# Summary Report of Influenza Season 2005/2006





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**Report updated: 5th September 2007**

This report is produced in collaboration with the Departments of Public Health

## Summary

The 2005/2006-influenza season was the sixth year of influenza surveillance using computerised sentinel general practices in Ireland. The Health Protection Surveillance Centre (HPSC) is working in collaboration with the National Virus Reference Laboratory (NVRL), the Irish College of General Practitioners (ICGP) and the Departments of Public Health on this surveillance project.

Influenza activity was moderate in Ireland for most of the 2005/2006 season, with the peak of activity occurring later than usually observed, during week 10 2006. Influenza A (H3) and B co-circulated this season. Influenza activity mainly affected 5 to 14 year olds.

The most significant global event during the 2005/2006-influenza season was the continuing global spread of poultry outbreaks of avian influenza A (H5N1) associated with sporadic cases/clusters of human infection and a significant proportion of human deaths. [1, 2]

## Background to sentinel surveillance in Ireland

***Clinical data***

Forty-six general practices were recruited to report electronically, on a weekly basis, the number of patients with influenza-like illness (ILI). ILI is defined as the sudden onset of symptoms with a temperature of 38°C or more, with two or more of the following: headache, sore throat, dry cough and myalgia. Cases were those attending for the first time with these symptoms. In total, the 46 sentinel general practices comprise 96.5 general practitioners and represent 4.1% of the national population. Practices were located in all HSE Areas with the number of sentinel practices in each HSE Area largely based on the population of the HSE Area (table 1).

*Table 1. Number of sentinel GPs by HSE Area, percentage of total practice population and percentage of population in each HSE Area, 2005/2006 season*

| HSE-Area | No. Practices | No. Practitioners | Patient population | % Patient population (n=162054) | 2002 census* | % Census population (n=3917203*) | % Patient population (n=3917203*) |
|---|---|---|---|---|---|---|---|
| HSE-ER | 14 | 27 | 39251 | 24.2 | 1401441 | 35.8 | 2.8 |
| HSE-MA | 1 | 2 | 2950 | 1.8 | 225363 | 5.8 | 1.3 |
| HSE-MWA | 3 | 4 | 6140 | 3.8 | 339591 | 8.7 | 1.8 |
| HSE-NEA | 5 | 15 | 27000 | 16.7 | 344965 | 8.8 | 7.8 |
| HSE-NWA | 4 | 9 | 13946 | 8.6 | 221574 | 5.7 | 6.3 |
| HSE-SEA | 8 | 20.5 | 45738 | 28.2 | 423616 | 10.8 | 10.8 |
| HSE-SA | 7 | 14 | 19579 | 12.1 | 580356 | 14.8 | 3.4 |
| HSE-WA | 4 | 5 | 7450 | 4.6 | 380297 | 9.7 | 2.0 |
| **Total** | **46** | **96.5** | **162054** | **100.0** | **3917203** | **100** | **4.1** |

**Source: CSO 2002 population census*

***Virological data***
Sentinel GPs were requested to send a combined nasal and throat swab on at least one patient per week where a clinical diagnosis of ILI was made. Swabs were sent to the NVRL for testing for influenza and respiratory syncytial virus (RSV) using immunofluorescence and PCR techniques and results were reported to HPSC. The NVRL also reported the results of respiratory specimens (predominantly paediatric), referred mainly from hospitals, on a weekly basis.

***Other indicators of influenza activity***
The Departments of Public Health reported an influenza activity index (no report, no activity, sporadic, localised, regional or widespread activity) every week, to HPSC. The activity index is analogous to that used by the WHO global influenza surveillance system and the European Influenza Surveillance Scheme (EISS).[3,4] The index is based on sentinel GP ILI consultation rates, laboratory-confirmed cases of influenza, and influenza/ILI outbreaks.

Each Department of Public Health also established one sentinel hospital in each HSE Area, reporting total hospital admissions, accident and emergency admissions and respiratory admissions data on a weekly basis. Sentinel primary and secondary schools were also located in each HSE Area in close proximity to the sentinel GPs, reporting absenteeism data on a weekly basis.

The Departments of Public Health also notified all cases of influenza and all influenza/ILI outbreaks to HPSC on a weekly basis (following the amendments to the infectious disease regulations (SI No. 707 of 2003)). An enhanced dataset on all hospitalised influenza cases aged between 0 and 14 years of age was also reported to HPSC by the Departments of Public Health. From January 2005, HPSC was notified of all registered deaths on a weekly basis from the General Register Office (GRO), including influenza and pneumonia deaths.

***Weekly report and EISS***
HPSC produce a weekly influenza report, which is posted on the HPSC website www.hpsc.ie each Thursday. Results of clinical and virological data are reported, along with a map of influenza activity and a summary of influenza activity worldwide. HPSC also report the clinical and virological dataset to the European Influenza Surveillance Scheme (EISS) every Thursday.

## Results

*It should be noted that influenza notifications data for the 2005/2006 season are provisional.*

### *Clinical data*

Influenza activity in Ireland peaked later in the 2005/2006 season, compared to the 2004/2005 season. Activity was mild for most of the 2005/2006 influenza season, with a sharp peak during week 10 2006, peaking at 82.5 per 100,000 population (figure 1). During the peak in ILI consultation rates, the majority of cases reported were aged between 15 to 64 years. Figure 2 shows the age-specific GP consultation rate for ILI per 100,000 population by week for the 2005/2006-influenza season. A total of 905 ILI cases were reported by sentinel GPs during the 2005/2006 season compared to 585 during the 2004/2005 season (figure 3).

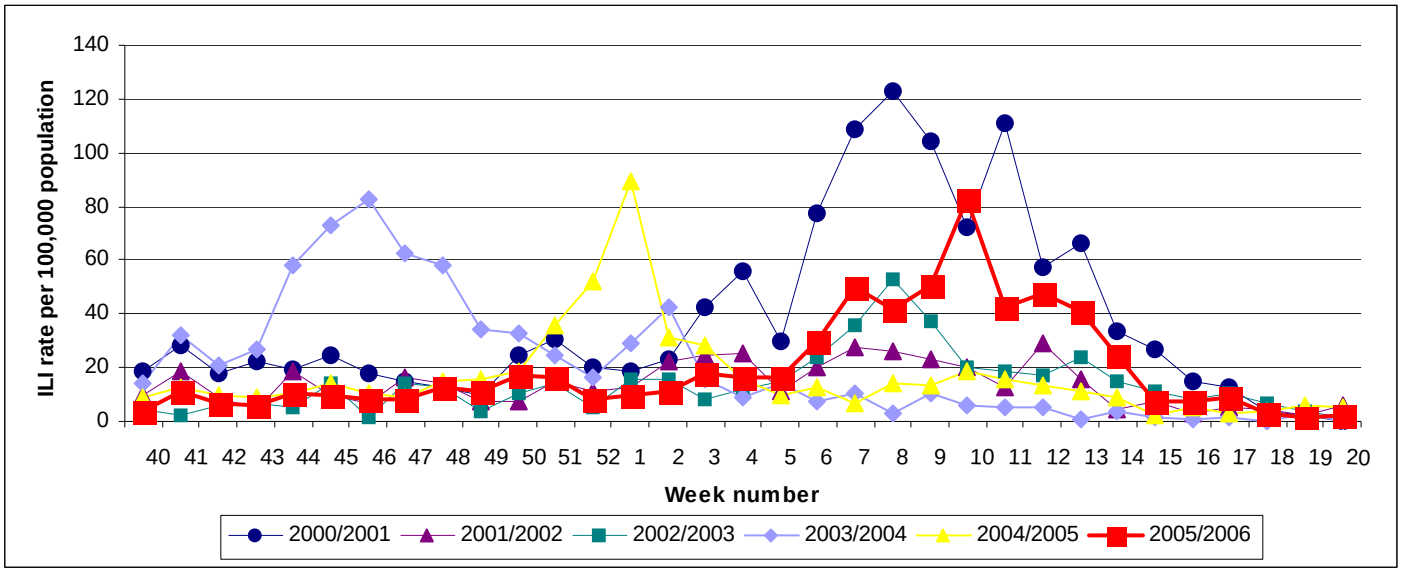


*Figure 1. GP consultation rate for influenza-like illness per 100,000 population by report week, during the 2000/2001, 2001/2002, 2002/2003, 2003/2004, 2004/2005* & 2005/2006 influenza seasons.*

**Please note that for comparison with previous years, data for week 52 2004 on this graph represents the average of weeks 52 2004 and 53 2004.*

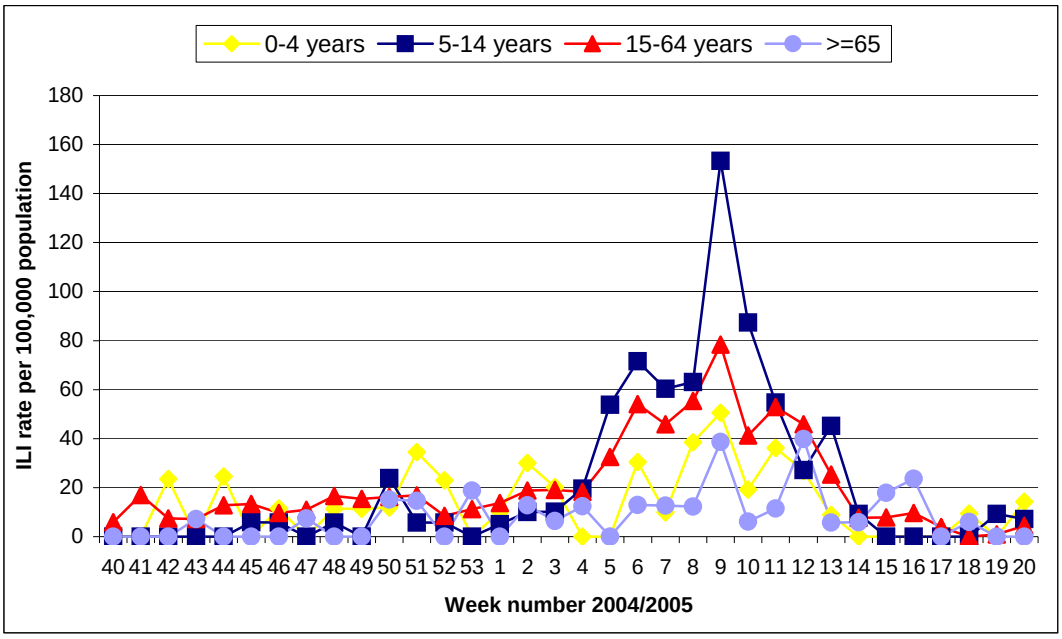


*Figure 2. Age-specific* GP consultation rate for ILI per 100,000 population by week for the 2005/2006-influenza season*

** Please note the denominator used in the age-specific consultation rate is from the 2002 census data; this assumes that the age distribution of the sentinel general practices is similar to the national age distribution.*

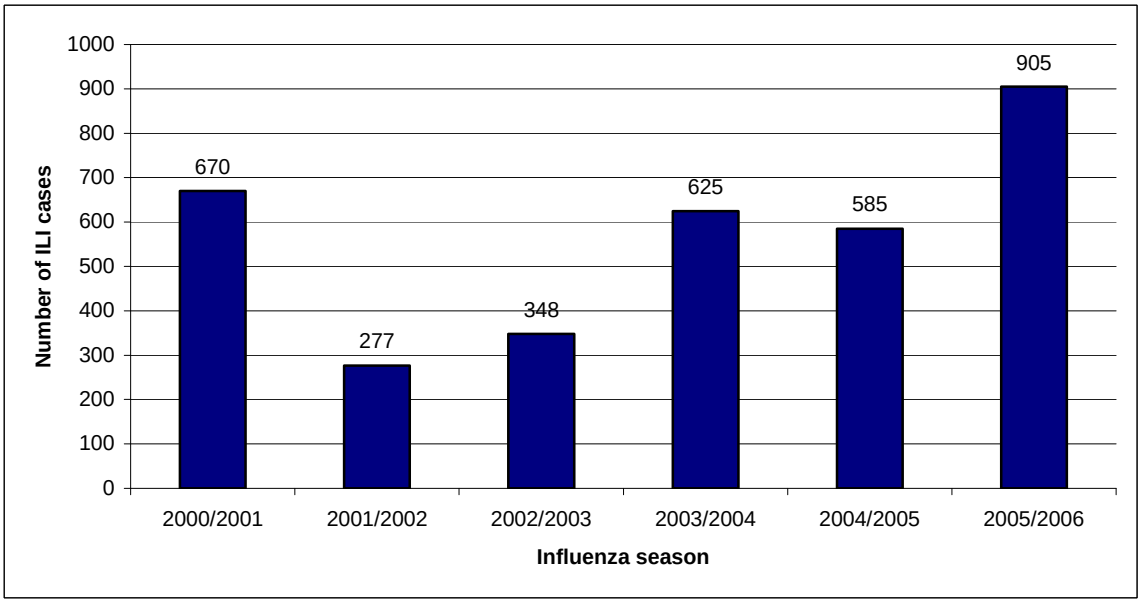


*Figure 3. ILI cases reported by sentinel GPs during the 2000/2001, 2001/2002, 2002/2003, 2003/2004, 2004/2005 & 2005/2006 seasons.**

**Please note when comparing the number of ILI cases reported per season that the number of sentinel practices has increased each season.*

***Virological data***

The NVRL tested 378 sentinel specimens for influenza virus during the 2005/2006 season (table 2). One hundred and thirty two (34.9%) sentinel specimens were positive for influenza: 64 influenza A (61 A H3 and 3 A unsubtyped) and 68 influenza B. The predominant influenza virus subtype identified was influenza A (H3), accounting for 46.2% of positive specimens. The majority of positive influenza sentinel cases were in the 15 to 64 year age group (77.3%) (figure 4).

The NVRL also tested 1783 non-sentinel respiratory specimens, mainly from hospitals. Of the 1783 specimens tested, 24 (1.3%) were positive for influenza A, 12 (0.7%) for influenza B and 376 (21.1%) were positive for RSV. The majority of influenza and RSV positive non-sentinel specimens were aged between 0 and 4 years (90.2%). It should be noted that non-sentinel specimens are predominantly from hospitalised paediatric cases.

The number of sentinel and non-sentinel positive influenza specimens by season is shown in figure 5, compared to the ILI rate per 100,000 population. Figure 6 shows the number of non-sentinel influenza and RSV positive specimens by week for the 2005/2006 season.

*Table 2. Number of sentinel GP swabs tested and number and percentage positive for influenza & RSV by season.*

| Season | Sentinel practices | Total swabs | Influenza | % Influenza | Influenza A | Influenza B | RSV | % RSV |
|---|---|---|---|---|---|---|---|---|
| 2000/2001 | 20 | 339 | 151 | 44.5 | 59 | 92 | NA | NA |
| 2001/2002 | 32 | 243 | 58 | 23.9 | 57 | 1 | NA | NA |
| 2002/2003 | 34 | 249 | 86 | 34.5 | 27 | 59 | NA | NA |
| 2003/2004 | 35 | 350 | 149 | 42.6 | 142 | 7 | NA | NA |
| 2004/2005 | 36 | 370 | 142 | 38.4 | 103 | 39 | 6 | 1.6 |
| 2005/2006 | 46 | 378 | 132 | 34.9 | 64 | 68 | N/A | N/A |
| **Total** | - | 1929 | 718 | 37.2 | 452 | 266 | **N/A** | **NA** |

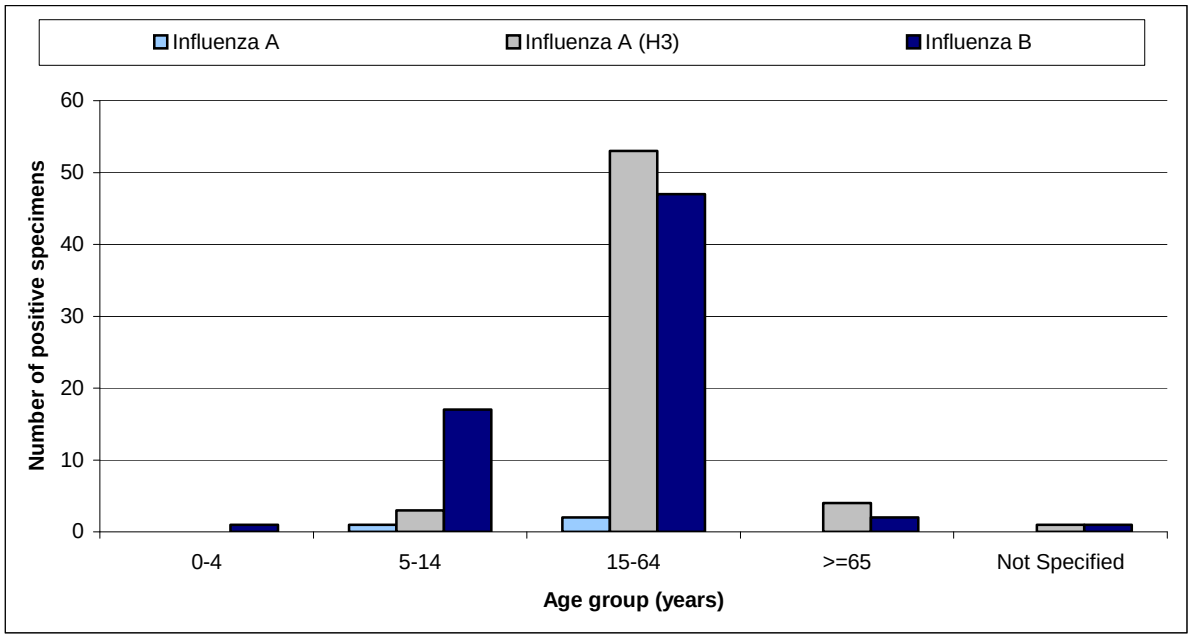


*Figure 4. Number of sentinel swabs positive for influenza virus by type, subtype, and age group (years), for the 2005/2006 season.*

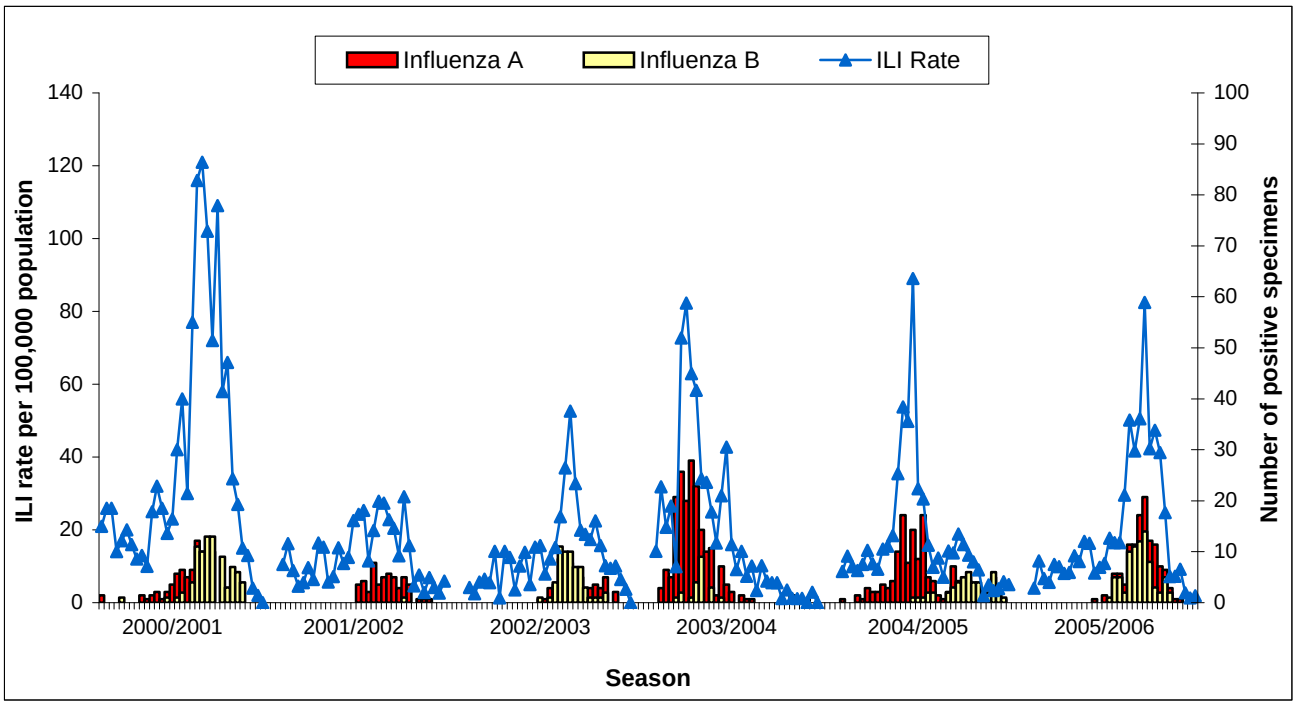


*Figure 5. ILI rate per 100,000 population and the number of positive influenza specimens (sentinel & non-sentinel) detected by the NVRL during the 2000/2001, 2001/2002, 2002/2003, 2003/2004, 2004/2005 & 2005/2006 seasons.*

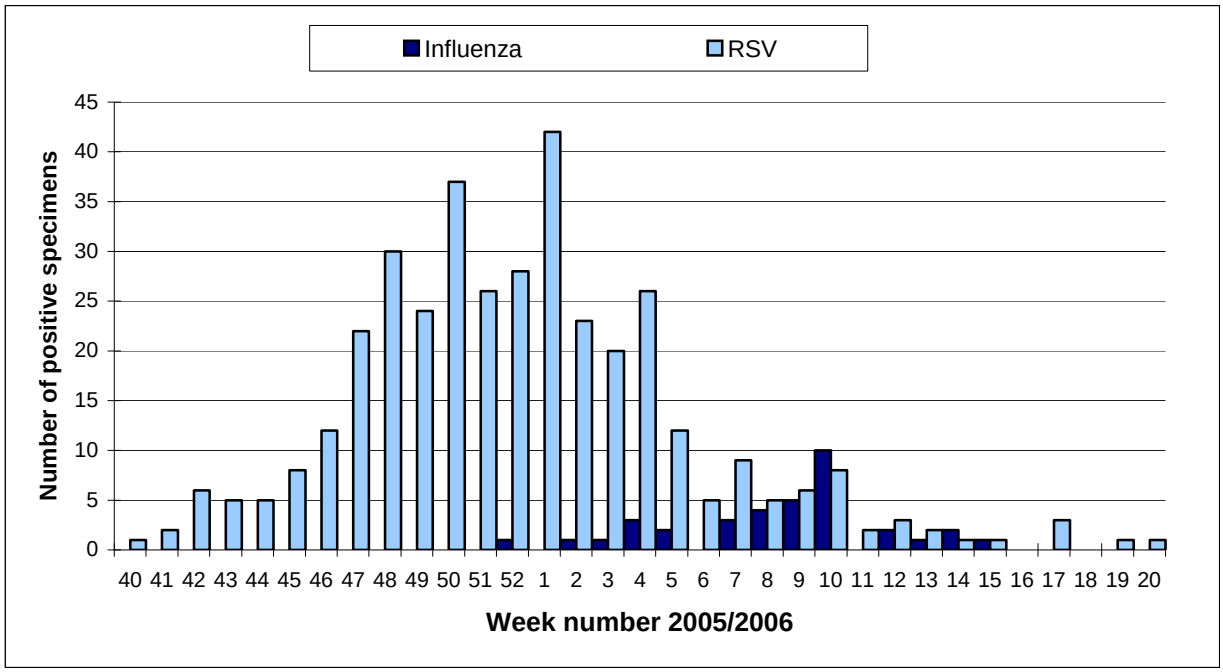


*Figure 6. Number of influenza and RSV positive non-sentinel specimens detected during the 2005/2006 season.*

***Vaccination status***

Of the 132 positive influenza virus detections from sentinel specimens, 109 (82.6%) were unvaccinated, 10 (7.6%) were vaccinated and vaccination status was unknown in 13 (9.8%) cases. Of the10 cases that were vaccinated, influenza A (H3) was detected in five cases and influenza B in five cases.

*Table 3. Influenza vaccination status of influenza virus positive cases detected from sentinel specimens during the 2005/2006-influenza season (n=132)*

| Influenza type/subtype | Vaccinated | Not Vaccinated | Unknown vaccination status | Positive cases |
|---|---|---|---|---|
| Influenza A (unsubtyped) | 0 | 3 | 0 | 3 |
| Influenza A (H3) | 5 | 53 | 3 | 61 |
| Influenza B | 5 | 53 | 10 | 68 |
| **Total** | **10** | **109** | **13** | **132** |

***Antigenic characterisation***

Two influenza specimens were sequenced at the NVRL and antigenic characterisation was undertaken at the WHO laboratory (Mill Hill) in London. One influenza A (H3) isolate was antigenically characterised as A/Hong Kong/4443/05 and one influenza B isolate was characterised as being closely related to B/Hong Kong/45/05.

***Regional influenza activity***

Influenza A and B co-circulated in all HSE Areas during the 2005/2006 season, except for HSE-NEA and HSE-NWA, where influenza A was the predominant influenza type detected and in HSE-WA where influenza B was the predominant type detected (table 4). Influenza activity peaked during week 10 2006, with HSE-ER, -MA, -MWA, -SEA and -SA all reporting localised influenza activity (figure 7). Overall, influenza activity was most intense in HSE-ER, -MWA and -NEA during the 2005/2006 season (figure 8). The highest ILI consultation rates were observed in HSE-MWA, peaking during week 10 2006.

*Table 4. Total number of sentinel and non-sentinel* influenza A and B positive specimens by HSE area for the 2005/2006 season to date*

| HSE-Area | Sentinel | | | Non-Sentinel | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Flu A** | **Flu B** | **Total** | **Flu A** | **Flu B** | **Total** | **Flu A** | **Flu B** | **Total** |
| HSE-ER | 21 | 22 | 43 | 20 | 9 | 29 | 41 | 31 | 72 |
| HSE-MA | 2 | 1 | 3 | 0 | 2 | 2 | 2 | 3 | 5 |
| HSE-MWA | 6 | 7 | 13 | 1 | 0 | 1 | 7 | 7 | 14 |
| HSE-NEA | 8 | 3 | 11 | 0 | 1 | 1 | 8 | 4 | 12 |
| HSE-NWA | 5 | 4 | 9 | 2 | 0 | 2 | 7 | 4 | 11 |
| HSE-SEA | 10 | 14 | 24 | 1 | 0 | 1 | 11 | 14 | 25 |
| HSE-SA | 10 | 8 | 18 | 0 | 0 | 0 | 10 | 8 | 18 |
| HSE-WA | 2 | 9 | 11 | 0 | 0 | 0 | 2 | 9 | 11 |
| **Total** | **64** | **68** | **132** | **24** | **12** | **36** | **88** | **80** | **168** |

**Please note that non-sentinel specimens include all specimens referred to the NVRL, these specimens are mainly from hospitals and some GPs and may include more than one specimen from each case.*

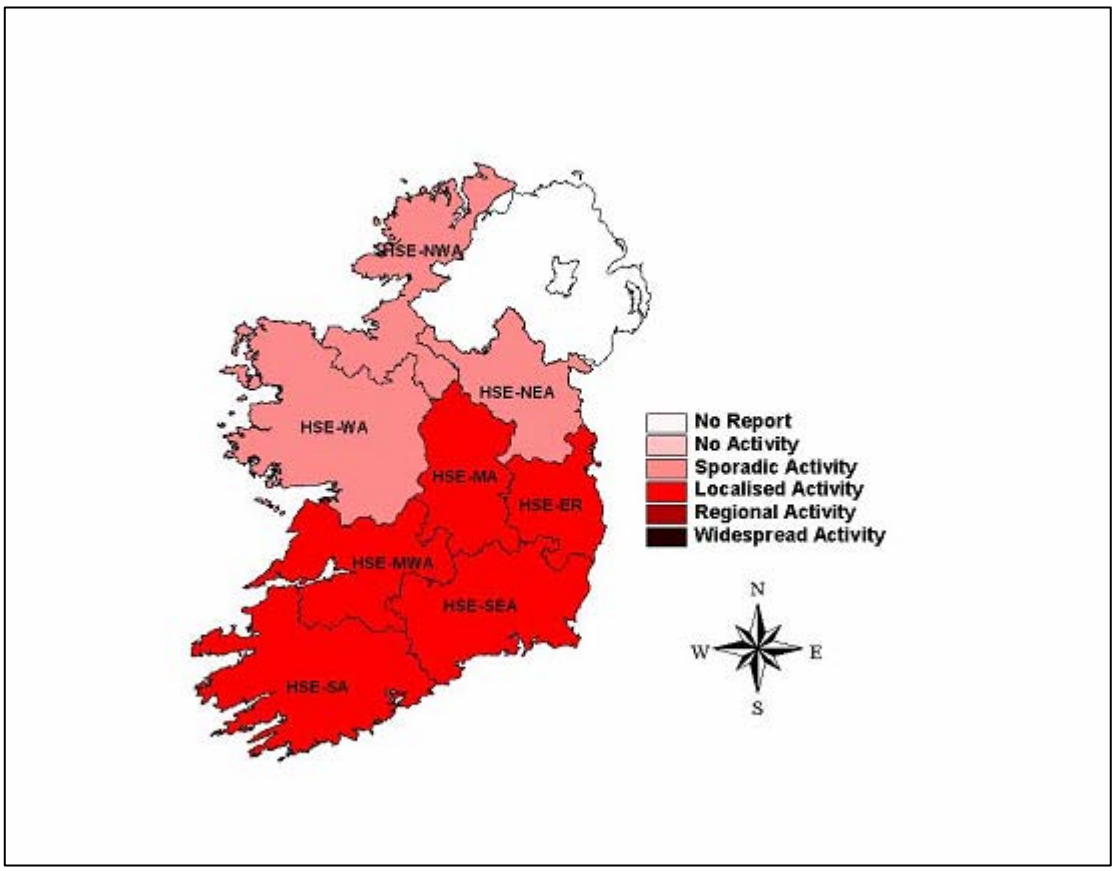


*Figure 7. Map of influenza activity by HSE Area during the 2005/2006 season peak of influenza activity, week 10 2005.*

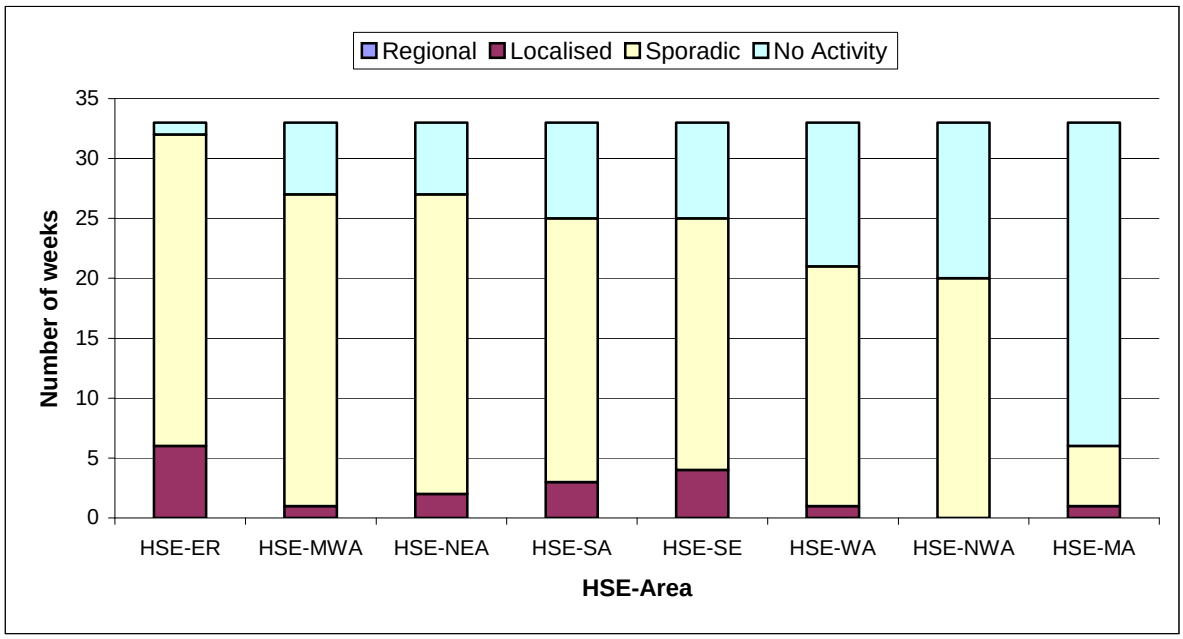


*Figure 8. Number of weeks during the 2005/2006 season that each HSE Area reported influenza activity.*

***Outbreaks***

During the 2005/2006 season, four ILI/influenza outbreaks were reported to HPSC. One ILI outbreak occurred during week 4 2006 in a nursing home in HSE-NEA. The main symptoms experienced were headache, malaise, nasal symptoms and fever. All residents had received the 2005/2006 influenza vaccine. HPSC also received notification of an ILI outbreak in a primary school in HSE-ER during week 9 2006. A further two ILI outbreaks occurred in HSE-MA during week 10 2006, both occurred in sentinel schools, one in a primary school and the other in a secondary school. The ILI outbreak in the sentinel secondary school comprised nine cases, six of whom were notified via CIDR. All six notifications were reported as male, with four notifications in 10-19 year olds and two notifications were reported as age unknown. One notification was reported as influenza B, three notifications as influenza unspecified and two notifications did not specify an organism.

***Sentinel hospitals & sentinel schools***

Hospital respiratory admissions (as a proportion of total hospital admissions) in sentinel hospitals peaked during week 52 2005 (figure 9), following the seasonal peak in RSV. A second smaller peak in hospital respiratory admissions was observed in week 12 2006, two weeks following the peak in sentinel GP ILI consultation rates. Absenteeism in several sentinel schools was also at elevated levels during the peak in ILI consultation rates.

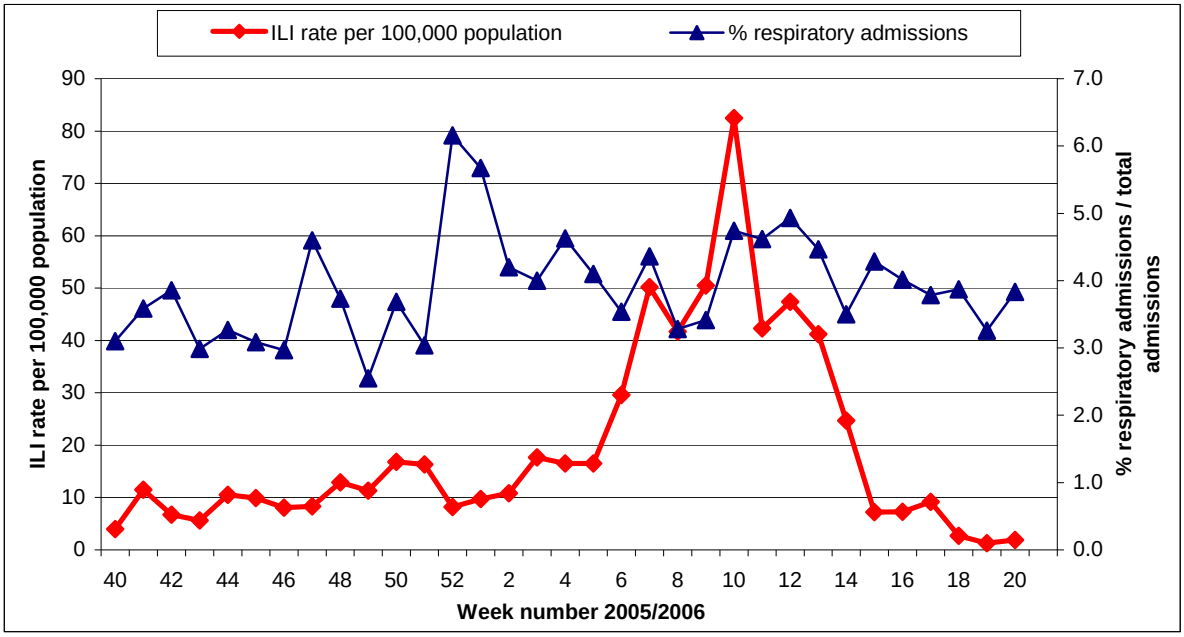


*Figure 9. Respiratory admissions as a percentage of total hospital admissions in seven sentinel hospitals and ILI rates per 100,000 population by week for the 2005/2006-influenza season.*

***Enhanced influenza surveillance***

A total of ten influenza cases were reported through the enhanced surveillance system during the 2005/2006 season. Two cases were hospitalised in February 2006, four in March 2006 and four in April 2006. All enhanced cases were in the 0-4 year age group; seven were under 1 year of age and three were in the 1-4 year age group. All

ten cases were notified from HSE-ER. This compares to 13 hospitalised influenza cases in 0-14 year olds reported during the 2004/2005 season (also from HSE-ER). ILI GP consultation rates were at elevated levels during February and March 2006 in HSE-ER. Nine enhanced cases were positive for influenza A and one was positive for influenza B. Symptoms included fever (10/10), cough (8/10), gastrointestinal manifestations (4/10), fatigue (4/10), sore throat (1/10), difficulty breathing (1/10) and myalgia (1/10). Complications included bronchitis, bronchiolitis, acute otitis media, secondary bacterial pneumonia, primary viral pneumonia and other respiratory complications. The mean number of days in hospital was 6.7 (ranging from 3-14). Four cases were in at risk categories for influenza vaccine, three of whom were not vaccinated. Nine cases have recovered and one case was lost to follow up.

***Mortality data***

There were 17,807 deaths from all causes and 3,567 pneumonia and influenza deaths[1] (20.0% of all deaths) registered with the GRO during the 2005/2006 season.

One death attributed to influenza was registered with the GRO during the 2005/2006 influenza season (during week 15 2006 from HSE-MA). Influenza was the secondary cause of death and not the primary cause in this case. This was the only registered death attributed to influenza reported to HPSC during the 2005/2006 season.

***Influenza notifications data***

A total of 243 influenza notifications were reported to HPSC during the 2005/2006 influenza season. The majority (73.8%) of cases were aged between 15 and 64 years. Influenza notifications peaked during week 13 2006. One outbreak was notified during the 2005/2006 season from HSE-MA in week 10 2006 coinciding with the ILI peak (see Outbreaks section). The number of influenza notifications (possible & confirmed) by type and week of notification is shown in figure 10 and compared to the ILI rate per 100,000 population.

[1] It is not intended to imply that all of these deaths could be attributed directly or indirectly to influenza. The deaths attributed to pneumonia include all pneumonia related deaths with the exception of aspiration pneumonia, pneumonitis and pneumococcal meningitis. The current best Irish national estimate of the number of deaths annually from influenza and its complications is 300-400 deaths per year and is based on extrapolation of studies done in the UK and the US.

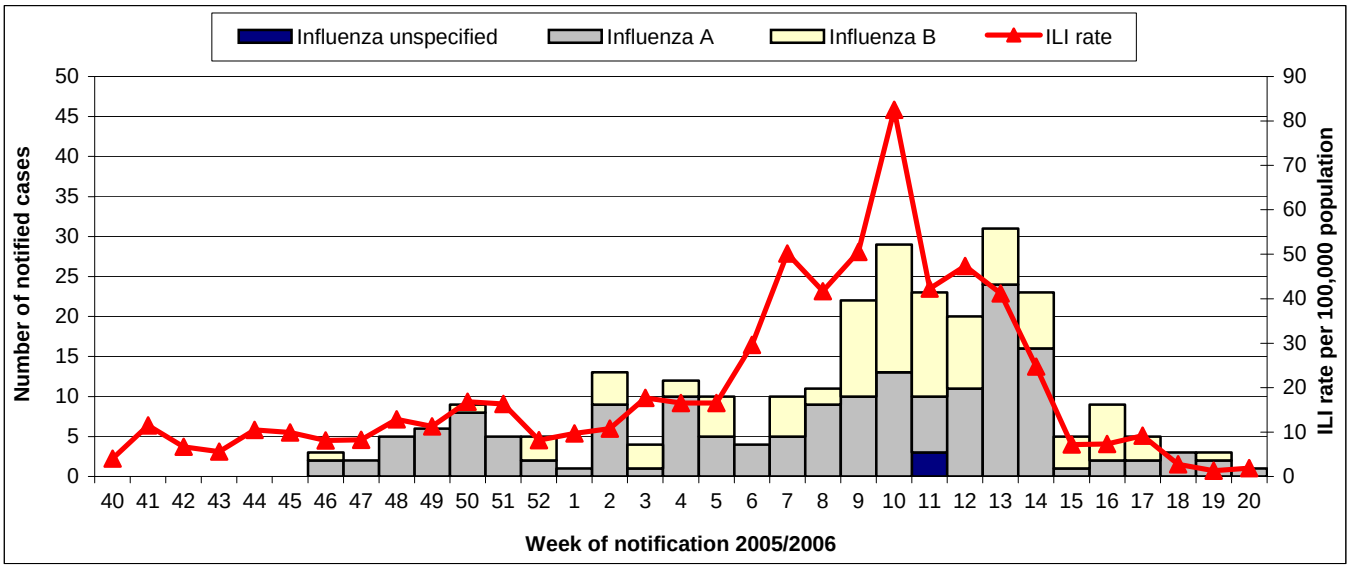


*Figure 10. Number of notifications of influenza (possible & confirmed) by type and by week of notification* and compared to ILI rates per 100,000 population during the 2005/2006 influenza season.*

**Please note that notification data are provisional and were extracted from CIDR on 27/09/2006.*

***Influenza activity worldwide***

During the 2005/2006 season, the United Kingdom experienced the sixth consecutive year of low levels of influenza activity, peaking late in the season, with B/Hong Kong/330/2001-like virus identified as the dominant circulating strain. Seven hundred and seven school outbreaks of ILI were reported from across England and Wales during the season, 70 of these were associated with influenza B. [5]

Influenza activity was moderate in the majority of European countries during 2005/2006, with influenza B virus identified as the dominant virus circulating. Only Estonia and Lithuania reported a high intensity of clinical influenza activity. Consultation rates above the baseline were first reported in week 1 2006.

A spatial analysis of the spread of influenza activity in Europe carried out at the end of the 2004/2005 season revealed a west-east spread of influenza activity during the past four influenza seasons (2001-2005). In contrast to the previous four seasons, the spatial analysis for the 2005/2006 season indicated that there was no significant west-east spread (p=0.575). There was also no significant south-north spread (p=0.559). However, the spatial analysis for the 2005/2006 season is affected by the large number of countries that had to be excluded as their consultation rate for ILI or ARI did not go above the baseline.

Based on subtyping data of all influenza virus detections in Europe from sentinel and non-sentinel sources up to week 16 2006 (N=9671), 60% were influenza B and 40% were influenza A. Of the 3884 influenza A virus detections, 65% were influenza A unsubtyped, 13% were A (H1) and 22% were A (H3N2). The N-subtype was determined in 45% of A (H1); 99.2% were A (H1N1) and 0.8% were A (H1N2). Of all 9671 influenza virus detections up to week 16 2006, 2195 have been antigenically and/or genetically characterised: 368 were A/New Caledonia/20/99 (H1N1)-like, 296 were A/California/7/2004 (H3N2)-like, 1386 were B/Malaysia/2506/2004-like

(B/Victoria/2/87-lineage) and 145 were B/Jiangsu/10/2003-like (B/Jiangsu/10/2003 is a B/Shanghai/361/2002-like virus from the B/Yamagata/16/88-lineage) .[3]

In Canada, influenza A and B co-circulated during 2005/2006 season with 232 (51.1%) influenza A and 222 (48.9%) influenza B detections. Of the 254 influenza virus detections, 96 influenza viruses were antigenically characterised by the National Microbiology Laboratory (NML): 56 were A/California/07/2004 (H3N2)-like; one was A/New Caledonia/ 20/1999 (H1N1)-like; 36 were B/Hong Kong/330/2001-like; and three were B/Shanghai/361/2002-like. All 57 (100%) of the influenza A strains characterised by the NML have matched those included in the 2005-2006 Canadian vaccine. [6]

In US, influenza A (H3N2) viruses predominated overall, but late in the season influenza B viruses were more frequently isolated than influenza A viruses. Influenza A (H1N1) viruses circulated at low levels throughout the season. Nationally, activity was low from October through early January, increased during February, and peaked in early March. Peak activity was less intense, but activity remained elevated for a longer period of time this season compared to the previous three seasons. Of the 563 influenza A (H3N2) viruses, 410 (72.8%) were characterised as A/California/07/2004-like, which is the influenza A (H3N2) component recommended for the 2005-06 influenza vaccine, and 153 (27.2%) viruses showed reduced titers with antisera produced against A/California/07/2004. Of the 153 low-reacting viruses, 127 were tested with antisera produced against A/Wisconsin/67/2005 (the H3N2 component selected for the 2006-07 vaccine), and 94 are A/Wisconsin-like. [7]

The most significant global influenza event during the 2005/2006 season was the poultry outbreaks of avian influenza A (H5N1) in Africa, Asia and Europe. Avian influenza (H5N1) outbreaks spread rapidly and widely and resulted in mass poultry culls, and were associated with cases/clusters of human infections and a number of human deaths. [1, 2]

The WHO announced its recommendations for the composition of the influenza vaccine for the northern hemisphere for 2005/2006 on February 10th 2005. The members of the WHO Collaborating Centres on Influenza recommended that influenza vaccines contain the following strains: an A/New Caledonia/20/99(H1N1)-like virus, an A/California/7/2004(H3N2)-like virus and a B/Shanghai/361/2002-like virus [8]

## Discussion

Influenza activity peaked late in Ireland during the 2005/2006-influenza season with influenza A (H3) and B co-circulating, occurring mostly in 5 to 14 year olds. Influenza activity also started later in most of Europe, Canada and the US, with lower levels of activity reported than the previous season. [3, 5, 6, 7]

Surveillance of hospital admissions data and school absenteeism data plays a significant role in the early detection of influenza epidemics. [9] This was demonstrated during the 2005/2006 season, with increased levels of admissions reported from sentinel hospitals following the seasonal peak in RSV and two weeks after the peak in sentinel GP ILI consultation rates. The value of collating school absenteeism data as

an indicator of influenza activity was also highlighted with the detection of two ILI outbreaks in sentinel schools.

The small number of influenza associated deaths reported to HPSC for the 2005/2006 season is not unexpected. Excess deaths due to influenza are often not registered as influenza deaths. The overall impact of influenza on mortality is estimated to be greater than registered influenza mortality. Monitoring influenza and pneumonia deaths is one method of identifying these influenza-non-attributed deaths, and from this estimating the mortality burden caused by influenza each season. [10]

Avian outbreaks of influenza A (H5N1) have posed a significant threat to human health since 2003. In a number of outbreaks in Asia, the virus has jumped from infected chickens or ducks directly to humans. These direct human infections have produced severe and sometimes fatal outcomes. The risk of virus transmission to humans from infected poultry will continue as long as outbreaks are occurring in poultry. Of greatest concern is the risk that continuing transmission of the virus to humans will give avian and influenza viruses an opportunity to exchange genes (re-assortment), thereby acquiring the ability to transmit easily from human-to-human and thus triggering a pandemic.[1, 2]

In October 2005, avian outbreaks of influenza A (H5N1) spread westwards to Turkish bird populations. This was followed shortly afterwards by detection of poultry outbreaks of influenza A (H5N1) in Romania, which were the first cases of influenza A (H5N1) in Europe.[11] Avian outbreaks of influenza A (H5N1) were also detected for the first time in Africa (Nigeria) during February 2006. As of July 7th 2006, Spain became the 14th EU Member State to report a case of highly pathogenic avian influenza A (H5N1) in wild birds. The other countries include Greece, Italy, Slovenia, Hungary, Austria, Germany, France, Slovakia, Sweden, Poland, Denmark, Czech Republic and the UK. Avian influenza A (H5N1) remains predominantly a disease of birds. A small number of human cases have been reported in Asia, Africa and Eastern Europe, all of which have been associated with close contact with dead or dying poultry. In all human cases to date there has been no evidence of efficient human-to-human transmission. Human infections remain a rare event.[1]

However, with the ever-greater threat of a pandemic posed by influenza A (H5N1), EU Member States are strengthening their preparedness for a potential human influenza pandemic.[12] As a result of this threat, a number of additional measures have been put in place in Ireland to improve surveillance of ILI/influenza. Work is in progress to increase the number of sentinel GPs, thereby improving geographical and population representation. Sentinel GPs are also currently monitoring ILI on a year round basis. In addition, influenza and all outbreaks became notifiable in Ireland on 1 January 2004. Reporting of such events is critical to early detection of influenza activity. An enhanced influenza surveillance system was set up to detect all hospitalised influenza cases aged between 0 and 14 years of age. Other activities that are being implemented to improve the surveillance of influenza include weekly surveillance of influenza and pneumonia registered deaths, monthly surveillance of influenza vaccine uptake data in those aged 65 years and older, and the construction of baseline and epidemic threshold levels for influenza activity in Ireland. An evaluation of sentinel hospital admissions and school absenteeism data has been completed and recommendations are currently being implemented. Contact and

attendance data is also currently being collated from GP co-operatives, to act as a crude indicator of influenza activity. Work is ongoing in several other areas including: case and contact based reporting of avian influenza, surveillance of unexplained deaths/increased deaths due to respiratory tract infections in healthcare facilities and surveillance of respiratory illness in healthcare workers. This information 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
http://www.hpsc.ie/A-Z/Respiratory/Influenza/

**Acknowledgements**
Special thanks are due to the sentinel GPs, the ICGP, the NVRL, the Departments of Public Health and sentinel schools and hospitals that provide data throughout the influenza season.

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