Influenza and Other Seasonal Respiratory Viruses

2016/2017 influenza season summary:

Peak influenza-like illness rate: 90.4/100,000 population
Influenza predominant type/subtype: Influenza A(H3N2)
Confirmed influenza cases hospitalised: 1425
Confirmed influenza cases admitted to ICU: 51
Total notified influenza cases that died: 95
Excess mortality in those aged 65 years and older: Weeks 49 2016 - 4 2017
Number of acute respiratory infection/influenza outbreaks: 111

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 2016/2017 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 send combined nose and throat swabs to the NVRL from ILI patients each week. The NVRL routinely test sentinel GP and non-sentinel respiratory specimens for influenza and a panel of other respiratory viruses.

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 excess mortality monitoring associated with the European mortality monitoring group (EuroMOMO)
- A network of sentinel hospitals reporting admissions data
- Acute respiratory infection and influenza outbreak surveillance
- Monitoring influenza vaccine effectiveness (I-MOVE study)

This report summarises influenza and other seasonal respiratory virus activity in Ireland during the 2016/2017 influenza season. The 2016/2017 season commenced on 3rd October 2016 (week 40 2016) and ended on 21st May 2017 (week 20 2017). The data presented in this summary were based on all data reported to HPSC by the 18th December 2017.

Sentinel GP Clinical Data

Influenza activity reported from the sentinel GP network in Ireland was at moderate intensity levels for all ages, and very high intensity levels for those aged 65 years and older during the 2016/2017 influenza season. Sentinel GP ILI consultation rates peaked at 90.4 per 100,000 population during week 1 2017 (the first week in January), the highest peak rate since the 2010/2011 season (figure 1). ILI rates first increased above baseline levels (18.3 per 100,000) during week 49 2016 and remained there for nine consecutive weeks, which is the average length of time above baseline in Ireland. ILI rates for all ages were above the medium intensity levels during weeks 1 and 2 2017 (figure 1). The highest age specific ILI rates were reported in those aged 65 years and older (peaking at 115.0/100,000), followed by the 15-64 year age group (peaking at 105.4/100,000). It is notable that the age specific rates in those aged 65 years and older were the highest ever reported and the peak rate during week 1 2017 exceeded the very high intensity threshold level for this age group.

Virological Data from National Virus Reference Laboratory (NVRL) – Influenza

Sentinel GP data: The NVRL tested 943 sentinel GP specimens for influenza virus during the 2016/2017 season. Four hundred and twenty (44.5%) sentinel specimens were positive for influenza: 407 influenza A (403 A(H3N2) and 4 A not subtyped) and 13 influenza B. There were no influenza A(H1N1)pdm09 influenza positive specimens detected by the sentinel GP network during the 2016/2017 season. Ninety seven percent of all confirmed influenza sentinel cases were positive for influenza A and 3% for influenza B. Of subtyped influenza A specimens, 100% were positive for influenza A(H3N2). Overall, 83% of ILI patients (with known vaccination status) were not vaccinated with the 2016/2017 influenza vaccine. Only three ILI patients were reported as having commenced antiviral treatment.

Non-sentinel data: The NVRL tested 11,245 non-sentinel respiratory specimens during the 2016/2017 season, 1429 (12.7%) of which were positive for influenza: 1361 influenza A (1304 A(H3N2), 5 A(H1N1)pdm09 and 52 A (not subtyped)) and 68 influenza B. Ninety-five percent of all confirmed influenza non-sentinel cases were positive for influenza A and 5% were positive for influenza B. Of subtyped influenza A specimens, 99.6% were positive for influenza A(H3N2).

Influenza A(H3N2) was the predominant influenza virus circulating during the 2016/2017 season. Influenza A accounted for 96% of all influenza positive specimens and influenza B for 4%. Of the 1712 influenza A sentinel and non-sentinel specimens that were subtyped, influenza A(H3N2) accounted for 99.7% and influenza A(H1N1)pdm09 for 0.3%. In total 1707 positive influenza A(H3N2) specimens were detected by the NVRL during the 2016/2017 season, this is the highest number of A(H3N2) viruses detected since this surveillance system began in 2000. Influenza positive specimens peaked during week 1 2017, with a total of 353 influenza positive specimens taken from patients during this week.

Influenza Virus Characterisation:
For the 2016/2017 influenza season, genetic characterisation of influenza viruses circulating in Ireland was carried out by the NVRL, on 117 influenza A(H3N2), one influenza A(H1N1)pdm09 and eight influenza B positive specimens. The majority of A(H3N2) viruses (72%, n=84/117) clustered in the genetic subclade 3C.2a1, a group represented by A/Bolzano/7/2016 and characterised by the hemagglutinin amino acid mutation N171K, often with N121K. Group 3C.2a1 was the dominant strain in Europe during the 2016/2017 season. Antigenic characterisation confirmed that these viruses were antigenically similar to the 2016/2017 vaccine strain, 3C.2a. Of particular interest in Ireland, 14.5% (17/117) of characterised A(H3N2) viruses clustered within the genetic subgroup 3C.3a, represented by A/Switzerland/9715293/2013 (the strain included in the 2015/2016 Northern Hemisphere vaccine), and had amino acid substitutions Q197K, S198P and S312N in HA1 antigenic sites B and C. 3C.3a viruses were rarely idenitfied elsewhere in Europe during the 2016/2017 season, representing less than 1% of circulating A(H3N2) viruses characterised. A further 16 A(H3N2) viruses (16/117; 14%) fell in the 2016/2017 vaccine component clade 3C.2a, represented by A/Hong Kong/4801/2014, the strain also recommended for the 2017/2018 vaccine. The 3C.2a viruses detected in Ireland fell into two clusters – one associated with N144K and one with R261Q. Influenza A(H1N1)pdm09 was infrequently detected in Ireland during the 2016/2017 season. One A(H1N1)pdm09 virus was characterised and belonged to the 6B.1 genetic clade, represented by A/Michigan/45/2015. Antigenic characterisation data has found this group to be antigenically indistinguishable from the 2016/2017 vaccine strain. The A/Michigan/45/2015 virus was selected for inclusion in the 2017/2018 Northern Hemisphere vaccine. Eight influenza B viruses were genetically characterised,

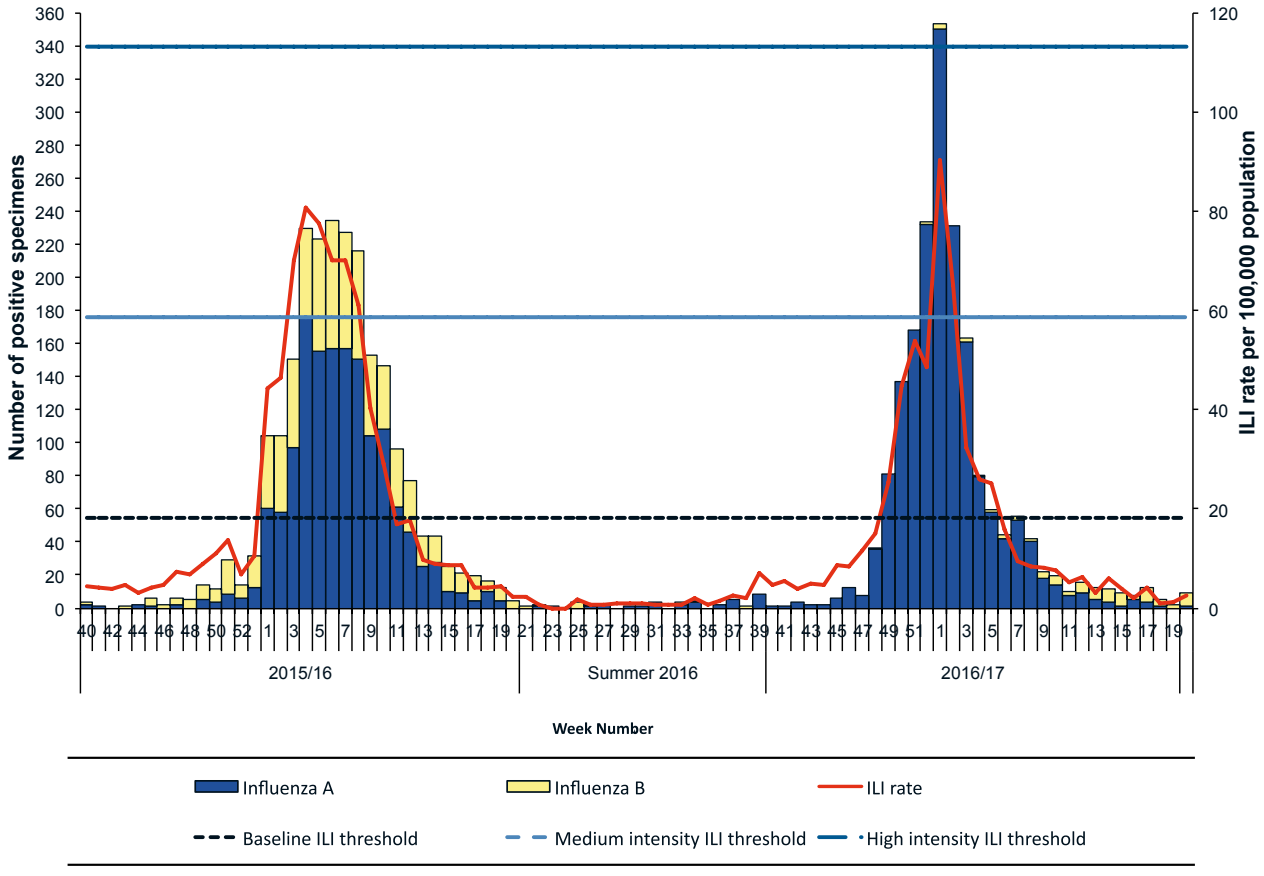

Figure 1: ILI sentinel GP consultation rates per 100,000 population, baseline ILI threshold, medium and high intensity ILI thresholds[1] and number of positive influenza A and B specimens tested by the NVRL, by influenza week and season. Source: Clinical ILI data from ICGP and virological data from the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

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

seven of which were B/Yamagata lineage viruses and one belonged to the B/Victoria lineage. All B/Yamagata viruses clustered in clade 3 represented by B/Phuket/3073/2013. The influenza B/Victoria lineage virus fell into the 1A group represented by B/Brisbane/60/2008, the virus recommended for the 2017/2018 vaccine. http://www.who.int/influenza/vaccines/virus/recommendations/en/

Virological Data from NVRL - Other seasonal respiratory viruses

During the 2016/2017 season respiratory syncytial virus (RSV) was at very high levels, with 1228 (10.9%) positive detections reported from non-sentinel sources, peaking during mid-December 2016. High levels of adenovirus (n=336; 3.0%), human metapneumovirus (hMPV) (n=345; 3.1%) and parainfluenza virus (PIV) type 3 (n=273; 2.4%) were also reported during the 2016/2017 season. In addition, 64 PIV-4, 24 PIV-2 and seven PIV-1 positive detections were reported during the season. RSV, adenovirus, hMPV and PIV-3 positive detections reached the highest numbers ever reported by the NVRL for any season.

Of the 943 sentinel GP specimens tested during the 2016/2017 season, 45 (4.8%) were positive for RSV, 32 (3.4%) hMPV, 15 (1.6%) adenovirus, 10 (1.1%) PIV-3, four (0.4%) PIV-2 and four (0.4%) PIV-4. There were no positive detections of PIV-1 from sentinel GP sources during the 2016/2017 season.

The total number of sentinel GP and non-sentinel specimens positive for seasonal respiratory viruses (including influenza, RSV, adenovirus, hMPV and parainfluenza virus types 1-4) peaked during week 1 2017 at 457. It should be noted that these data reported from the NVRL are analysed by the date the specimens were taken from patients.

Outbreaks

For the 2016/2017 season, 111 acute respiratory infection (ARI) and influenza outbreaks were notified to HPSC, 66 of which were associated with influenza A, four associated with influenza B, 21 with influenza (type/subtype not reported), four associated with RSV, two with human metapneumovirus (hMPV), one with parainfluenza virus and 13 ARI outbreaks with no pathogens identified. Of the 91 influenza outbreaks reported during the 2016/2017 season, the majority were in residential care facilities/community hospitals, mainly associated with influenza A and affecting those aged 65 years and older. All influenza A subtyped outbreaks were associated with influenza A(H3N2). The majority of outbreaks were notified from HSE-east and –south, table 1. Seventy-nine influenza outbreaks were reported from residential care facilities/community hospitals, 11 from acute hospital settings and one outbreak occurred on a coach tour. In total 35 deaths were recorded associated with these 91 influenza outbreaks. For all ARI and influenza outbreaks, vaccination status was reported for patients from nine residential care/healthcare facilities, with over 79% (296/374) of patients vaccinated prior to these outbreaks. Vaccination status was reported for staff from only six residential care/healthcare facilities, with only 17% (53/309) of staff reported as vaccinated prior to these outbreaks.Further information on influenza vaccine uptake is detailed in the Immunisation uptake chapter of the HPSC Annual Epidemiological Report, 2016.

GP Out-Of-Hours (OOHs)

The percentage of influenza-related calls to GP out-of-hours services in Ireland, peaked during week 1 2017 at 7.7%, coinciding with the peak in sentinel GP ILI consultation rates. The peak in influenza-related calls was the highest peak since the 2010/11 season. During the peak of activity, each service received on average 2.3 calls per hour relating to influenza.

Sentinel hospital admissions

Hospital respiratory admissions reported from a network of sentinel hospitals during the 2016/2017 season, peaked at 599 during week 52 2016. This is the highest peak level in recent years. The peak coincided with high levels of influenza activity. Total emergency admissions reported from sentinel hospitals peaked during weeks 47 (n=3056) and 48 (n=3050) 2016, coinciding with peak RSV activity and elevated influenza activity.

Influenza and RSV notifications

A total of 3336 influenza notifications were reported on Ireland's Computerised Infectious Disease Reporting System (CIDR) during the 2016/2017 influenza season; less than the 2015/2016 season (n=4252). Of the 3336 notifications, 3299 were reported as confirmed cases, 16 probable cases and 21 possible cases. Of the 3299 confirmed influenza cases, 1632 (49.5%) were positive for influenza A(H3N2), 7 (0.2%) influenza A(H1N1)pdm09, 1514 (45.9%) influenza A (not subtyped), 138 (4.2%) influenza B and 8 (0.2%) were notified with influenza type/subtype not recorded. Of the 1639 confirmed influenza A cases subtyped, 99.6% were influenza A(H3N2). A total of 2583 RSV notifications were reported to HPSC during the 2016/2017 season; the highest number of RSV notifications reported since RSV was made notifiable in 2012.

Table 1: Number of influenza outbreaks by HSE-Area for the 2016/2017 influenza season (n=91).

HSE-Area	No. of outbreaks	Total number ill	Total number lab confirmed	Total number hospitalised	Total number dead
HSE-E	26	241	69	28	4
HSE-M	5	63	22	3	4
HSE-MW	10	134	32	18	3
HSE-NE	8	98	31	7	1
HSE-NW	8	107	29	8	3
HSE-SE	7	121	33	17	6
HSE-S	22	354	42	14	10
HSE-W	5	39	22	25	4
Total	**91**	**1157**	**280**	**120**	**35**

Confirmed influenza cases hospitalised
During the 2016/2017 season, 1425 confirmed influenza cases (30/100,000 population) were reported as hospitalised; 43% of all confirmed influenza notified cases. The highest age specific rates in hospitalised cases for the 2016/2017 season were in those aged less than one year of age (n=74; 118.9 per 100,000 population) and those aged 65 years and older (n=699; 109.6 per 100,000 population) (table 2). The age specific rates in those aged 65 years and older were at the highest rate ever recorded in this age group, with 46% (319/699) of cases in this age group notified in the first two weeks of January. Of the 1425 hospitalised cases, 1361 (95.5%) were confirmed influenza A cases, 59 (4.1%) were influenza B cases and five (0.4%) influenza cases were notified with no influenza type/subtype recorded. Of the 567 subtyped influenza A cases, 99.5% were influenza A(H3N2) and only 0.5% were influenza A(H1N1)pdm09. Further data on confirmed influenza hospitalised cases for are detailed in tables 1-4.

Enhanced surveillance hospital data on 0-14 year age group
A total of 470 confirmed influenza cases aged between 0 and 14 years were notified on CIDR for the 2016/2017 influenza season, 268 (57%) of these cases were hospitalised. Over 95% (n=255) of hospitalised cases were positive for influenza A [118 A(H3N2) and 137 A (not subtyped)] and 5% (n=13) were positive for influenza B. The median age of cases was 2 years. Over 69% of cases were aged between 0 and 4 years, with 27% of cases aged less than one year. The most frequently reported symptoms included: fever (92.7%), cough (87.3%) and fatigue (70%). The most frequently reported complications included primary influenza viral pneumonia, secondary bacterial pneumonia, and other respiratory complications. The median length of stay in hospital was 2 days (ranging from 1 - 28 days). Approximately, 49% of hospitalised cases in this age group were reported as belonging to a risk group for influenza, with chronic respiratory disease (including asthma) being the most frequently reported risk group. Of the 84 cases with reported underlying medical conditions and known vaccination status, 88% were *not* vaccinated. Approximately, 45% of cases (81/182) commenced antiviral treatment. Additional surveillance data on paediatric cases admitted to critical care units are detailed below.

Confirmed influenza cases admitted to ICU
Of the 1425 hospitalised confirmed influenza cases reported during the 2016/2017 influenza season, 51 (4%) were admitted to critical care units (37 adults and 14 paediatric cases). Of the 51 critical care cases, 23 (45.1%) were infected with influenza A(H3N2), 22 (43.1%) with influenza A (not subtyped) and 6 (11.8%) with influenza B. No influenza A(H1N1)pdm09 critical care cases were notified during the 2016/17 season. Age specific rates for patients admitted to critical care units were highest in those aged 65 years and over (4.5 per 100,000 population) (table 2). The overall median age of all cases was 67 years. Underlying medical conditions were reported for 33 adults. The most frequently reported underlying medical conditions for adults were chronic heart disease (23/33, 69.7%) and chronic respiratory disease (18/33, 54.5%). No adult cases were reported as pregnant. Nineteen (51%) adult cases were reported as current/former smokers and two (5%) adult cases were reported to have alcohol related disease. Six paediatric cases were reported to have the following underlying medical conditions: neurological/neuromuscular, respiratory, cardiovascular and metabolic conditions. Thirty-three adult and six paediatric cases were ventilated during their stay in critical care units. The median length of stay in critical care for adult cases was 5 days and for paediatric cases 3 days. Of the 24 adult cases with known vaccination status, 58% were *not* vaccinated. Of the 12 paediatric cases with known vaccination status, 92% were *not* vaccinated. Eighty-four percent of all cases were reported to have received antiviral therapy. Seventeen adult (17/37; 46%) and three paediatric (3/14; 21%) cases admitted to critical care units during the 2016/2017 season died, giving a case fatality rate of 39%.

Mortality data
During the 2016/2017 influenza season, of the 3336 influenza cases notified, 95 (2.9%) cases were reported as having died. The case classification was confirmed for 87 of these cases, probable for one case and possible for seven cases. Of the 87 cases with known virology, 46 were associated with influenza A(H3N2), 36 with influenza A (not subtyped), one with influenza B and four with influenza type/subtype not recorded. No influenza A(H1N1)pdm09 associated deaths were reported. Influenza was reported as a cause of death (either on the death certificate or by the physician) for 68 cases. The median age of cases who died during the 2016/2017 influenza season was 80 years (interquartile range: 73-87). Cumulative excess all-cause mortality was reported in those aged 65 years and older for

Table 2: Age specific rate for confirmed influenza cases hospitalised and admitted to critical care during the 2016/2017 influenza season. Age specific rates are based on the 2016 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	74	118.9	2	3.2
1-4	111	41.2	6	2.2
5-14	83	12.3	5	0.7
15-24	54	9.4	1	0.2
25-34	106	16.1	1	0.2
35-44	82	12.4	1	0.1
45-54	88	14.1	1	0.2
55-64	126	24.8	5	1.0
≥65	699	109.6	29	4.5
Unknown	2	–	0	–
Total	**1425**	**29.9**	**51**	**1.1**

eight consecutive weeks between weeks 49 2016 and 4 2017, reaching higher levels than previously recorded.

Summary tables of confirmed influenza hospitalised and critical care cases and notified influenza-associated deaths for all ages are detailed in 2-5.

Overview of the 2016/2017 season

In Ireland, the 2016/2017 influenza season commenced and peaked earlier than usual, with a peak in the first week in January. The season was characterised by almost complete predominance of influenza A(H3N2), which resulted in higher incidence of severe disease for those aged 65 years and older. The impact of influenza during the 2016/2017 season resulted in high hospitalisation rates in older age groups, an older median age of hospitalisation and admission to critical care units, a large number of outbreaks in residential care facilities and excess mortality in older age groups. This is in contrast to the 2015/2016 influenza season, when influenza A(H1N1)pdm09 predominated and mainly affected younger age groups.

Sentinel GP ILI consultation rates were above baseline levels for nine consecutive weeks during the 2016/2017 season, which is the average length of time ILI rates remain above baseline in Ireland. ILI rates were at the highest levels reported since the 2010/2011 season, with rates in those aged 65 years and older exceeding the very high intensity level threshold for this age group for the first time since surveillance began in 2000. The NVRL reported the highest number of influenza A(H3N2) viruses detected since surveillance began in 2000. Very high levels of RSV and high levels of adenovirus, human metapneumovirus and parainfluenza virus type 3 were also observed during the 2016/2017 season, compared to recent seasons.

The vast majority of influenza A(H3N2) viruses circulating in Ireland and Europe during the 2016/2017 season, belonged to the genetic subclade, 3C.2a1, a subclade that remained antigenically similar to the 2016/2017 vaccine strain, 3C.2a. Both the vaccine clade (3C.2a) and subclade (3C.2a1) are rapidly evolving and require close monitoring. For the 2017/2018 influenza season in the northern hemisphere, WHO recommended trivalent influenza vaccines contain the following strains: an A/Michigan/45/2015 (H1N1)pdm09-like virus; an A/Hong Kong/4801/2014 (H3N2)-like virus; and a B/Brisbane/60/2008-like virus (B/Victoria lineage).[2]

The number of influenza outbreaks reported during the 2016/2017 season was at the highest level recorded since

Table 3: Summary table of confirmed influenza cases hospitalised for all ages by influenza season: 2009/10-2016/17. Rates for 2009/10-2013/14 are based on the 2011 CSO census; rates for 2014/15-2016/17 are based on the 2016 CSO census.

	Hospitalised							
Season	**2009 pdm period**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**
Predominant flu type	AH1pdm09	AH1pdm09; B	AH3	B; AH3 & AH1pdm09	AH3; AH1pdm09	AH3; B	AH1pdm09; B	AH3
Total cases	1059	968	147	469	693	1009	1856	1425
Crude rate /100,000	23.1	21.1	3.2	10.2	15.1	21.2	39.0	29.9
Median age (years)	17	29	27	32	51	59	30	67
Females	50%	55%	56%	57%	57%	53%	53%	52%
Total deaths - all causes	25	42	6	22	34	47	75	67
Case fatality rate	2%	4%	4%	5%	5%	5%	4%	5%

Table 4: Summary table of confirmed influenza cases admitted to critical care units for all ages by influenza season: 2009/10-2016/17. Rates for 2009/10-2013/14 are based on the 2011 CSO census; rates for 2014/15-2016/17 are based on the 2016 CSO census.

	Admitted to ICU							
Season	**2009 pdm period**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**
Predominant flu type	AH1pdm09	AH1pdm09; B	AH3	B; AH3 & AH1pdm09	AH3; AH1pdm09	AH3; B	AH1pdm09; B	**AH3**
Total cases	100	121	15	39	83	69	161	**51**
Crude rate /100,000	2.2	2.6	0.3	0.8	1.8	1.4	3.4	**1.1**
Median age (years)	34	49	60	39	50	63	51	**67**
Females	50%	53%	80%	49%	41%	41%	42%	**33%**
Pregnant/postpartum (No.)	8	8	0	4	4	1	5	**0**
Cases with co-morbidities	82%	74%	93%	90%	85%	86%	83%	**93%**
% Vaccinated	NA	17%	-	-	32%	47%	18%	**31%**
Antiviral treatment	NA	NA	86%	88%	90%	83%	94%	**84%**
ICU: Hospital ratio	9%	13%	10%	8%	12%	7%	9%	**4%**
ICU Median LOS - Adult	12	14	5	9	9	9	9	**5**
ICU Median LOS - Paediatric	8	7	3	5	8	3	5	**3**
Mechanical ventilation (%)	86%	90%	77%	91%	94%	93%	92%	**98%**
ECMO (No.)	5	10	0	0	2	1	11	**0**
Total deaths - all causes	18	35	5	11	27	23	47	**20**
Case fatality rate	18%	29%	33%	28%	33%	33%	29%	**39%**

the 2009 pandemic. The majority of these outbreaks were caused by influenza A 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 amongst health-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, 2016.

Excess all-cause mortality was reported in Ireland during the 2016/2017 season, with higher excess deaths than previously recorded among those aged 65 years and older, over 8 consecutive weeks, from early December 2016 to late-January 2017. Excess all-cause mortality in older age groups was also reported throughout Europe during the 2016/2017 season.[1]

The Irish overall adjusted influenza vaccine effectiveness (VE) estimates in preventing influenza confirmed infection in primary care during the 2016/2017 season for all influenza, influenza A(H3N2) and for all influenza in at risk groups were at moderate levels.

For the 2017/2018 season, existing surveillance systems in Ireland are being further strengthened. HPSC are currently reviewing severe influenza surveillance systems, with a view to improving their efficiency and reporting. A severe influenza surveillance working group has been established to review and implement the required changes to improve severe influenza surveillance in Ireland.

HPSC are 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), working together to increase GP and patient participation during the 2017/2018 season, in order to improve the precision of Irish influenza VE estimates. HPSC are also collaborating with the NVRL to increase influenza genetic testing, which will result in additional epidemiological information on evolving influenza genetic clades and subclades circulating each season in Ireland. 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

References

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2. WHO recommendations on the composition of influenza virus vaccines http://www.who.int/influenza/vaccines/virus/recommendations/en/

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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: 2009/10-2016/17. Rates for 2009/10-2013/14 are based on the 2011 CSO census; rates for 2014/15-2016/17 are based on the 2016 CSO census.

	Influenza notifications - Deaths from all causes							
	Pandemic period	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**
Total deaths	32	43	12	38	58	66	84	95
Crude rate /100,000	0.7	0.9	0.3	0.8	1.3	1.4	1.8	2.0