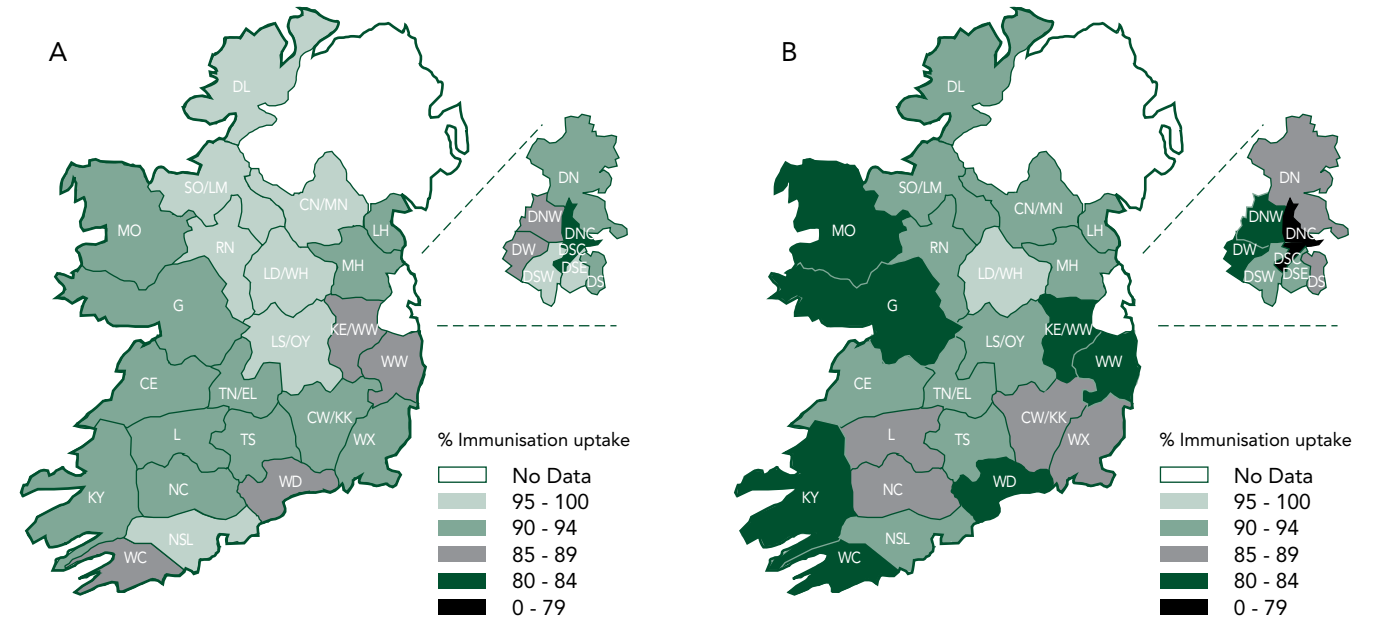



*Figure 2. $D_3$ (A) and $MMR_1$ (B) immunisation uptake rates (%) by Local Health Office (LHO) in those 24 months of age in 2007*
*LHOs in Dublin are highlighted separately for ease of viewing*
*North Lee and South Lee are separate LHOs, however, their combined (labelled NSL on the map) immunisation uptake rates are reported here*

# 09

# Antimicrobial Consumption and Resistance

# 9.1 Antimicrobial Consumption


## Summary

Outpatient antibiotic consumption, 2007: 22.5 DID
Outpatient antibiotic consumption, 2006: 21.1 DID
Median hospital antibiotic consumption, 2007: 80.6 DBD
Median hospital antibiotic consumption, 2006: 78.7 DBD


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

**Outpatient Antibiotic Consumption**

The overall outpatient antibiotic consumption for Ireland in 2007 was 22.5 DID, a rise from the previous year's rate of 21.1 DID, and has been rising steadily at 3% per year since 2000. In an ESAC report of outpatient antibiotic consumption from 29 EU countries with reliable data for 2005, the range of outpatient antibiotic usage was 9.2 DID (Russian Federation) to 34.7 DID (Greece). The median for all countries was 18.1 DID. Outpatient antibiotic usage in Ireland has been around 19 - 23 DID over the last five years. Thus the overall rate in Ireland is mid-to-high in Europe. Furthermore, the ESAC report also highlighted that Ireland is one of only four countries where the trend in consumption is increasing, while six of the remaining 25 countries showed a decrease in usage.

In Ireland in 2007, outpatient consumption of penicillins accounted for the largest class used (50% of total at 11.3 DID), followed by macrolides (18%, 4.0 DID), tetracyclines (14%, 3.3 DID), cephalosporins (9%, 1.9 DID), quinolones (5%, 1.0 DID) and sulphonamides (4%,

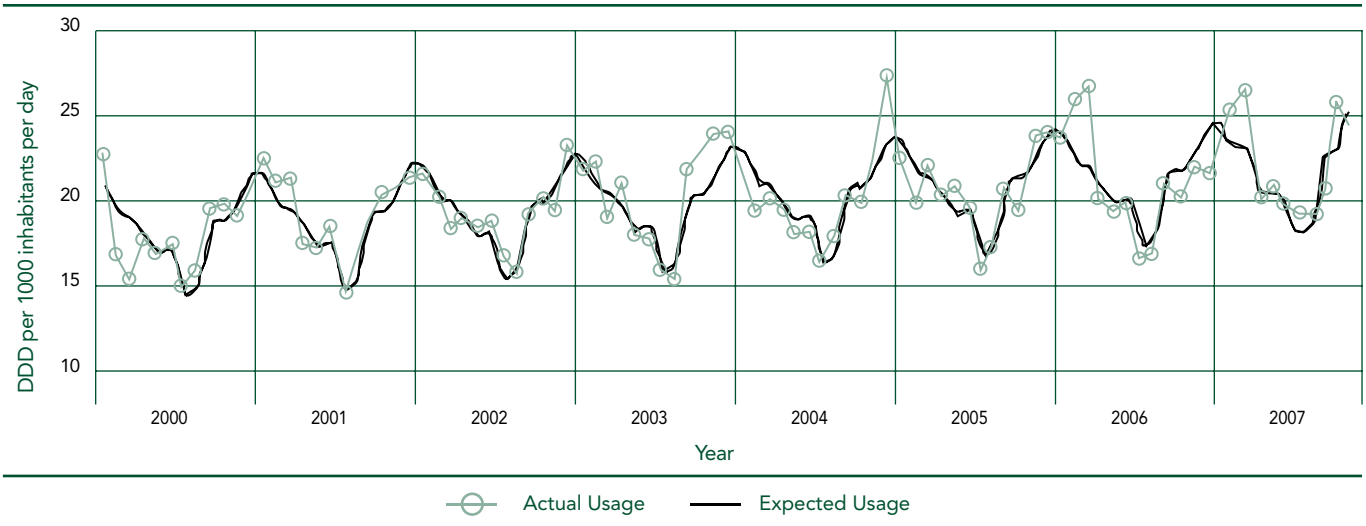



*Figure 1. Outpatient antibiotic consumption in Ireland by month, 2000-2007*

0.9 DID). Other antibiotic classes accounted for about 1% of total use.

Penicillin in combination with beta-lactamase inhibitor (such as co-amoxiclav) accounted for the largest proportion of penicillins and showed a dramatic rise over last seven years (3.2 DID in 2000 to 5.5 DID in 2007). Broad-spectrum penicillin (such as ampicillin and amoxicillin) usage was stable but high (3.5 DID).

There was considerable variability in the overall outpatient antibiotic usage at county level (18.5 to 28.9 DID) as shown in figure 2. Furthermore, analysis of Primary Care Reimbursement data showed that those entitled to reimbursement (representing 30% of the population) are prescribed about 55% of the antibiotics in terms of cost.

Seasonal fluctuation (26% rise in DID from summer to winter, figure 1) has been seen every year in outpatient antibiotic consumption and is probably related to over-prescribing of antibiotics for respiratory tract infections in winter months. In an analysis of recent Irish data, it was shown that outpatient antibiotic use is strongly associated with seasonal influenza activity.

The consistently increasing trend in outpatient antibiotic usage may lead to Ireland having among the highest rates of usage in Europe. Furthermore, strong seasonal fluctuations, over-reliance on broad-spectrum antibiotics and high density usage in some regions are factors that may work together to increase the pressure for selection of resistant variants of bacterial pathogens.

**Hospital Antibiotic Consumption**

Data for hospital antibiotic consumption for 2006 and 2007 were published by named institution for the first time in April 2008. That publication was also the first time accurate acute in-patient antibiotic usage statistics were calculated, whereas in previous publications about 10% of the volume of antibiotics included in hospital antibiotic usage analyses was accounted for by non-acute or outpatient use.

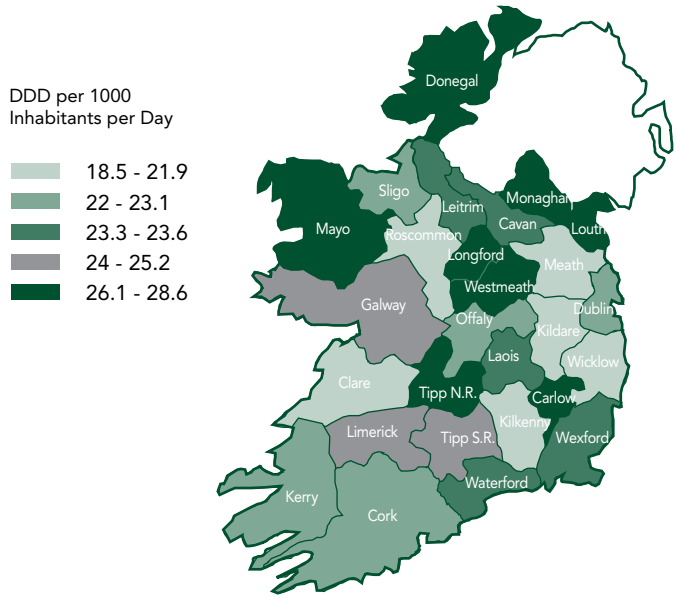



*Figure 2. Outpatient antibiotic consumption in Ireland by county, 2007.*

Thirty-five public acute hospitals provided valid antibiotic usage data for 2007. The median rate of antibiotic consumption usage was 80.6 DBD (range 17.1 – 120.0 DBD). This was a rise from the previous year's rate of 78.7 DBD. These levels are again mid-to-high in Europe.

Hospital function was the main driver for the differences in the rates of antibiotic consumption between hospitals. The rates for regional/tertiary and general hospitals (medians 81.9 and 88.2 DBD) centred just above the median for Ireland, while the rate for single specialist facilities (maternity, orthopaedic or paediatric) was much lower (median 54.2 DBD), though with a wider range (17.1 – 80.3). The lower median consumption in single speciality hospitals probably reflects differences in case mix, compared to other hospitals, but may also reflect the fact that DDDs are based on adult dosing and may therefore underestimate antibiotic consumption in paediatric settings. Differences in percentage injectable antibiotics over total (median 42.5%, range 23.8% – 62.2%), which is a measure of patient acuity, also reflected the category of hospital.

There was an increase in the consumption of some "high risk" antibiotics (fluoroquinolones and penicillins such as co-amoxiclav) and reserved antibiotics (vancomycin and teicoplanin) in 2007 as shown in table 1. This is one area where antibiotic stewardship programmes would help to limit the spread and development of drug-resistant organisms that can cause healthcare-associated infections.

*Table 1. Key antibiotics and antibiotic groups, and the average consumption rate among all hospitals in DBD for 2007 compared with 2006. Also shown is the percentage change in consumption.*

| Antibiotic | 2006 | 2007 | Change |
|---|---|---|---|
| Penicillin with beta-lactamase inhibitor | 19.40 | 20.62 | 6% |
| Other Penicillins | 16.25 | 17.23 | 6% |
| First-generation cephalosporins | 0.34 | 0.35 | 4% |
| Second-generation cephalosporins | 2.91 | 2.65 | -10% |
| Third-generation cephalosporins | 1.90 | 1.75 | -8% |
| Macrolides | 10.70 | 10.62 | -1% |
| Fluoroquinolones | 9.56 | 10.44 | 8% |
| Clindamycin | 0.46 | 0.50 | 8% |
| Oral Vancomycin | 0.01 | 0.02 | 45% |
| Injectable Vancomycin | 1.10 | 1.39 | 21% |
| Teicoplanin | 1.29 | 1.38 | 6% |

The detailed breakdown of antibiotic consumption for 2006 and 2007 by individual hospital may be found at www.hpsc.ie in the "Publications" subsection, under "Healthcare Associated Infections". The figures presented in this report may vary from previously published levels owing to methodological changes. More detailed analyses of antibiotic usage data can be found on the www.hpsc.ie website, through "Topics A-Z", under "ESAC".

EU Network: ESAC  www.esac.ua.ac.be

# 9.2 Antimicrobial Resistance

## Summary

- There were 1,394 reports of *S. aureus* bacteraemia submitted to the European Antimicrobial Resistance Surveillance System (EARSS), of which 537 (38.5%) were meticillin-resistant *S. aureus* (MRSA). This represents a decrease {bordering on statistical significance} from 41.9% reported in 2006. Overall, the number of MRSA reports was down by 9.3% from 592 in 2006

  For acute public hospitals only, the rate (and corresponding proportion) of MRSA bacteraemia was 0.14 per 1,000 patient bed days used (39.3%), a decrease from 0.15 per 1,000 patient bed days used (42.5%) in 2006

  There was one report of vancomycin-intermediate *S. aureus* (VISA)

- There were 438 reports of invasive *S. pneumoniae* infection, an increase of almost 8% from 407 in 2006. The national rate of invasive infection was 10.5 per 100,000 population compared to 9.8 in 2006

  The proportion of penicillin-non-susceptible *S. pneumoniae* (PNSP) has increased significantly over the past 3 years from 10.3% in 2004 to 17.4% in 2007; the proportion of isolates with high-level resistance to penicillin increased significantly from 2.9% in 2006 to 5.7% in 2007

  A pilot project for serotyping pneumococci was established in 2007. Overall, serotype data were available on 238 isolates and results indicate good coverage for both the 23-valent polysaccharide (PPV23) and 7-valent conjugate (PCV7) vaccines in their target populations: 86% (adults ≥65 years) and 88% (children <2 years), respectively

- There were 332 reports of *E. faecium* bacteraemia, an increase of 25% from 265 in 2006. The proportions that were vancomycin-resistant *E. faecium* (VREfm) and multi-drug resistant (MDR) decreased from 37.1% and 25.6% to 33.5% and 22.3%, respectively. The number of VREfm isolates, however, increased by about 13% from 98 to 111 over the same period

- There were 1,784 reports of invasive *E. coli* infection, an increase of almost 8% from 1,656 reports in 2006. Resistance to gentamicin and third-generation cephalosporins (3GCs) and extended-spectrum beta-lactamase (ESBL)-production increased significantly in 2007. Ciprofloxacin resistance increased only marginally but the overall trend was still upwards. MDR *E. coli* increased from 9.0% in 2006 to 11.4% in 2007

- Resistance to most antibiotics increased for invasive *K. pneumoniae* and *P. aeruginosa* infections with MDR isolates accounting for 11.9% and 12.5%, respectively

- See http://www.hpsc.ie for further details of EARSS and antimicrobial resistance in Ireland, including quarterly and annual reports and more detailed slide presentations on the 2007 EARSS data for each of the pathogens under surveillance

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

**Introduction**

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

***Staphylococcus aureus***

There were 1,394 reports of *S. aureus* bacteraemia from 1,331 patients, of which 537 (38.5%) were meticillin-resistant *S. aureus* (MRSA) (table 1). This represents the lowest annual proportion since surveillance began in 1999. In 2006, the proportion was 41.9%. The decrease observed in 2007 was bordering on significance ($Chi^2$=3.4, P=0.07). The proportion of MRSA in Ireland had been stable at approximately 42% for the previous four years (figure 1). Overall, there was a 9.1% decrease in the number of MRSA bacteraemia reports compared with 2006 (n=592), however the total overall number of *S. aureus* bacteraemia reports remained at about the same level (1,412 in 2006 vs. 1,394 in 2007). Despite the decrease in numbers and proportion of MRSA, Ireland still had one of the highest proportions of MRSA in Europe in 2007 (see http://www.rivm.nl/earss/database/ for European data, including EARSS maps). One MRSA isolate with reduced susceptibility to vancomycin was detected at the National MRSA Reference Laboratory by the Etest® macromethod with a value of 12mg/L. This isolate also had a vancomycin minimum inhibitory concentration (MIC) of 4mg/L, by which it was classified as vancomycin-intermediate *S. aureus* (VISA) according to the latest CLSI guidelines. The isolate was shown to be hetero-VISA by Population Analysis Profiling.

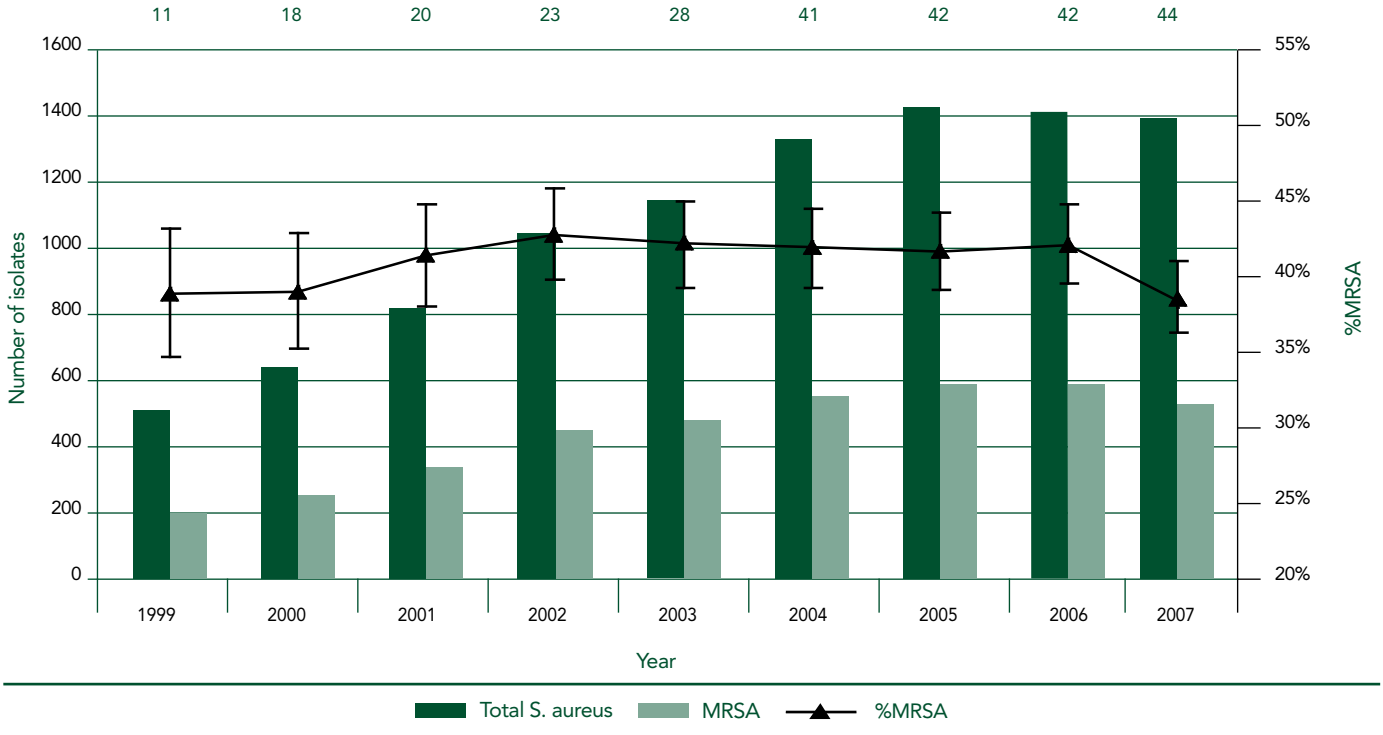



*Figure 1. Trends for S. aureus – total numbers of S. aureus/MRSA and percentage MRSA with 95% confidence intervals. The numbers of participating laboratories by year-end are indicated above the bars*

*Table 1. Summary of EARSS data by pathogen and year*

| Pathogen | Year 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|
| Number laboratories by year-end | 12 | 19 | 20 | 23 | 28 | 41 | 42 | 42 | 44 |
| *S. aureus* | | | | | | | | | |
| Number of isolates | 510 | 639 | 815 | 1042 | 1140 | 1323 | 1424 | 1412 | 1394 |
| Number Meticillin-R (or MRSA) | 198 | 249 | 337 | 445 | 480 | 553 | 592 | 592 | 537 |
| Meticillin-R (or MRSA) | 38.8% | 39.0% | 41.3% | 42.7% | 42.1% | 41.8% | 41.6% | 41.9% | 38.5% |
| Number VISA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 |
| VISA* | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.1% | 0.1% |
| *S. pneumoniae* | | | | | | | | | |
| Number of isolates | 157 | 201 | 245 | 278 | 364 | 400 | 401 | 407 | 438 |
| Penicillin-NS | 19.1% | 13.4% | 12.2% | 11.5% | 11.8% | 10.3% | 11.7% | 15.7% | 17.4% |
| of which: HLR | 0.0% | 3.5% | 1.6% | 1.4% | 2.2% | 1.8% | 3.0% | 2.9% | 5.7% |
| Int | 16.6% | 8.5% | 10.6% | 9.7% | 8.8% | 7.0% | 8.7% | 12.5% | 11.0% |
| Erythromycin-R* | 14.0% | 12.0% | 12.5% | 12.7% | 11.6% | 14.4% | 12.1% | 16.1% | 16.4% |
| Number laboratories by year-end | | | | 21 | 27 | 40 | 41 | 42 | 44 |
| *E. faecalis* | | | | | | | | | |
| Number of isolates | No data | No data | No data | 168 | 218 | 242 | 290 | 294 | 281 |
| Ampicillin-R* | | | | 8.1% | 5.1% | 0.8% | 3.5% | 4.5% | 2.2% |
| Vancomycin-R | | | | 2.4% | 1.4% | 1.3% | 2.5% | 3.7% | 2.8% |
| HLG-R* | | | | 38.5% | 33.9% | 41.3% | 43.1% | 42.4% | 37.2% |
| *E. faecium* | | | | | | | | | |
| Number of isolates | No data | No data | No data | 85 | 135 | 187 | 224 | 265 | 332 |
| Ampicillin-R* | | | | 88.9% | 91.0% | 95.7% | 92.3% | 93.9% | 93.1% |
| Vancomycin-R | | | | 11.1% | 19.4% | 23.2% | 31.7% | 37.1% | 33.5% |
| HLG-R* | | | | 16.7% | 53.8% | 58.0% | 51.4% | 44.3% | 34.9% |
| MDR* | | | | 3.7% | 11.4% | 18.5% | 25.6% | 25.6% | 22.3% |
| *E. coli* | | | | | | | | | |
| Number of isolates | No data | No data | No data | 741 | 991 | 1256 | 1445 | 1656 | 1784 |
| Ampicillin-R* | | | | 62.2% | 61.9% | 65.0% | 67.6% | 70.7% | 68.3% |
| 3GC-R* | | | | 3.0% | 2.4% | 2.4% | 4.1% | 4.1% | 6.7% |
| Ciprofloxacin-R* | | | | 5.4% | 9.5% | 12.6% | 17.3% | 21.5% | 22.1% |
| Gentamicin-R* | | | | 2.7% | 3.9% | 5.7% | 8.5% | 7.7% | 9.9% |
| ESBL-producers* | | | | 1.2% | 1.3% | 1.1% | 2.4% | 2.5% | 4.1% |
| MDR* | | | | 2.4% | 3.8% | 5.6% | 7.7% | 9.0% | 11.4% |
| Number laboratories by year-end | | | | | | | | 36 | 39 |
| *K. pneumoniae* | | | | | | | | | |
| Number of isolates | No data | No data | No data | No data | No data | No data | No data | 217 | 244 |
| Ampicillin-R* | | | | | | | | 97.7% | 99.2% |
| 3GC-R* | | | | | | | | 10.2% | 9.9% |
| Ciprofloxacin-R* | | | | | | | | 15.3% | 18.1% |
| Gentamicin-R* | | | | | | | | 7.8% | 9.9% |
| Imipenem/meropenem-R* | | | | | | | | 0.0% | 0.6% |
| ESBL-producers* | | | | | | | | 8.6% | 3.7% |
| MDR* | | | | | | | | 11.2% | 11.9% |
| *P. aeruginosa* | | | | | | | | | |
| Number of isolates | No data | No data | No data | No data | No data | No data | No data | 128 | 177 |
| Pipericillin/tazobactam-R* | | | | | | | | 10.2% | 13.2% |
| Ceftazidime-R* | | | | | | | | 10.6% | 11.8% |
| Imipenem/meropenem-R* | | | | | | | | 11.8% | 12.2% |
| Ciprofloxacin-R* | | | | | | | | 18.0% | 22.9% |
| Gentamicin-R* | | | | | | | | 10.2% | 13.3% |
| MDR* | | | | | | | | 9.5% | 12.5% |

*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 and cefpodoxime); ESBL, Extended-Spectrum Beta-Lactamase; MDR, Multi-Drug Resistant*
** Not all isolates tested*

The MRSA rate for acute public hospitals only was 0.14 per 1,000 patient bed days used (calculated using acute public hospital activity data from the National Hospitals Office at the Health Services Executive). The corresponding MRSA proportion was 39.3% (527 of 1,340 isolates). Both the MRSA rate and proportion for acute public hospitals decreased from 0.15 per 1,000 patient days and 42.5% observed in 2006.

In patients with laboratory-confirmed *S. aureus* bacteraemia, the probability that the infecting organism was MRSA as compared to meticillin-susceptible *S. aureus* (MSSA) was almost 2-times greater in patients aged ≥65years than in those aged <65 years (RR=1.98, $Chi^2$=96.4, P<0.0001).

Males were approximately 1.8-times more likely to get an invasive *S. aureus* infection (1.5-times for MRSA, z=4.3, P<0.0001; 2.1-times for MSSA, z=11.0, P<0.0001) than females (z=11.2, P<0.0001). The frequency of invasive *S. aureus* infection increased with age, with the majority of infections (n=978; 70%) occurring in adults over 50 years. The median age for patients with an MRSA infection was 71 years (95%CI, 70-72) while the median age for patients with MSSA was 58 years (95%CI, 56-60). This was considered to be a significant difference as the confidence intervals did not overlap.

***Streptococcus pneumoniae***

There were 438 reports of invasive *S. pneumoniae* infection (423 from blood and 15 from CSF) from 435 patients, an increase of 7.6% from 407 reports in 2006. 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 17.4% (n=76) of all isolates in 2007. The proportion of PNSP in Ireland has increased significantly over the past four years from 10.3% in 2004 ($Chi^2_{trend}$=11.1, P=0.0008) (figure 2). The proportion of isolates with high-level resistance (HLR) to penicillin increased from 2.9% in 2006 to 5.7% in 2007 but this was only borderline significant ($Chi^2$=3.8, P=0.05). Sixty-six (16.4%) of 403 isolates were resistant to erythromycin, which compares with 16.1% in 2006. In 2007, moderately high levels of PNSP and erythromycin resistance were seen in Ireland, similar to the situation observed in much of Southern and Central Europe. More notably, Ireland had one of the highest levels of HLR to penicillin in Europe.

Of the 76 PNSP isolates, 48 were intermediately-resistant (Int; MIC=0.1-1.0mg/L) and 25 were HLR (MIC >1.0mg/L) to penicillin. No penicillin MICs were available for three non-susceptible (NS) isolates.

Of isolates tested against both penicillin and erythromycin (n=403), 32 (7.9%) were simultaneously PNSP (22 Int, 9 HLR, 1 NS) and erythromycin-resistant in 2007 compared with 7.4% in 2006.

Prior to the introduction of the 7-valent pneumococcal conjugate vaccine (PCV7) into the childhood immunisation schedule in September 2008, a national pilot project was established early in 2007 as a result of a collaborative initiative between RCSI/Beaumont Hospital, Children's University Hospital, Temple St and HPSC with the aim of providing baseline serotyping data on invasive *S. pneumoniae* isolates. Serotype data were available on 219 pneumococcal isolates from 26 laboratories (of 33 that reported pneumococcal isolates to EARSS in 2007) representing 81% of all pneumococcal isolates reported to EARSS, Quarters (Q) 2-4 2007. Serotype data were available on an additional 19 isolates from Q1. Overall for 2007, 203 (85%) and 113 (48%) of 238 isolates belonged to serotypes

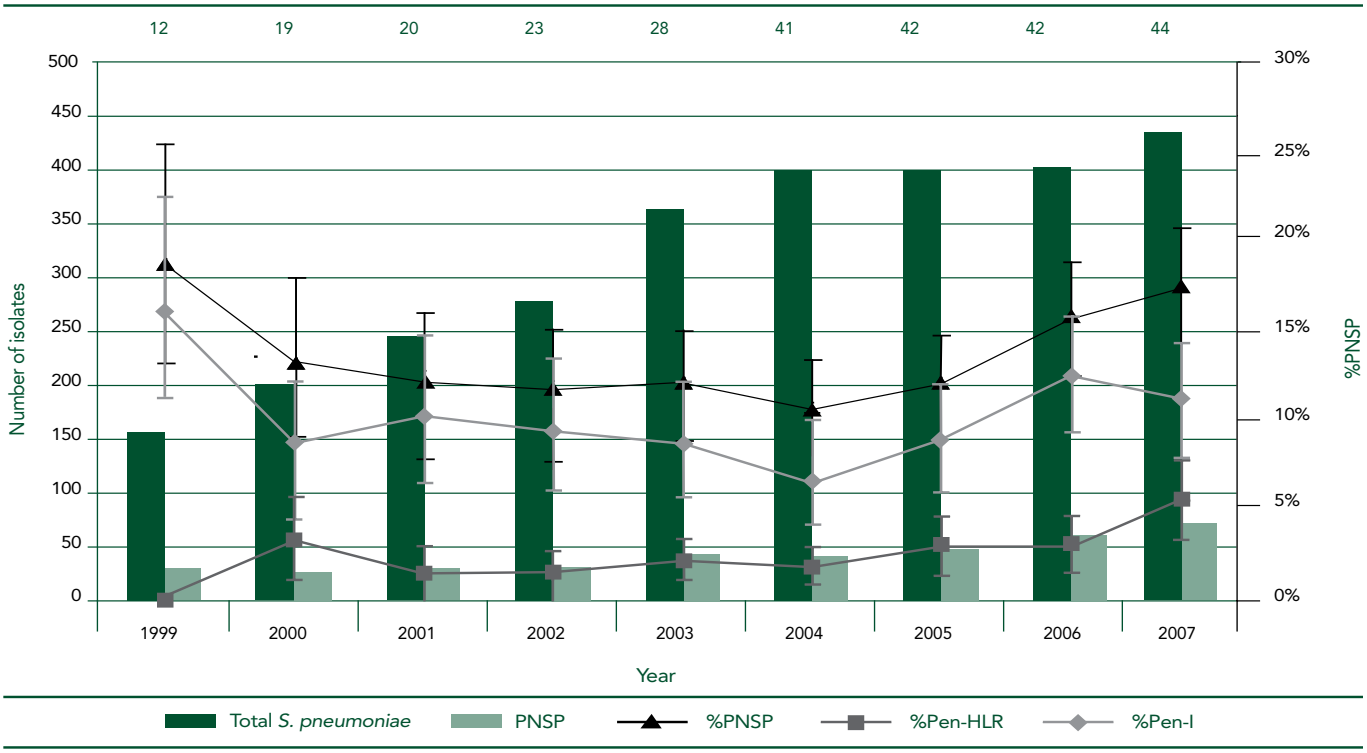



*Figure 2. Trends for S. pneumoniae – total numbers of S. pneumoniae/PNSP and percentage PNSP with 95% confidence intervals. The numbers of participating laboratories by year-end are indicated above the bars*

covered by the pneumococcal polysaccharide (PPV23; target population: adults ≥65 years and at risk groups) and conjugate (PCV7; target population: children <2 years) vaccines, respectively. From adults ≥65 years, 80 of 93 (86%) isolates would be covered by PPV23, while from children <2 years, 23 of 26 (88%) isolates would be covered by PCV7. Of the 39 PNSP isolates, 16 of 17 (94%) from adults ≥65 years were covered by PPV23 while all four (100%) were from children <2 years were covered by PCV7.

The rate of invasive pneumococcal disease (IPD) in Ireland in 2007 was estimated to be 10.5 per 100,000 population compared with 9.8 in 2006 (note: both calculated using the 2006 census data and adjusted for the estimated population coverage by EARSS for that year). The highest rates of IPD were observed in children <1 year (37.7 per 100,000) and adults aged 75-79 years (48.7) and adults >80 years (72.6).

Males were approximately 1.3-times more likely to have an invasive *S. pneumoniae* infection [1.6-times for PNSP, z=2.0, P=0.04; 1.2-times for penicillin-susceptible *S. pneumoniae* (PSP), z=1.8, P=0.07] than females (z=2.5, P=0.02). Although these findings were significant for *S. pneumoniae* overall, they were at best approaching borderline significance for PNSP and PSP. The frequency of invasive *S. pneumoniae* infection was highest in children aged <1 year (n=23; 5.3% of all reported isolates) and 1-4 years (n=43, 9.8%) and in adults aged ≥65 years (n=196; 45%). The median age was 62 years (95%CI, 58-64).

***Enterococcus faecalis***

There were 281 reports of *E. faecalis* bacteraemia from 274 patients, a decrease from 294 reports in 2006. See table 1 for the annual proportions of *E. faecalis* isolates resistant to the three "indicator" antibiotics (ampicillin, vancomycin and high-level gentamicin) by year since 2002 when surveillance began. Vancomycin-resistant *E. faecalis* (VREfa) accounted for 2.8% of isolates. Although this proportion was low, Ireland still had one of the highest proportions of VREfa in Europe in 2007.

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

Males were approximately 1.3-times more likely to have an invasive *E. faecalis* infection than females but this was only of borderline significance (z=1.9, P=0.05). The frequency of invasive *E. faecalis* infection increased with age with the majority of infections (n=216; 77%) occurring in adults over 50 years. The median age was 68 years (95%CI, 64-71).

***Enterococcus faecium***

There were 332 reports of *E. faecium* bacteraemia from 324 patients, of which 33.5% were vancomycin-resistant *E. faecium* (VREfm). This represents a decrease from 37.1% in 2006. See table 1 for the annual proportions of *E. faecium* isolates resistant to the three "indicator" antibiotics (as for *E. faecalis* above) by year since 2002. Between 2002 and 2006, the proportion of isolates that was VREfm increased significantly ($Chi^2_{trend}$=30.0; P<0.0001) (figure 3). In 2007, Ireland had the second highest proportion of VREfm in Europe after Greece (37.7%). In contrast to the proportion, the total number of VREfm isolates increased by about 13% from 98 in 2006 to 111 in 2007.

Of 296 isolates tested against all three "indicator" antibiotics, 66 (22.3%) were resistant to all three and therefore classed as multi-drug resistant (MDR). This represents a decrease from 25.6% in 2006. In contrast

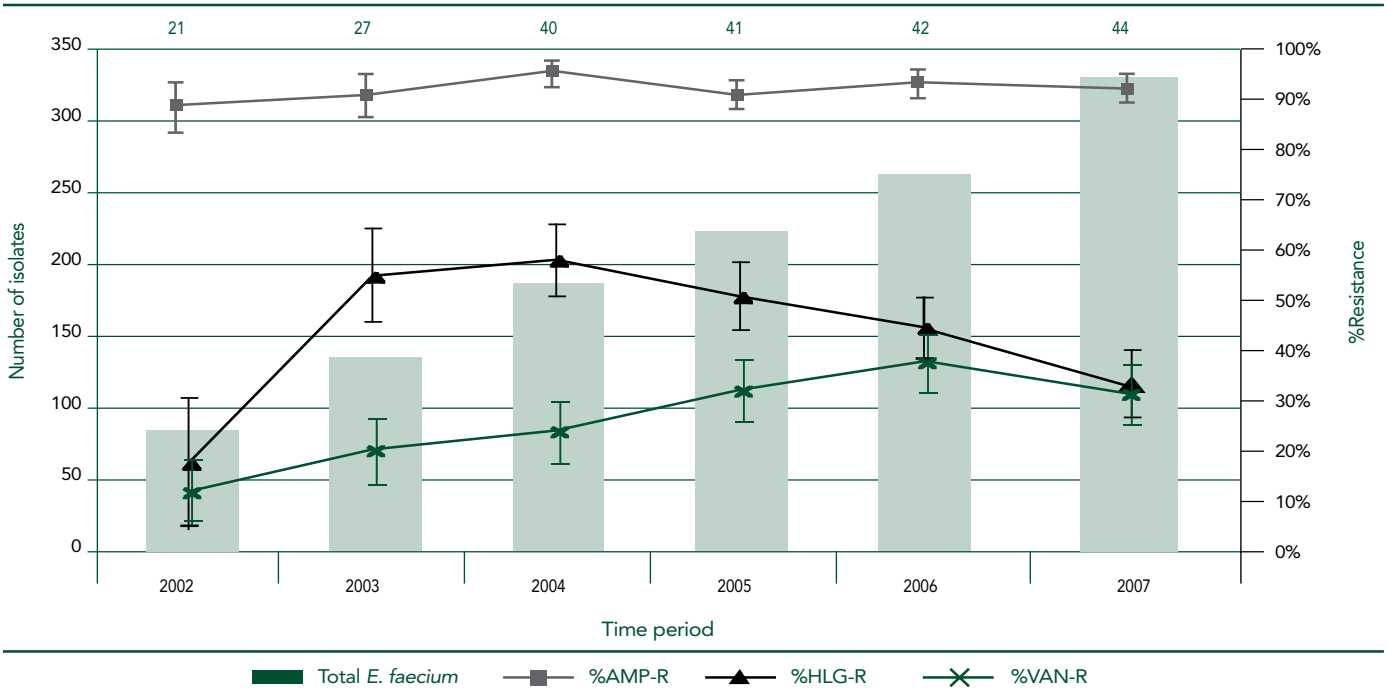



*Figure 3. Trends for E. faecium – total numbers of E. faecium and percentage resistance to ampicillin (AMP), high-level gentamicin (HLG) and vancomycin (VAN) with 95% confidence intervals.*
*The numbers of participating laboratories by year-end are indicated above the bars*

to the proportion, the total number of MDR isolates increased from 63 in 2006 to 66 in 2007.

Males were approximately 1.6-times more likely to have an invasive *E. faecium* infection than females (z=3.0, P=0.0001). The frequency of invasive *E. faecium* infection increased with age with the majority of infections (n=271; 82%) occurring in adults over 50 years. The median age was 65 years (95%CI, 63-68).

***Escherichia coli***

There were 1,784 reports of invasive *E. coli* infection (1,782 from blood and 2 from CSF) from 1,749 patients, an increase of 7.7% from 1,656 reports in 2006. See table 1 for the proportion of *E. coli* isolates resistant to the four "indicator" antibiotics/antibiotic classes [ampicillin, third-generation cephalosporins (3GCs; cefotaxime, ceftriaxone, ceftazidime or cefpodoxime), fluoroquinolones (ciprofloxacin or ofloxacin) and aminoglycosides (gentamicin or tobramycin)] by year since 2002. Ciprofloxacin resistance increased marginally from 21.5% in 2006 to 22.1% in 2007 (non-significant; $Chi^2$ =0.18, P=0.67). Looking at the overall trend, the proportion of ciprofloxacin resistant isolates has increased significantly since 2002 ($Chi^2_{trend}$=178.6, P<0.0001) (figure 4), although the rate of increase appeared to have slowed down in 2007. The proportions of isolates with resistance to 3GCs and gentamicin increased significantly from 4.1% and 7.7% in 2006 to 6.7% ($Chi^2$ =11.6, P=0.0007) and 9.9% ($Chi^2$ =5.2, P=0.02), respectively, in 2007. Resistance to 3GCs, ciprofloxacin and gentamicin in *E. coli* isolates have been increasing throughout most of Europe in recent years. In 2007, ciprofloxacin resistance was at moderately high levels in Ireland compared to other European countries while resistance to 3GCs and gentamicin were both moderately low.

Extended spectrum beta-lactamases (ESBLs) were detected in 68 (4.1%) of 1,669 isolates tested. This represents a significant increase from 2.5% in 2006 ($Chi^2$ =5.7, P=0.02). ESBLs are enzymes that confer resistance to most penicillins and cephalosporins (including 3GCs). ESBL-producing bacteria (including *K. pneumoniae* and, increasingly, *E. coli*) are often resistant to other classes of antibiotics and have emerged as important causes of infections in hospitals.

Of 1,751 isolates tested against all four "indicator" antibiotics, 199 (11.4%) were identified as MDR (defined as resistance to three or more of these), including 34 with resistance to all four. The proportion of isolates that are MDR has increased significantly ($Chi^2_{trend}$ =94.1, P<0.0001) from 2.4% in 2002 when surveillance began.

Females were approximately 1.3-times more likely to have an invasive *E. coli* infection than males (z=4.8, P<0.0001), however, males were 1.3-times more likely to get an infection with ciprofloxacin-resistant *E. coli* (borderline significant; z=2.2, P=0.03) and 1.7-times more likely to get an infection with MDR *E. coli* (highly significant; z=3.4, P=0.0007). The frequency of invasive *E. coli* infection increased with age with the majority of infections (n=1,382; 78%) occurring in adults over 55 years. The median age was 72 years (95%CI, 71-72).

***Klebsiella pneumoniae***

There were 244 reports of invasive *K. pneumoniae* infection (all from blood) from 237 patients (with 39 of 44 laboratories participating in the surveillance of this pathogen). See table 1 for the proportion of *K. pneumoniae* isolates resistant to the four "indicator" antibiotics (as for *E. coli* above) in 2006 and 2007. In 2007, 3GC resistance decreased slightly from that reported in 2006 while resistance to both ciprofloxacin

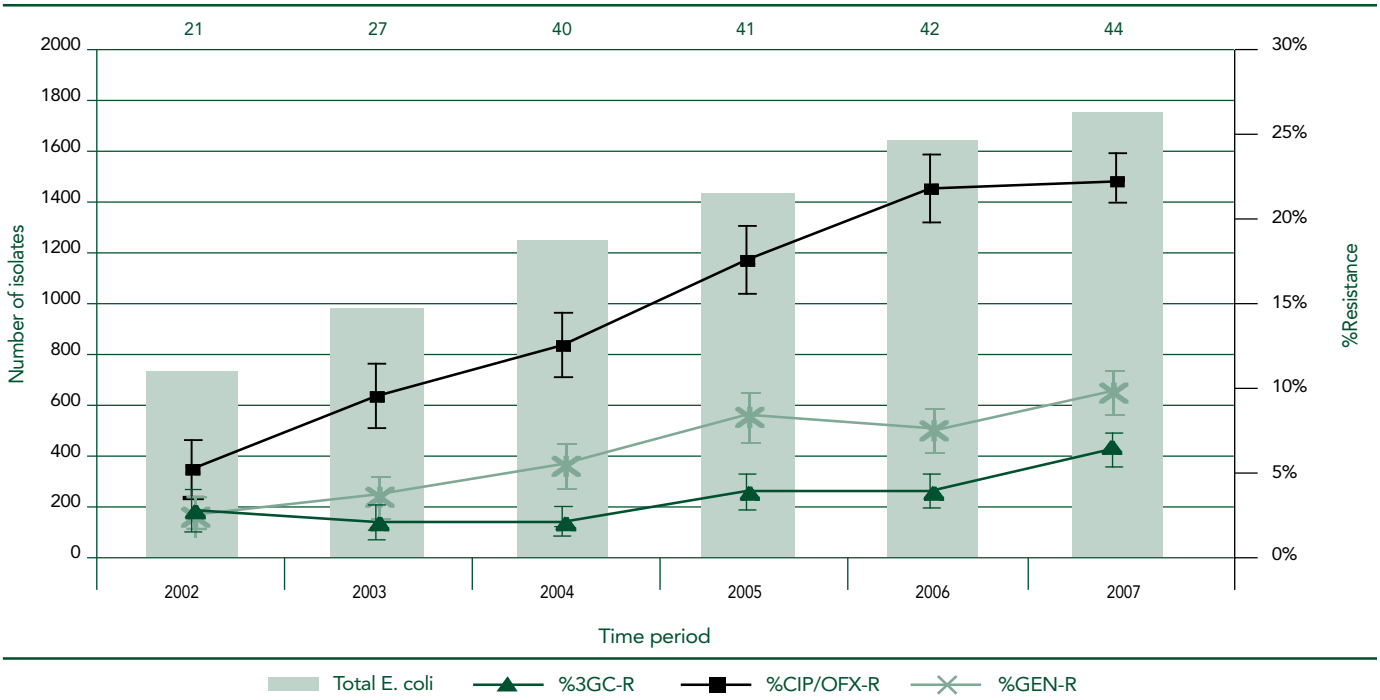



*Figure 4. Trends for E. coli – total numbers of E. coli and percentage resistance to 3GCs, ciprofloxacin/ofloxacin (CIP/OFX) and gentamicin (GEN with 95% confidence intervals.*
*The numbers of participating laboratories by year-end are indicated above the bars*

and gentamicin increased, however none of the differences were found to be significant.

Two isolates were ampicillin-susceptible, which either represent isolates misidentified as *K. pneumoniae* or misclassified as ampicillin-susceptible, as all klebsiellae are inherently resistant to this antibiotic.

ESBLs were detected in 8 (3.7%) of 214 isolates tested. This represents a decrease from 8.6% (11 of 128 isolates) in 2006. However, a greater proportion of isolates were tested for ESBL production in 2007 (88% vs. 59%).

Twenty-eight, or 11.9%, of 235 isolates tested against all four "indicator" antibiotics were identified as MDR, including nine with resistance to all four. This compares with 11.2% in 2006.

Males were approximately 1.6-times more likely to have an invasive *K. pneumoniae* infection than females (z=3.5, P=0.0005). The frequency of invasive *K. pneumoniae* infection increased with age with the majority of infections (n=182; 75%) occurring in adults over 55 years. The median age was 67 years (95%CI, 62-69).

***Pseudomonas aeruginosa***

There were 177 reports of invasive *P. aeruginosa* infection (174 from blood and three from CSF) from 172 patients (with 39 of 44 laboratories participating in the surveillance of this pathogen). See table 1 for the proportion of *P. aeruginosa* isolates resistant to the five "indicator" antibiotics/antibiotic classes [piperacillin-tazobactam, ceftazidime, carbapenems (meropenem or imipenem), fluoroquinolones (ciprofloxacin or ofloxacin) and gentamicin] in 2006 and 2007. The resistance proportions observed in 2007 were all higher compared with the data for 2006. Notably, ciprofloxacin increased from 18.0% in 2006 to almost 22.9% in 2007, however, none of the differences were found to be significant.

Nineteen (12.5%) of 152 isolates tested against all five "indicator" antibiotics were MDR, including six (from five laboratories) with resistance to all five.

Males were approximately 1.7-times more likely to have an invasive *P. aeruginosa* infection than females (z=3.4, P=0.0006). The frequency of invasive *P. aeruginosa* infection increased with age with the majority of infections (n=123; 70%) occurring in adults over 55 years. The median age was 66 years (95%CI, 61-70).

**Conclusion**

The proportion of MRSA decreased from approximately 42% in 2006 (and similar levels in recent years) to 38.5% in 2007, with the corresponding number of reports decreasing by 9.3% from 592 to 537, respectively. However, the total overall number of *S. aureus* bacteraemia reports remained at about the same level. This may be related to infection prevention and control interventions selectively targeted at MRSA, or may indicate that some process is taking place whereby the prevalent MRSA strains causing bacteraemia are on the wane and are being replaced by MSSA strains, some of which can be as virulent, or more so, than MRSA. It is hoped that the decrease in MRSA seen in 2007 will be sustained in 2008 and beyond.

Despite the encouraging MRSA trend, AMR continues to be a growing problem in other EARSS pathogens in this country. PNSP has been increasing for the past four years and in 2007 for the first time the proportion of isolates with HLR has increased to over 5% with the result that Ireland now has one of the highest proportions of HLR in *S. pneumoniae* in countries reporting to EARSS. The introduction of the 7-valent pneumococcal conjugate vaccine, PCV7, into the childhood immunisation program in September 2008 may go some way to reduce the burden of invasive pneumococcal disease in children less than two years and also the general population as a whole as children are known to act as reservoirs for pneumococci. However, on-going surveillance of the predominant serotypes is required as strains with serotypes other than those in the vaccine have been reported to increase in prevalence following introduction of PCV7 in other countries, hence the need for a fully resourced reference facility.

The number of *E. faecium* isolates reported to EARSS rose by 25% between 2006 and 2007. Over this period the proportion of isolates that were VREfm decreased from 37.1% to 33.5%, however, this belies that the total number of VREfm isolates actually increased by 13.2% from 98 to 111.

Resistance in *E. coli* and other Gram-negative pathogens is also becoming more problematic. Although the data for 2007 seem to indicate that the rate of increase in ciprofloxacin resistance slowed down, the overall trend was still upwards. Gentamicin and 3GC resistance plus ESBL-production also increased and consequently the proportion of MDR isolates now stands at 11.4% (up from 2.4% in 2002). Resistance to most of the "indicator" antibiotics and MDR increased in *K. pneumoniae* and *P. aeruginosa* from the previous year but it is still too early to comment on trends as surveillance of these has been undertaken for just two years.

Recent improvements in infection prevention and control structures may have contributed to reducing the burden of MRSA bacteraemia in Ireland in 2007. However, the data for the other pathogens once again highlight the urgent need for full implementation of the recommendations included in the 2001 Strategy for the control of Antimicrobial Resistance in Ireland (SARI) to tackle the growing problems of AMR and HCAI in this country. In particular, measures to promote prudent antibiotic use in both hospital and community settings are required to reduce the burden of AMR in Ireland.

# 9.3 Enhanced EARSS Surveillance

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

There were 1234 records of individual cases or isolates under the EARSS definition submitted from 11 laboratories. This figure is down from the 2006 finalised figure of 1580, as at the time of writing this report data were outstanding from two laboratories. The total number of records thus far for 2007 represent 26% of the total core EARSS dataset.

Demographic and other basic data for the major resistance profiles of EARSS pathogens are shown in table 1. These and clinical features of the BSI are detailed in the rest of this section. Note that each patient may have more than one risk factor reported. Malignancies were noted in 23% and immunosuppression in 12% of all BSI, and these two risk factors are not mentioned again in relation to specific pathogens here.

***Staphylococcus aureus***

There were 349 records for *Staphylococcus aureus*, 152 (44%) of which were meticillin-resistance *S. aureus* (MRSA) and 197 were meticillin-sensitive *S. aureus* (MSSA). The majority of MRSA isolates (57%) were in those aged 65 or older. Common sources of the MRSA BSI were central venous catheter (CVC, 29%), skin/soft tissue (12%) and respiratory tract infections (12%). Recent surgery (19%) and stay in intensive care unit (ICU stay, 10%) were risk factors specific to MRSA. The common origins of MSSA BSI were CVC (20%), and skin/soft tissue infections (19%). The most common risk factor specific to MSSA was recent surgery (11%) and 4% had endocarditis.

The majority of MSSA BSI (51%) were detected <48 hours after admission, meaning a large proportion were probably community-acquired, while 33% of MRSA BSI were detected <48 after admission. A closer examination of the records revealed that 37% of MSSA and 27% of MRSA BSI were recorded as "healthcare-associated", and 41% of MSSA and 61% of MRSA records were "hospital-acquired" within the hospital that made the notification.

Figure 1 shows how factors affecting *S. aureus* bacteraemia have changed over the last two years, 2006 and 2007. The data were from six laboratories that contributed complete information for both years. The proportion of isolates that were MRSA from the six laboratories changed from 49% to 45%, and this

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

| | Total Number of isolates in 2007 | Proportion Female | Mean age in years | Proportion <5 years old | Proportion 65 years or older | Detected <48hrs after admission | Detected >5days after admission |
|---|---|---|---|---|---|---|---|
| MRSA | 152 | 44% | 63.8 | 1% | 57% | 33% | 48% |
| MSSA | 197 | 34% | 54.3 | 6% | 38% | 51% | 29% |
| PNSP | 18 | 47% | 54.0 | 11% | 44% | 89% | 6% |
| PSSP | 93 | 45% | 55.9 | 6% | 42% | 76% | 13% |
| FQREC | 128 | 39% | 68.3 | 0% | 66% | 45% | 43% |
| FQSEC | 337 | 61% | 66.0 | 2% | 62% | 63% | 22% |
| VRE | 40 | 45% | 59.8 | 0% | 43% | 10% | 85% |
| VSE | 142 | 43% | 63.8 | 3% | 54% | 29% | 55% |
| KPN | 76 | 37% | 66.1 | 0% | 57% | 46% | 38% |
| PAE | 51 | 49% | 65.8 | 2% | 61% | 33% | 53% |

appears to reflect the decrease in the proportion of patients who were aged 65 years or older. However, other factors may also influence the likelihood of acquiring either MRSA or MSSA bacteraemia. Furthermore, significant factors may vary between institutions.

**Other organisms**
Of the 111 records for *Streptococcus pneumoniae* BSI, 78% were isolated <48 hours after admission showing that these infections were mainly community-acquired. They tended to occur in younger patients (mean age 55 year, compared to a mean age of 63 years for all of the pathogens), reflecting the bimodal age distribution of *S. pneumoniae* BSI (see table 1). The vast majority (96%) originated from respiratory tract infections. Eighteen records (16%) were penicillin non-susceptible *S. pneumoniae* (PNSP) BSI as compared to 93 penicillin susceptible *S. pneumoniae* (PSSP).

There were 465 records for *Escherichia coli*, 128 (28%) of which were fluoroquinolone-resistant *E. coli* (FQREC) and 337 were fluoroquinolone-sensitive *E. coli* (FQSEC). The majority of patients were 65 years or over (66% FQREC and 62% FQSEC). Urinary tract infections (35% FQREC and 49% FQSEC) and gastrointestinal tract infections (21% FQREC and 27% FQSEC) were common sources for these BSI. Urinary catheter was also a common source for FQREC BSI (21%), but only in 9% of FQSEC BSI.

There were 182 enterococcal BSI records, 80 *Enterococcus faecalis* and 102 *E. faecium*. Of the enterococci BSI, 40 (22%) were vancomycin-resistant enterococci (VRE) and 142 vancomycin-sensitive enterococci (VSE). VRE BSI were associated with longer stay in hospital (85% detected >5 days after admission).

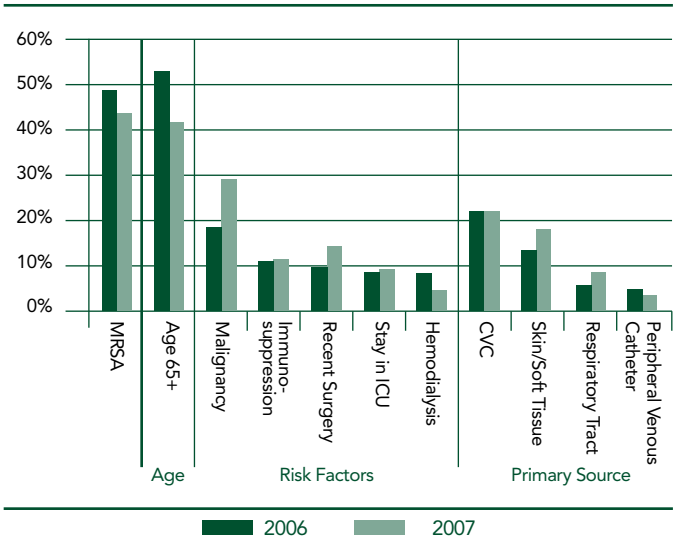



*Figure 1. Factors affecting patients with Staphylococcus aureus bacteraemia in 2006 and 2007, in data from six laboratories that contributed complete information for both years.*

CVC were a common source for these BSI (65% VRE and 22% VSE), followed by gastro-intestinal tract (17% VRE and 46% VSE). Common pathogen-specific risk factors were ICU stay (28% VRE and 24% VSE) and recent surgery (13% VRE and 23% VSE).

There were 76 records for *Klebsiella pneumoniae* (KPN) BSI, originating mainly from gastro-intestinal tract sources (33%), CVC (20%), respiratory tract (15%) and urinary tract infections (11%). Common risk factors specific for KPN BSI were recent surgery (14%) and ICU stay (13%).

There were 51 records for *Pseudomonas aeruginosa* (PNE) BSI, originating mainly from respiratory tract (21%) and urinary tract infection catheter (18%), and also from CVC, gastro-intestinal and urinary tracts (each 15%). Common risk factors specific for PNE BSI were recent surgery (12%) and ICU stay (14%).

*Conclusion*
Data from the enhanced EARSS surveillance programme shows that, with the exception of *S. pneumoniae*, the majority of the reported bloodstream infections occurred more than 48 hours after hospital admission and can, thus, be considered "hospital-acquired". Bloodstream infections occurring less than 48 hours after hospital admission are traditionally considered to be "community-acquired". However, a proportion of the latter may be related to prior healthcare exposure. As in previous reports, CVC were identified as the commonest modifiable risk factor for bloodstream infections, particularly for *S. aureus*. While not all healthcare-associated, or hospital-acquired, bloodstream infections are preventable, these data underline the importance of ensuring interventions to reduce the occurrence of bloodstream infections are put in place, with particular emphasis on management of CVC.

More information can be found at www.hpsc.ie in "Topics A-Z", under "Enhanced Bacteraemia Surveillance".

# 9.4 Healthcare-associated infection surveillance

Surveillance is one of the key elements in the control and prevention of healthcare-associated infection (HCAI). There are multiple examples from the literature, demonstrating reductions in HCAI rates following the implementation of surveillance programmes. For surveillance to be effective, however, it needs to be standardised, timely and relevant to the institution providing the data.

In 2007, the Health Protection Surveillance Centre (HPSC) established a multidisciplinary expert group under the auspices of the Strategy for the Control of Antimicrobial Resistance in Ireland (SARI) to evaluate methods for establishing surveillance in general surgery. In August 2007, a questionnaire was sent to the infection prevention and control teams of 59 acute national hospitals to capture the type of HCAI surveillance activities being carried out across the country. 45 hospitals responded and reported participating in a variety of surveillance activities (figure 1). While all hospitals were using CDC definitions of surgical site infection, only three hospitals had access to an automated data entry system (Teleform / Formic) and only four hospitals are using standardised international protocols (HELICS / Pan Celtic)

41 (91%) hospitals expressed an interest in participating in national HCAI surveillance initiatives, however additional resources (IT and personnel) would be required in many centres to participate. This gap in surveillance infrastructure was previously highlighted during the 2006 prevalence study of HCAI, when HSE-funded data collectors enabled 44 hospitals to participate. Without HSE support, the majority of hospitals would have been unable to participate in the survey, which is the only source of national HCAI data that Ireland has to date.

A draft national protocol for surveillance of surgical site infection (SSI) in general surgery and recommendations on the development of a high quality national surgical site infection surveillance system that is standardised and internationally comparable were drafted and sent for consultation in late 2007. In 2008 the group plan to produce similar protocols for surveillance in other surgical specialities.

The meticillin resistant *Staphylococcus aureus* (MRSA) in ICU Prevalence study was developed by members of the SARI Infection Control Sub-Committee in conjunction with HPSC. The objective of this study was to develop a simple surveillance protocol to collect a weekly snapshot of the problem of MRSA (both colonisation and infection) in the ICU setting that would require minimal if any additional resources. ICUs were chosen because the number of patients there is relatively

*Table 1: National data on alcohol hand rub consumption in acute public hospitals in Ireland - 2006 and 2007.*

| | 2006* | 2007** |
|---|---|---|
| Minimum Value | 0.5 | 5.2 |
| **National Median** | **10.5** | **15.0** |
| Maximum Value | 29.0 | 47.1 |

**No data received from one hospital*

*** No data received from two hospitals*

| **Overview of current HCAI surveillance activities** | |
|---|---|
| Surgical site infection surveillance: | 13 (29%) |
| HCAI surveillance in the intensive care unit: | 17 (38%) |
| Catheter-related bloodstream infection surveillance: | 10 (22%) |
| Surveillance of pneumonia: | 5 (11%) |
| Surveillance of urinary tract infections: | 5 (11%) |
| Other surveillance activities: | 15 (33%) |
| | |
| **Surgical site infection surveillance in 13 hospitals** | |
| Orthopaedic surgery | 7 |
| Colon surgery | 6 |
| Cholecystectoy | 6 |
| Cardiac surgery | 4 |
| Caesarean section | 2 |
| Other surgical specialities | 5 |

*Figure 1: HCAI surveillance activities in 45 acute hospitals in Ireland.*

small. Data was to be collated nationally by the HPSC. A multidisciplinary steering group was established in 2007 to oversee the survey and provide guidance in its development and implementation.

In July 2007, HPSC commenced a nine month pilot study. During this time, several amendments were made to the protocol following valuable hospital feedback and the number of participating hospitals increased. At the end of the pilot period, 31 hospitals (eight regional, 20 general, one specialist and two private hospitals) were providing weekly MRSA surveillance data. The majority (17) of participating ICU's contained between five and nine beds, with eight ICU's containing less than four ICU beds. During the course of the pilot study, three hospitals changed their policy to routinely screen all patients for MRSA upon admission to the ICU. Now 100% (31/31) of participating hospitals routinely screen all patients. One of the most notable findings of the pilot study was the wide variation in isolation room facilities across ICU's. Many of the single rooms cannot be classified as isolation rooms as they lack many of the basic features of an isolation room such as a hand sink and anteroom. The average ratio of single rooms to available beds is 0.2 (i.e. one single bed for every five available beds) for general hospitals and 0.3 (i.e. 1 single bed for every 3.3 available beds) for regional hospitals. Moreover, the appropriate specifications associated with an isolation room, i.e. a hand sink, anteroom and negative/positive pressure options, are more often found in ICUs within regional hospitals than general hospitals.

**Alcohol-based hand rub consumption**

Alcohol-based hand rubs have been shown to be an effective and rapid method of hand hygiene in healthcare settings, and are recommended as the primary means of hand hygiene in Irish national guidelines. Measurement of consumption of alcohol-based hand rub, expressed as volume used per 1,000 bed-days, has been shown to correlate with overall hand hygiene activity in hospitals. It is a recommended process measure of hand hygiene activity by both the World Health Organisation (WHO) and the US Centers for Disease Control (CDC). HPSC collated data on alcohol-based hand rub consumption in acute hospitals in 2006 and 2007. This data represented the total volume of alcohol-based hand rub delivered or dispensed to wards, clinics and other hospital areas per quarter, excluding that used for pre-operative surgical 'scrub'. The rate of usage per hospital was calculated as the total volume of hand rub consumed (in litres) per 1,000 bed-days used. (table 1)

There was a statistically significant (43%, excluding hospitals that only provided 2006 data) increase in the median rate of alcohol hand rub consumption, between 2006 and 2007. The overall level of alcohol hand rub consumption is similar to levels reported from successful hand hygiene campaigns internationally. The wide variation in levels of hand gel consumption between hospitals may be largely explained by differences in methodologies for collecting and reporting the data, and differences in types and range of hand hygiene agents used.

The main limitations to be noted when examining the data in table 1 is that the data only refers to the use of alcohol-based hand rub, and does not take account of other hand hygiene agents (e.g. medicated liquid soap) that may also be in used in hospitals. In addition, the data does not give an indication of the frequency with which hand decontamination is carried out at a given hospital nor distinguish between who has used the hand rub (visitor, patient and healthcare worker). There is clearly a need for better standardisation of data collection and reporting. However, even with better standardisation, the volume of alcohol-based hand rub consumed remains an inexact process measure of hand hygiene and additional outcome measures are required, including detailed audits of hand hygiene compliance.

# 10

# Computerised Infectious Disease Reporting System (CIDR)

# 10. Computerised Infectious Disease Reporting (CIDR)


## Summary

- CIDR Application software and reports significantly enhanced
- ISO 27001 Information Security Management certification achieved
- Number of laboratory records in CIDR continue to increase significantly per year


2007 represented the third full year of CIDR operation and demonstrated that CIDR continues to meet the ongoing and expanding needs of infectious disease surveillance in Ireland. Implementation of CIDR continued with two major academic teaching hospitals going 'live' – Cork University Hospital and St. Vincent's University Hospital. The number of laboratory records uploaded or entered into CIDR continues to increase as more laboratories are using CIDR (see figure 1).

The CIDR application software was updated in 2007 with the deployment of version 1.2.3. This version included a number of significant improvements to the system particularly in the area of laboratory results management. Similarly a significant number of reports were created or updated through 2007 to meet the developing needs of CIDR users.

A major achievement in 2007 was the migration of the existing CIDR accreditation for information security management from the old ISO 17799 standard to the new ISO 27001 standard. The new standard aligns more closely with other ISO standards such as the ISO 9000 series and has an increased emphasis on security incident management and levels of service.

The operation and use of CIDR over the past three years has been underpinned by the CIDR Business Rules developed from the pilot implementation in 2004. It has become increasingly clear in the light of operation and further implementations since that time that these rules needed to be updated. Consequently a new national CIDR Business Rules Committee was formed in 2007 to review the existing document. This committee met three times through 2007 to update these rules to ensure that CIDR continued to be used appropriately and that the security of the system was maximised.

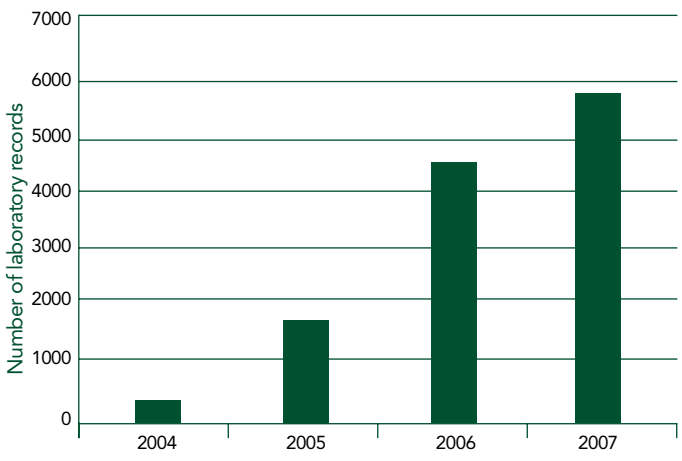



*Figure 1. Number of laboratory records in CIDR per year.*

In parallel with the ongoing development of new Business Rules the number of active CIDR accounts was reviewed to ensure that these accounts continued to be needed. This also allowed the CIDR team to replace the security tokens needed to access the CIDR system which expired in September 2007.

The CIDR User Group met four times in 2007 and continued to act as a valuable channel of communication between the CIDR team and CIDR users across the country. It also allowed CIDR users to share expertise and best practice amongst themselves. Subjects that were discussed included enhanced surveillance data items, particular problems in relation to hepatitis notifications, and data items in relation to outbreaks and hospital acquired infections.

CIDR training for CIDR users continued through 2007 with 16 courses delivered to 59 trainees. The courses delivered included introductory courses for public health and for laboratory users, advanced courses for public health users, and introductory courses in the use of Business Objects software-based reporting in CIDR. The CIDR helpdesk continued to support CIDR users in relation to business and technical support calls although the number of calls was slightly reduced compared with 2006 (figure 2). This reduction compared with 2006 was primarily attributable to the fact that no new implementation of CIDR at public health level occurred in 2007.

International cooperation continued on several fronts through 2007. A member of the CIDR team was invited by the Netherlands School of Public Health to participate in an EU-funded Accession preparedness programme in Bulgaria. This involved two separate week-long missions to Bulgaria to investigate the requirements and opportunities for electronic infectious disease reporting in that country. The new TESSy infectious disease information system developed by the European Centre for Disease Prevention and Control in Stockholm was introduced to representatives from national surveillance institutes, including HPSC / CIDR and implications of this new information system for member states and their national infectious disease information systems such as CIDR were discussed. HPSC was visited for a week in June by a delegation from Uzbekistan, including public health specialists and information technology experts, who were interested in find out more about infectious disease surveillance in Ireland, including CIDR and to see how the system works.

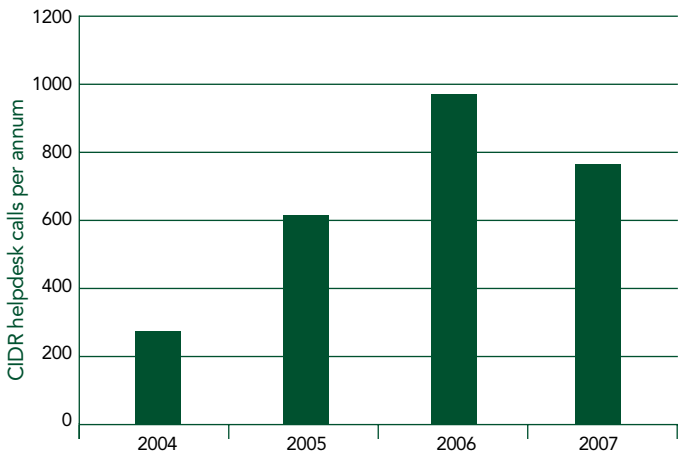



*Figure 2. CIDR helpdesk calls per annum*

Work continued through 2007 in preparation for the replacement of hardware approaching 'end of life' and the updating of third-party software applications used in CIDR to current up to date / supported versions. In parallel with this activity a public notice was published on eTenders.gov (the public sector tendering website) inviting suppliers to tender for a new information and communications technology framework support contract for HPSC, including maintenance, support and continued development of the CIDR system.

Two CIDR-associated presentations were made in 2007. Bernadette O'Connor from the Department of Public Health HSE South (SE) presented their experiences with CIDR at the annual Five Nations Health Protection Conference in Belfast, May 2007, concluding that *'The implementation of CIDR in the HSE-South(SE) was successful, thus ensuring accurate and timely reporting of both clinical and laboratory notifiable infectious diseases. Integration of CIDR into the QMS (the Quality Management System) optimises the efficiency of the system.'* A presentation on the impact of CIDR on the quality of infectious disease information was made by John Brazil in February at the 4th Annual Data Quality Forum held in Dublin City University by the Irish Community of Practice of The International Association for Information and Data Quality (IAIDQ) in conjunction with the Irish Computer Society.

# 11

# Appendix 1
# Notifiable Infectious Diseases in Ireland

## Notes:

Figures presented in this appendix were extracted from the Computerised Infectious Disease Reporting (CIDR) system on the 19th August 2008. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

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

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

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

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

| Infectious Disease | Causative Pathogen(s) |
|---|---|
| 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, 2005-2007 and crude incidence rates of diseases, 2007*

| Infectious Disease | 2005 | 2006 | 2007 | CIR* 2007 |
|---|---|---|---|---|
| Acute anterior poliomyelitis | 0 | 0 | 0 | 0.00 |
| Acute infectious gastroenteritis | 2398 | 2306 | 2520 | 59.44 |
| Anthrax | 0 | 0 | 0 | 0.00 |
| *Bacillus cereus* food-borne infection/intoxication | 0 | 0 | 0 | 0.00 |
| Bacterial meningitis (not otherwise specified) | 29 | 46 | 33 | 0.78 |
| Botulism | 0 | 1 | 0 | 0.00 |
| Brucellosis | 53 | 29 | 28 | 0.66 |
| Campylobacter infection | 1801 | 1812 | 1891 | 44.60 |
| Cholera | 0 | 0 | 0 | 0.00 |
| *Clostridium perfringens* (type A) food-borne disease | 1 | 0 | 0 | 0.00 |
| Creutzfeldt Jakob disease | 4 | 6 | 3 | 0.07 |
| Creutzfeldt Jakob disease (new variant) | 2 | 1 | 0 | 0.00 |
| Cryptosporidiosis | 568 | 367 | 609 | 14.36 |
| Diphtheria | 0 | 0 | 0 | 0.00 |
| Echinococcosis | 0 | 0 | 0 | 0.00 |
| Enterohaemorrhagic *Escherichia coli* | 134 | 174 | 192 | 4.53 |
| Giardiasis | 57 | 65 | 62 | 1.46 |
| *Haemophilus influenzae* disease (invasive) | 34 | 38 | 31 | 0.73 |
| Hepatitis A (acute) | 56 | 39 | 32 | 0.75 |
| Hepatitis B (acute and chronic) | 874 | 811 | 863 | 20.35 |
| Hepatitis C | 1432 | 1220 | 1558 | 36.75 |
| Influenza | 316 | 276 | 280 | 6.60 |
| Legionellosis | 9 | 13 | 16 | 0.38 |
| Leptospirosis | 15 | 20 | 22 | 0.52 |
| Listeriosis | 12 | 7 | 21 | 0.50 |
| Malaria | 44 | 96 | 71 | 1.67 |
| Measles | 93 | 83 | 53 | 1.25 |
| Meningococcal disease | 203 | 209 | 179 | 4.22 |
| Mumps | 1079 | 427 | 142 | 3.35 |
| Noroviral infection | 1045 | 1635 | 1317 | 31.06 |
| Paratyphoid | 0 | 1 | 4 | 0.09 |
| Pertussis | 83 | 62 | 78 | 1.84 |
| Plague | 0 | 0 | 0 | 0.00 |
| Q fever | 10 | 12 | 17 | 0.40 |
| Rabies | 0 | 0 | 0 | 0.00 |
| Rubella | 17 | 14 | 19 | 0.45 |
| Salmonellosis | 347 | 422 | 456 | 10.76 |
| Severe Acute Respiratory Syndrome (SARS) | 0 | 0 | 0 | 0.00 |
| Shigellosis | 36 | 54 | 43 | 1.01 |
| Smallpox | 0 | 0 | 0 | 0.00 |
| Staphylococcal food poisoning | 6 | 0 | 0 | 0.00 |
| Streptococcus group A infection (invasive) | 49 | 61 | 57 | 1.34 |
| *Streptococcus pneumoniae* infection (invasive) | 271 | 293 | 361 | 8.51 |
| Tetanus | 0 | 0 | 1 | 0.02 |
| Toxoplasmosis | 45 | 44 | 49 | 1.16 |
| Trichinosis | 0 | 0 | 2 | 0.05 |
| Tuberculosis | 0 | 0 | 0 | 0.00 |
| Tularemia | 0 | 0 | 0 | 0.00 |
| Typhoid | 5 | 9 | 9 | 0.21 |
| Typhus | 0 | 0 | 0 | 0.00 |

*Table A1.2 (continued) Number of notifiable infectious diseases, 2005-2007 and crude incidence rates of diseases, 2007*

| Infectious Disease | 2005 | 2006 | 2007 | CIR* 2007 |
|---|---|---|---|---|
| Viral encephalitis | 6 | 16 | 8 | 0.19 |
| Viral haemorrhagic fevers | 0 | 0 | 0 | 0.00 |
| Viral meningitis | 35 | 148 | 46 | 1.08 |
| Yellow fever | 0 | 0 | 0 | 0.00 |
| Yersiniosis | 3 | 1 | 6 | 0.14 |
| **Total** | **11172** | **10818** | **11079** | **-** |

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

*Table A1.3 Number of notifiable infectious diseases in 2007 by HSE area*

| Infectious Disease | HSE-E | HSE-M | HSE-MW | HSE-NE | HSE-NW | HSE-SE | HSE-S | HSE-W | Total |
|---|---|---|---|---|---|---|---|---|---|
| Acute infectious gastroenteritis | 718 | 272 | 74 | 106 | 176 | 418 | 279 | 477 | **2520** |
| Bacterial meningitis (not otherwise specified) | 10 | 1 | 3 | 2 | 0 | 10 | 3 | 4 | **33** |
| Brucellosis | 1 | 2 | 24 | 1 | 0 | 0 | 0 | 0 | **28** |
| Campylobacter infection | 646 | 146 | 173 | 141 | 101 | 174 | 250 | 260 | **1891** |
| Creutzfeldt Jakob disease | * | * | * | * | * | * | * | * | **3** |
| Cryptosporidiosis | 22 | 34 | 57 | 24 | 25 | 79 | 60 | 308 | **609** |
| Enterohaemorrhagic *Escherichia coli* | 29 | 20 | 17 | 13 | 79 | 9 | 14 | 11 | **192** |
| Giardiasis | 28 | 1 | 3 | 6 | 0 | 9 | 9 | 6 | **62** |
| *Haemophilus influenzae* disease (invasive) | 12 | 3 | 2 | 0 | 1 | 5 | 2 | 6 | **31** |
| Hepatitis A (acute) | 16 | 2 | 1 | 2 | 1 | 4 | 4 | 2 | **32** |
| Hepatitis B (acute and chronic) | 521 | 37 | 61 | 43 | 18 | 58 | 80 | 45 | **863** |
| Hepatitis C | 1206 | 42 | 47 | 55 | 20 | 44 | 67 | 77 | **1558** |
| Influenza | 59 | 7 | 114 | 17 | 16 | 32 | 24 | 11 | **280** |
| Legionellosis | 10 | 3 | 1 | 2 | 0 | 0 | 0 | 0 | **16** |
| Leptospirosis | 5 | 2 | 3 | 2 | 1 | 4 | 3 | 2 | **22** |
| Listeriosis | 11 | 3 | 1 | 1 | 1 | 1 | 2 | 1 | **21** |
| Malaria | 32 | 8 | 3 | 6 | 0 | 9 | 6 | 7 | **71** |
| Measles | 29 | 0 | 3 | 1 | 1 | 7 | 3 | 9 | **53** |
| Meningococcal disease | 59 | 10 | 18 | 21 | 13 | 18 | 22 | 18 | **179** |
| Mumps | 53 | 3 | 6 | 8 | 34 | 12 | 8 | 18 | **142** |
| Noroviral infection | 582 | 77 | 134 | 88 | 36 | 125 | 195 | 80 | **1317** |
| Paratyphoid | * | * | * | * | * | * | * | * | **4** |
| Pertussis | 24 | 3 | 6 | 5 | 3 | 9 | 11 | 17 | **78** |
| Q fever | 1 | 1 | 9 | 0 | 0 | 0 | 4 | 2 | **17** |
| Rubella | 14 | 0 | 0 | 1 | 0 | 2 | 0 | 2 | **19** |
| Salmonellosis | 143 | 23 | 29 | 29 | 21 | 37 | 131 | 43 | **456** |
| Shigellosis | 21 | 2 | 2 | 4 | 0 | 2 | 9 | 3 | **43** |
| Streptococcus group A infection (invasive) | 28 | 0 | 2 | 3 | 3 | 10 | 4 | 7 | **57** |
| *Streptococcus pneumoniae* infection (invasive) | 117 | 14 | 29 | 30 | 30 | 84 | 35 | 22 | **361** |
| Tetanus | * | * | * | * | * | * | * | * | **1** |
| Toxoplasmosis | 25 | 3 | 0 | 3 | 4 | 8 | 4 | 2 | **49** |
| Trichinosis | * | * | * | * | * | * | * | * | **2** |
| Typhoid | 6 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | **9** |
| Viral encephalitis | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 3 | **8** |
| Viral meningitis | 16 | 6 | 1 | 5 | 3 | 6 | 4 | 5 | **46** |
| Yersiniosis | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | **6** |

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

*Table A1.4 Number of notifiable infectious diseases in 2007 by age group (years)*

| 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 | 2357 | 59 | 12 | 2 | 5 | 23 | 10 | 3 | 9 | 22 | 18 | **2520** |
| Bacterial meningitis (not otherwise specified) | 18 | 0 | 2 | 3 | 0 | 5 | 2 | 0 | 1 | 2 | 0 | **33** |
| Brucellosis | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 9 | 11 | 4 | 0 | **28** |
| Campylobacter infection | 483 | 121 | 57 | 89 | 167 | 319 | 191 | 179 | 105 | 170 | 10 | **1891** |
| Creutzfeldt Jakob disease | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | **3** |
| Cryptosporidiosis | 306 | 96 | 42 | 14 | 23 | 57 | 20 | 14 | 11 | 24 | 2 | **609** |
| Enterohaemorrhagic *Escherichia coli* | 68 | 17 | 10 | 1 | 7 | 11 | 20 | 10 | 6 | 14 | 28 | **192** |
| Giardiasis | 20 | 5 | 2 | 1 | 4 | 11 | 8 | 5 | 3 | 3 | 0 | **62** |
| *Haemophilus influenzae* disease (invasive) | 9 | 0 | 1 | 0 | 1 | 2 | 2 | 0 | 3 | 13 | 0 | **31** |
| Hepatitis A (acute) | 2 | 6 | 4 | 2 | 2 | 5 | 3 | 2 | 2 | 4 | 0 | **32** |
| Hepatitis B (acute and chronic) | 3 | 3 | 3 | 36 | 151 | 320 | 225 | 71 | 30 | 17 | 4 | **863** |
| Hepatitis C | 7 | 0 | 5 | 20 | 126 | 752 | 372 | 177 | 57 | 30 | 12 | **1558** |
| Influenza | 53 | 14 | 9 | 22 | 12 | 42 | 51 | 39 | 22 | 15 | 1 | **280** |
| Legionellosis | 0 | 0 | 0 | 1 | 0 | 1 | 4 | 3 | 5 | 2 | 0 | **16** |
| Leptospirosis | 0 | 0 | 0 | 0 | 3 | 5 | 6 | 3 | 4 | 1 | 0 | **22** |
| Listeriosis | 3 | 0 | 0 | 0 | 2 | 4 | 1 | 2 | 1 | 8 | 0 | **21** |
| Malaria | 7 | 7 | 3 | 3 | 5 | 19 | 18 | 5 | 3 | 1 | 0 | **71** |
| Measles | 32 | 10 | 5 | 2 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | **53** |
| Meningococcal disease | 106 | 14 | 13 | 20 | 5 | 10 | 2 | 3 | 2 | 4 | 0 | **179** |
| Mumps | 24 | 13 | 10 | 16 | 17 | 18 | 22 | 12 | 7 | 3 | 0 | **142** |
| Noroviral infection | 265 | 19 | 8 | 17 | 24 | 59 | 56 | 54 | 86 | 704 | 25 | **1317** |
| Paratyphoid | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | **4** |
| Pertussis | 63 | 3 | 4 | 3 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | **78** |
| Q fever | 1 | 0 | 0 | 1 | 0 | 6 | 3 | 2 | 1 | 3 | 0 | **17** |
| Rubella | 16 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | **19** |
| Salmonellosis | 108 | 27 | 16 | 24 | 38 | 76 | 43 | 38 | 35 | 51 | 0 | **456** |
| Shigellosis | 7 | 1 | 1 | 1 | 6 | 16 | 4 | 5 | 2 | 0 | 0 | **43** |
| Streptococcus group A infection (invasive) | 13 | 4 | 1 | 0 | 2 | 8 | 5 | 3 | 6 | 15 | 0 | **57** |
| *Streptococcus pneumoniae* infection (invasive) | 68 | 2 | 4 | 3 | 5 | 19 | 31 | 31 | 46 | 150 | 2 | **361** |
| Tetanus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | **1** |
| Toxoplasmosis | 3 | 0 | 2 | 2 | 3 | 21 | 10 | 6 | 2 | 0 | 0 | **49** |
| Trichinosis | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | **2** |
| Typhoid | 2 | 0 | 1 | 0 | 2 | 3 | 1 | 0 | 0 | 0 | 0 | **9** |
| Viral encephalitis | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 2 | 2 | 0 | **8** |
| Viral meningitis | 21 | 3 | 2 | 3 | 3 | 5 | 6 | 0 | 2 | 0 | 1 | **46** |
| Yersiniosis | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | **6** |
| **Total** | **4068** | **426** | **217** | **288** | **619** | **1826** | **1119** | **678** | **467** | **1267** | **104** | **11079** |

*See explanatory note on first page of Appendix 1.*

*Table A1.5 Number of notifiable infectious diseases in 2007 by gender*

| Infectious Disease | Male | Female | Unknown | Total |
|---|---|---|---|---|
| Acute infectious gastroenteritis | 1281 | 1213 | 26 | **2520** |
| Bacterial meningitis (not otherwise specified) | 18 | 15 | 0 | **33** |
| Brucellosis | 25 | 3 | 0 | **28** |
| Campylobacter infection | 1011 | 866 | 14 | **1891** |
| Creutzfeldt Jakob disease | 1 | 2 | 0 | **3** |
| Cryptosporidiosis | 327 | 278 | 4 | **609** |
| Enterohaemorrhagic *Escherichia coli* | 96 | 96 | 0 | **192** |
| Giardiasis | 36 | 23 | 3 | **62** |
| *Haemophilus influenzae* disease (invasive) | 25 | 6 | 0 | **31** |
| Hepatitis A (acute) | 17 | 15 | 0 | **32** |
| Hepatitis B (acute and chronic) | 462 | 361 | 40 | **863** |
| Hepatitis C | 979 | 551 | 28 | **1558** |
| Influenza | 130 | 147 | 3 | **280** |
| Legionellosis | 9 | 7 | 0 | **16** |
| Leptospirosis | 21 | 1 | 0 | **22** |
| Listeriosis | 8 | 13 | 0 | **21** |
| Malaria | 43 | 26 | 2 | **71** |
| Measles | 29 | 24 | 0 | **53** |
| Meningococcal disease | 97 | 82 | 0 | **179** |
| Mumps | 84 | 58 | 0 | **142** |
| Noroviral infection | 584 | 730 | 3 | **1317** |
| Paratyphoid | 1 | 3 | 0 | **4** |
| Pertussis | 40 | 38 | 0 | **78** |
| Q fever | 6 | 11 | 0 | **17** |
| Rubella | 9 | 10 | 0 | **19** |
| Salmonellosis | 238 | 214 | 4 | **456** |
| Shigellosis | 16 | 27 | 0 | **43** |
| Streptococcus group A infection (invasive) | 26 | 31 | 0 | **57** |
| *Streptococcus pneumoniae* infection (invasive) | 189 | 172 | 0 | **361** |
| Tetanus | 1 | 0 | 0 | **1** |
| Toxoplasmosis | 17 | 32 | 0 | **49** |
| Trichinosis | 1 | 1 | 0 | **2** |
| Typhoid | 7 | 2 | 0 | **9** |
| Viral encephalitis | 6 | 2 | 0 | **8** |
| Viral meningitis | 28 | 18 | 0 | **46** |
| Yersiniosis | 2 | 4 | 0 | **6** |
| **Total** | **5870** | **5082** | **127** | **11079** |

*See explanatory note on first page of Appendix 1.*

*Table A1.6 Number of notifiable infectious diseases in 2007 by case classification*

| Infectious Disease | Confirmed | Probable | Possible | Not Specified | Total |
|---|---|---|---|---|---|
| Acute infectious gastroenteritis | 2327 | 193 | 0 | 0 | **2520** |
| Bacterial meningitis (not otherwise specified) | 11 | 8 | 14 | 0 | **33** |
| Brucellosis | 7 | 21 | 0 | 0 | **28** |
| Campylobacter infection | 1888 | 2 | 0 | 1 | **1891** |
| Creutzfeldt Jakob disease | 3 | 0 | 0 | 0 | **3** |
| Cryptosporidiosis | 609 | 0 | 0 | 0 | **609** |
| Enterohaemorrhagic *Escherichia coli* | 140 | 52 | 0 | 0 | **192** |
| Giardiasis | 62 | 0 | 0 | 0 | **62** |
| *Haemophilus influenzae* disease (invasive) | 31 | 0 | 0 | 0 | **31** |
| Hepatitis A (acute) | 29 | 1 | 2 | 0 | **32** |
| Hepatitis B (acute and chronic) | 863 | 0 | 0 | 0 | **863** |
| Hepatitis C | 1558 | 0 | 0 | 0 | **1558** |
| Influenza | 276 | 0 | 4 | 0 | **280** |
| Legionellosis | 15 | 1 | 0 | 0 | **16** |
| Leptospirosis | 22 | 0 | 0 | 0 | **22** |
| Listeriosis | 21 | 0 | 0 | 0 | **21** |
| Malaria | 71 | 0 | 0 | 0 | **71** |
| Measles | 20 | 0 | 33 | 0 | **53** |
| Meningococcal disease | 161 | 1 | 17 | 0 | **179** |
| Mumps | 68 | 1 | 73 | 0 | **142** |
| Noroviral infection | 1270 | 47 | 0 | 0 | **1317** |
| Paratyphoid | 4 | 0 | 0 | 0 | **4** |
| Pertussis | 47 | 3 | 27 | 1 | **78** |
| Q fever | 4 | 13 | 0 | 0 | **17** |
| Rubella | 3 | 0 | 16 | 0 | **19** |
| Salmonellosis | 440 | 16 | 0 | 0 | **456** |
| Shigellosis | 43 | 0 | 0 | 0 | **43** |
| Streptococcus group A infection (invasive) | 57 | 0 | 0 | 0 | **57** |
| *Streptococcus pneumoniae* infection (invasive) | 310 | 51 | 0 | 0 | **361** |
| Tetanus | 1 | 0 | 0 | 0 | **1** |
| Toxoplasmosis | 49 | 0 | 0 | 0 | **49** |
| Trichinosis | 2 | 0 | 0 | 0 | **2** |
| Typhoid | 8 | 1 | 0 | 0 | **9** |
| Viral encephalitis | 8 | 0 | 0 | 0 | **8** |
| Viral meningitis | 35 | 10 | 1 | 0 | **46** |
| Yersiniosis | 6 | 0 | 0 | 0 | **6** |
| **Total** | **10469** | **421** | **187** | **2** | **11079** |

*See explanatory note on first page of Appendix 1.*
*Case classifications are assigned to notifications as per the Case Definitions for Notifiable Diseases booklet, available at http://www.hpsc.ie*
**As per the case definitions, meningococcal disease notifications are classified as definite, presumed and possible. For convenience they are reported in this table as confirmed, probable and possible, respectively.*

# Explanatory Notes
# Glossary of Terms

# Explanatory Notes

## Notifiable Infectious Diseases

### Computerised Infectious Disease Reporting (CIDR) system

For the majority of the notifiable infectious diseases (see appendix 1), data were collated using the Computerised Infectious Disease Reporting (CIDR) system. Notification data were inputted directly by areas using the system. For areas not yet on CIDR, data were forwarded weekly to HPSC for input to CIDR. Enhanced surveillance was undertaken for certain diseases and these data collated on CIDR. Outbreak data were also collated on CIDR using the same process outlined above. Weekly Reports on infectious disease notifications and outbreaks were produced by HPSC.

Throughout the year data were cleaned and validated on an ongoing basis and final data checks and cleaning were undertaken following year end by HPSC and the Departments of Public Health. Data analysis was performed using Business Objects Reporting and MS Excel. Figures for the relevant chapters within this report were extracted from CIDR during August and September 2008. 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 2006 were collated in the regional Departments of Public Health, where data were entered on the Epi2000 NTBSS database. Each HSE Area provided finalised 2006 data with outcome information to HPSC in early to mid 2007. Data were validated and cleaned with each area and the national data were collated. Provisional 2007 data were obtained from each area in August 2008.

### European Antimicrobial Resistance Surveillance System (EARSS)

Data were collected by participating EARSS laboratories in 2007 on the first invasive isolate per patient per quarter on *Staphylococcus aureus* and *Enterococcus faecalis* from blood only and on *Streptococcus pneumoniae*, *Escherichia coli*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* from blood and cerebrospinal fluid (CSF). Data were reported quarterly to HPSC and collated in the WHONET database. Quarterly and annual reports were produced.

**Note:** In general, invasive infections due to *K. pneumoniae* and *P. aeruginosa* are not notifiable but these pathogens are now included for surveillance under the EARSS project.

### Sexually Transmitted Infections (STIs)

Clinicians and laboratories notified their respective Departments of Public Health of probable and confirmed cases of STIs in 2006. Notifications were anonymised prior to notification. Data were collated and analysed by Departments of Public Health and aggregated data were reported quarterly to HPSC. National data were collated on an MS Access database, analysis preformed and reports produced by HPSC. At the time of writing, finalised STI data for 2007 had not yet been received by HPSC.

## Other Surveillance Systems

### Influenza Surveillance

A sentinel surveillance system is used in Ireland for the surveillance of influenza activity. For the 2007/2008 influenza season (October to May), 52 geographically distributed general practices participated (representing 4.8% of the population) in collaboration with the ICGP, NVRL, DoHC and HPSC. Each week the participating GPs reported electronically to the ICGP the number of patients who consulted with influenza-like illness (ILI). The NVRL reported to HPSC on a weekly basis the number of influenza positive specimens tested (from sentinel and non-sentinel sources). The Departments of Public Health notified HPSC weekly of all cases of influenza and all influenza/ILI outbreaks. Other indicators of influenza activity reported by the Departments of Public Health to HPSC included a regional influenza activity index, sentinel hospital admission levels, sentinel school absenteeism and enhanced surveillance data on hospitalised cases of influenza in 0-14 year olds. HPSC was notified of all registered deaths on a weekly basis from the General Register Office. At HPSC data were collated from the various sources and weekly influenza reports were

produced. Clinical and virological data were reported weekly to EISS. Following the end of the influenza season, annual data were analysed and reports produced. During the summer of 2008 the surveillance of influenza activity continued involving the ICGP, NVRL and HPSC. Data were reported to EISS biweekly and monthly influenza reports were produced by HPSC.

**HIV**
HIV and AIDS surveillance in Ireland is voluntary and anonymised and operates in co-operation with laboratories, clinicians and Departments of Public Health. In 2007, 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, which are available at www.hpsc.ie

**Immunisation Uptake**
Each HSE Area maintains a childhood immunisation database. In 2007, each HSE Area provided HPSC with immunisation uptake data for their area and for each of the Local Health Offices in their area on a quarterly basis. National data were collated and analysed at HPSC using a MS Excel database. Quarterly reports were produced and are available on the HPSC website. For further details on methods used, please see the immunisation uptake chapter within this report.

**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 2004-2007 data, Census 2002 for 2000-2003 data and Census 1996 for 1999 data.

Population size was estimated between 1993 and 2007 for non-census years using a curve interpolation method for the calculation of outpatient antibiotic consumption rates. Bed-days used and other activity data for public acute hospitals were provided by the National Hospital's Office of the HSE and used to calculate rates of MRSA and hospital antibiotic consumption.

**HSE Areas**
Although organisational changes have taken place in the Health Services, the term HSE Areas are used in this report when analysing and presenting data by geographical area (equating to the eight former health board regions/areas). This is because operationally the surveillance, prevention and control of infectious diseases are still managed by eight Departments of Public Health, one in each HSE Area.

# Glossary of Terms

| | |
|---|---|
| **CIDR** | Computerised Infectious Diseases Reporting |
| **DoHC** | Department of Health and Children |
| **EARSS** | European Antimicrobial Surveillance System |
| **EISS** | European Influenza Surveillance System |
| **EPIET** | European Programme for Intervention Epidemiology Training |
| **FSAI** | Food Safety Authority of Ireland |
| **FSPB** | Food Safety Promotion Board |
| **ICGP** | Irish College of General Practitioners |
| **IDU** | Injecting Drug User |
| **IgM** | Immunoglobulin M |
| **IMMRL** | Irish Meningococcal and Meningitis Reference Laboratory |
| **HPSC** | Health Protection Surveillance Centre |
| **HSE** | Health Services Executive |
| **HSE-E** | HSE Eastern Region |
| **HSE-M** | HSE Midland Area |
| **HSE-MW** | HSE Mid-Western Area |
| **HSE-NE** | HSE North Eastern Area |
| **HSE-NW** | HSE North Western Area |
| **HSE-SE** | HSE South Eastern Area |
| **HSE-S** | HSE Southern Area |
| **HSE-W** | HSE Western Area |
| **MRSA** | Methicillin Resistant *Staphylococcus aureus* |
| **MSM** | Men who have Sex with Men |
| **NVRL** | National Virus Reference Laboratory |
| **STIs** | Sexually Transmitted Infections |
| **TB** | Tuberculosis |
| **WHO** | World Health Organization |



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