Influenza Surveillance in Ireland – Weekly Report

Influenza Weeks 15 & 16 2018 (9th – 22nd April 2018)

Summary

All indicators of influenza activity continued to decrease during weeks 15 and 16 2018 (week ending 22nd April 2018), compared to previous weeks. Sentinel GP influenza-like illness consultation rates were at low levels. Hospitalised influenza cases were reported at low levels and have declined significantly during weeks 15 and 16 2018. Localised influenza outbreaks were reported in residential care facilities. Influenza A and B were co-circulating at low levels.

- Influenza-like illness (ILI): The sentinel GP influenza-like illness (ILI) consultation rate was at low levels during weeks 15 and 16 2018, at 6.7 and 4.6 per 100,000 population, respectively.
  - ILI rates were below the Irish baseline threshold (17.5 per 100,000).
  - ILI age specific rates remained low in all age groups.
- GP Out of Hours: The proportion of influenza–related calls to GP Out-of-Hours services was at low levels.
- Respiratory admissions: Respiratory admissions reported from a network of sentinel hospitals have continued to slowly decline in April.
- National Virus Reference Laboratory (NVRL):
  - The number of influenza positive specimens decreased significantly during weeks 15 and 16 2018, compared to the previous two weeks. Influenza viruses continued to circulate at low levels, with influenza positivity reported by the NVRL from sentinel and non-sentinel sources during weeks 15 and 16 2017, at 14% and 10%, respectively.
  - Influenza A(H3N2), A(H1N1)pdm09 and influenza B are all co-circulating, with a higher proportion of influenza A detected since week 10 2018. Co-infections of all seasonal respiratory viruses have been reported throughout the 2017/18 season.
  - Respiratory syncytial virus (RSV), human metapneumovirus (hMPV), adenovirus, parainfluenza virus, coronavirus and picornavirus were reported in varying proportions throughout the season to date.
- Hospitalisations: 86 and 77 confirmed influenza hospitalised cases were notified during weeks 15 and 16 2018, respectively, a decrease compared to 116 notified during week 14 2018. For the season to date, 4594 confirmed influenza hospitalised cases have been notified, with the highest rates occurring in those aged ≥65 years.
- Critical care admissions: 184 confirmed influenza cases were admitted to critical care units and reported to HPSC (weeks 40 2017 – 16 2018), 51% associated with influenza A and 49% with influenza B.
- Mortality: 209 deaths in notified influenza cases were reported to HPSC between weeks 40 2017 - 16 2018, with a median age of 81 years. Excess all-cause mortality has now returned to normal expected levels in Ireland.
- Outbreaks: Ten influenza/acute respiratory infection outbreaks were notified during weeks 15 and 16 2018, bringing the season total to 223.
- International: Influenza activity was at inter-seasonal levels in the majority of countries of the European Region.

1. GP sentinel surveillance system - Clinical Data

- During week 16 2018, 11 influenza-like illness (ILI) cases were reported from sentinel GPs, corresponding to an ILI consultation rate of 4.6 per 100,000 population, a slight decrease compared to the rate of 6.7 per 100,000 reported during week 15 2018 (figure 1).
- ILI rates were below the Irish baseline ILI threshold (17.5/100,000 population) during weeks 15 and 16 2018. ILI rates were above the baseline threshold level for 14 consecutive weeks (weeks 50 2017 – 11 2018) and above the medium intensity threshold (59.6/100,000 population) for seven consecutive weeks (weeks 1 - 7 2018).
- During week 16 2018, ILI age specific rates were low in all age groups, ranging from 0/100,000 in the 0-4 and 5-14 year age groups to 6.3/100,000 in those aged 65 years and older (figure 2).
- HPSC in consultation with the European Centre for Disease Prevention and Control (ECDC) has revised the Irish baseline ILI threshold for the 2017/2018 influenza season to 17.5 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.[1]
- The baseline ILI threshold (17.5/100,000 population), medium (59.6/100,000 population) and high (114.5/100,000 population) intensity ILI thresholds are shown in figure 1.

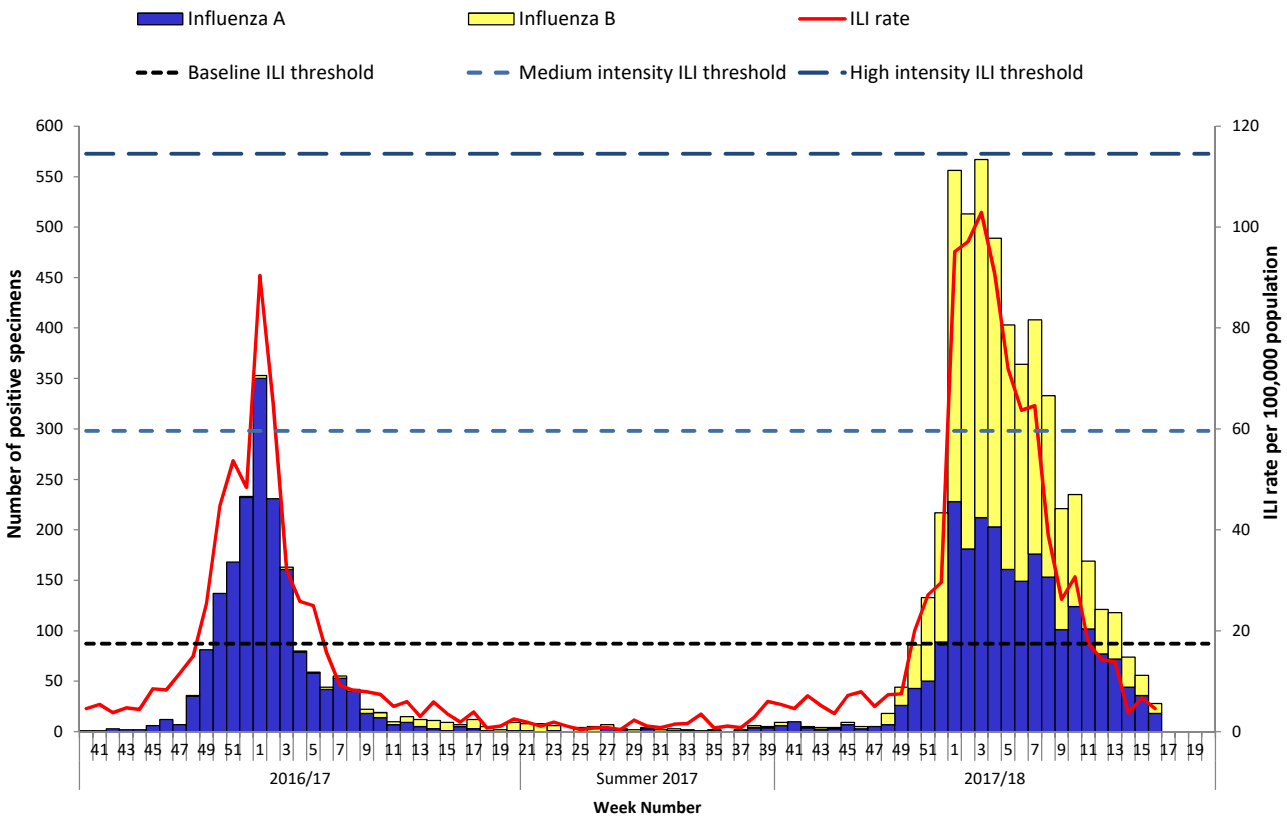

Figure 1: ILI sentinel GP consultation rates per 100,000 population, baseline ILI threshold, medium and high intensity ILI thresholds* and number of positive influenza A and B specimens tested by the NVRL, by influenza week and season.
Source: ICGP and NVRL

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

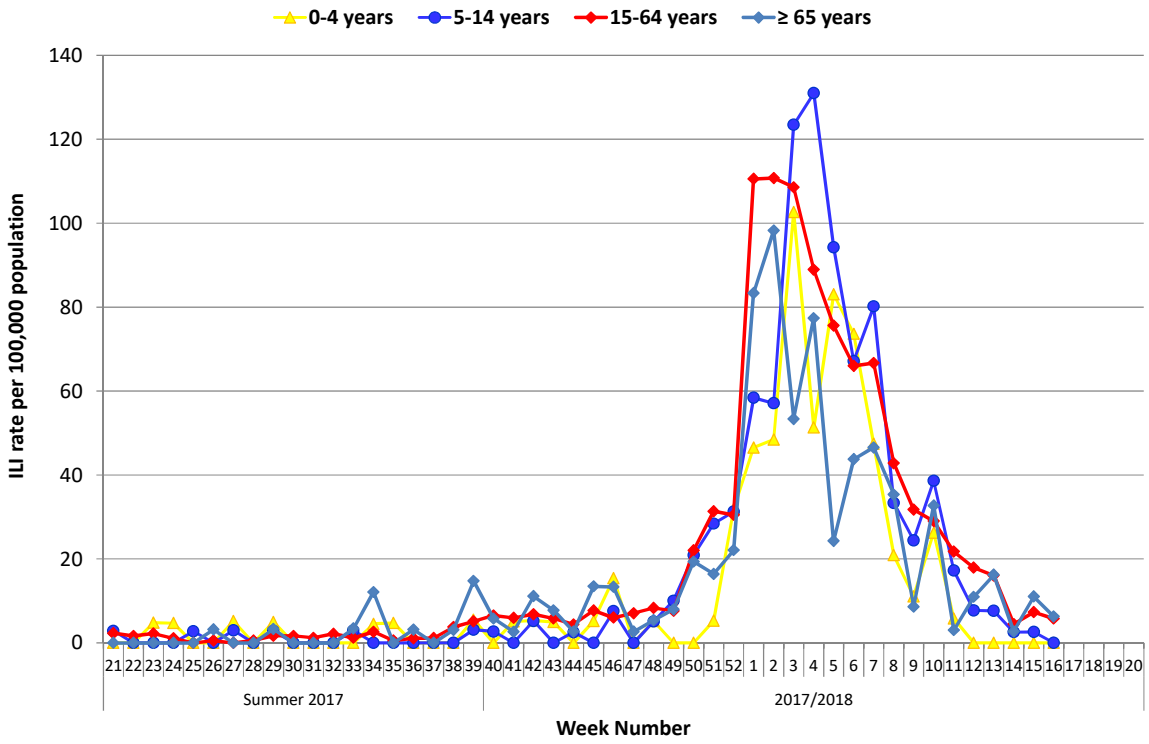

Figure 2: Age specific sentinel GP ILI consultation rate per 100,000 population by week during the summer of 2017 and the 2017/2018 influenza season to date. *Source: ICGP.*

2. Influenza and Other Respiratory Virus Detections - NVRL

The data reported in this section for the 2017/2018 influenza season refer 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 and tables 1 & 2).

- The overall number of influenza positive specimens has declined significantly since peak levels reported in week 3 2018 (January). During week 16 2018, 28 (10%) influenza positive specimens were reported from the NVRL, 64% influenza A and 36% influenza B: 9 A(H3N2), 8 A(H1N1)pdm09, 1 A (not subtyped) and 10 B. Data on respiratory specimens tested this season are updated each week. Data from the NVRL for weeks 15 and 16 2017 and the 2017/18 season to date are detailed in tables 1 and 2.
- Week 16 2018:
  - 1 of 4 (25%) sentinel specimens were influenza positive, an influenza A (H3) positive specimen.
  - 27 of 276 (9.8%) non-sentinel specimens were influenza positive: 63% influenza A and 37% B.
- Influenza A(H3N2), A(H1N1)pdm09 and influenza B are all co-circulating at low levels, with a higher proportion of influenza A detected since week 10 2018 (figures 3 & 4).
- Co-infections of all seasonal respiratory viruses have been reported throughout the 2017/18 season.
- Respiratory syncytial virus (RSV), human metapneumovirus (hMPV), adenovirus, parainfluenza virus, coronavirus and picornavirus (which includes both rhinovirus and enterovirus) were reported in varying proportions this season (table 2).[1]
- The overall proportion of non-sentinel specimens positive for respiratory viruses[1] was 22.5% during week 16 2018, significantly lower than peak levels of 67.1% reported during week 52 2017.

[1] *Respiratory viruses routinely tested by the NVRL and included in this report are detailed above. It should be noted that there are no historic data on picornaviruses or coronaviruses for seasonal comparisons, data on these viruses are not included in this report.*

Virus Characterisation:

- The recommended composition of trivalent influenza vaccines for the 2017/2018 influenza season in the Northern Hemisphere included: 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). For quadrivalent vaccines, a B/Phuket/3073/2013-like virus (B/Yamagata lineage) was recommended. Trivalent influenza vaccines are the most widely used influenza vaccines in Europe. http://www.who.int/influenza/vaccines/virus/recommendations/en/
- Genetic characterisation of influenza viruses circulating this season in Ireland has been carried out by the NVRL on 65 influenza A(H3N2), 22 influenza A(H1N1)pdm09 and 114 influenza B positive specimens to date. Further genetic and antigenic testing is ongoing at the NVRL.
- Of the 65 influenza A(H3N2) viruses genetically characterised, the majority (78.
- 5%; n=51) of viruses belonged to the vaccine virus clade, clade 3C.2a represented by A/Hong Kong/4801/2014. Twelve (18.5%) viruses belonged to subclade 3C.2a1, represented by A/Singapore/INFIMH-16-0019/2016. Both 3C.2a (vaccine virus clade) and 3C.2a1 viruses circulated last season in Ireland and Europe, with 3C.2a1 viruses predominating last season. Viruses in these two groups are antigenically similar; however both clade and subclade are evolving rapidly, thereby requiring continued monitoring. Two (3%) influenza A (H3N2) viruses were characterised as 3C.3a viruses, represented by A/Switzerland/9715293/2013. This strain circulated in Ireland during the 2016/2017 season and has been identified sporadically throughout Europe this season.
- Twenty-two influenza A(H1N1)pdm09 viruses were characterised and all viruses (100%) belonged to the influenza A(H1N1)pdm09 vaccine virus clade, genetic clade 6B.1, represented by A/Michigan/45/2015.
- 114 influenza B viruses were genetically characterised, the vast majority (96.5%; n=110) were B/Yamagata lineage viruses, clustering in clade 3 represented by B/Phuket/3073/2013. The most prevalent influenza B lineage virus detected this season in Europe, is B/Yamagata, which is not included in the 2017/2018 trivalent influenza vaccine. All circulating B/Yamagata viruses have been associated with the AA mutations L172Q and M251V in the haemagglutinin gene. Four (3.5%) B/Victoria lineage viruses were detected by the NVRL, belonging to a subgroup of clade 1A viruses, represented by B/Norway/2409/2017, which carries the HA1 double amino acid deletion, Δ162-163, characteristic of a new antigenically distinct subgroup of viruses that has been detected in low numbers in several countries in the European Region, the US and Canada.
- See ECDC influenza surveillance reports for further information.

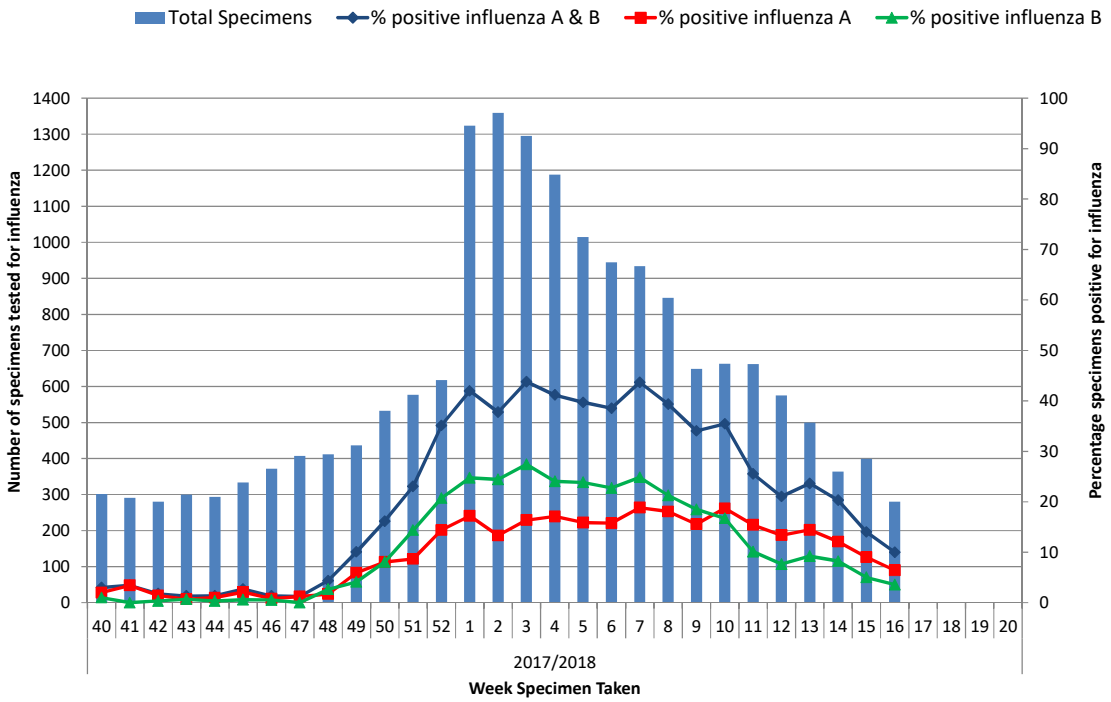

Figure 3: Number of specimens (from sentinel and non-sentinel sources combined) tested by the NVRL for influenza and percentage influenza positive by week for the 2017/2018 influenza season. *Source: NVRL*

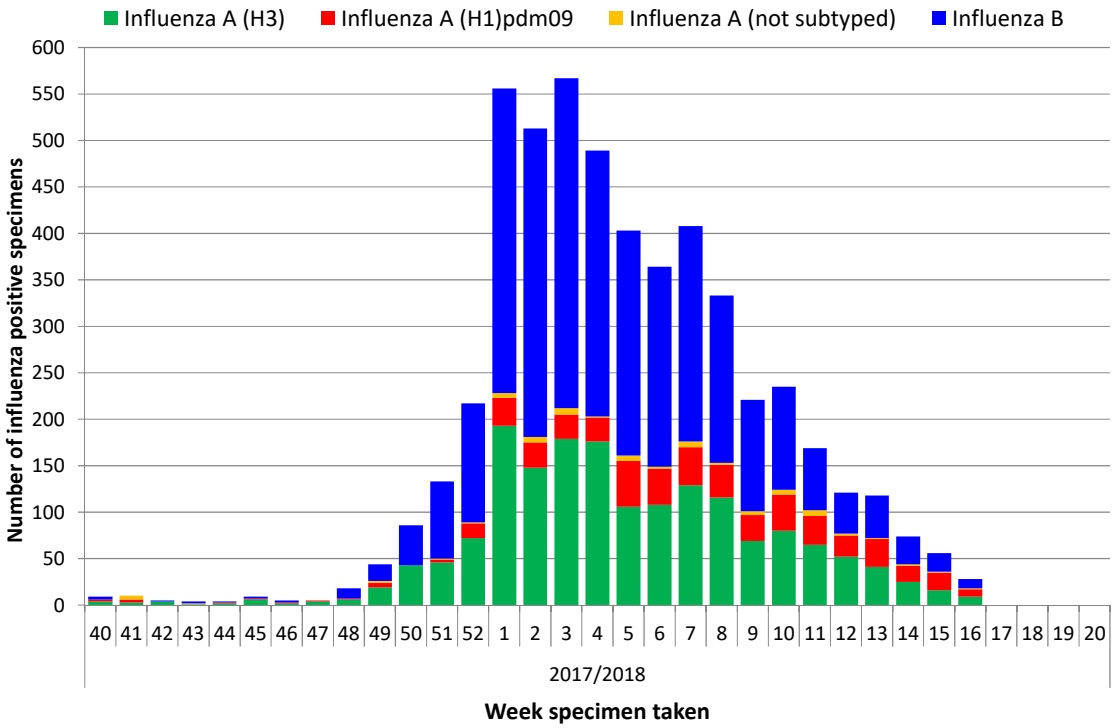

Figure 4: Number of positive influenza specimens (from sentinel and non-sentinel sources combined) by influenza type/subtype tested by the NVRL, by week for the 2017/2018 influenza season. *Source: NVRL.*

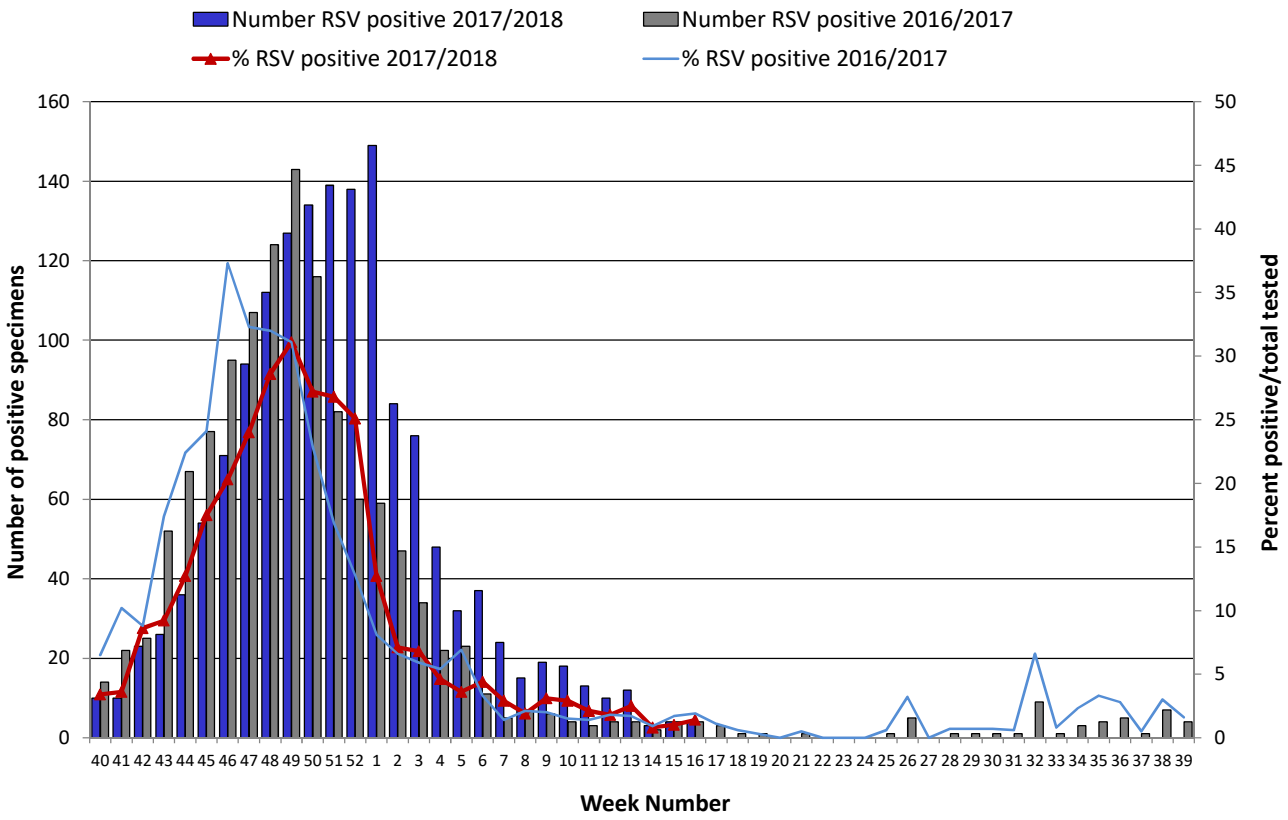

Figure 5: Number and percentage of non-sentinel RSV positive specimens detected by the NVRL during the 2017/2018 season, compared to the 2016/2017 season. *Source: NVRL.*

Table 1: Number of sentinel and non-sentinel[†] respiratory specimens tested by the NVRL and positive influenza results, for weeks 15 & 16 2018 and the 2017/2018 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	
15 2018	Sentinel	6	1	16.7	0	0	0	0	1
	Non-sentinel	393	55	14.0	19	16	1	36	19
	Total	**399**	**56**	**14.0**	**19**	**16**	**1**	**36**	**20**
16 2018	Sentinel	4	1	25.0	0	1	0	1	0
	Non-sentinel	276	27	9.8	8	8	1	17	10
	Total	**280**	**28**	**10.0**	**8**	**9**	**1**	**18**	**10**
2017/2018	Sentinel	1572	872	55.5	61	234	6	301	571
	Non-sentinel	16579	4332	26.1	441	1490	60	1991	2341
	Total	**18151**	**5204**	**28.7**	**502**	**1724**	**66**	**2292**	**2912**

Table 2: Number of non-sentinel specimens tested by the NVRL for other respiratory viruses and positive results, for weeks 15 & 16 2018 and the 2017/2018 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
15 2018	Sentinel	6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Non-sentinel	393	4	1.0	27	6.9	0	0.0	0	0.0	10	2.5	0	0.0	26	6.6
	Total	**399**	**4**	**1.0**	**27**	**6.8**	**0**	**0.0**	**0**	**0.0**	**10**	**2.5**	**0**	**0.0**	**26**	**6.5**
16 2018	Sentinel	4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Non-sentinel	276	4	1.4	17	6.2	0	0.0	1	0.4	4	1.4	0	0.0	9	3.3
	Total	**280**	**4**	**1.4**	**17**	**6.1**	**0**	**0.0**	**1**	**0.4**	**4**	**1.4**	**0**	**0.0**	**9**	**3.2**
2017/2018	Sentinel	1572	31	2.0	31	2.0	12	0.8	1	0.1	0	0.0	3	0.2	33	2.1
	Non-sentinel	16579	1522	9.2	427	2.6	169	1.0	83	0.5	61	0.4	56	0.3	939	5.7
	Total	**18151**	**1553**	**8.6**	**458**	**2.5**	**181**	**1.0**	**84**	**0.5**	**61**	**0.3**	**59**	**0.3**	**972**	**5.4**

[†] 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 is reviewed on a weekly basis using sentinel GP ILI consultation rates, laboratory data and outbreak data.

- During week 15 2018, localised influenza activity was reported in HSE-East and -South and sporadic influenza activity was reported in all other HSE-Areas (figure 6).
- During week 16 2018, localised influenza activity was reported in HSE-East and –South, sporadic influenza activity was reported in HSE-Midlands, -Midwest, -Northeast, -Southeast and –West and no influenza activity was reported in HSE-Northwest (figure 6).
- Influenza activity has decreased significantly in all HSE-Areas since peak levels were reported in January.

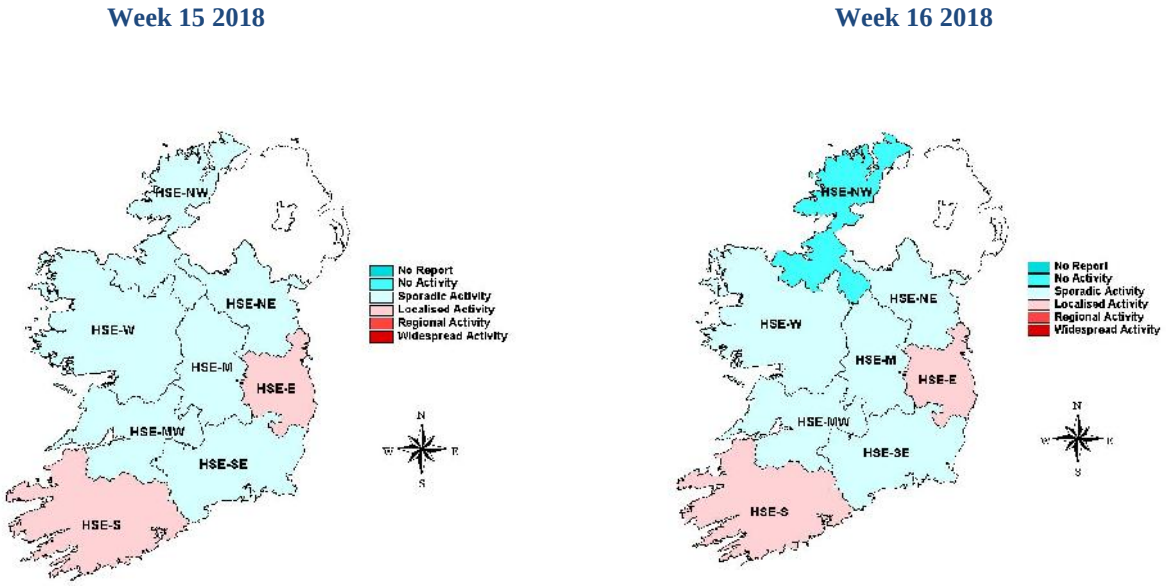

Figure 6: Map of provisional influenza activity by HSE-Area during weeks 15 and 16 2018

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.

During weeks 15 and 16 2018, data were available from seven of eight sentinel hospitals, with 271 and 293 respiratory admissions reported, respectively. Respiratory admissions reported from the sentinel hospital network peaked during week 1 2018 at 535 (figure 7).

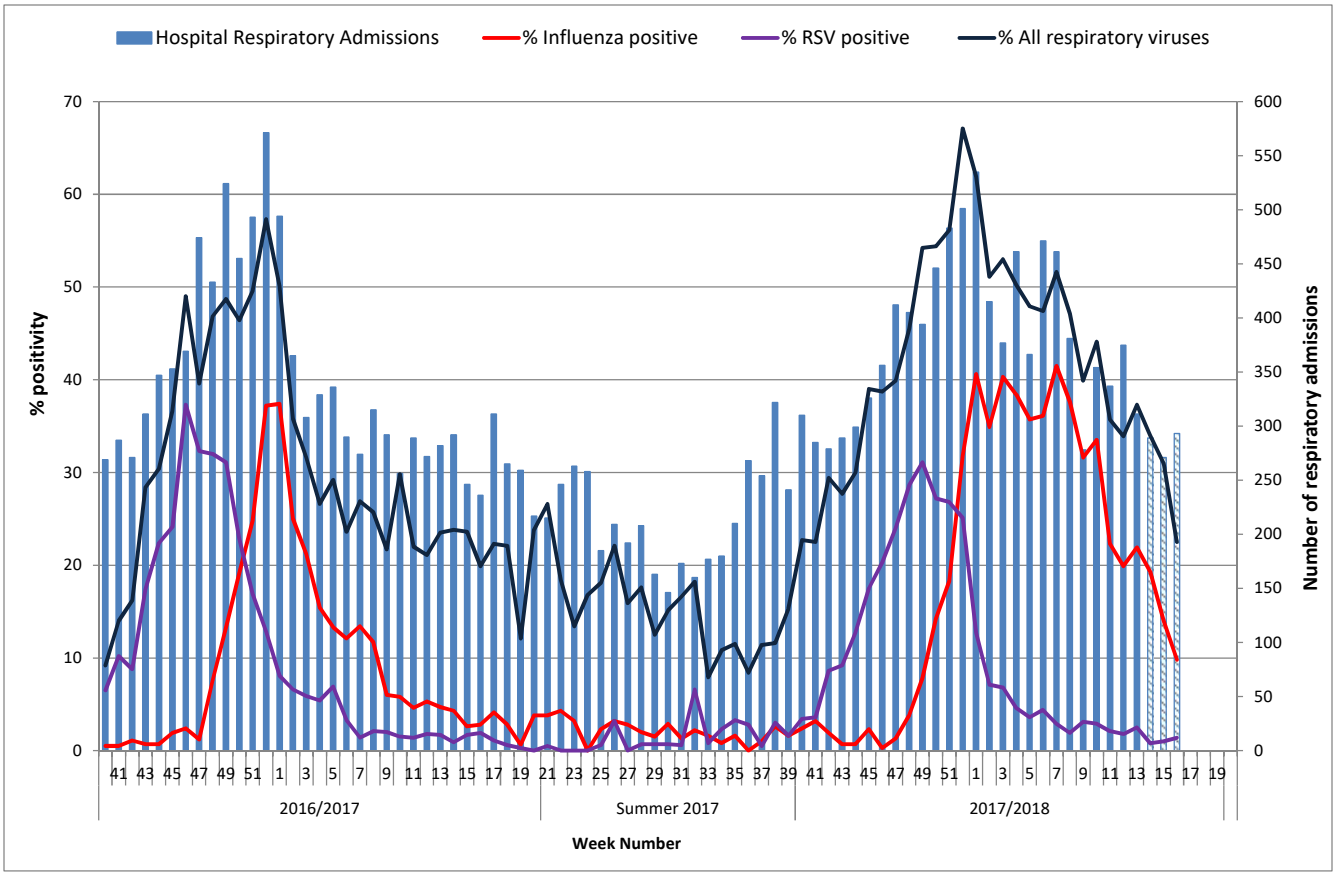

Figure 7: Number of respiratory admissions reported from the sentinel hospital network and % positivity for influenza, RSV and all seasonal respiratory viruses tested* by the NVRL by week and season. *Source: Departments of Public Health - Sentinel Hospitals & NVRL. *All seasonal respiratory viruses 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 14, 15 and 16 2018; 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 15 and 16 2018 at 1.5% and 1.2%, respectively. For the 2017/2018 season to date, the proportion of influenza–related calls to GP Out-of-Hours services peaked at 9.5% during week 1 2018 (figure 8).

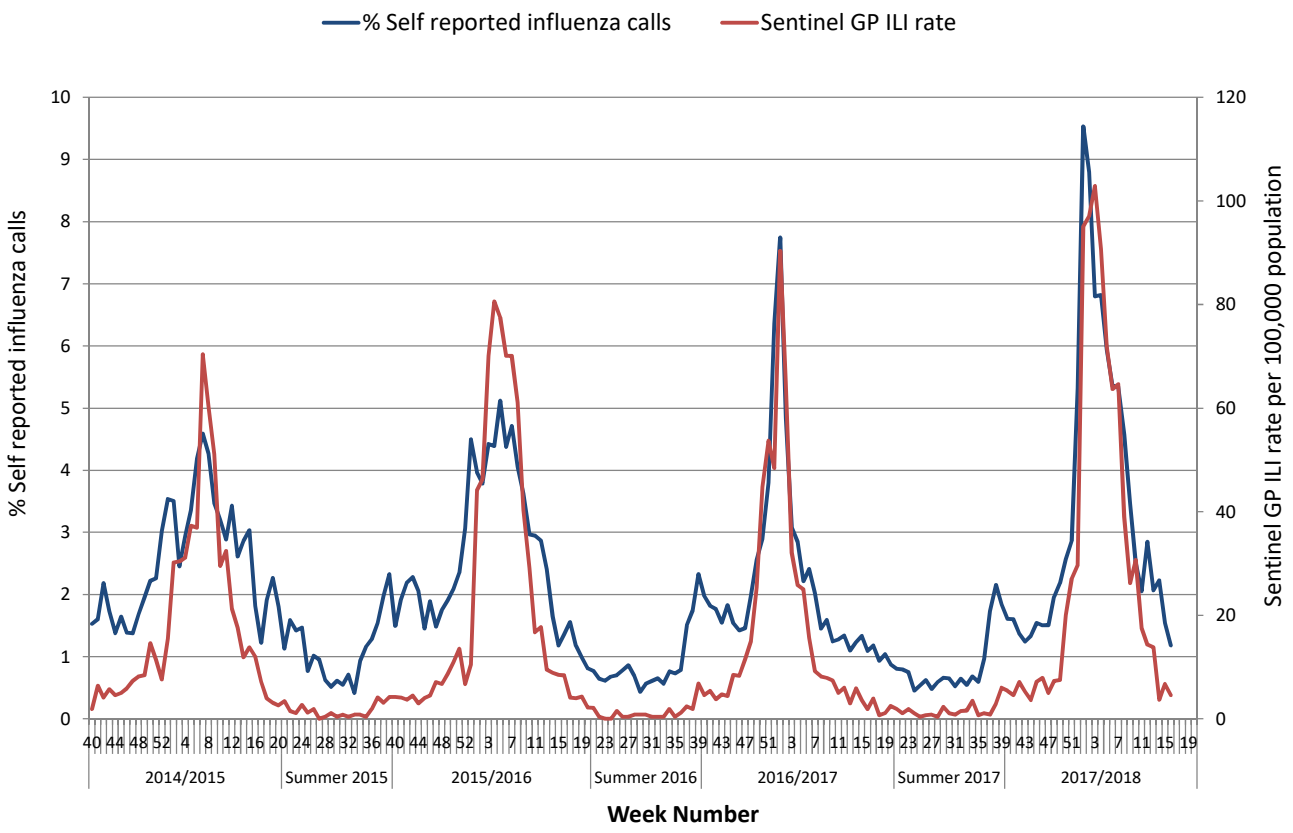

Figure 8: Self-reported influenza-related calls as a proportion of total calls to Out-of-Hours GP Co-ops and sentinel GP ILI consultation rate per 100,000 population by week and season. *Source: GP Out-Of-Hours services in Ireland (collated by HSE-NE) & ICGP.*

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.

- The number of confirmed influenza cases notified decreased during week 16 2018 to 157, compared to 212 in week 15 2018; significantly lower than the peak number of notifications (n=1191) reported during week 2 2018.
- During week 16 2018, 97 (62%) cases were associated with influenza A [11 A(H3N2), 23 A(H1N1)pdm09 and 63 A (not subtyped)], 60 (38%) cases were associated with influenza B. The number of confirmed influenza cases notified on Ireland's Computerised Infectious Disease Reporting System by week of notification is shown in figure 9.
- For the 2017/2018 influenza season to date, 11,655 confirmed influenza cases have been notified to HPSC: 4923 (42%) cases were associated with influenza A [1525 A(H3N2), 561 A(H1N1)pdm09, 2837 A (not subtyped)], 6682 (57%) cases with influenza B and 50 (0.4%) cases with influenza type not reported. The median age of notified confirmed influenza cases this season to date is 52 years.
- RSV notifications remained at low levels during weeks 15 and 16 2018, with 40 cases in total notified during this period.

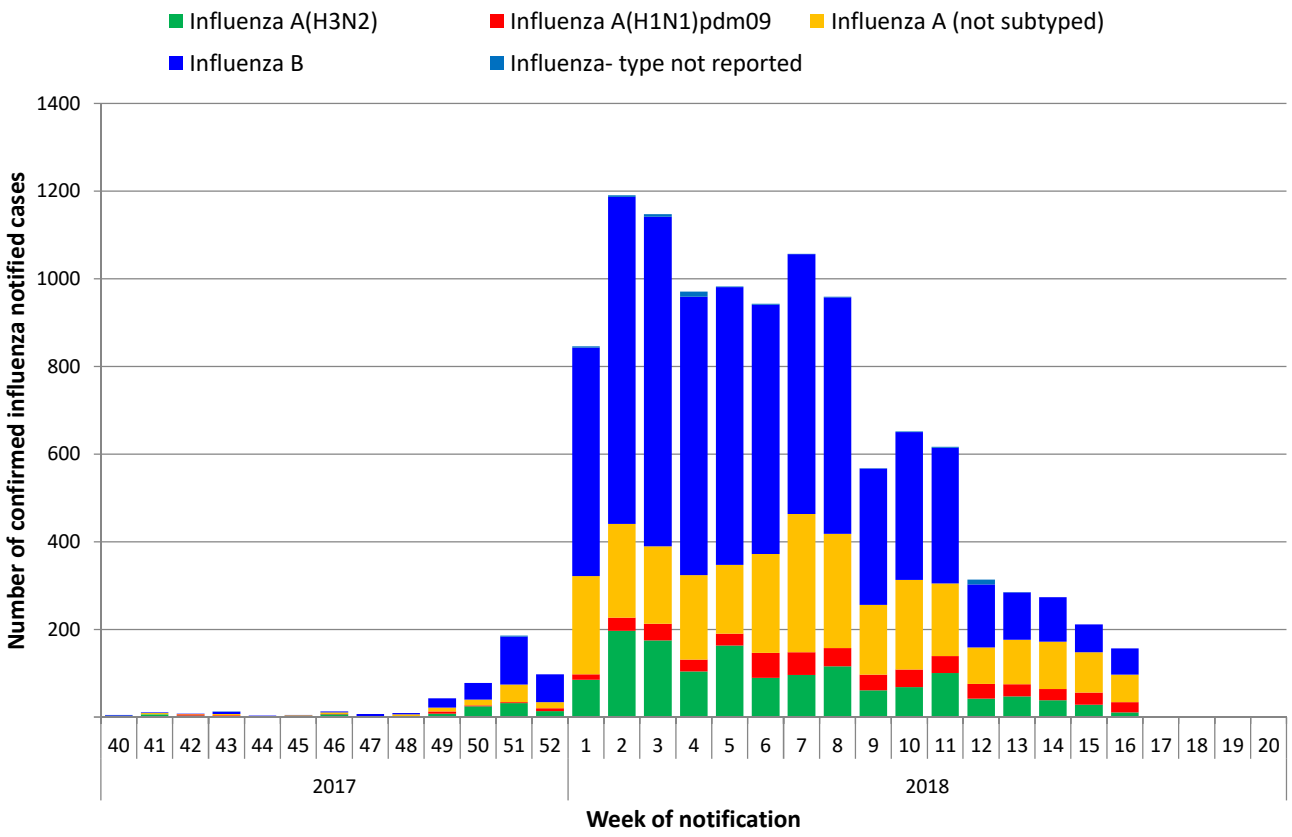

Figure 9: Number of confirmed influenza cases notified on Ireland's Computerised Infectious Disease Reporting System by influenza type/subtype and by week of notification for the 2017/2018 season. *Source: Ireland's Computerised Infectious Disease Reporting System (CIDR).*

6. Influenza Hospitalisations

- During weeks 15 and 16 2018, 86 and 77 confirmed influenza hospitalised cases were notified, respectively, a decrease compared to 116 cases notified during week 14 2018 and a significant decrease compared to peak levels of 491 notified during week 2 2018. Of typed influenza viruses notified during week 16 2018, 70% were associated with influenza A and 30% with influenza B.
- For the 2017/2018 influenza season to date, 4594 confirmed influenza hospitalised cases have been notified to HPSC: 2052 (44.7%) were associated with influenza A [514 associated with A(H3N2), 231 with A(H1N1)pdm09, 1307 with A (not subtyped)], 2508 (54.6%) with influenza B and 34 (0.7%) with influenza type not reported. Age specific rates for hospitalised influenza cases are reported in table 3, with the highest rates reported in those aged 65 years and older. The median age of hospitalised cases this season to date is 63 years. The number of confirmed influenza hospitalised cases by influenza type/subtype and by week of notification is shown in figure 10.

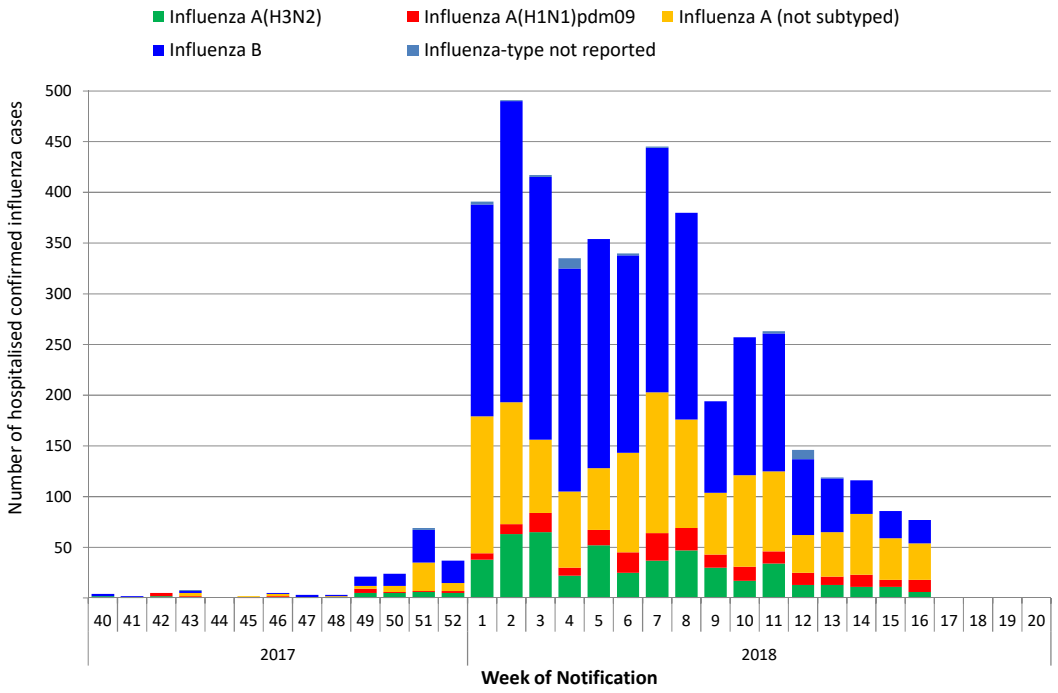

Figure 10: Number of confirmed influenza cases hospitalised by influenza type/subtype and by week of notification. *Source: Ireland's Computerised Infectious Disease Reporting System (CIDR).*

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.

- 184 confirmed influenza cases were admitted to critical care units and reported to HPSC during weeks 40 2017 – 16 2018, 51% associated with influenza A and 49% with influenza B: 26 A(H3N2), 14 influenza A(H1N1)pdm09, 54 A - not subtyped and 90 influenza B. The highest age specific rates were reported in those aged less than one year old and those aged 65 years and older (table 3). The median age of cases is 60 years.

Table 3: Age specific rates for confirmed influenza cases hospitalised and admitted to critical care during the 2017/2018 influenza season to date. 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	163	261.8	10	16.1
1-4	443	164.5	9	3.3
5-14	436	64.6	19	2.8
15-24	152	26.4	4	0.7
25-34	176	26.7	4	0.6
35-44	291	44.1	17	2.3
45-54	279	44.6	12	1.9
55-64	434	85.3	30	5.9
≥65	2218	347.9	79	12.4
Unknown Age	2		0	
Total	**4594**	**96.5**	**184**	**3.9**

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/

- 209 deaths in notified influenza cases have been reported to HPSC during weeks 40 2017 – 16 2018. The median age at the time of death was 81 years. Influenza A was confirmed for 42.1% of notified cases that died; influenza B for 48.3% and influenza type was not reported for 9.6%.
- Excess mortality from all causes has now returned to normal expected levels in Ireland. All-cause excess mortality was reported in Ireland in those aged 65 years and older for 11 weeks this season, after correcting GRO data for reporting delays with the standardised EuroMOMO algorithm. It is important to note that these data are provisional due to the time delay in deaths' registration in Ireland.
- Excess mortality from all causes has returned to normal expected levels in all reporting EU countries and regions that are participating in the EuroMOMO mortality monitoring project. http://www.euromomo.eu/

9. Outbreak Surveillance

- Ten influenza general outbreaks were notified to HPSC during weeks 15 and 16 2018 from HSE-East (n=2), -Midlands (n=1), -South (n=5), and -West (n=2). Six outbreaks were associated with influenza A, one with influenza B, one with influenza A and B and two with influenza type/subtype not reported. Two influenza A outbreaks were in acute hospital settings and the remaining eight were in residential care facilities/community hospitals.
- For the 2017/2018 influenza season to date, 223 influenza/acute respiratory infection (ARI) general outbreaks have been notified: 199 associated with influenza (reported from all HSE-Areas; 41% were in HSE-East), 10 associated with RSV (in HSE-East, -Northeast, -Midwest, -Northwest and -South) and 14 ARI outbreaks (the majority associated with rhinovirus) in HSE-East, -Midlands, -Northwest, -South, and -West. Of the 199 influenza outbreaks notified, 78 were associated with influenza A [49 with A(H3N2), five with A(H1N1)pdm09 and 24 with influenza A-not subtyped], 98 with influenza B, 16 with both influenza A and B and seven with no influenza type reported. Thirty-five influenza outbreaks were reported in acute hospital settings, one in a school, one in a childcare facility, 158 in residential care facilities/other residential settings and four in other settings. The number of influenza, ARI, and RSV outbreaks by week of notification is shown in figure 11. *Family outbreaks are not included in this surveillance report.*

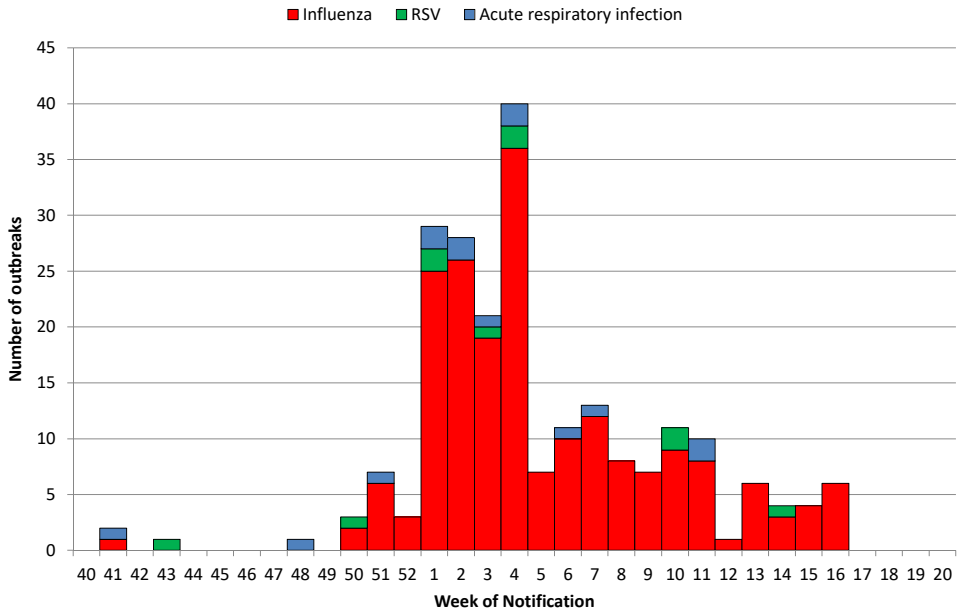

Figure 11: Number of acute respiratory infection, influenza and RSV outbreaks notified by week of notification. *Source: Ireland's Computerised Infectious Disease Reporting System (CIDR).*

10. International Summary

- During week 16 2018, influenza activity was at inter-seasonal levels, with 40 countries in the European Region reporting low intensity of activity of respiratory infections and one country reporting medium intensity.
- Influenza circulated widely in the European Region between weeks 52 2017 and 16 2018, which was longer than in previous seasons and may have contributed to the severity of the season.
- For the Region overall, the majority of influenza viruses detected were type B, representing a high level of circulation of influenza B viruses compared to recent seasons. Different patterns of dominant influenza type and subtype were observed between European countries and within different settings (e.g. sentinel versus non-sentinel; acute hospital non-ICU versus ICU settings). Of the influenza A detections from sentinel sources, A(H1N1)pdm09 viruses have outnumbered A(H3N2) viruses, while in non-sentinel sources more A(H3N2) viruses were reported than A(H1N1)pdm09 viruses.
- For influenza B viruses from both sentinel and non-sentinel sources, B/Yamagata lineage viruses have greatly outnumbered those of the B/Victoria lineage. The current trivalent seasonal influenza vaccine does not include a virus from the B/Yamagata lineage. Of the genetically characterised A(H3N2) viruses, 57% belonged to clade 3C.2a, the vaccine virus clade as described in the WHO recommendations for vaccine composition for the northern hemisphere 2017–18, 42% to clade 3C.2a1 and 1% to clade 3C.3a. Viruses in both clades 3C.2a and 3C.2a1 are antigenically similar. All A(H1N1)pdm09 viruses fell in the A/Michigan/45/2015 vaccine component clade (6B.1).
- As of April 16th 2018, influenza activity decreased in most of the countries in the temperate zone of the northern hemisphere. In the temperate zone of the southern hemisphere, influenza activity remained at inter-seasonal levels. Worldwide, influenza A and influenza B accounted for a similar proportion of influenza detections.
- Interim results from 5 European studies indicate that influenza vaccine effectiveness was estimated to be similar to that in recent years.
- ECDC and WHO Europe issued a joint press statement in February 2018 regarding low uptake of seasonal influenza vaccination in Europe.
- See ECDC and WHO influenza surveillance reports for further information.

- 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.
- Further information on avian influenza is available on the ECDC website. The latest ECDC rapid risk assessment on highly pathogenic avian influenza A of H5 type is also available on the ECDC website.

11. WHO recommendations on the composition of influenza virus vaccines

On February 22, 2018, the WHO vaccine strain selection committee recommended that quadrivalent vaccines for use in the 2018/2019 northern hemisphere influenza season contain the following

- an A/Michigan/45/2015 (H1N1)pdm09-like virus;
- an A/Singapore/INFIMH-16-0019/2016 (H3N2)-like virus;
- a B/Colorado/06/2017-like virus (B/Victoria/2/87 lineage); and
- a B/Phuket/3073/2013-like virus (B/Yamagata/16/88 lineage).

It is recommended that the influenza B virus component of trivalent vaccines for use in the 2018-2019 northern hemisphere influenza season be a B/Colorado/06/2017-like virus of the B/Victoria/2/87-lineage.
http://www.who.int/influenza/vaccines/virus/recommendations/2018_19_north/en/

Further information on influenza in Ireland is available at www.hpsc.ie

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