2.1 Influenza and Other Seasonal Respiratory Viruses

2015/2016 influenza season summary:

Peak influenza-like illness rate: 80.6/100,000 population
Total confirmed influenza cases hospitalised:1856
Total confirmed influenza cases admitted to ICU: 161
Total notified influenza cases that died: 84
Total number of acute respiratory infection and influenza outbreaks: 63

HPSC has worked in collaboration with the National Virus Reference Laboratory (NVRL), the Irish College of General Practitioners (ICGP) and the Departments of Public Health on the influenza sentinel surveillance project since 2000. During the 2015/2016 influenza season, 61 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 nose and throat swab to the NVRL on one ILI patient per week. The NVRL also tested respiratory non-sentinel specimens, referred mainly from hospitals.

Other surveillance systems set up to monitor ILI/influenza activity include:

- Surveillance of all calls to GP out-of-hours (OOHs) centres, monitored for self-reported influenza. These data were provided by HSE-NE.
- Surveillance of all confirmed influenza notifications, including hospitalisation status reported to the Computerised Infectious Disease Reporting System (CIDR) in Ireland.
- Enhanced surveillance of hospitalised influenza cases aged 0-14 years.
- Intensive Care Society of Ireland (ICSI) and the Critical Care Programme (CCP) enhanced surveillance of all critical care patients with confirmed influenza
- Surveillance of all reported influenza deaths.
- All-cause mortality monitoring associated with the European mortality monitoring group (EuroMOMO)
- A network of sentinel hospitals reporting admissions data.
- Outbreak surveillance – Acute respiratory infections and influenza
- Influenza vaccine effectiveness study (I-MOVE)

This report summarises influenza and other seasonal respiratory virus activity in Ireland during the 2015/2016 influenza season. The 2015/2016 season commenced on 28th September 2015 (week 40 2015) and ended on 22nd May 2016 (week 20 2016). The data presented in this summary were based on all data reported to HPSC by the 28th November 2016.

Sentinel GP Clinical Data
Influenza activity reported from the sentinel GP network in Ireland was at moderate levels during the 2015/2016 influenza season, with ILI consultation rates peaking at 80.6 per 100,000 population during week 4 2016 (late January), the highest peak rate since the 2010/2011 season. ILI rates first increased above baseline levels (17.9 per 100,000) during week 1 2016 and remained there for 10 consecutive weeks, which is the average length of time above baseline in Ireland. ILI rates were above medium intensity levels for five consecutive weeks (figure 1). The highest age specific ILI rates were reported in the 5-14 year age group (peaking at 131.6/100,000), followed by the 0-4 year age group (112.9/100,000), the 15-64 year age group (81.7/100,000) and those aged 65 years and older (69.1/100,000). It is notable that the age specific rates in the 0-4, 5-14 and 15-64 year age groups were the highest reported in these age groups since the 2010/2011 season. Age specific rates in those aged 65 years and older were the highest reported since the 2008/2009 season and were only higher during the 2003/04 season.

Virological Data from National Virus Reference Laboratory (NVRL) – Influenza
Sentinel GP data: The NVRL tested 1158 sentinel specimens for influenza virus during the 2015/2016 season. Five hundred and seventy-three (49.5%) sentinel specimens were positive for influenza: 329 influenza A (313 A(H1)pdm09, 6 A(H3) and 10 A not subtyped) and 244 influenza B. Fifty seven percent of all confirmed influenza sentinel cases were positive for influenza A and 43% for influenza B. Of subtyped influenza A specimens, 98% were positive for influenza A(H1) pdm09. Overall, 89% (968/1088 with known vaccination status) of ILI patients tested for influenza were not

vaccinated with the 2015/2016 seasonal influenza vaccine. Sixty-four percent of those aged 65 years and older were not vaccinated and 76% of those aged less than 65 years with a known risk factor for influenza were not vaccinated. Fifteen ILI patients were reported as having commenced antiviral treatment.

Non-sentinel data: The NVRL tested 11,362 non-sentinel respiratory specimens during the 2015/2016 season, 1694 (14.9%) of which were positive for influenza: 1130 influenza A (1023 A(H1)pdm09, 42 A(H3), and 65 A (not subtyped)) and 564 influenza B. Sixty-seven percent of all confirmed influenza non-sentinel cases were positive for influenza A and 33% were positive for influenza B. Of subtyped influenza A specimens, 96% were positive for influenza A(H1)pdm09.

Influenza A(H1)pdm09 was the predominant influenza virus circulating during the 2015/2016 season, co-circulating with influenza B throughout the season. Influenza A accounted for 64% of all influenza positive specimens and influenza B for 36%. Of the 1384 influenza A sentinel and non-sentinel specimens that were subtyped, influenza A(H1)pdm09 accounted for 96.5% and influenza A(H3) for 3.5%. In total 1336 positive influenza A(H1)pdm09 cases were detected by the NVRL during the 2015/2016 season, this is the highest number of A(H1)pdm09 viruses detected since the 2010/2011 season.

Influenza virus characterisation:
For the 2015/2016 influenza season, genetic and antigenic characterisation of influenza viruses circulating in Ireland was carried out by the NVRL on 122 positive samples: 83 A(H1)pdm09, 9 A(H3), and 30 B. All influenza A(H1N1) pdm09 viruses genetically characterised belonged to the genetic group A/South Africa/3626/2013 (subgroup 6B). All influenza A(H1)pdm09 viruses successfully isolated and antigenically characterised by the NVRL during the 2015/2016 season were similar to the 2015/2016 A(H1) pdm09 vaccine strain A/California/07/2009. Nine influenza A(H3) viruses were genetically characterised, all belonged to the genetic group A/Hong Kong/4801/2014 (3C.2a), which is a genetic group of viruses that was antigenically similar to the 2015/2016 influenza A(H3) vaccine strain. One of 30 influenza B viruses genetically characterised during the 2015/16 season belonged to the genetic group B/Phuket/3073/2013 (Yamagata lineage clade 3); this virus was also successfully isolated and antigenically characterised as being similar to the 2015/16 trivalent influenza vaccine strain B/Phuket/3073/2013. The majority (29 of 30; 96.7%) of influenza B viruses genetically characterised belonged to the genetic group B/Victoria/2/87 (clade 1A). The vast majority of influenza B viruses successfully isolated and antigenically characterised by the NVRL during the 2015/2016 season were similar to the B/ Brisbane/60/2008-like virus. The B/Brisbane/60/2008-like virus (a B/Victoria virus) was not present in the 2015/2016

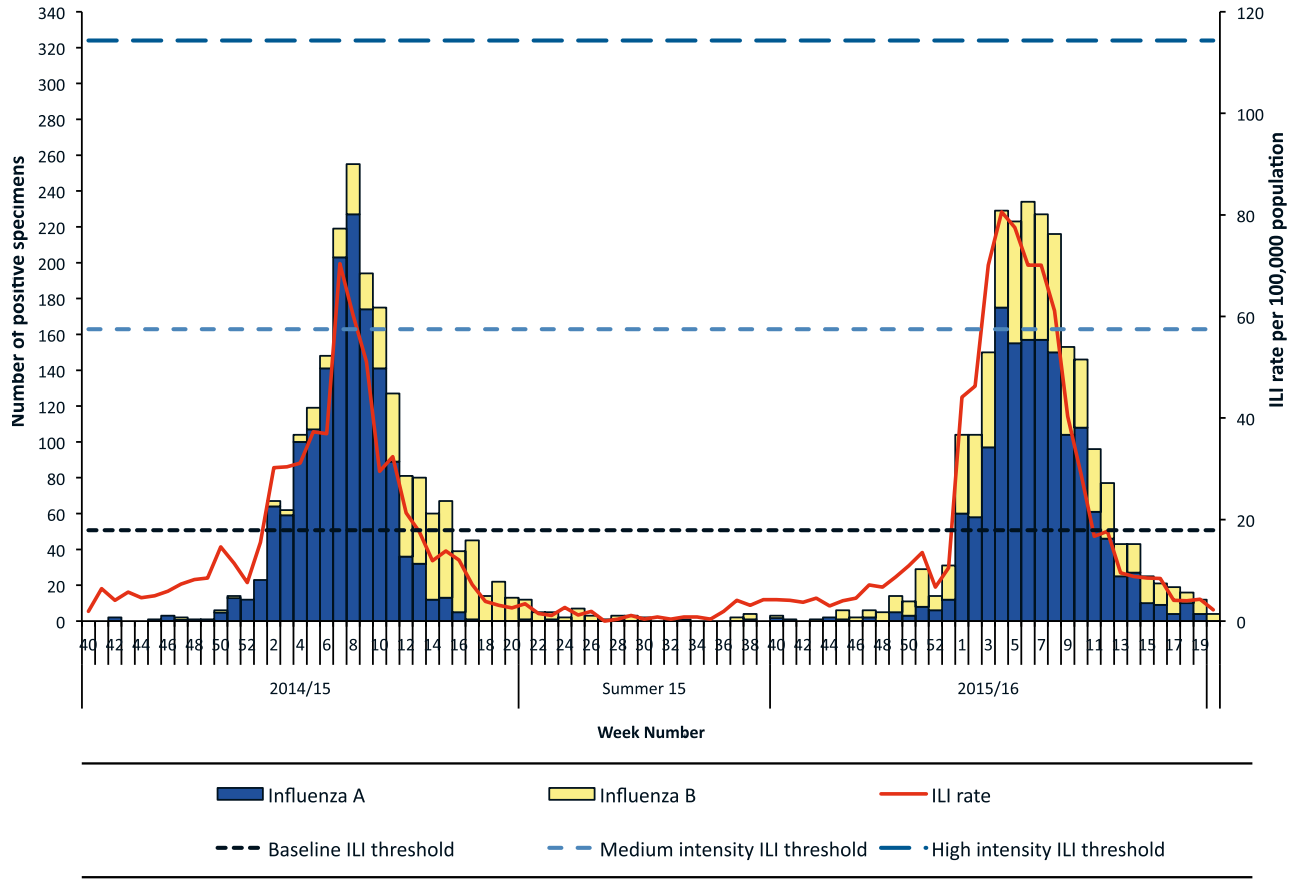

Figure 1: ILI sentinel GP consultation rates per 100,000 population, baseline ILI threshold, medium and high intensity ILI thresholds1 and number of positive influenza A and B specimens tested by the NVRL, by influenza week and season.
Source: Clinical ILI data from ICGP and virological data from the NVRL.

[1] For further information on the Moving Epidemic Method (MEM) to calculate ILI thresholds: http://www.ncbi.nlm.nih.gov/pubmed/22897919

trivalent influenza vaccine used in Ireland and throughout most of Europe.

Virological Data from NVRL - Other seasonal respiratory viruses

During the 2015/2016 season, of 11,362 non-sentinel specimens tested by the NVRL, 951 (8.4%) positive detections of respiratory syncytial virus (RSV) were reported, peaking (at 33.8% positivity) during week 50 2015. A total of 199 (1.8%) positive detections of human metapneumovirus (hMPV) were reported, peaking during mid-December 2015. One hundred and fifty-eight (1.4%) positive detections of adenovirus were reported, peaking in mid-February 2016. Sixty-five (0.6%) parainfluenza virus type 1 (PIV-1), 29 (0.3%) PIV-2, 59 (0.5%) PIV-3 and 19 (0.04%) PIV-4 positive detections were reported during the 2015/2016 season. Positive detections of RSV, adenovirus and parainfluenza virus type 1 reached the highest numbers ever reported by the NVRL for any season.

Of the 1158 sentinel specimens tested during the 2015/2016 season, 27 (2.3%) were positive for RSV, 16 (1.4%) for hMPV, 13 (1.1%) for adenovirus, six (0.5%) PIV-1, one (0.2%) PIV-2, and two (0.2%) PIV-4. There were no positive detections of PIV-3 from sentinel sources during the 2015/2016 season.

Outbreaks, GP OOHs & sentinel hospital data

Thirty-six confirmed influenza general outbreaks were reported to HPSC during the 2015/2016 influenza season (table 1), a significant decrease compared to 90 reported during the 2014/2015 season. The majority of influenza outbreaks reported during the 2015/16 season were associated with influenza A(H1)pdm09. Thirty outbreaks were associated with influenza A (27 A(H1)pdm09 and 3 A - not subtyped) and five with influenza B. No influenza type/subtype was reported for one outbreak. Twenty-one confirmed influenza outbreaks were reported from community hospitals/residential care facilities, 13 from acute hospital settings and two from schools. In total four deaths were recorded as associated with these 36 outbreaks. It is probable that the actual number of deaths linked with these outbreaks exceeds this number. A further 27 acute respiratory infection (ARI) general outbreaks were reported during the 2015/2016 influenza season, eight were associated with RSV, two with hMPV, two with parainfluenza type 1, one with rhinovirus and 14 associated with unidentified pathogens. For all ARI and influenza outbreaks, vaccination status was reported for patients from 14 healthcare facilities/residential institutions, with over 92% (466/507) of patients vaccinated prior to these outbreaks. Vaccination status was reported for staff from only six healthcare facilities/residential care facilities, with only 7% (17/244) of staff reported as vaccinated prior to these outbreaks. Use of antivirals for treatment in healthcare settings was reported from 11 ARI/influenza outbreaks (of 17 outbreaks that reported data) and use of antivirals for chemoprophylaxis was reported from seven ARI/influenza outbreaks (of 14 outbreaks that reported data).

The percentage of influenza-related calls to GP out-of-hours services in Ireland, peaked during week 5 2016 (the first week in February) at 5.1%, one week later than the peak in sentinel GP ILI consultation rates. The peak in influenza-related calls was the highest peak since the 2012/13 season. During the peak of activity, each service received on average, one call per hour relating to influenza.

Hospital respiratory admissions reported from a network of sentinel hospitals during the 2015/2016 season, peaked at 531 during week 51 2015, this is the highest peak level in recent years. The peak coincided with high levels of RSV activity and increasing influenza activity. Total emergency admissions reported from sentinel hospitals peaked during weeks 3-6 2016, coinciding with peak influenza activity. Total emergency admissions peaked at 3003 during week 3 2016.

Influenza and RSV notifications

A total of 4252 influenza notifications were reported on Ireland's Computerised Infectious Disease Reporting System (CIDR) during the 2015/2016 influenza season; the highest number of influenza notifications reported ever with the exception of the 2009 pandemic. Of the 4252 notifications, 4245 were confirmed cases, two were probable cases and five were possible cases. Of the 4245 confirmed influenza cases, 2072 (48.8%) were positive for influenza A(H1)pdm09, 30 (0.7%) for influenza A (H3), 559 (13.2%) influenza A (not subtyped) and 1584 (37.3%) influenza B. A total of 2078 RSV notifications were reported to HPSC during the 2015/2016 season; the highest number of notifications reported since RSV was made notifiable in 2012.

Confirmed influenza cases hospitalised

During the 2015/16 season, 1856 confirmed influenza cases (40.5/100,000 population) were reported as hospitalised; 44% of all confirmed influenza notified cases. The highest age specific rate in hospitalised cases for the 2015/2016 season was in those aged less than one year of age (150.5 per 100,000 population) which was the highest rate ever

Table 1: Number of influenza outbreaks by HSE-Area for the 2015/2016 influenza season (n=36).

HSE-Area	No. of outbreaks	Total number ill	Total number lab confirmed	Total number hospitalised	Total number dead
HSE-E	13	97	50	22	0
HSE-M	1	3	3	3	0
HSE-MW	4	41	19	14	1
HSE-NE	2	18	6	6	1
HSE-NW	4	64	19	12	2
HSE-SE	3	33	5	3	0
HSE-S	6	166	14	11	0
HSE-W	3	44	7	12	0
Total	**36**	**466**	**123**	**83**	**4**

reported in this age group, followed by those aged 1-4 years (130.7 per 100,000) (table 2). Of the 1856 hospitalised cases, 1223 (65.9%) were confirmed influenza A cases and 633 (34.1%) were influenza B cases. Of the 954 subtyped influenza A cases, over 99% were influenza A(H1)pdm09 and less than 1% were influenza A(H3). Further data on confirmed influenza hospitalised cases are detailed in tables 1-4.

Enhanced surveillance hospital data on 0-14 year age group
A total of 1445 confirmed influenza cases aged between 0 and 14 years were notified on CIDR for the 2015/2016 influenza season, 754 (52.2%) of these cases were hospitalised. Sixty percent (n=452) of hospitalised cases were positive for influenza A [346 A(H1)pdm09, 2 A(H3) and 104 A (not subtyped)] and 40% (n=302) were positive for influenza B. The median age of cases was 3 years. Over 63% of cases were aged between 0 and 4 years, with 15% of cases aged less than one year. The most frequently reported symptoms included: fever (59.2%), cough (48.5%) and fatigue (36.0%). Complications were reported for 476 (63%) cases; of these cases more than one complication was reported for 26.7% of cases. The most frequently reported complications included secondary bacterial pneumonia, primary influenza viral pneumonia and other respiratory complications. The median length of stay in hospital was 2 days (ranging from 1 - 56 days). Approximately, 29% of hospitalised cases in this age group were reported as belonging to a risk group for influenza, with chronic respiratory disease (including asthma), chronic neurological disease, congenital/chronic heart disease, immunosuppression, conditions that can compromise respiratory function and other medical conditions being the most frequently reported. Trisomy 21 was reported as a risk group for 12 cases. Five cases were reported as being premature. Of the 130 cases with reported underlying medical conditions and known vaccination status, 91% were *not* vaccinated. Approximately, 47% of cases (216/459) commenced antiviral treatment. Thirty-six cases were reported as being admitted to critical care units and seven children died (for further details, see below).

Confirmed influenza cases admitted to ICU
Of the 1856 hospitalised confirmed influenza cases reported during the 2015/16 influenza season, 161 (9%) were admitted to critical care (125 adults and 36 paediatric cases). Of the 161 critical care cases, 109 (68%) were infected with influenza A(H1)pdm09, 1 (0.6%) with influenza A(H3), 22 (14%) influenza A (not subtyped) and 29 (18%) with influenza B. Age specific rates for patients admitted to critical care units were highest in those aged less than one year (18.0 per 100,000 population), followed by those aged 65 years and older (7.7 per 100,000 population) (table 2). The overall median age of all cases was 51 years. The median age in years for paediatric cases was 3, and 58 for adult cases. One hundred and one (101/117, 86%) adults and 25 (25/34, 74%) paediatric cases had pre-existing medical conditions. The most frequently reported underlying medical conditions for adults were chronic respiratory disease (54/101, 54%), followed by chronic heart disease (46/101, 46%), and immunosuppression (26/101, 26%). Five adult cases were pregnant. Fifty-one (41%) adult cases were reported as current/former smokers and two (2%) adult cases were reported to have alcohol related disease. The most frequently reported underlying medical conditions for paediatric cases were neurological/neuromuscular conditions (15/25, 60%) and cardiovascular conditions (8/25; 32%). Ninety percent (112/125) of adults were ventilated during their stay in critical care units. Ventilation status was only reported for 13 paediatric cases; 11 (85%) of which were ventilated. The median length of stay in critical care for adult cases was 9 days (ranging from 1 - 139 days) and for paediatric cases 5 days (ranging from 1 - 35 days). Of the adult cases with known risk factors for influenza, 77% were not vaccinated. Of the 20 paediatric cases with known risk factors for influenza and known vaccination status, 95% were *not* vaccinated. Ninety-five percent of adult and paediatric cases were reported to have received antiviral therapy. Forty-two adult (42/125, 33.6%) and five paediatric (5/36 (13.9%) confirmed influenza cases admitted to critical care units during the 2015/2016 season died.

Mortality data
During the 2015/2016 influenza season, of the 4252 influenza cases notified, 84 (2%) cases were reported as having died. The case classification of influenza was

Table 2: Age specific rate for confirmed influenza cases hospitalised and admitted to critical care during the 2015/2016 influenza season. Age specific rates are based on the 2011 CSO census.

	Hospitalised		Admitted to ICU	
Age (years)	**Number**	**Age specific rate per 100,000 pop.**	**Number**	**Age specific rate per 100,000 pop.**
<1	109	150.5	13	18.0
1-4	371	130.7	14	4.9
5-14	274	44.0	7	1.1
15-24	86	14.8	2	0.3
25-34	184	24.4	6	0.8
35-44	164	21.7	22	3.2
45-54	119	20.5	22	3.8
55-64	152	32.8	34	7.3
≥65	397	74.2	41	7.7
Total	**1856**	**40.5**	**161**	**3.5**

confirmed for 83 of these cases and possible for one case. Of the 83 cases with known virology, 55 were associated with influenza A(H1)pdm09, 13 with influenza A (not subtyped) and 15 with influenza B. No influenza A(H3) associated deaths were reported. Influenza was reported as a cause of death (either on the death certificate or by the physician) for 56 cases. The median age of cases who died during the 2015/2016 influenza season was 65 years, ranging from 0-97 years. There was no significant cumulative excess all-cause mortality reported during the 2015/2016 season for the age groups monitored: 0-4, 5-14, 15-64 and 65 years and older.

Summary tables of confirmed influenza hospitalised and critical care cases and influenza-associated deaths for all ages are detailed in tables 3, 4 and 5.

Overview of the 2015/2016 season

In Ireland, the 2015/2016 influenza season was more severe than recent seasons. Influenza A (H1)pdm09 viruses predominated, co-circulating with influenza B. Only sporadic cases of influenza A (H3) were detected throughout the season. The 2015/2016 season was the first season since the 2009 pandemic and the 2010/2011 post-pandemic season that influenza A(H1)pdm09 viruses predominated in Ireland throughout the season. The impact of influenza during the 2015/2016 season affected all age groups, in particular younger age groups, with high hospitalisation and critical care admission rates and an increase in the number of notified influenza deaths reported. The number of confirmed influenza hospitalised cases (n=1856) reported during the 2015/2016 season, was the highest ever reported (data are available since 2009). Similarly, the number of critical care admissions was at the highest levels ever reported. There was a significant increase in the overall hospitalisation rate for those aged less than one year compared to previous seasons, reaching the highest rate (151/100,000 population) ever reported for this age group. Unlike the 2014/2015 season, when influenza A(H3) predominated, excess all-cause mortality was not reported in Ireland among people aged 65 years and older during the 2015/2016 season. Some countries in Europe reported excess mortality in the 15-64 year age group during the 2015/2016 season; this was not observed in Ireland.[1]

Sentinel GP ILI consultation rates in Ireland were above baseline levels for 10 consecutive weeks during the 2015/2016 season, which is the average length of time ILI rates remain above baseline in Ireland. ILI rates were at their highest levels since the 2010/2011 season. The NVRL reported the highest number of influenza A(H1)pdm09 viruses detected since the 2010/2011 season. RSV activity was high during the 2015/2016 season. Positive detections of adenovirus and parainfluenza virus type 1 reported by the NVRL, were at higher levels than are usually observed.

The number of acute respiratory infection and influenza outbreaks reported during the 2015/2016 season was lower than the previous season. The majority of these outbreaks were caused by influenza A(H1)pdm09 and mainly affected the elderly in residential care facilities. Reported influenza vaccination status of patients/clients in these outbreaks was high, whilst vaccination status of staff was low, highlighting the need to improve influenza vaccine uptake among health-

Table 3: Summary table of confirmed influenza cases hospitalised for all ages by influenza season: 2009-2016. Rates are based on the 2011 CSO census.

	Hospitalised						
	2009 pdm period	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Predominant flu type	**AH1pdm09**	**AH1pdm09; B**	AH3	B; AH3 & AH1pdm09	AH3; AH1pdm09	AH3; B	**AH1pdm09; B**
Total cases	1059	968	147	469	693	1009	1856
Crude rate /100,000	23.1	21.1	3.2	10.2	15.1	22.0	40.5
Median age (years)	17	29	27	32	51	59	30
Females	50%	55%	56%	57%	57%	53%	53%
Total deaths - all causes	25	42	6	22	34	47	75
Case fatality rate	2%	4%	4%	5%	5%	5%	4%

Table 4: Summary table of confirmed influenza cases admitted to critical care units for all ages by influenza season: 2009-2016. Rates are based on the 2011 CSO census.

	Admitted to ICU						
	Pandemic period	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Predominant flu type	AH1pdm09	AH1pdm09; B	AH3	B; AH3 & AH1pdm09	AH3; AH1pdm09	AH3; B	AH1pdm09; B
Total cases	100	121	15	39	83	69	161
Crude rate /100,000	2.2	2.6	0.3	0.8	1.8	1.5	3.5
Median age (years)	34	49	60	39	50	63	51
Females	50%	53%	80%	49%	41%	41%	42%
Cases with risk factor	82%	74%	93%	90%	85%	86%	83%
% Vaccinated	NA	17%	-	-	32%	47%	18%
ICU: Hospital ratio	9%	13%	10%	8%	12%	7%	9%
ICU Median LOS - Adult	12	14	5	9	9	9	9
ICU Median LOS - Paediatric	8	7	3	5	8	3	5
Total deaths - all causes	18	35	5	11	27	23	47
Case fatality rate	18%	29%	33%	28%	33%	33%	29%

care workers in order to reduce influenza-related morbidity and mortality. Further information on seasonal influenza vaccine uptake in hospitals and long term care facilities is available in the Immunisation Uptake chapter of the HPSC Annual Epidemiological Report, 2015. Only two influenza outbreaks in schools were reported during the 2015/2016 season. With levels of transmission of influenza amongst children high in community and hospital settings throughout the 2015/2016 season, it is likely that influenza outbreaks in schools were under-reported.

All influenza A(H1)pdm09 and A(H3) viruses characterised in Ireland during the 2015/2016 season belonged to genetic groups that were antigenically similar to the strains recommended for inclusion in the 2015/2016 trivalent influenza vaccines. The majority of influenza B viruses characterised during the 2015/2016 season in Ireland belonged to the B/Victoria lineage; these viruses were not present in the 2015/2016 trivalent vaccine used in Ireland and throughout most of Europe. Influenza A(H1N1)pdm09 viruses have evolved since 2009, with newly emerging subclades 6B.1 and 6B.2, reported worldwide during the 2015/2016 season. Despite this genetic evolution, most A(H1)pdm09 viruses remained antigenically closely related to the 2015/2016 A(H1N1)pdm09 vaccine virus. WHO has however recommended that trivalent vaccines for use in the 2017 southern hemisphere influenza season contain the influenza A(H1)pdm09 subclade 6B.1 virus.[1, 2, 3]

The Irish overall adjusted vaccine effectiveness (VE) estimates in preventing influenza confirmed infection in primary care for all influenza, influenza A(H1)pdm09 and influenza B and for all influenza in targeted patients were moderate for the 2015/2016 season. Despite the fact that B/Victoria viruses (not present in the trivalent influenza vaccine) were circulating in Ireland during the season, moderate protection against medically-attended laboratory confirmed influenza B presenting to general practice was observed, possibly due to cross protective immunity. The adjusted influenza VE estimate against A(H1N1)pdm09 (for all ages) was lower than for influenza B. Reasons for lower influenza A(H1N1)pdm09 vaccine estimates as of yet remain unclear and may possibly be due to the newly emerged influenza A(H1N1)pdm09 subclade 6B.1, although this subclade is not purported to have any changed antigenic properties.[1, 2, 3]

For the 2016/2017 influenza season in the northern hemisphere, WHO have recommended trivalent influenza vaccines contain the following strains: an A/California/7/2009 (H1N1)pdm09-like virus; an A/Hong Kong/4801/2014 (H3N2)-like virus; and a B/Brisbane/60/2008-like virus.[3] This represents a change in the influenza A(H3) and influenza B components compared with the composition of the Northern Hemisphere 2015/2016 influenza vaccine.

In Ireland, for the 2016/2017 season, existing surveillance systems are being further strengthened. HPSC are currently evaluating severe influenza surveillance systems, with a view to improving the efficiency of these systems and overall reporting of severe influenza cases for future seasons. A severe influenza surveillance working group has been established to review these evaluations and implement the required changes to improve severe influenza surveillance in Ireland. It is important to note the improvements in surveillance, reporting and testing when interpreting influenza surveillance data since the 2009 pandemic.

In light of the significant increase in notified influenza cases during the 2015/16 season, HPSC are currently conducting an influenza survey of all microbiology laboratories in Ireland. HPSC are also focusing on improving influenza vaccine uptake and antiviral data on severe influenza cases, outbreaks, health care workers and those in risk groups for influenza. HPSC, ICGP and the NVRL are continuing to work on the European influenza vaccine effectiveness study (I-MOVE project). Data from all of these surveillance projects will assist in guiding the management and control of influenza and of any future epidemics or pandemics. www.hpsc.ie

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Table 5: Summary table of notified influenza cases that died from all causes and were reported on Ireland's Computerised Infectious Disease Reporting System (CIDR) by influenza season: 2009-2016. Rates are based on the 2011 CSO census.

	Influenza notifications - Deaths from all causes						
	Pandemic period	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Total deaths	32	43	12	38	58	66	84
Crude rate /100,000	0.7	0.9	0.3	0.8	1.3	1.4	1.6