Influenza Surveillance in Ireland – Weekly Report

Influenza Week 8 2018 (19th – 25th February 2018)

Summary

Overall, all indicators of influenza activity decreased in Ireland during week 8 2018 (week ending 25 February 2018), with community influenza activity at moderate levels and hospitalised influenza cases remaining at high levels. Influenza B and A(H3N2) are co-circulating at high levels, with low levels of influenza A(H1N1)pdm09 also circulating. Hospitalised cases of influenza have remained at a sustained high level for eight consecutive weeks. Influenza outbreaks continue to be reported each week. It is recommended that antivirals be considered for the treatment and prophylaxis of influenza at-risk groups.

- Influenza-like illness (ILI): The sentinel GP influenza-like illness (ILI) consultation rate was 33.5 per 100,000 population in week 8 2018, a significant decrease compared to the updated rate of 65.1 per 100,000 reported during week 7 2018.
  - ILI rates have been above the Irish baseline threshold (17.5 per 100,000) for 11 consecutive weeks; however decreased below the medium intensity threshold (59.6/100,000) during week 8 2018 for the first time since December. During week 8 2018, ILI age specific rates decreased in all age groups.
- GP Out of Hours: The proportion of influenza–related calls to GP Out-of-Hours services has continued to slowly decrease each week since January, however remained at moderate levels during week 8.
- Respiratory admissions: Most sentinel hospitals reported a decrease in respiratory admissions during week 8 2018, compared to the previous week.
- National Virus Reference Laboratory (NVRL):
  - Influenza positivity remained at high levels during week 8 2018, with 259 (35.1%) influenza positive specimens were reported from the NVRL: 44% influenza A [88 A(H3N2), 25 A(H1N1)pdm09, 2 A (not subtyped)] and 56% (144) influenza B. The overall number of influenza positive specimens has declined since peak levels reported in week 3 2018.
  - Influenza B and A(H3N2) are co-circulating, with a higher proportion of influenza B detected. Influenza A(H1N1)pdm09 also continues to circulate at low levels. The proportion of influenza co-infections with another seasonal respiratory virus has declined to 12%.
  - Respiratory syncytial virus (RSV) positivity was at low levels during week 8 2018. Human metapneumovirus, adenovirus, parainfluenza virus, coronavirus and picornavirus (which includes both rhinovirus and enterovirus) continue to be detected in varying proportions.
- Hospitalisations: 366 confirmed influenza hospitalised cases were notified during week 8 2018, 46% associated with influenza A and 54% with influenza B. For the season to date, 3281 confirmed influenza hospitalised cases have been notified to HPSC, with the highest rates occurring in those aged ≥65 years.
- Critical care admissions: 150 confirmed influenza cases were admitted to critical care units and reported to HPSC (weeks 40 2017 - 8 2018), 49% associated with influenza A and 51% with influenza B.
- Mortality: 116 deaths in notified influenza cases were reported to HPSC between weeks 40 2017 - 8 2018, with a median age of 80 years. Excess all-cause mortality was reported in those aged 65 years and older for weeks 52 2017 – 3 2018.
- Outbreaks: Eight influenza/acute respiratory infection (ARI) general outbreaks were notified during week 8 2018, bringing the season total to 174.
- International: Influenza activity was widespread in the European region, with both influenza A and B co-circulating, with a higher proportion of influenza B.

1. GP sentinel surveillance system - Clinical Data

- During week 8 2018, 87 influenza-like illness (ILI) cases were reported from sentinel GPs, corresponding to an ILI consultation rate of 33.5 per 100,000 population, a significant decrease compared to the updated rate of 65.1 per 100,000 reported during week 7 2018 (figure 1).
- The ILI rates have been above the Irish baseline ILI threshold (17.5/100,000 population) for 11 consecutive weeks (weeks 50 2017 – 8 2018); however decreased below the medium intensity threshold (59.6/100,000) during week 8 2018 for the first time since December. ILI rates were above the medium intensity threshold (59.6/100,000 population for seven consecutive weeks (weeks 1 - 7 2018).
- During week 8 2018, ILI age specific rates decreased in all age groups, ranging from 22.1/100,000 in the 0-4 year age group to 35.9/100,000 in the 15-64 year age group (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.

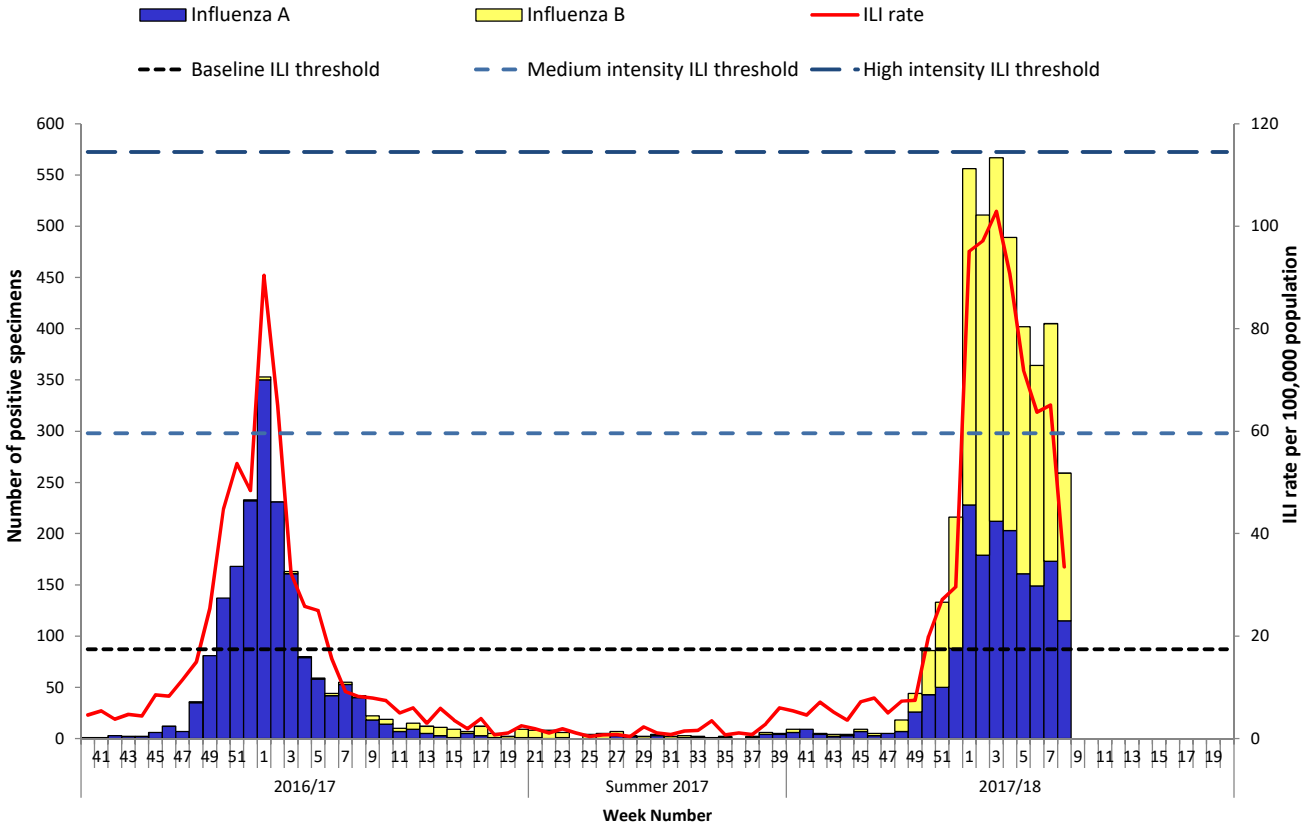

Figure 1: ILI sentinel GP consultation rates per 100,000 population, baseline ILI threshold, medium and high intensity ILI thresholds* and number of positive influenza A and B specimens tested by the NVRL, by influenza week and season.
Source: ICGP and NVRL

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

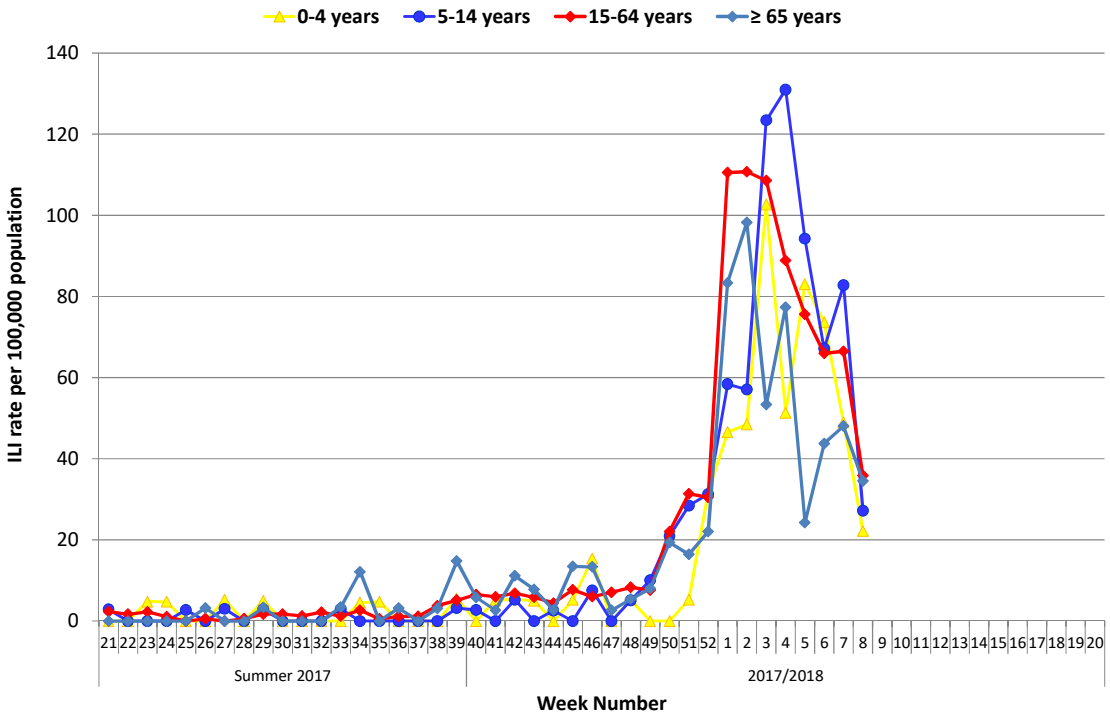

Figure 2: Age specific sentinel GP ILI consultation rate per 100,000 population by week during the summer of 2017 and the 2017/2018 influenza season to date. *Source: ICGP.*

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).

- Influenza positivity remained at high levels during week 8 2018, with 259 (35.1%) influenza positive specimens were reported from the NVRL: 44% influenza A [88 A(H3N2), 25 A(H1N1)pdm09, 2 A (not subtyped)] and 56% (144) influenza B. The overall number of influenza positive specimens has declined since peak levels reported in week 3 2018. It should be noted that data on respiratory specimens tested for the season to date are updated each week.
- Week 8 2018:
  - 28 of 58 (48.3%) sentinel specimens were influenza positive: 32% influenza A and 68% influenza B.
  - 231 of 679 (34.0%) non-sentinel specimens were influenza positive: 46% influenza A and 54% B.
- Influenza B and A(H3N2) are co-circulating, with a higher proportion of influenza B detected. Influenza A(H1N1)pdm09 also continues to circulate at low levels (figures 3 & 4).
- Coinfections of all seasonal respiratory viruses were reported during week 8 2018. 12% of influenza detections from non-sentinel sources co-infected with another respiratory virus, a decrease from 20% in the previous week.
- Respiratory syncytial virus (RSV) positivity was at low levels during week 8 2018. Human metapneumovirus, adenovirus, parainfluenza virus, coronavirus and picornavirus (which includes both rhinovirus and enterovirus) continue to be detected in varying proportions (table 2).[1]
- Data from the NVRL for week 8 2018 and the 2017/2018 season to date are detailed in tables 1 and 2.
- The overall proportion of non-sentinel specimens positive for respiratory viruses[1] remained high at 42% during week 8 2018, however decreased slightly compared to 52% during week 7 2018.

[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 38 influenza A(H3N2), 16 influenza A(H1N1)pdm09 and 63 influenza B positive specimens to date. Further genetic and antigenic testing is ongoing at the NVRL.
- Of the 38 influenza A(H3N2) viruses genetically characterised, the majority (73.7%; n=28) of viruses belonged to the vaccine virus clade, clade 3C.2a represented by A/Hong Kong/4801/2014. Nine (23.7%) 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. One influenza A (H3N2) virus was characterised as a 3C.3a virus, 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.
- Sixteen 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.
- Sixty-three influenza B viruses were genetically characterised, the vast majority (96.8%; n=61) 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 to date 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. Two 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.

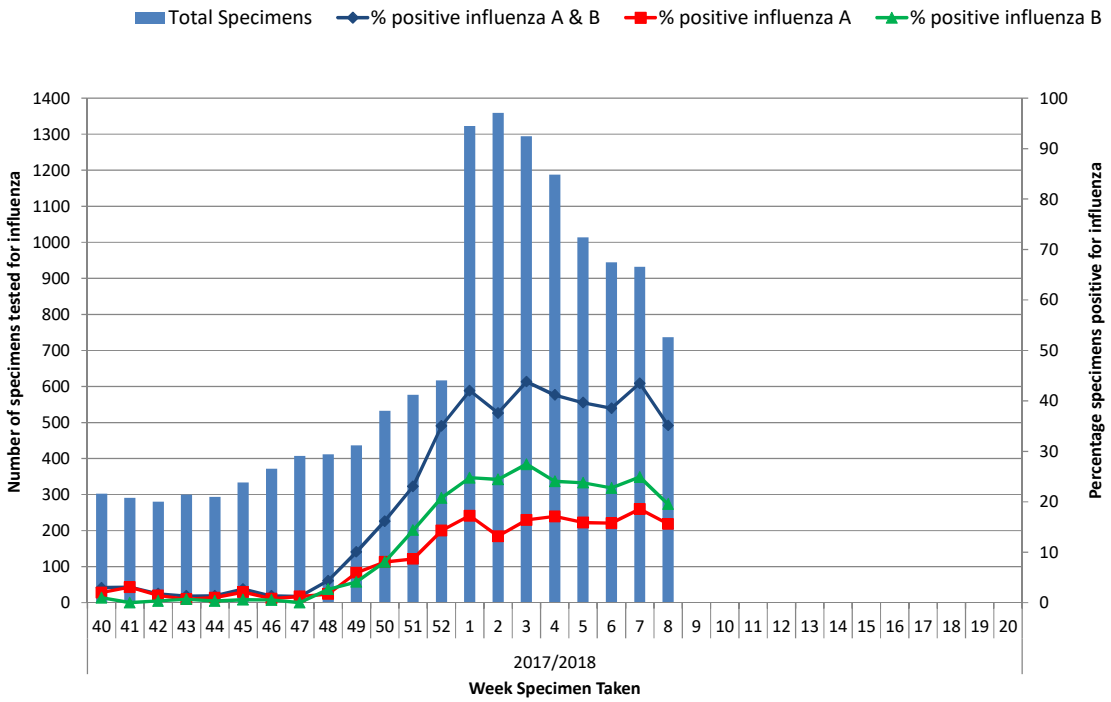

Figure 3: Number of specimens (from sentinel and non-sentinel sources combined) tested by the NVRL for influenza and percentage influenza positive by week for the 2017/2018 influenza season. *Source: NVRL*

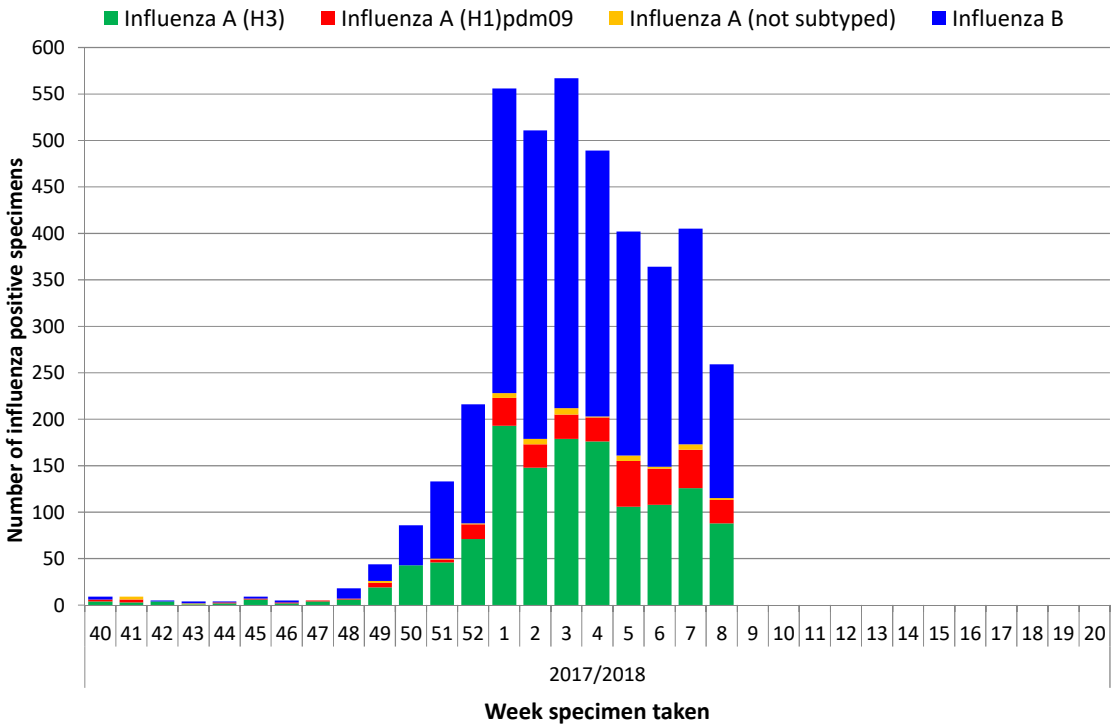

Figure 4: Number of positive influenza specimens (from sentinel and non-sentinel sources combined) by influenza type/subtype tested by the NVRL, by week for the 2017/2018 influenza season. *Source: NVRL.*

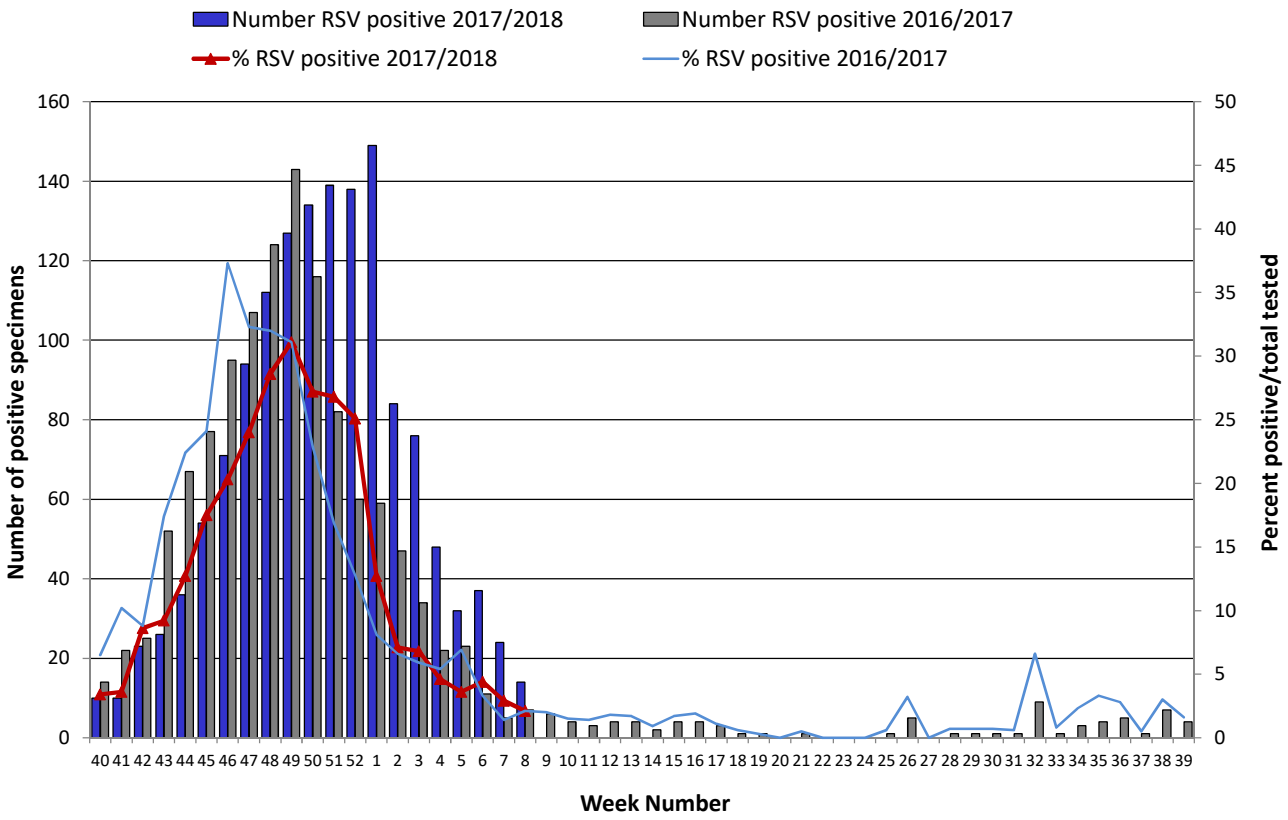

Figure 5: Number and percentage of non-sentinel RSV positive specimens detected by the NVRL during the 2017/2018 season, compared to the 2016/2017 season. *Source: NVRL.*

Table 1: Number of sentinel and non-sentinel[†] respiratory specimens tested by the NVRL and positive influenza results, for week 8 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	
8 2018	Sentinel	58	28	48.3	3	6	0	9	19
	Non-sentinel	679	231	34.0	22	82	2	106	125
	Total	**737**	**259**	**35.1**	**25**	**88**	**2**	**115**	**144**
2017/2018	Sentinel	1352	734	54.3	38	180	6	224	510
	Non-sentinel	12594	3366	26.7	257	1155	37	1449	1917
	Total	**13946**	**4100**	**29.4**	**295**	**1335**	**43**	**1673**	**2427**

Table 2: Number of non-sentinel specimens tested by the NVRL for other respiratory viruses and positive results, for week 8 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
8 2018	Sentinel	58	0	0.0	2	3.4	0	0.0	0	0.0	0	0.0	0	0.0	1	1.7
	Non-sentinel	679	14	2.1	17	2.5	0	0.0	0	0.0	2	0.3	1	0.1	23	3.4
	Total	**737**	**14**	**1.9**	**19**	**2.6**	**0**	**0.0**	**0**	**0.0**	**2**	**0.3**	**1**	**0.1**	**24**	**3.3**
2017/2018	Sentinel	1352	29	2.1	23	1.7	12	0.9	1	0.1	0	0.0	3	0.2	31	2.3
	Non-sentinel	12594	1438	11.4	234	1.9	166	1.3	74	0.6	20	0.2	50	0.4	756	6.0
	Total	**13946**	**1467**	**10.5**	**257**	**1.8**	**178**	**1.3**	**75**	**0.5**	**20**	**0.1**	**53**	**0.4**	**787**	**5.6**

[†] 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.

Widespread influenza activity was reported in HSE-East, -Southeast, -South and -Midwest, regional activity was reported in HSE-Midlands, -Northeast and -West and localised activity was reported in HSE-Northwest during week 8 2018 (figure 6). Influenza activity decreased or remained stable in all HSE-Areas.

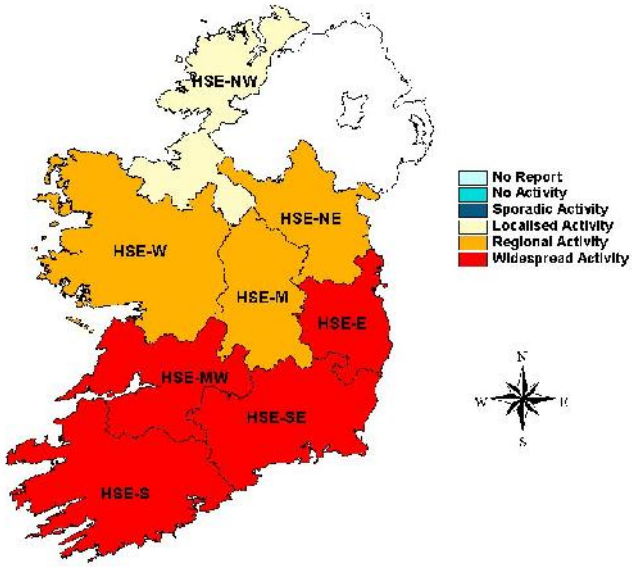

Figure 6: Map of provisional influenza activity by HSE-Area during week 8 2018

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 week 8 2018, data were available from six of eight sentinel hospitals, with 324 respiratory admissions reported. Five of six sentinel hospitals reported a decrease in respiratory admissions during week 8 2018, compared to the previous week. The latest complete data on respiratory admissions reported from a network of sentinel hospitals were at high levels during week 7 2018 (n=461), a slight decrease from 471 reported during week 6 2018, and remaining lower than peak levels reported during week 1 2018 (n=535) (figure 7).

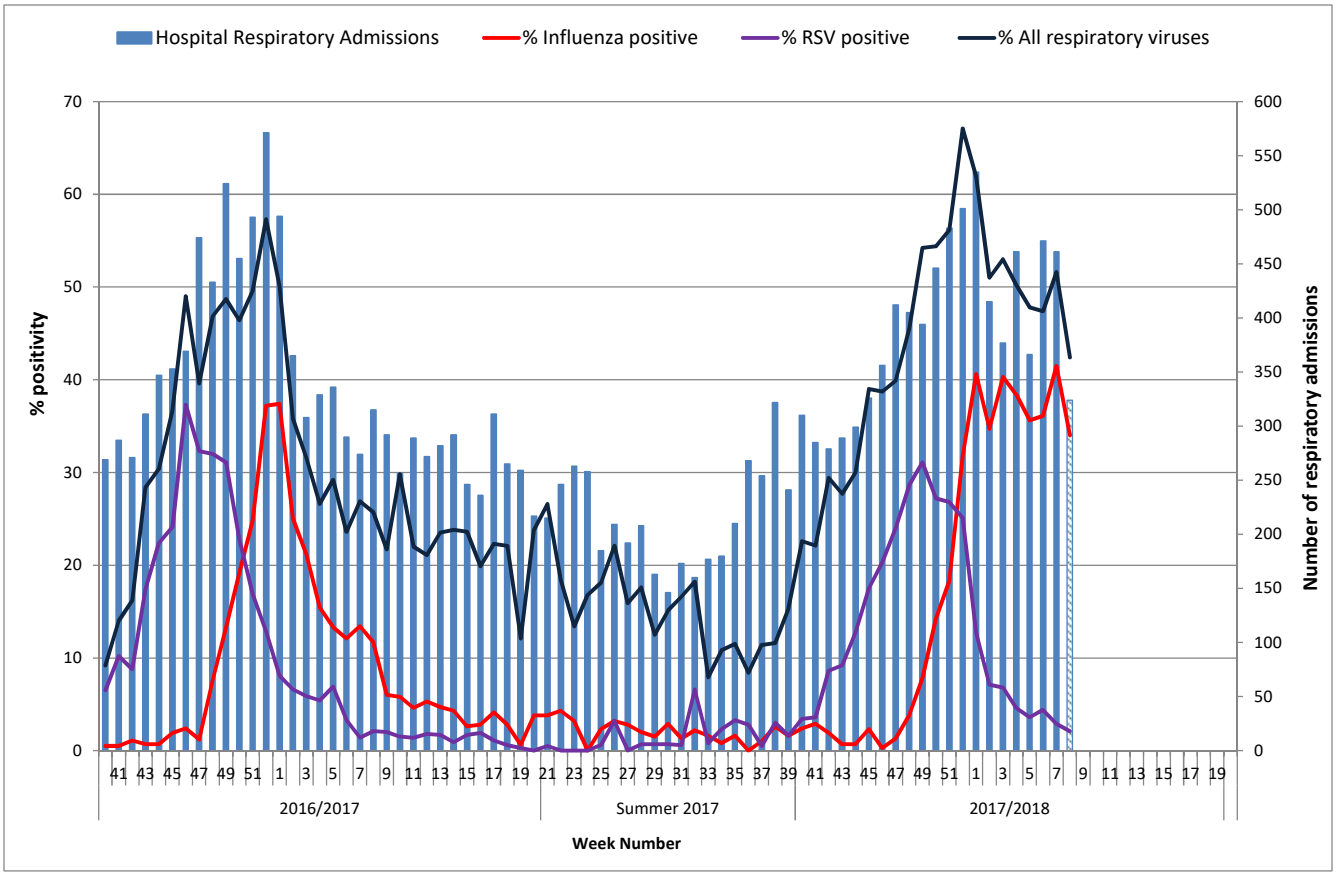

Figure 7: Number of respiratory admissions reported from the sentinel hospital network and % positivity for influenza, RSV and all seasonal respiratory viruses tested* by the NVRL by week and season. *Source: Departments of Public Health - Sentinel Hospitals & NVRL. *All seasonal respiratory viruses 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 week 8 2018; this week is 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 has continued to slowly decrease each week since January, however remained at moderately high levels during week 8 at 4.6%. 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).

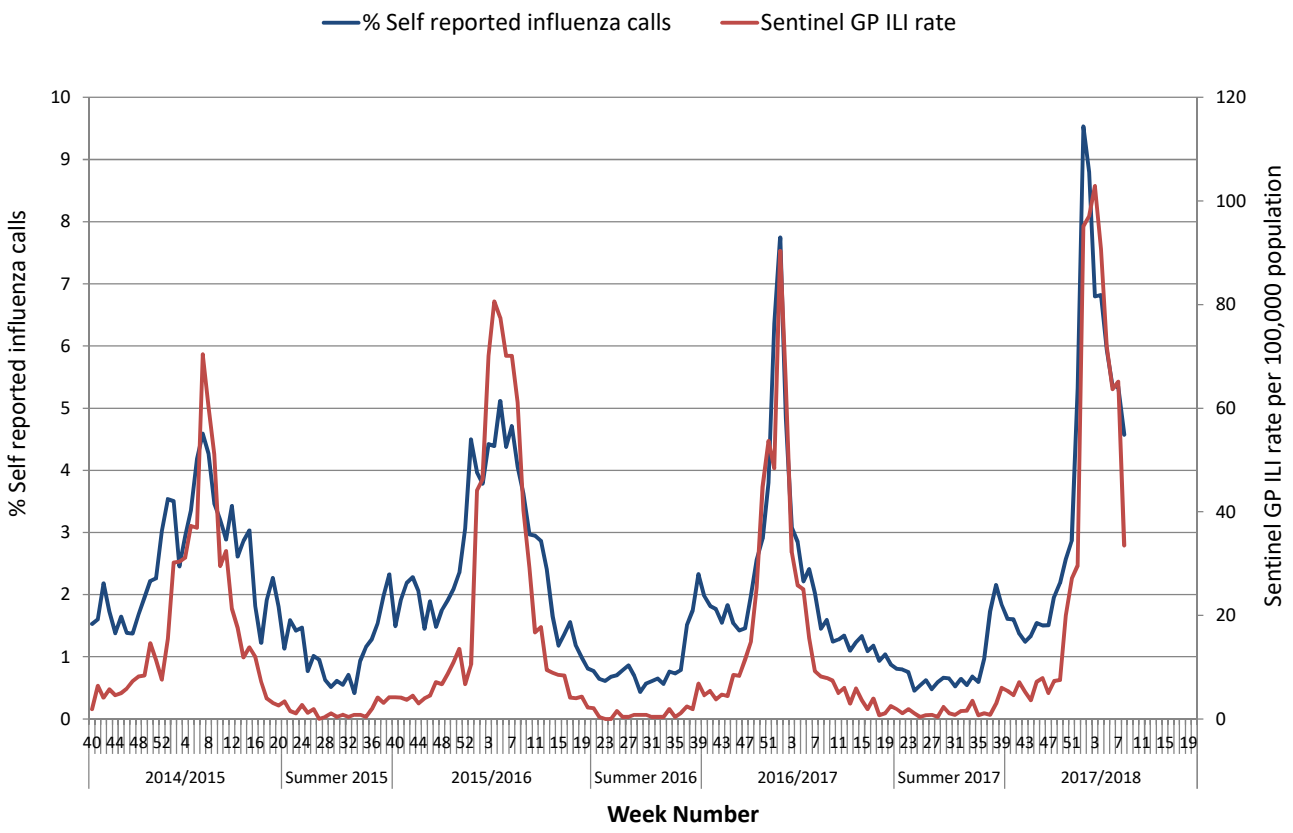

Figure 8: Self-reported influenza-related calls as a proportion of total calls to Out-of-Hours GP Co-ops and sentinel GP ILI consultation rate per 100,000 population by week and season. *Source: GP Out-Of-Hours services in Ireland (collated by HSE-NE) & ICGP.*

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 remained at high levels during week 8 2018, at 960, a decrease compared to 1057 in the previous week. During week 8 2018, 417 (43.4%) cases were associated with influenza A [92 A(H3N2), 37 A(H1N1)pdm09 and 288 A (not subtyped)], 538 (56.0%) cases were associated with influenza B, and 5 (0.5%) cases with influenza type not reported. 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, 8578 confirmed influenza cases have been notified to HPSC: 3293 (38.4%) cases were associated with influenza A [1077 A(H3N2), 298 A(H1N1)pdm09, 1918 A (not subtyped)], 5246 (61.2%) cases with influenza B, and 39 (0.4%) cases with influenza type not reported. The median age of notified confirmed influenza cases this season to date is 53 years.
- RSV notifications continued to decrease during week 8 2018, with 29 cases notified, compared to 52 notified cases during week 7 2018.

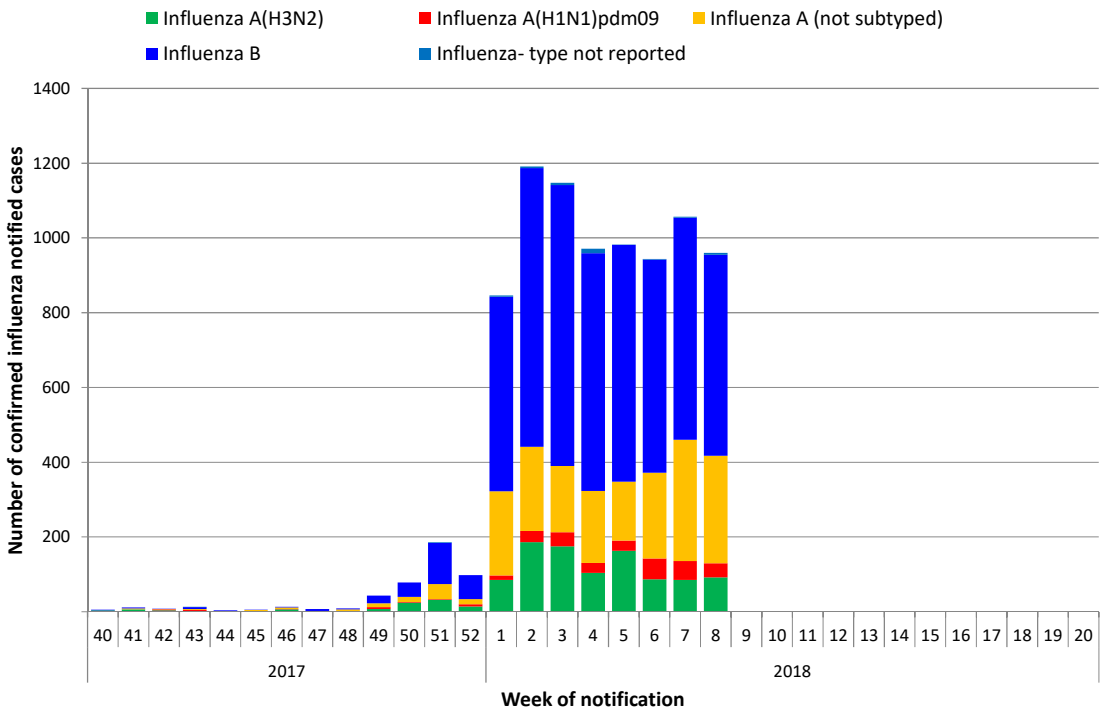

Figure 9: Number of confirmed influenza cases notified on Ireland's Computerised Infectious Disease Reporting System by influenza type/subtype and by week of notification for the 2017/2018 season. *Source: Ireland's Computerised Infectious Disease Reporting System (CIDR).*

6. Influenza Hospitalisations

- 366 confirmed influenza hospitalised cases were notified during week 8 2018, a decrease from 429 notified during week 7 2018. Of typed influenza viruses notified during week 8 2018, 46.4% were associated with influenza A and 53.6% with influenza B.
- For the 2017/2018 influenza season to date, 3281 confirmed influenza hospitalised cases have been notified to HPSC: 1348 (41.1%) were associated with influenza A [341 associated with A(H3N2), 127 with A(H1N1)pdm09, 880 with A (not subtyped)], 1908 (58.2%) with influenza B and 25 (0.8%) 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 64 years. The number of confirmed influenza hospitalised cases by influenza type/subtype and by week of notification is shown in figure 10.

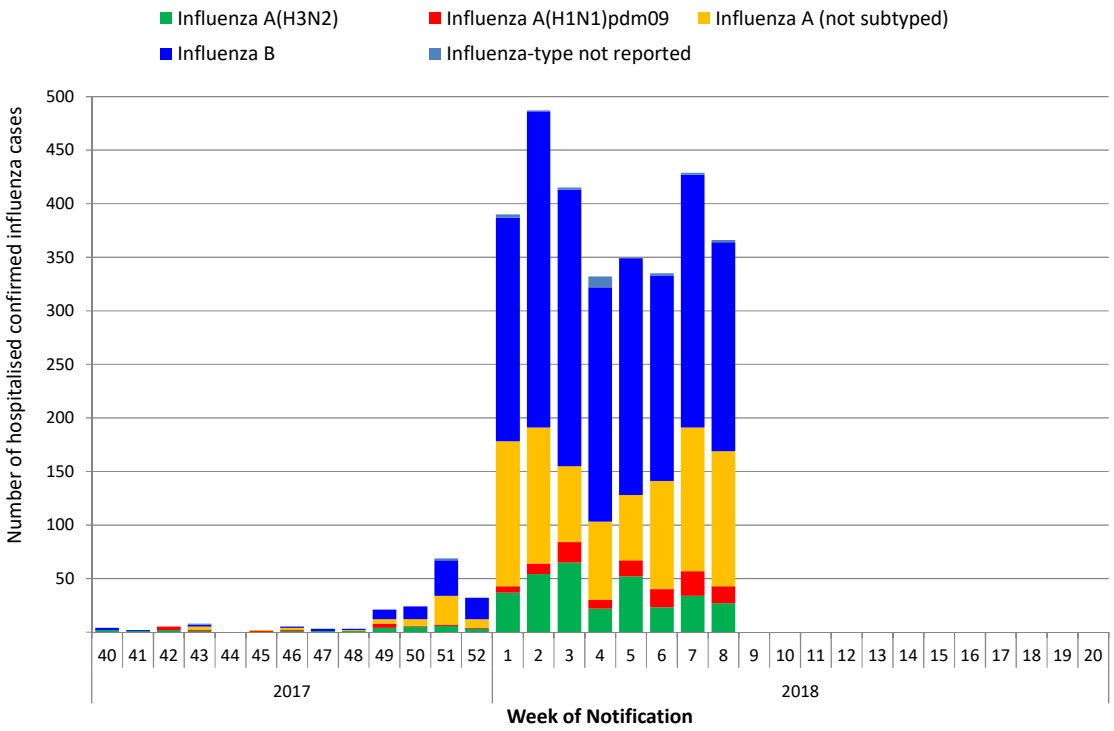

Figure 10: Number of confirmed influenza cases hospitalised by influenza type/subtype and by week of notification. *Source: Ireland's Computerised Infectious Disease Reporting System (CIDR).*

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.

- 150 confirmed influenza cases were admitted to critical care units and reported to HPSC during weeks 40 2017 – 8 2018, 49% associated with influenza A and 51% with influenza B: 23 A(H3N2), 10 influenza A(H1N1)pdm09, 41 A - not subtyped and 76 influenza B. The highest age specific rates were reported in those aged less than one year old, followed by 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	108	173.5	8	12.8
1-4	294	109.2	8	3.0
5-14	315	46.7	13	1.9
15-24	104	18.0	4	0.7
25-34	124	18.8	3	0.5
35-44	205	31.1	16	2.1
45-54	207	33.1	11	1.8
55-64	311	61.1	25	4.9
≥65	1612	252.8	62	9.7
Unknown Age	1		0	
Total	**3281**	**68.9**	**150**	**3.2**

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/

- 116 deaths in notified influenza cases have been reported to HPSC during weeks 40 2017 – 8 2018. The median age at the time of death was 80 years. Influenza A was confirmed for 41% of notified cases that died; influenza B for 48% and influenza type was not reported for 11%.
- All-cause excess mortality was reported in Ireland in those aged 65 years and older during weeks 52 2017 - 3 2018, 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.
- Increased all-cause mortality among the elderly has been reported in Europe in recent weeks, except in Central and Eastern Europe. http://www.euromomo.eu/

9. Outbreak Surveillance

- Eight influenza general outbreaks were notified to HPSC during week 8 2018, from HSE-East, -Midwest, -Northeast, -Northwest, Southeast and -South. Six of these outbreaks were associated with influenza B and two with influenza A. One outbreak was reported in an acute hospital setting and seven were in residential care facilities/long stay units during week 8 2018. No acute respiratory infection (ARI) outbreaks associated with other respiratory pathogens were reported during week 8 2018.
- For the 2017/2018 influenza season to date, 174 influenza/ARI general outbreaks have been notified: 152 associated with influenza (reported from all HSE-Areas), eight associated with RSV (in HSE-East, -Midwest, -Northwest and -South) and 14 ARI outbreaks (the majority associated with rhinovirus) in HSE-East, -Midlands, -Northwest, -Southeast, -South, and -West. Of the 152 influenza outbreaks notified, 54 were associated with influenza A [20 with A(H3N2), three with A(H1N1)pdm09 and 31 with influenza A-not subtyped], 76 with influenza B, 14 with both influenza A and B and 8 with no influenza type reported. Twenty-four influenza outbreaks were reported in acute hospital settings, one in a school, one in a childcare facility, 120 in residential care facilities/other residential setting, three in other settings and three with the outbreak setting not reported. 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.*

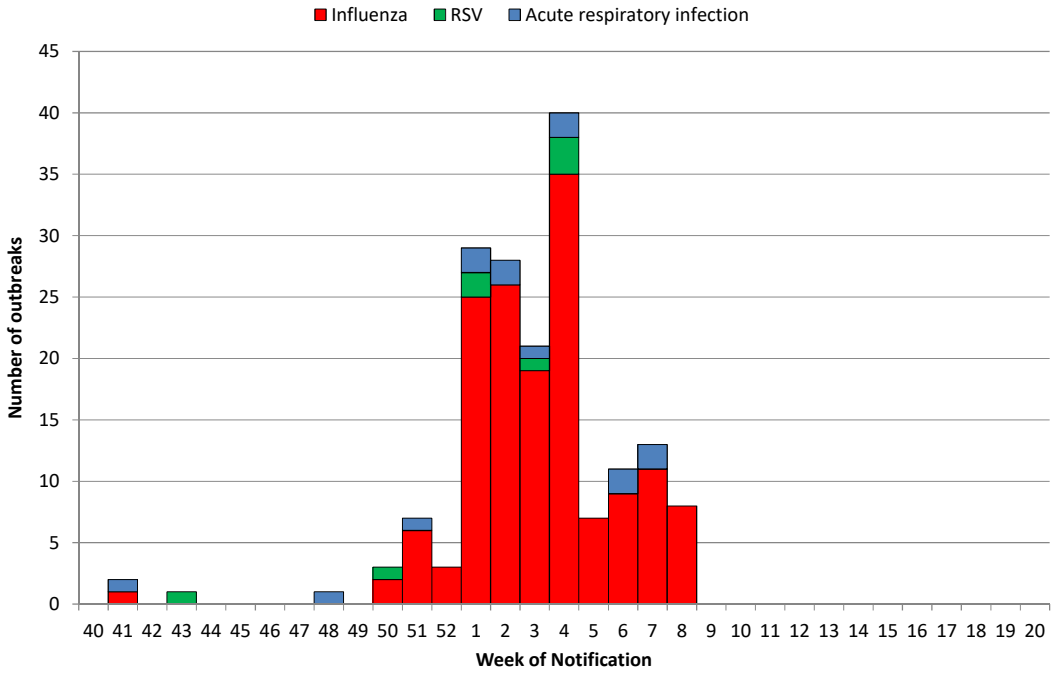

Figure 10: Number of acute respiratory infection, influenza and RSV outbreaks notified by week of notification. *Source: Ireland's Computerised Infectious Disease Reporting System (CIDR).*

10. International Summary

- During week 7 2018, influenza activity was widespread in the majority of reporting European countries. For the European Region overall, a higher proportion of influenza B compared to influenza A viruses has been detected in sentinel and non-sentinel sources. 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, 59% belonged to clade 3C.2a, the vaccine virus clade as described in the WHO recommendations for vaccine composition for the northern hemisphere 2017–18, 37% to clade 3C.2a1 and 4% to clade 3C.3a. Viruses in both clades 3C.2a and 3C.2a1 are antigenically similar.
- As of February 19th 2018, influenza activity remained high in the temperate zone of the northern hemisphere while in the temperate zone of the southern hemisphere activity was at inter-seasonal levels. Worldwide, influenza A accounted for the majority of influenza detections, with increased influenza B (mostly from the Yamagata lineage) in recent weeks. The majority of countries reported ILI activity reaching moderate levels in comparison with previous years, with few reaching levels exceeding those of previous years. Some countries however have reported levels of hospitalisation and ICU admissions reaching or exceeding peak levels of previous influenza seasons. WHO recommends countries with current influenza activity or entering their season to adopt necessary measures for ensuring appropriate case management, compliance with infection control measures and seasonal influenza vaccination for high risk groups.
- ECDC and WHO Europe have issued a joint press statement regarding low uptake of seasonal influenza vaccination in Europe. ECDC published a Risk assessment for seasonal influenza, EU/EEA, 2017–2018 and the WHO Regional office for Europe published a situation analysis that describes the early season evolving epidemiological pattern. 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/

On March 2, 2017, the WHO vaccine strain selection committee recommended that trivalent vaccines for use in the 2017/2018 northern hemisphere influenza season 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/

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

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