2.1 Influenza

Summary

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

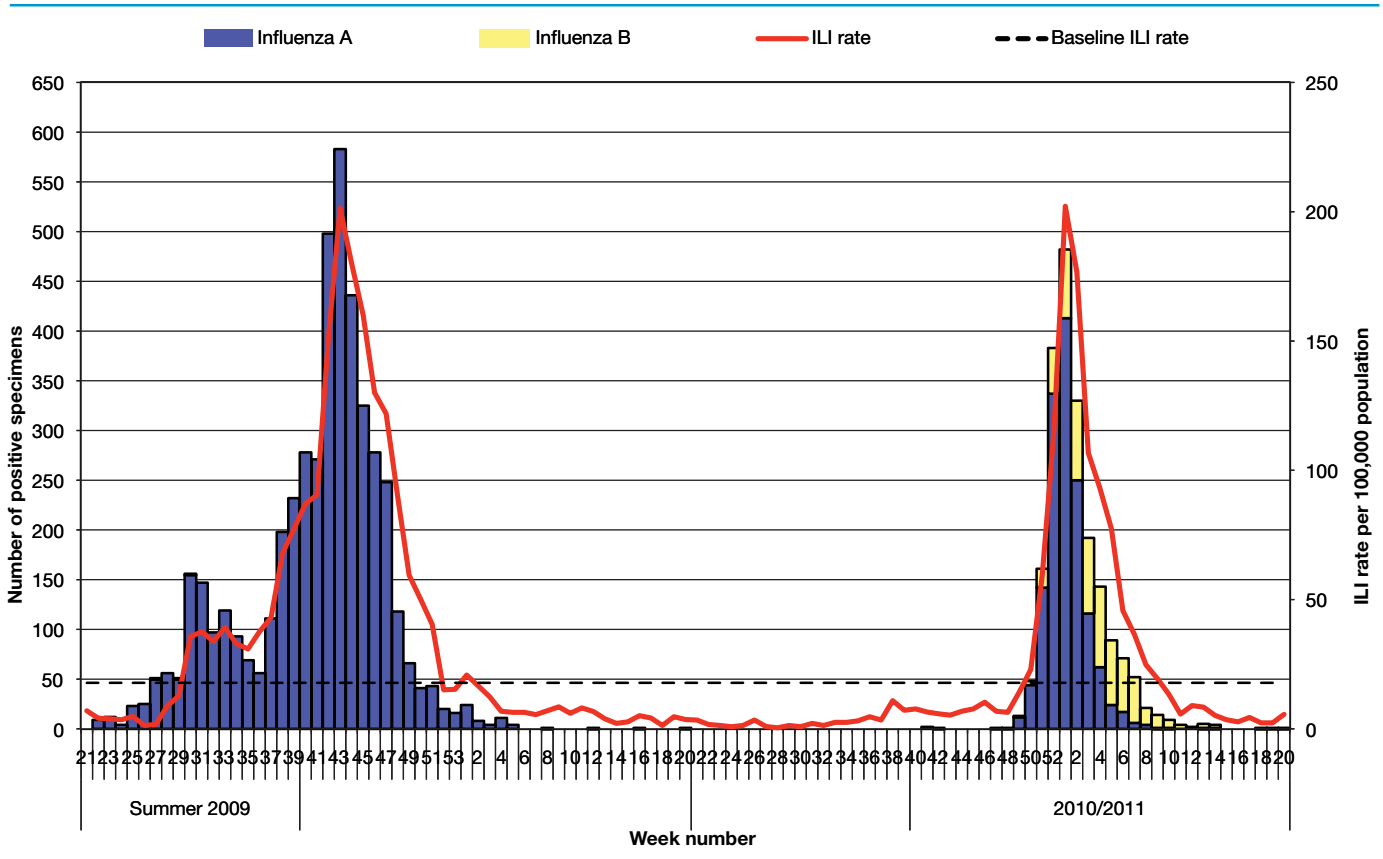

Figure 1. ILI sentinel GP consultation rates per 100,000 population, baseline ILI threshold rate, and number of positive influenza A and B specimens tested by the NVRL[2] , by influenza week and season.
Source: Clinical ILI data from ICGP and virological data from the NVRL.

Pregnancy

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

Enhanced surveillance hospital data on 0-14 year age group

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

Critical care

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

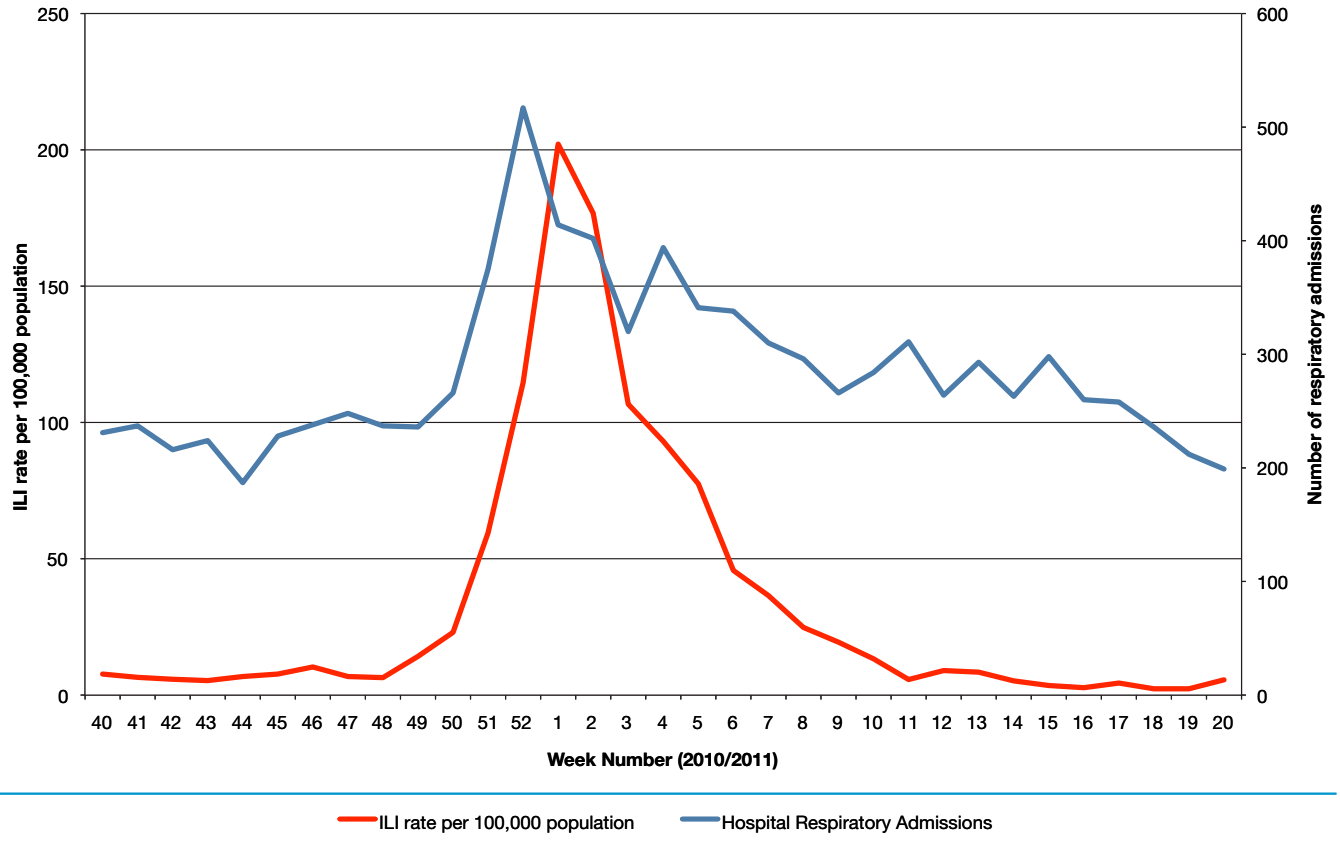

Figure 2. Total hospital respiratory admissions in nine sentinel hospitals and ILI sentinel GP consultation rate per 100,000 population by week for the 2010/2011 influenza season. It should be noted that admissions data from one sentinel hospital were not available for weeks 40-50 2010.

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

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

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

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

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

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

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

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

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

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

References

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

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

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

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