

# Influenza Surveillance in Ireland – Weekly Report

Weeks 14 & 15 2017 (3<sup>rd</sup> – 16<sup>th</sup> April 2017)



 Intensive Care Society of Ireland

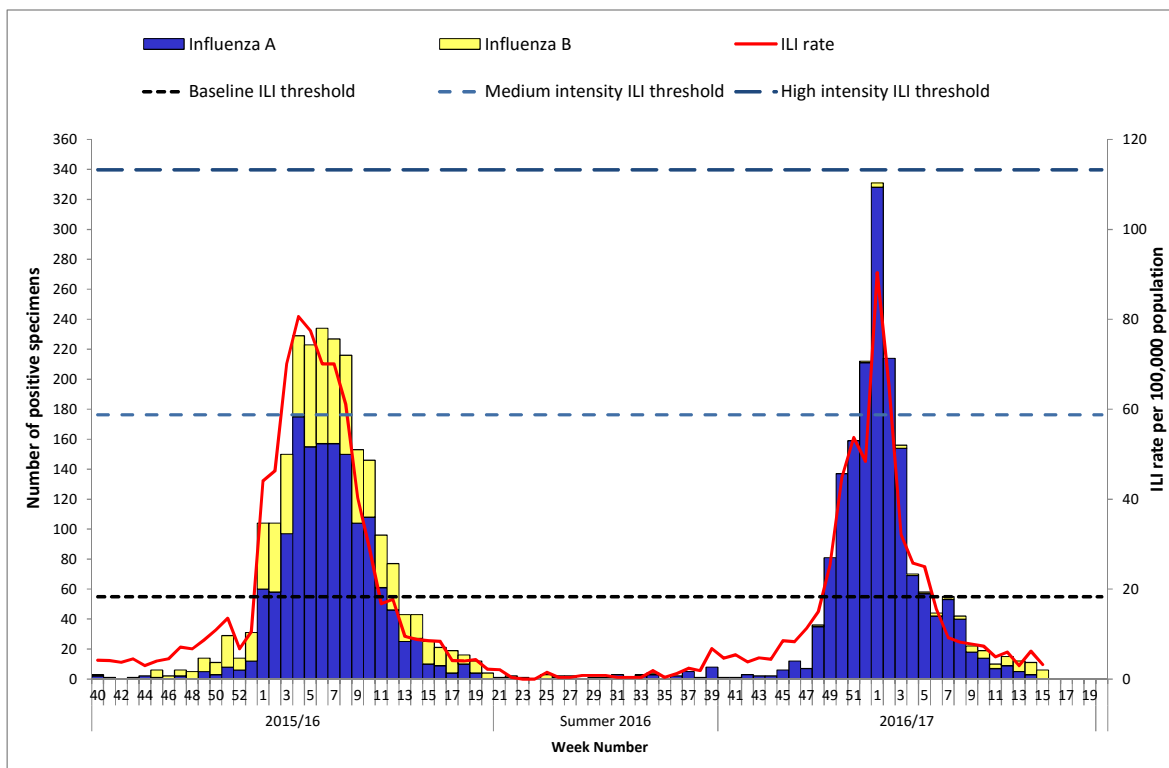
## Summary

All indicators of influenza activity in Ireland were at low levels during weeks 14 and 15 2017 (up to the week ending April 16, 2017). Sentinel GP influenza-like illness (ILI) consultation rates and influenza positivity were at very low levels. One influenza B outbreak in a residential care facility and sporadic confirmed influenza hospitalised cases were reported during this period. Influenza A(H3N2) predominated this season, with those aged 65 years and older most affected from severe influenza. Low numbers of sporadic influenza A and B cases continue to be reported.

- Influenza-like illness (ILI): The sentinel GP ILI consultation rate was 3.2 per 100,000 population in week 15 2017, a decrease compared to the rate of 6.2 per 100,000 reported during week 14 2017.
  - ILI rates have been below the Irish baseline ILI threshold (18.3/100,000) for ten consecutive weeks.
  - ILI age specific rates were very low in all age groups during weeks 14 and 15 2017.
- GP Out of Hours: The proportion of influenza-related calls to GP Out-of-Hours services remained at low levels.
- National Virus Reference Laboratory (NVRL):
  - Influenza positivity reported by the NVRL from sentinel and non-sentinel sources was at very low levels during weeks 14 and 15 2017, at 4.5% and 3.3%, respectively.
  - Influenza A(H3N2) was the predominant influenza virus circulating this season. Low numbers of sporadic influenza A and B cases were reported in recent weeks.
  - Respiratory syncytial virus (RSV) positivity remained very low during weeks 14 and 15 2017.
  - Parainfluenza viruses, human metapneumovirus (hMPV) and adenoviruses continued to circulate during weeks 14 and 15 2017. Coinfections of all seasonal respiratory viruses have been reported throughout the 2016/17 season.
- Respiratory admissions: Respiratory admissions data reported from a network of sentinel hospitals remained at low levels.
- Hospitalisations: Nine confirmed influenza hospitalised cases were notified to HPSC during weeks 14 and 15 2017, bringing the season total to 1360. The majority of hospitalised cases, this season to date, were in those aged 65 years and older.
- Critical care admissions: For the season to date, 47 confirmed influenza cases have been admitted to critical care units and reported to HPSC.
- Mortality: 88 influenza cases died and were notified to HPSC this season to date. Excess deaths from all causes were reported in December and January, most likely associated with influenza A(H3N2) activity.
- Outbreaks: One influenza B outbreak was reported to HPSC during week 15 2017, in a residential care facility in HSE-South. The total number of acute respiratory infection/influenza outbreaks for the season to date is 105.
- International: In the European region, most countries are now reporting low intensity of influenza activity. Influenza A(H3N2) was the predominant virus circulating this season, with those aged 65 years and older most severely affected. Low numbers of influenza B cases have been reported in recent weeks.

## 1. GP sentinel surveillance system - Clinical Data

- During week 15 2017, six influenza-like illness (ILI) cases were reported from sentinel GPs, corresponding to an ILI consultation rate of 3.2 per 100,000 population, remaining at very low levels, and a decrease compared to the rate of 6.2 per 100,000 reported during week 14 2017. The ILI rates have remained below the Irish baseline ILI threshold (18.3/100,000 population) for ten consecutive weeks. For the 2016/2017 season, ILI rates were above baseline levels for nine consecutive weeks (weeks 49 2016 – 5 2017) and above the medium intensity threshold for two consecutive weeks (weeks 1 and 2 2017). ILI rates peaked during week 1 2017 at 90.4/100,000.
- ILI age specific rates were very low in all age groups during weeks 14 and 15 2017. ILI age specific rates for all age groups peaked at the end of December/early January (figure 2).
- HPSC in consultation with the European Centre for Disease Prevention and Control (ECDC) has revised the Irish baseline ILI threshold for the 2016/2017 influenza season to 18.3 per 100,000 population; this threshold indicates the likelihood that influenza is circulating in the community. The Moving Epidemic Method (MEM) has been adopted by ECDC to calculate thresholds for GP ILI consultations in a standardised approach across Europe.<sup>1</sup>
- The baseline ILI threshold (18.3/100,000 population), medium (58.7/100,000 population) and high (113.3/100,000 population) intensity ILI thresholds are shown in figure 1.



**Figure 1: ILI sentinel GP consultation rates per 100,000 population, baseline ILI threshold, medium and high intensity ILI thresholds<sup>1</sup> and number of positive influenza A and B specimens tested by the NVRL, by influenza week and season.**  
*Source: ICGP and NVRL*

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

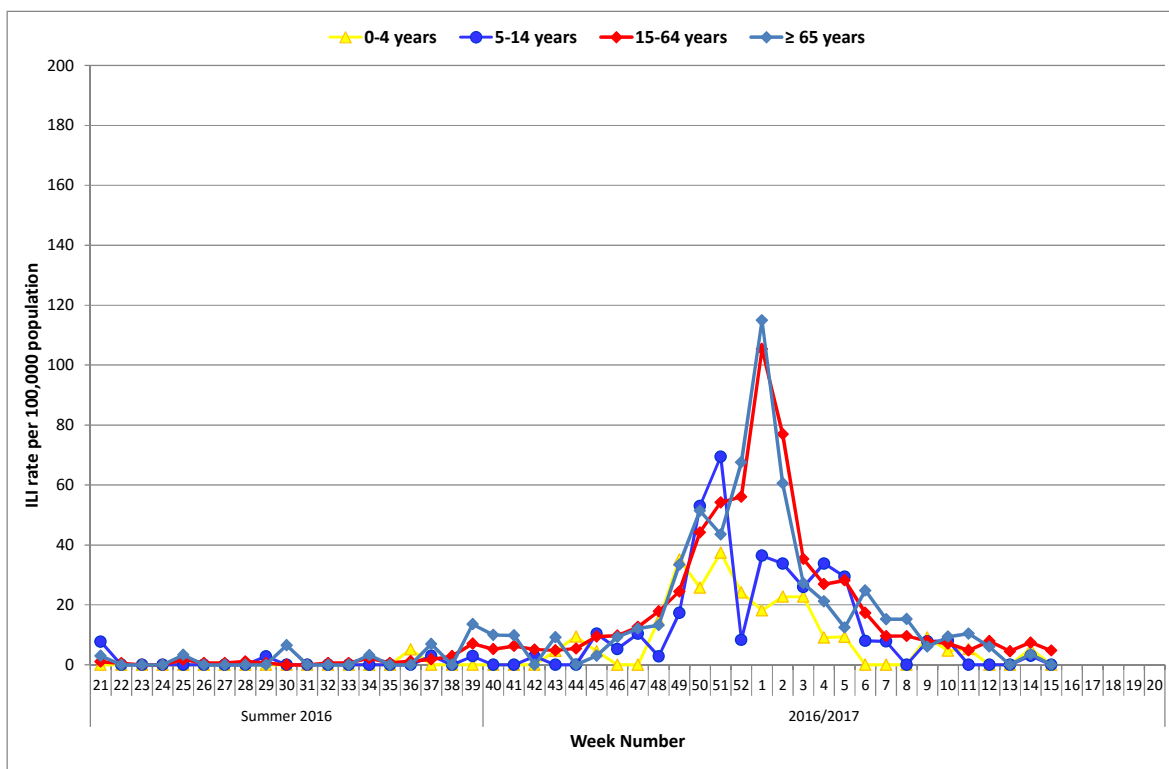


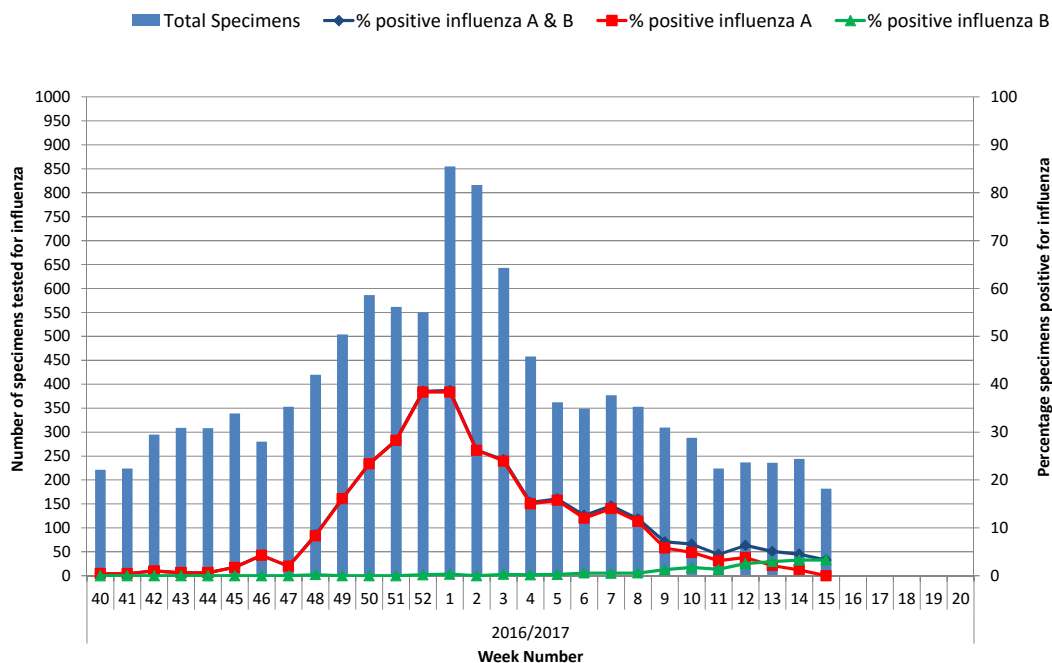
Figure 2: Age specific sentinel GP ILI consultation rate per 100,000 population by week during the summer of 2016 and the 2016/2017 influenza season to date. Source: ICGP.

## 2. Influenza and Other Respiratory Virus Detections - NVRL

The data reported in this section for the 2016/2017 influenza season refers to sentinel and non-sentinel respiratory specimens routinely tested for influenza, respiratory syncytial virus (RSV), adenovirus, parainfluenza viruses types 1, 2, 3 & 4 (PIV-1, -2, -3 & -4) and human metapneumovirus (hMPV) by the National Virus Reference Laboratory (NVRL) (figures 3, 4 & 5, tables 1 & 2).

- Influenza positivity reported by the NVRL from sentinel and non-sentinel sources was at very low levels during weeks 14 and 15 2017, at 4.5% and 3.3%, respectively.
- Influenza A(H3) was the predominant influenza virus circulating this season. Low numbers of sporadic influenza A and B cases were reported in recent weeks. Data from the NVRL for weeks 14 and 15 2017 and the 2016/17 season to date are detailed in tables 1 and 2.
- Respiratory syncytial virus (RSV) positivity remained very low during weeks 14 and 15 2017, with four positive non-sentinel specimens reported by the NVRL. In total 1217 RSV positive non-sentinel specimens have been detected by the NVRL this season. RSV circulated earlier and at higher levels this season than are normally observed. Figure 5 shows the number and percentage of non-sentinel RSV positive specimens detected by the NVRL during the 2016/17 season, compared to the 2015/16 season. For the 2016/17 season to date, 43 RSV positive specimens have been detected from sentinel GPs.
- Significant numbers of human metapneumovirus (hMPV), adenovirus and parainfluenza virus (PIV) positive specimens continued to be reported by the NVRL during weeks 14 and 15 2017 (table 2). Coinfections of all seasonal respiratory viruses\* have been reported throughout the 2016/17 season.
- The overall proportion of non-sentinel specimens positive for respiratory viruses\* was 23.9% during week 14 2017 and 19.1% during week 15 2017, a significant decrease compared to the peak proportion of 52.4% during week 52 2016. \*Respiratory viruses routinely tested for by the NVRL are detailed above.

- Genetic characterisation of influenza viruses circulating this season in Ireland has been carried out by the NVRL, on 61 influenza A(H3N2) and one influenza A(H1N1)pdm09 positive specimens to date. Further genetic and antigenic testing is ongoing at the NVRL.
- 72% (n=44/61) of influenza A(H3N2) viruses analysed clustered in a new genetic subclade 3C.2a1, represented by A/Bolzano/7/2016, a subgroup of the vaccine component 3C.2a clade. Two specimens (3%; 2/61) fell into the 3C.2a clade, represented by A/Hong Kong/4801/2014, which is also the strain proposed for the 2017/18 Northern Hemisphere vaccine. ECDC has reported that 3C.2a1 viruses are antigenically similar to the 2016/17 A(H3N2) vaccine strain (clade 3C.2a). The 3C.2a1 clade is evolving rapidly and several additional amino acid mutations have emerged resulting in a number of clusters within the 3C.2a1 subclade.
- A further 25% (n=15/61) of influenza A(H3N2) viruses analysed clustered in subgroup 3C.3a, represented by A/Switzerland/9715293/2013, the A(H3N2) strain included in the 2015/16 Northern Hemisphere vaccine. Of particular interest, with the exception of Ireland and Spain, 3C.3a viruses have been rarely identified in Europe this season.
- Influenza A(H1N1)pdm09 viruses have been infrequently detected in Ireland this season. One Influenza A(H1N1)pdm09 virus was characterised and belonged to the 6B.1 genetic clade, represented by A/Michigan/45/2015. ECDC has reported that A/Michigan/45/2015 (H1N1)pdm09-like viruses are antigenically indistinguishable from the 2016/17 vaccine strain A/California/7/2009. The A/Michigan/45/2015 (H1N1)pdm09-like virus has been selected for inclusion in the 2017/18 Northern Hemisphere vaccine. <http://www.who.int/influenza/vaccines/virus/recommendations/en/>



**Figure 3: Number of specimens (from sentinel and non-sentinel sources combined) tested by the NVRL for influenza and percentage influenza positive by week for the 2016/2017 influenza season. Source: NVRL**

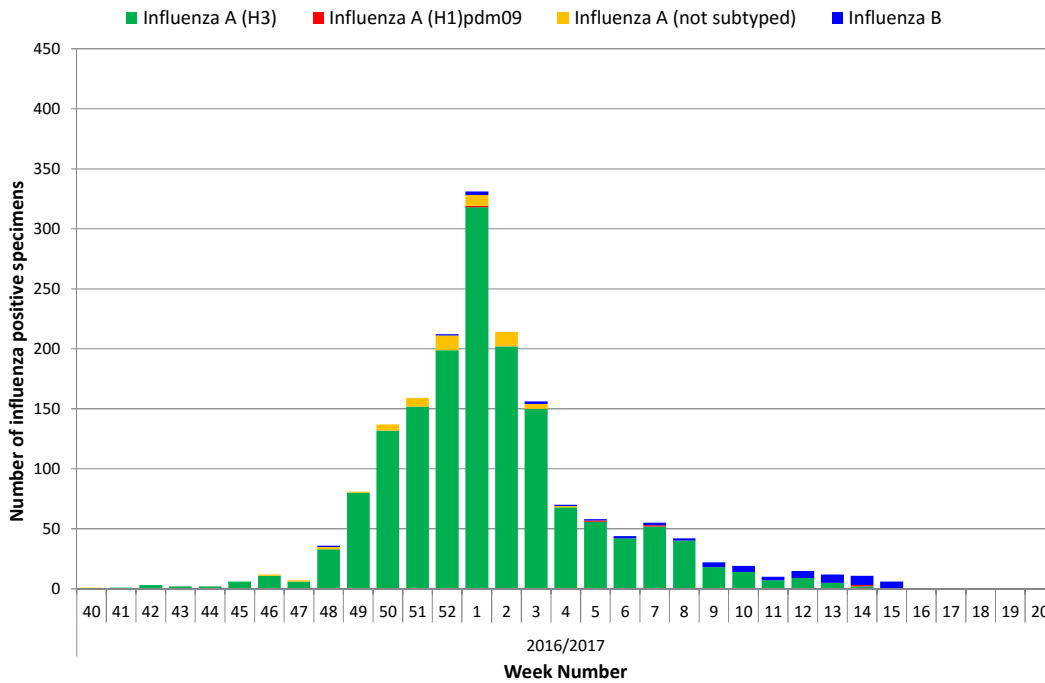


Figure 4: Number of positive influenza specimens (from sentinel and non-sentinel sources combined) by influenza type/subtype tested by the NVRL, by week for the 2016/2017 influenza season. *Source: NVRL.*

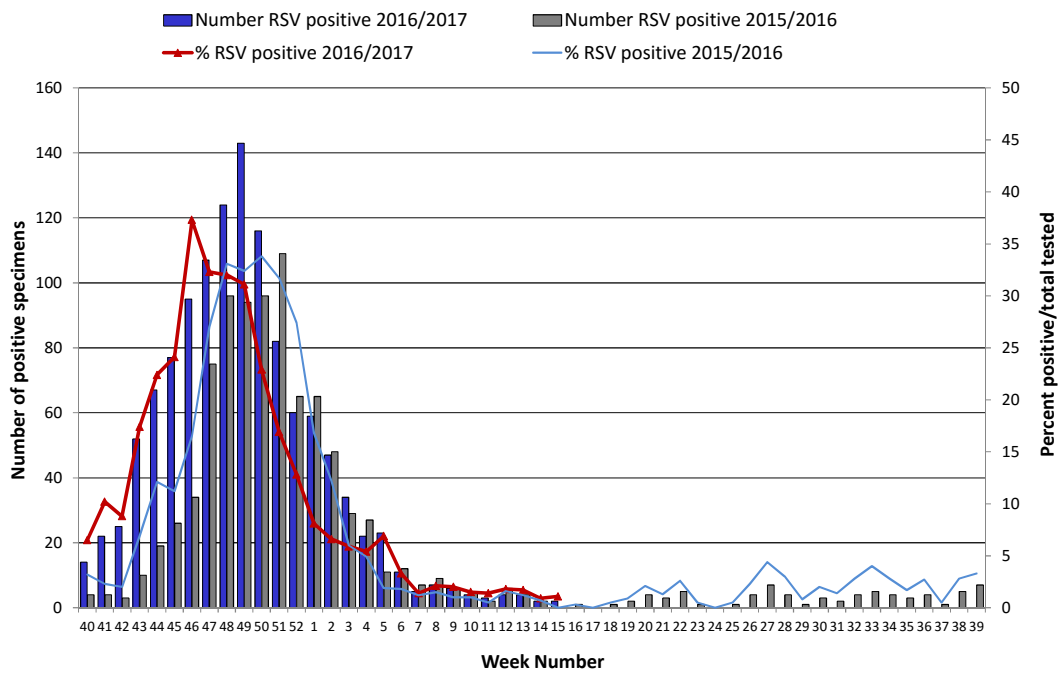


Figure 5: Number and percentage of non-sentinel RSV positive specimens detected by the NVRL during the 2016/2017 season, compared to the 2015/2016 season. *Source: NVRL.*

**Table 1: Number of sentinel and non-sentinel<sup>†</sup> respiratory specimens tested by the NVRL and positive influenza results, for weeks 14 and 15 2017 and the 2016/2017 season to date. Source: NVRL**

Week	Specimen type	Total tested	Number influenza positive	% Influenza positive	Influenza A				Influenza B
					A(H1)pdm09	A(H3)	A (not subtyped)	Total influenza A	
<b>14 2017</b>	Sentinel	14	1	7.1	0	0	0	0	1
	Non-sentinel	230	10	4.3	1	2	0	3	7
	<b>Total</b>	<b>244</b>	<b>11</b>	<b>4.5</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>3</b>	<b>8</b>
<b>15 2017</b>	Sentinel	4	2	50.0	0	0	0	0	2
	Non-sentinel	178	4	2.2	0	0	0	0	4
	<b>Total</b>	<b>182</b>	<b>6</b>	<b>3.3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>
<b>2016/2017</b>	Sentinel	919	415	45.2	0	400	4	404	11
	Non-sentinel	9966	1309	13.1	4	1210	52	1266	43
	<b>Total</b>	<b>10885</b>	<b>1724</b>	<b>15.8</b>	<b>4</b>	<b>1610</b>	<b>56</b>	<b>1670</b>	<b>54</b>

**Table 2: Number of sentinel and non-sentinel specimens tested by the NVRL for other respiratory viruses and positive results, for weeks 14 and 15 2017 and the 2016/2017 season to date. Source: NVRL**

Week	Specimen type	Total tested	RSV	% RSV	Adenovirus	% Adenovirus	PIV-1	% PIV-1	PIV-2	% PIV-2	PIV-3	% PIV-3	PIV-4	% PIV-4	hMPV	% hMPV
<b>14 2017</b>	Sentinel	14	0	0.0	0	0.0	0	0.0	0	0.0	2	14.3	0	0.0	2	14.3
	Non-sentinel	230	2	0.9	21	9.1	1	0.4	0	0.0	14	6.1	0	0.0	7	3.0
	<b>Total</b>	<b>244</b>	<b>2</b>	<b>0.8</b>	<b>21</b>	<b>8.6</b>	<b>1</b>	<b>0.4</b>	<b>0</b>	<b>0.0</b>	<b>16</b>	<b>6.6</b>	<b>0</b>	<b>0.0</b>	<b>9</b>	<b>3.7</b>
<b>15 2017</b>	Sentinel	4	0	0.0	0	0.0	0	0.0	0	0.0	1	25.0	0	0.0	0	0.0
	Non-sentinel	178	2	1.1	17	9.6	0	0.0	1	0.6	6	3.4	0	0.0	4	2.2
	<b>Total</b>	<b>182</b>	<b>2</b>	<b>1.1</b>	<b>17</b>	<b>9.3</b>	<b>0</b>	<b>0.0</b>	<b>1</b>	<b>0.5</b>	<b>7</b>	<b>3.8</b>	<b>0</b>	<b>0.0</b>	<b>4</b>	<b>2.2</b>
<b>2016/2017</b>	Sentinel	919	43	4.7	13	1.4	0	0.0	3	0.3	8	0.9	4	0.4	31	3.4
	Non-sentinel	9966	1217	12.2	245	2.5	3	0.0	22	0.2	200	2.0	63	0.6	299	3.0
	<b>Total</b>	<b>10885</b>	<b>1260</b>	<b>11.6</b>	<b>258</b>	<b>2.4</b>	<b>3</b>	<b>0.0</b>	<b>25</b>	<b>0.2</b>	<b>208</b>	<b>1.9</b>	<b>67</b>	<b>0.6</b>	<b>330</b>	<b>3.0</b>

<sup>†</sup> Please note that non-sentinel specimens relate to specimens referred to the NVRL (other than sentinel specimens) and may include more than one specimen from each case.

### 3. Regional Influenza Activity by HSE-Area

The geographical spread of influenza activity is reviewed on a weekly basis using sentinel GP ILI consultation rates, laboratory data and outbreak data.

Maps of the geographical spread of influenza/ILI during weeks 14 and 15 2017 are shown in figure 6. Sporadic influenza activity was reported in HSE-East, -Midlands, -Midwest and -South and no influenza activity was reported in HSE-Northeast, -Northwest, -West and -Southeast during week 14 2017. During week 15 2017, sporadic influenza activity was reported in HSE-East, -Northwest and -Midwest and -South, and no influenza activity was reported in HSE-Midlands, -Northeast, -Southeast and -West (figure 6).

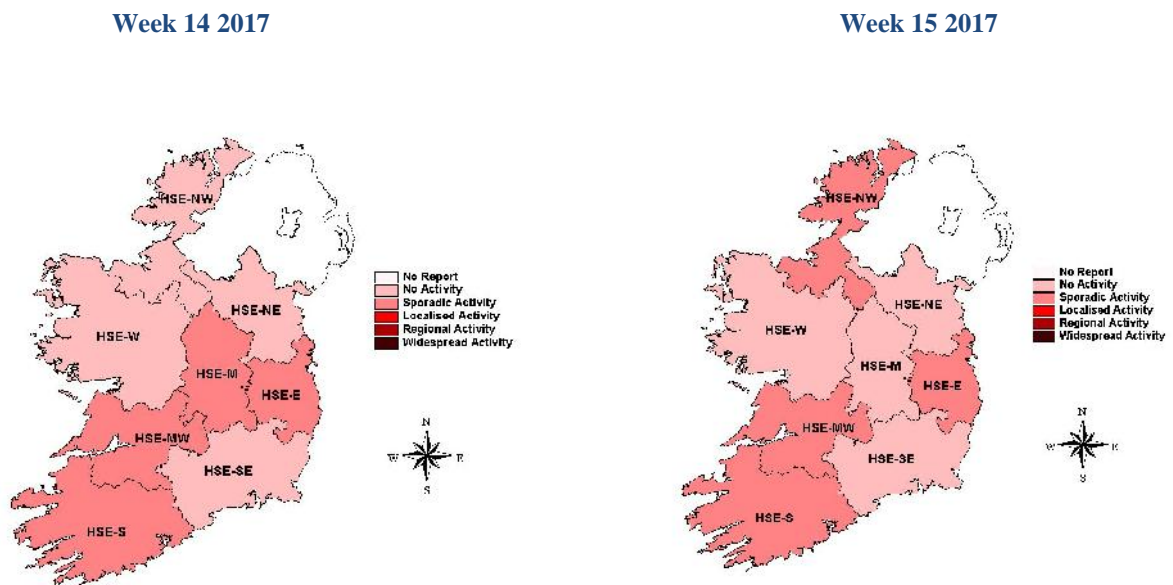
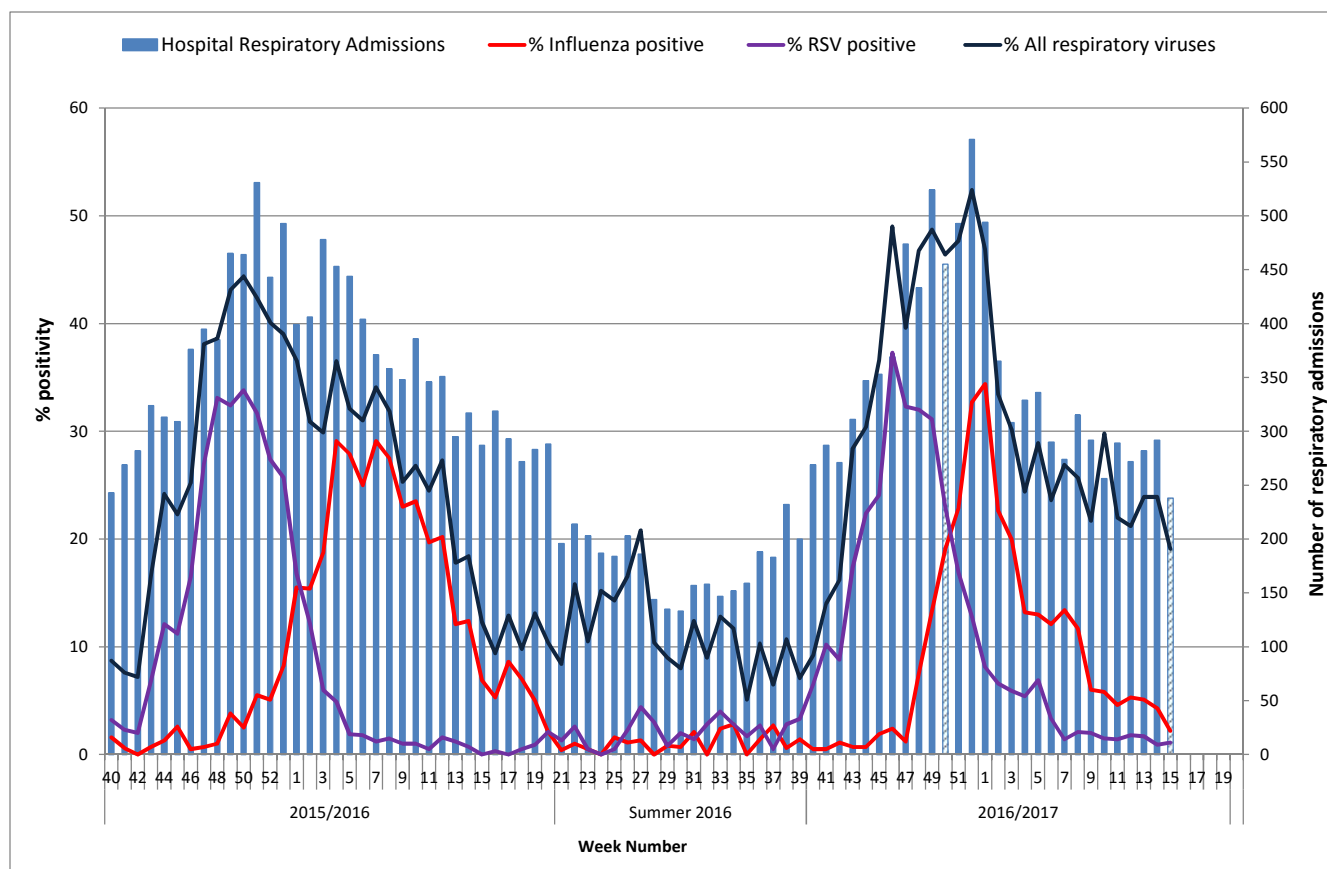


Figure 6: Maps of provisional influenza activity by HSE-Area during weeks 14 and 15 2017

#### Sentinel hospitals

The Departments of Public Health have established at least one sentinel hospital in each HSE-Area, to report data on total, emergency and respiratory admissions on a weekly basis. For the 2016/2017 influenza season, eight sentinel hospitals are regularly reporting respiratory admissions data in a timely manner.

Respiratory admissions reported from a network of sentinel hospitals were at low levels at 292 during week 14 2017 and 238 during week 15 2017 (figure 7). It should be noted that only seven of eight sentinel hospitals reported during week 15 2017. For the 2016/2017 season to date, respiratory admissions peaked during week 52 2016 at 571, the highest level ever reported.



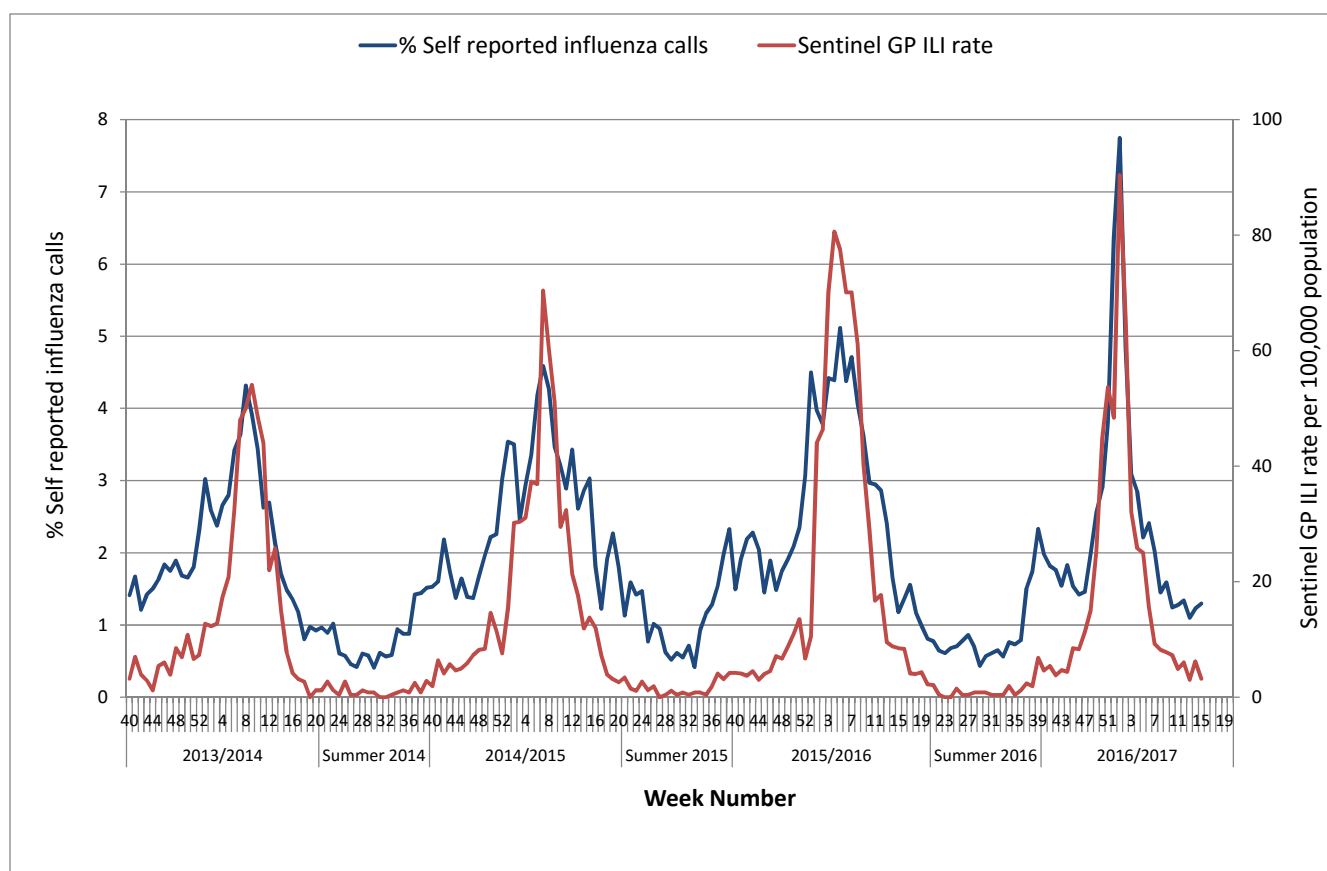
**Figure 7: Number of respiratory admissions reported from the sentinel hospital network and % positivity for influenza, RSV and all seasonal respiratory viruses tested\* by the NVRL by week and season.** Source: Departments of Public Health - Sentinel Hospitals & NVRL. \*All seasonal respiratory viruses tested refer to non-sentinel respiratory specimens routinely tested by the NVRL including influenza, RSV, adenovirus, parainfluenza viruses and human metapneumovirus (hMPV). Data were incomplete during weeks 50 2016 and 15 2017; these weeks are represented by the hatched bar.

#### 4. GP Out-Of-Hours services surveillance

The Department of Public Health in HSE-NE is collating national data on calls to nine of thirteen GP Out-of-Hours services in Ireland. Records with clinical symptoms reported as flu or influenza are extracted for analysis. This information may act as an early indicator of increased ILI activity. However, data are self-reported by callers and are not based on coded influenza diagnoses.

The proportion of influenza-related calls to GP Out-of-Hours services was at low levels during weeks 14 and 15 2017, at 1.2% and 1.3%, respectively. The proportion of influenza related calls reported peaked during week 1 2017 at 7.7%, which was the highest level reported since the 2010/2011 season (figure 8).





**Figure 8: Self-reported influenza-related calls as a proportion of total calls to Out-of-Hours GP Co-ops and sentinel GP ILI consultation rate per 100,000 population by week and season.** *Source: GP Out-Of-Hours services in Ireland (collated by HSE-NE) & ICGP.*

## 5. Influenza & RSV notifications

Influenza and RSV cases notifications are reported on Ireland’s Computerised Infectious Disease Reporting System (CIDR), including all positive influenza/RSV specimens reported from all laboratories testing for influenza/RSV and reporting to CIDR.

Influenza and RSV notifications are reported in the [Weekly Infectious Disease Report for Ireland](#). Influenza notifications remained low during weeks 14 and 15 2017, with 8 and 15 confirmed influenza cases notified, respectively. Of the cases notified during this period, two were associated with influenza A(H3), one with influenza A(H1)pdm09, one with influenza A (not subtyped) and 19 with influenza B. Influenza notifications peaked during week 2 2017 at 801. RSV notifications remained at very low levels during weeks 14 and 15 2017, with four notified cases reported. RSV notifications peaked at 359 during week 50 2016.

## 6. Influenza Hospitalisations

Nine confirmed influenza hospitalised cases were notified to HPSC during weeks 14 and 15 2017: one associated with influenza A(H3), one with A(H1)pdm09 and seven with influenza B. To date this season (up to the week ending April 16, 2017), 1360 confirmed influenza hospitalised cases have been notified to HPSC: 524 associated with influenza A(H3), 3 with influenza A(H1)pdm09, 799 with influenza A (not subtyped), 28 with influenza B and 6 with influenza type/subtype not reported. The highest age specific rates in confirmed influenza hospitalised cases were in those aged 65 years and older, followed by those aged less than one year of age (table 3). Seventy-six percent of hospitalised cases, this season to date, were reported by HSE-East, -Midwest, -Southeast and -South.

## 7. Critical Care Surveillance

The Intensive Care Society of Ireland (ICSI) and the HSE Critical Care Programme are continuing with the enhanced surveillance system set up during the 2009 pandemic, on all critical care patients with confirmed influenza. HPSC processes and reports on this information on behalf of the regional Directors of Public Health/Medical Officers of Health.

Forty-seven confirmed influenza cases (19 associated with influenza A(H3), 25 with influenza A (not subtyped) and three with influenza B) were admitted to critical care units and reported to HPSC this season to date. The majority of cases were in those aged 65 years and older, with a median age of 66 years. Thirteen paediatric cases have been reported this season to date (table 3).

**Table 3: Age specific rates for confirmed influenza cases hospitalised and admitted to critical care during the 2016/2017 influenza season to date. Age specific rates are based on the 2011 CSO census.**

Age (years)	Hospitalised		Admitted to ICU	
	Number	Age specific rate per 100,000 pop.	Number	Age specific rate per 100,000 pop.
<1	71	98.1	2	2.8
1-4	104	36.6	5	1.8
5-14	80	12.8	5	0.8
15-24	50	8.6	1	0.2
25-34	97	12.8	1	0.1
35-44	79	10.5	1	0.1
45-54	85	14.7	1	0.2
55-64	124	26.8	5	1.1
≥65	668	124.8	26	4.9
Unknown	2	-	0	-
<b>Total</b>	<b>1360</b>	<b>29.6</b>	<b>47</b>	<b>1.0</b>

## 8. Mortality Surveillance

Influenza-associated deaths include all deaths where influenza is reported as the primary/main cause of death by the physician or if influenza is listed anywhere on the death certificate as the cause of death. HPSC receives daily mortality data from the General Register Office (GRO) on all deaths from all causes registered in Ireland. These data have been used to monitor excess all-cause and influenza and pneumonia deaths as part of the influenza surveillance system and the European Mortality Monitoring Project. These data are provisional due to the time delay in deaths' registration in Ireland. <http://www.euromomo.eu/>

- To date this season, 88 notified influenza cases died and were reported to HPSC. The majority (87.5%) of deaths were in cases aged 65 years and older. The median age of cases who died during the 2016/2017 influenza season to date is 80 years. Forty-two cases were associated with influenza A(H3), 34 with influenza A (not subtyped), one with influenza B and 11 clinical influenza cases with no pathogen identified.
- Excess all-cause mortality in those aged 65 years and older was reported in Ireland over eight consecutive weeks, between weeks 49 2016 and 4 2017, after correcting GRO data for reporting delays with the standardised EuroMOMO algorithm. These excess deaths were most likely associated with high levels of influenza A(H3N2) activity. However, these data should be interpreted with caution, due to delays in reporting.
- Excess all-cause mortality was reported among the elderly in Europe this season, most likely due to the high levels of influenza A(H3N2) circulating and also associated with severe weather conditions in some countries. However, the observed increase in excess mortality is prone to uncertainty due to delay adjustment and should be interpreted with caution. <http://www.euromomo.eu/>

## 9. Outbreak Surveillance

One influenza B outbreak was reported to HPSC during week 15 2017, in a residential care facility/community hospital in HSE-South. To date this season (up to the week ending April 16, 2017), 105 acute respiratory infection (ARI) and influenza outbreaks were reported to HPSC, 63 of which were associated with influenza A, one associated with influenza B, 23 with influenza (type & subtype not reported), four associated with RSV, two with human metapneumovirus (hMPV), one with parainfluenza virus and 11 ARI outbreaks with no pathogens identified. The majority of influenza outbreaks reported to date this season were in residential care facilities/community hospitals, mainly associated with influenza A(H3) and affecting those aged 65 years and older. Eleven confirmed influenza outbreaks were reported in acute hospital settings this season to date, five in HSE-East, two each in HSE-Midwest and West and one each in HSE-Southeast and -South. To date this season, the majority of ARI and influenza outbreaks were reported from HSE-East and -South: 29 in the East, 5 in Midlands, 10 in Midwest, 8 in Northeast, 11 in Northwest, 8 in Southeast, 29 in South and 5 in the West. *Family outbreaks are not included in this report. All outbreaks notified to HPSC are reported in the [HPSC Outbreak Weekly Report](#).*

## 10. International Summary

Influenza activity in the European region has continued to decrease, with the vast majority of countries reporting low intensity of influenza activity. Influenza A(H3N2) was the predominant virus circulating this season, with those aged 65 years and older most severely affected. Low numbers of influenza B have been reported in recent weeks. Excess all-cause mortality was reported among the elderly in the European region this season, most likely due to high levels of influenza A(H3N2) circulating and also associated with severe weather conditions in some countries. To date this season, the majority of circulating influenza A(H3N2) viruses in Europe were reported as antigenically similar to the 2016/2017 A(H3N2) vaccine strain. While about two-thirds of the A(H3N2) viruses characterised belong to a new genetic subclade (3C.2a1), these viruses are reported as antigenically similar to the vaccine strain (clade 3C.2a), however 3C.2a1 viruses are evolving rapidly. All tested influenza viruses collected recently for antiviral sensitivity were susceptible to the neuraminidase inhibitor antiviral medications.

See [ECDC](#) and [WHO](#) influenza surveillance reports for further information. The latest ECDC risk assessment (RA) on seasonal influenza in EU/EEA countries for the 2016/2017 season was published on the 25<sup>th</sup> January 2017 on the [ECDC website](#).

- Further information is available on the following websites:
  - Northern Ireland <http://www.fluawareni.info/>
  - Europe – ECDC <http://ecdc.europa.eu/>
  - Public Health England <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/SeasonalInfluenza/>
  - United States CDC <http://www.cdc.gov/flu/weekly/fluactivitysurv.htm>
  - Public Health Agency of Canada <http://www.phac-aspc.gc.ca/fluwatch/index-eng.php>
- Information on Middle Eastern Respiratory Syndrome Coronavirus (MERS), including the latest ECDC rapid risk assessment is available on the [ECDC website](#). Further information and guidance documents are also available on the [HPSC](#) and [WHO](#) websites.
- The latest ECDC and WHO risk assessments on influenza A(H5N8) have been published on the [ECDC](#) and [WHO websites](#). Further information on the public health measures for protecting and managing people exposed to highly pathogenic avian influenza A(H5N8) in Europe has been published on the [Eurosurveillance website](#).
- Further information on avian influenza is available on the [ECDC](#) website.

## 11. WHO recommendations on the composition of influenza virus vaccines

On March 2, 2017, the WHO vaccine strain selection committee recommended that trivalent vaccines for use in the 2017/2018 influenza season (northern hemisphere winter) contain the following: an A/Michigan/45/2015 (H1N1)pdm09-like virus; an A/Hong Kong/4801/2014 (H3N2)-like virus; a B/Brisbane/60/2008-like virus. It is recommended that quadrivalent vaccines containing two influenza B viruses contain the above three viruses and a B/Phuket/3073/2013-like virus.

<http://www.who.int/influenza/vaccines/virus/recommendations/en/>

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<http://www.who.int/influenza/vaccines/virus/recommendations/en/>

Further information on influenza in Ireland is available at [www.hpsc.ie](http://www.hpsc.ie)

### Acknowledgements

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