

Influenza Surveillance in Ireland – Weekly Report

Influenza Week 10 2018 (5th – 11th March 2018)



 *Intensive Care Society of Ireland*



Summary

Overall, influenza activity has declined significantly since peak levels reported in January, with activity remaining at moderate levels in Ireland during week 10 2018 (week ending 11th March 2018). Influenza A and B co-circulated during week 10 2018. Hospitalised influenza cases and influenza outbreaks continue to be reported each week at moderate levels. A slight increase in activity was reported during week 10 2018 compared to the previous week, this is primarily due to the impact of severe weather conditions during week 9 2018 which affected access to health care facilities and impacted on testing and reporting levels. 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 32.9 per 100,000 population in week 10 2018, a slight increase compared to the updated rate of 26.5 per 100,000 reported during week 9 2018.
 - ILI rates have been above the Irish baseline threshold (17.5 per 100,000) for 13 consecutive weeks.
 - During week 10 2018, 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 has continued to slowly decrease each week since January.
- **Respiratory admissions:** The latest data on respiratory admissions reported from a network of sentinel hospitals were at moderate levels.
- **National Virus Reference Laboratory (NVRL):**
 - The overall number of influenza positive specimens has declined significantly since peak levels reported in January. During week 10 2018, 181 (33.6%) influenza positive specimens were reported from the NVRL, 52% influenza A and 48% influenza B: 60 A(H3N2), 31 A(H1N1)pdm09, 4 A (not subtyped) and 86 influenza B.
 - Influenza A(H3N2), A(H1N1)pdm09 and influenza B are all co-circulating, with a higher proportion of influenza A detected during week 10. 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 during week 10 2018.
- **Hospitalisations:** 249 confirmed influenza hospitalised cases were notified during week 10 2018, an increase from 185 notified during week 9 2018. For the season to date, 3731 confirmed influenza hospitalised cases have been notified to HPSC, with the highest rates occurring in those aged ≥65 years.
- **Critical care admissions:** 165 confirmed influenza cases were admitted to critical care units and reported to HPSC (weeks 40 2017 - 10 2018), 50% associated with influenza A and 50% with influenza B.
- **Mortality:** 148 deaths in notified influenza cases were reported to HPSC between weeks 40 2017 - 10 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 – 5 2018.
- **Outbreaks:** 11 influenza/acute respiratory infection (ARI) general outbreaks were notified during week 10 2018, bringing the season total to 192.
- **International:** Influenza continues to circulate widely in the European region, with both influenza A and B co-circulating, with a higher proportion of influenza B. Differences in proportions of circulating influenza virus types/subtypes were observed between countries.

When interpreting data for weeks 9 and 10 2018, it is important to note that severe weather conditions affected access to health care facilities and impacted on testing and reporting levels during week 9 2018.

1. GP sentinel surveillance system - Clinical Data

- During week 10 2018, 78 influenza-like illness (ILI) cases were reported from sentinel GPs, corresponding to an ILI consultation rate of 32.9 per 100,000 population, a slight increase compared to the updated rate of 26.5 per 100,000 reported during week 9 2018 (figure 1).
- The ILI rates have been above the Irish baseline ILI threshold (17.5/100,000 population) for 13 consecutive weeks (weeks 50 2017 – 10 2018). ILI rates were above the medium intensity threshold (59.6/100,000 population) for seven consecutive weeks (weeks 1 - 7 2018).
- During week 10 2018, ILI age specific rates were low in all age groups, ranging from 30.3/100,000 in the 0-4 year age group to 38.7/100,000 in the 5-14 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

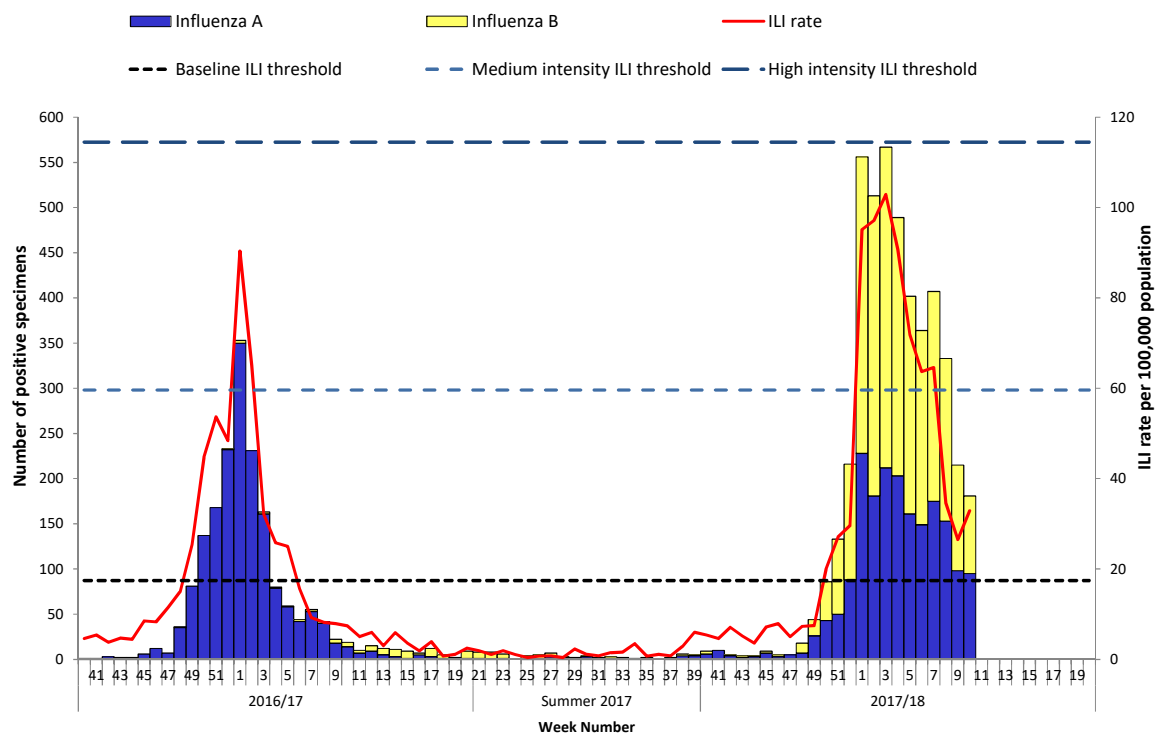


Figure 1: ILI sentinel GP consultation rates per 100,000 population, baseline ILI threshold, medium and high intensity ILI thresholds* and number of positive influenza A and B specimens tested by the NVRL, by influenza week and season.
 Source: ICGP and NVRL

* For further information on the Moving Epidemic Method (MEM) to calculate ILI thresholds:

<http://www.ncbi.nlm.nih.gov/pubmed/22897919>

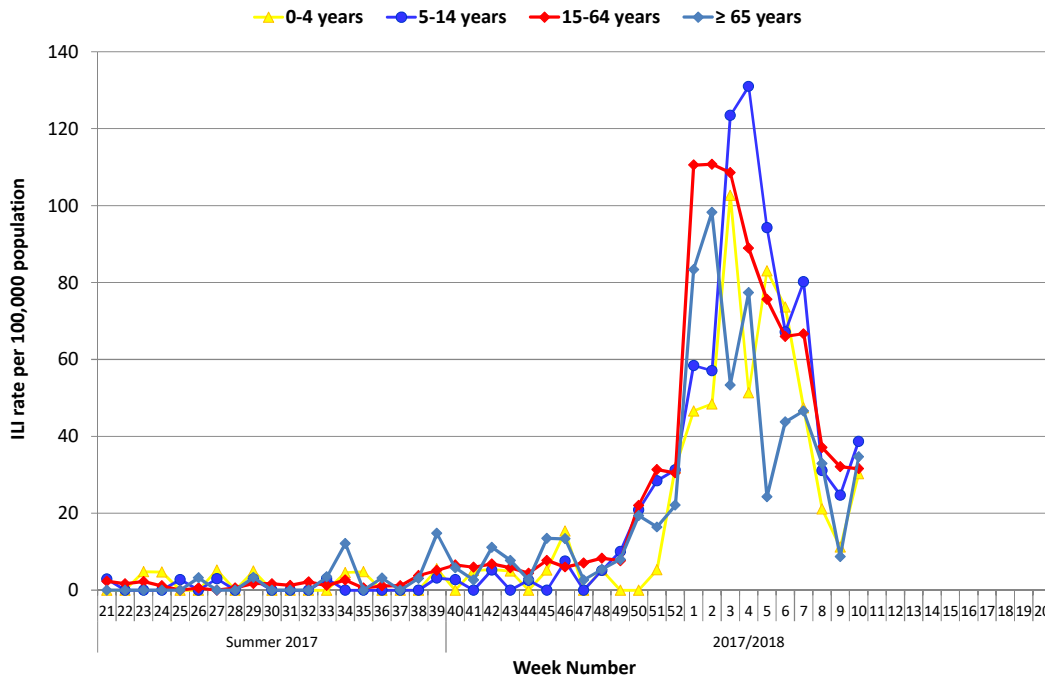


Figure 2: Age specific sentinel GP ILI consultation rate per 100,000 population by week during the summer of 2017 and the 2017/2018 influenza season to date. Source: ICGP.

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 10 2018, 181 (33.6%) influenza positive specimens were reported from the NVRL, 52% influenza A and 48% influenza B: 60 A(H3N2), 31 A(H1N1)pdm09, 4 A (not subtyped) and 86 B. It should be noted that data on respiratory specimens tested this season are updated each week.
- Week 10 2018:
 - 17 of 28 (60.7%) sentinel specimens were influenza positive: 65% influenza A and 35% influenza B.
 - 164 of 511 (32.1%) non-sentinel specimens were influenza positive: 51% influenza A and 49% B.
- Influenza A(H3N2), A(H1N1)pdm09 and influenza B are all co-circulating, with a higher proportion of influenza A detected during week 10 2018 for the first time since December (figures 3 & 4).
- Co-infections of all seasonal respiratory viruses were reported during week 10 2018, with 17% of influenza positive cases from non-sentinel sources co-infected with another respiratory virus.
- Respiratory syncytial virus (RSV), human metapneumovirus (hMPV), adenovirus, parainfluenza virus, coronavirus and picornavirus (which includes both rhinovirus and enterovirus) were reported during week 9 2018 in varying proportions (table 2).¹
- Data from the NVRL for week 10 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 viruses¹ was 42% during week 10 2018, significantly lower than peak levels of 67% 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 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 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, Δ 162-163, 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.

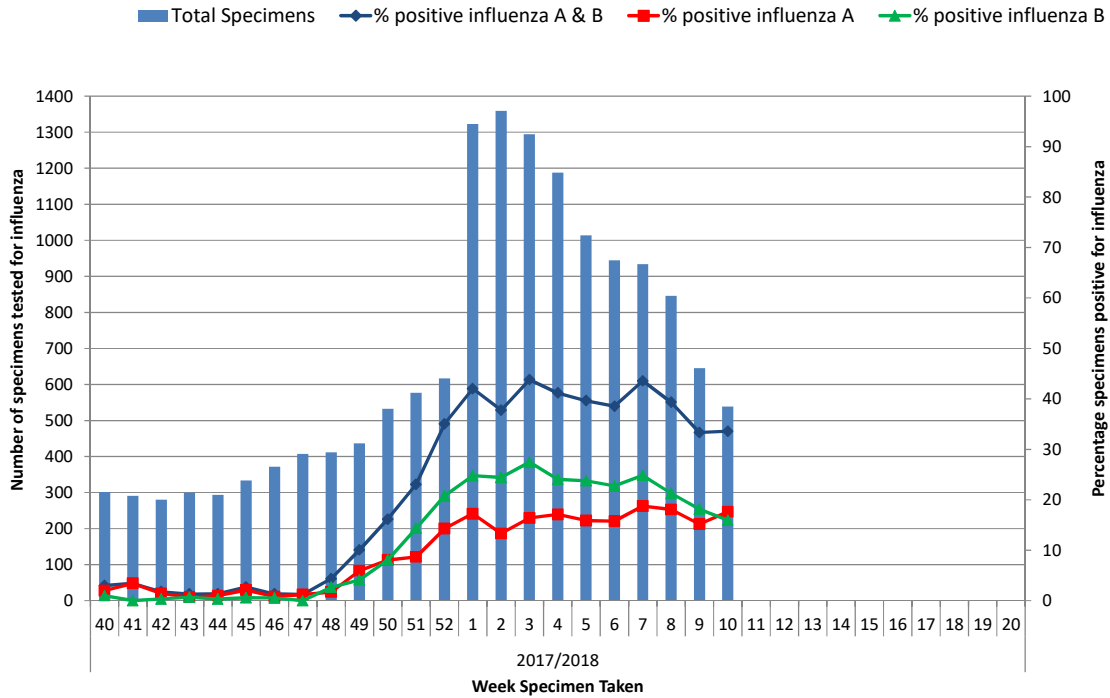


Figure 3: Number of specimens (from sentinel and non-sentinel sources combined) tested by the NVRL for influenza and percentage influenza positive by week for the 2017/2018 influenza season. *Source: NVRL*

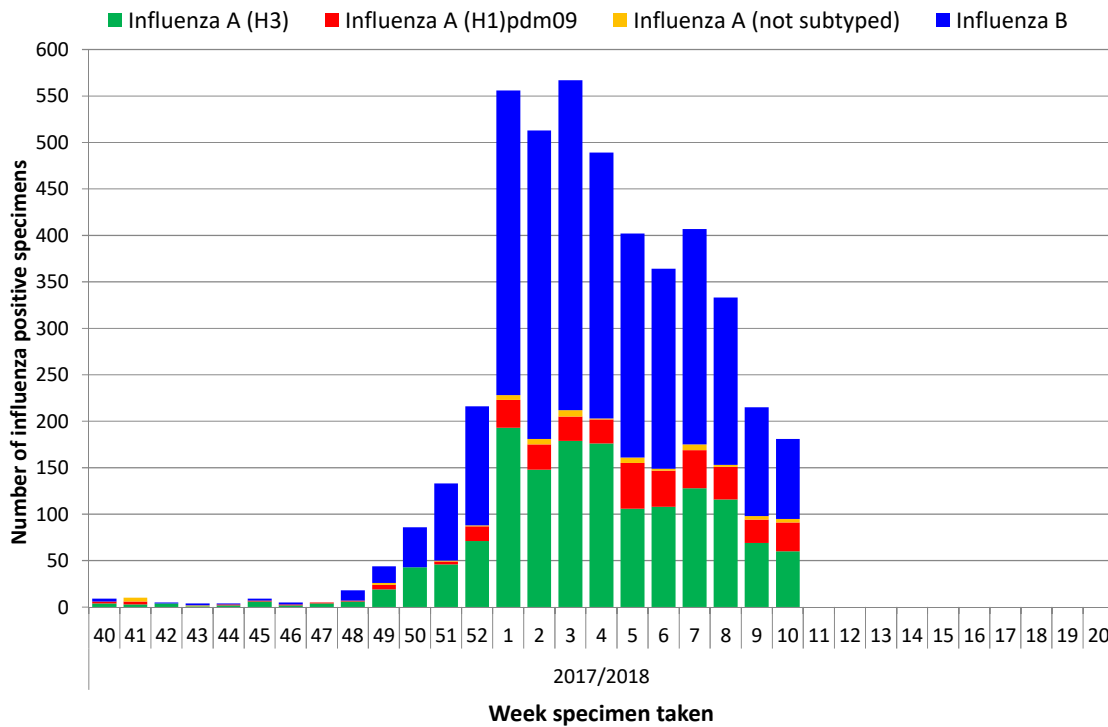


Figure 4: Number of positive influenza specimens (from sentinel and non-sentinel sources combined) by influenza type/subtype tested by the NVRL, by week for the 2017/2018 influenza season. *Source: NVRL.*

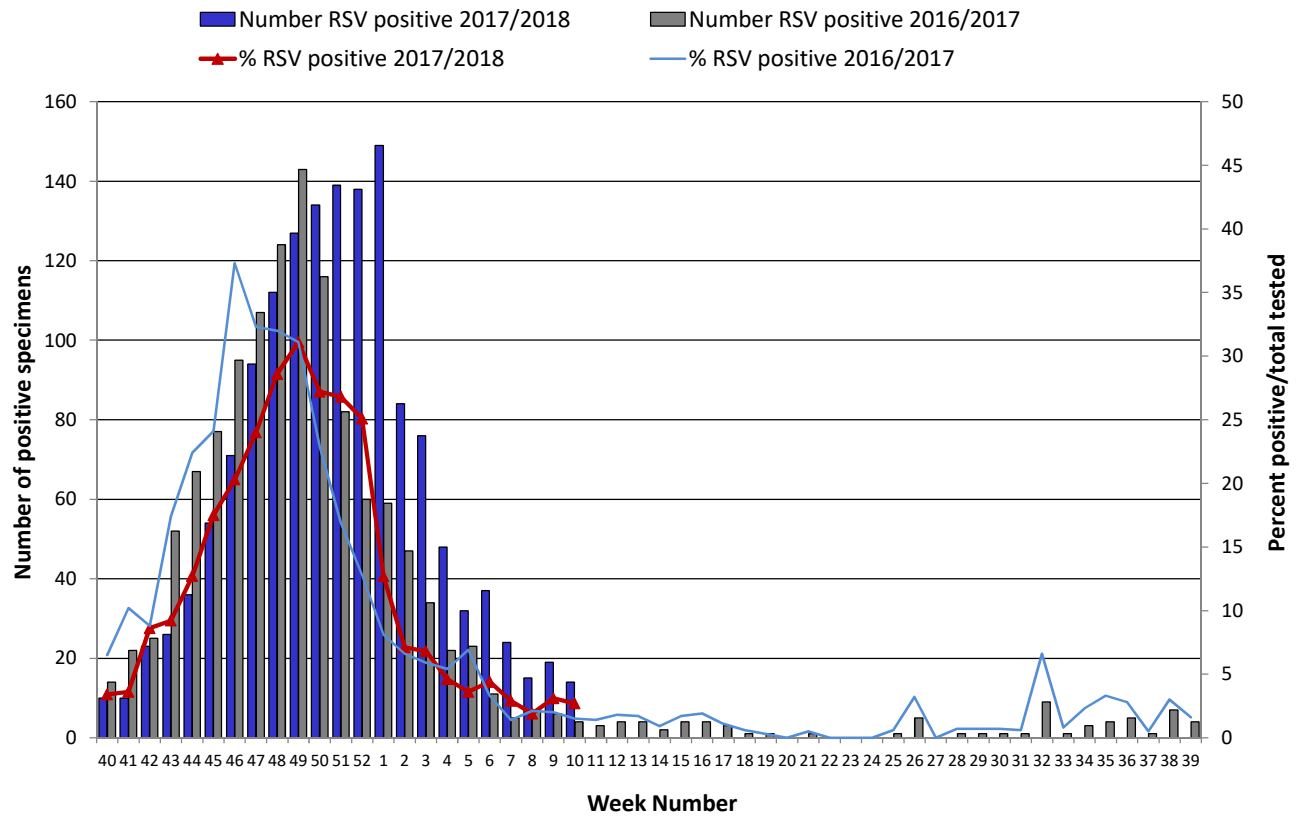


Figure 5: Number and percentage of non-sentinel RSV positive specimens detected by the NVRL during the 2017/2018 season, compared to the 2016/2017 season. Source: NVRL.

Table 1: Number of sentinel and non-sentinel[†] respiratory specimens tested by the NVRL and positive influenza results, for week 10 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	
10 2018	Sentinel	28	17	60.7	4	7	0	11	6
	Non-sentinel	511	164	32.1	27	53	4	84	80
	Total	539	181	33.6	31	60	4	95	86
2017/2018	Sentinel	1432	789	55.1	44	197	6	247	542
	Non-sentinel	13808	3786	27.4	319	1297	46	1662	2124
	Total	15240	4575	30.0	363	1494	52	1909	2666

Table 2: Number of non-sentinel specimens tested by the NVRL for other respiratory viruses and positive results, for week 10 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
10 2018	Sentinel	28	0	0.0	3	10.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Non-sentinel	511	14	2.7	23	4.5	0	0.0	1	0.2	1	0.2	0	0.0	10	2.0
	Total	539	14	2.6	26	4.8	0	0.0	1	0.2	1	0.2	0	0.0	10	1.9
2017/2018	Sentinel	1432	29	2.0	26	1.8	12	0.8	1	0.1	0	0.0	3	0.2	32	2.2
	Non-sentinel	13808	1472	10.7	270	2.0	167	1.2	76	0.6	22	0.2	51	0.4	796	5.8
	Total	15240	1501	9.8	296	1.9	179	1.2	77	0.5	22	0.1	54	0.4	828	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.

Regional influenza activity was reported in HSE-East and -Midwest, localised activity was reported in HSE-Northeast, -Midlands, -Southeast, -South and -Northwest and sporadic influenza activity was reported in HSE-West during week 10 2018 (figure 6). Influenza activity has decreased in all HSE-Areas since peak levels were reported in January.

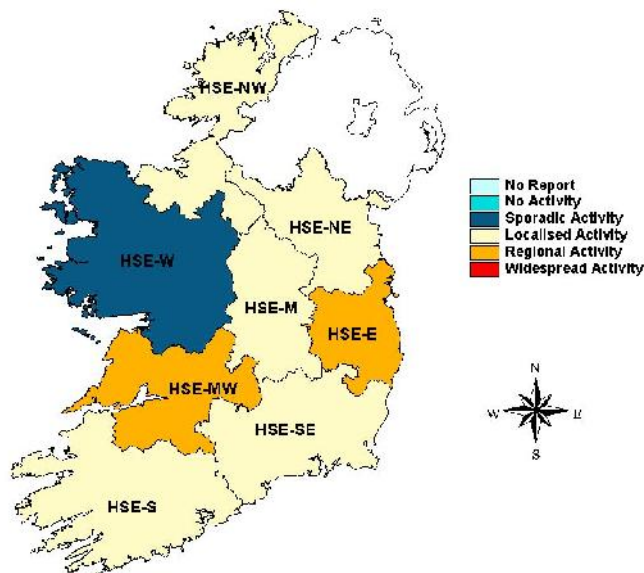


Figure 6: Map of provisional influenza activity by HSE-Area during week 10 2018

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 10 2018, data were available from seven of eight sentinel hospitals, with 269 respiratory admissions reported. The latest complete data on respiratory admissions reported from the sentinel hospital network were at moderate levels during week 9 2018 (n=278), a decrease from 381 reported during week 8 2018, and remaining significantly lower than peak levels reported during week 1 2018 (n=535) (figure 7).

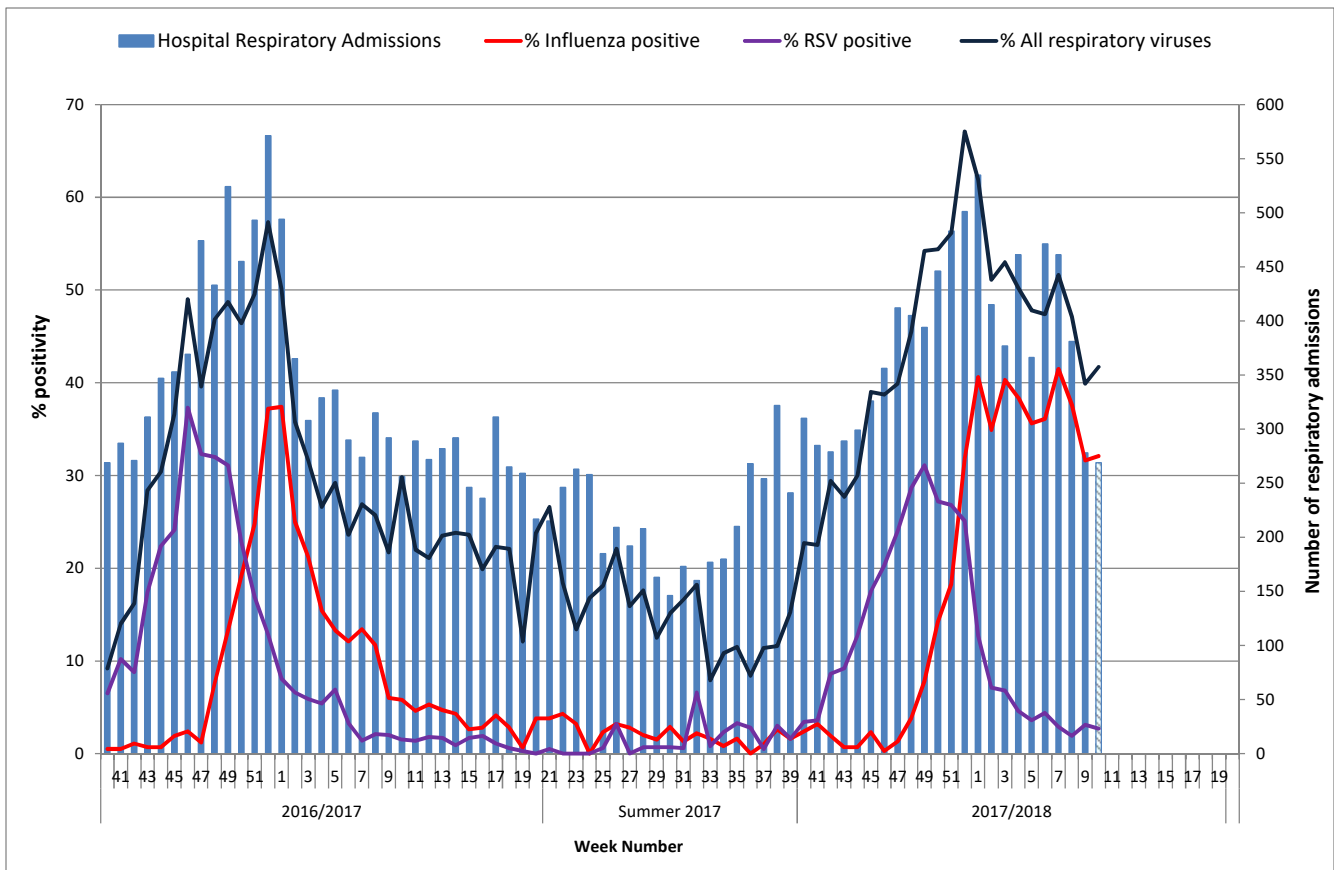


Figure 7: Number of respiratory admissions reported from the sentinel hospital network and % positivity for influenza, RSV and all seasonal respiratory viruses tested* by the NVRL by week and season. *Source: Departments of Public Health - Sentinel Hospitals & NVRL. *All seasonal respiratory viruses 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 10 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, reaching moderate levels during week 10 at 2.5%. 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).

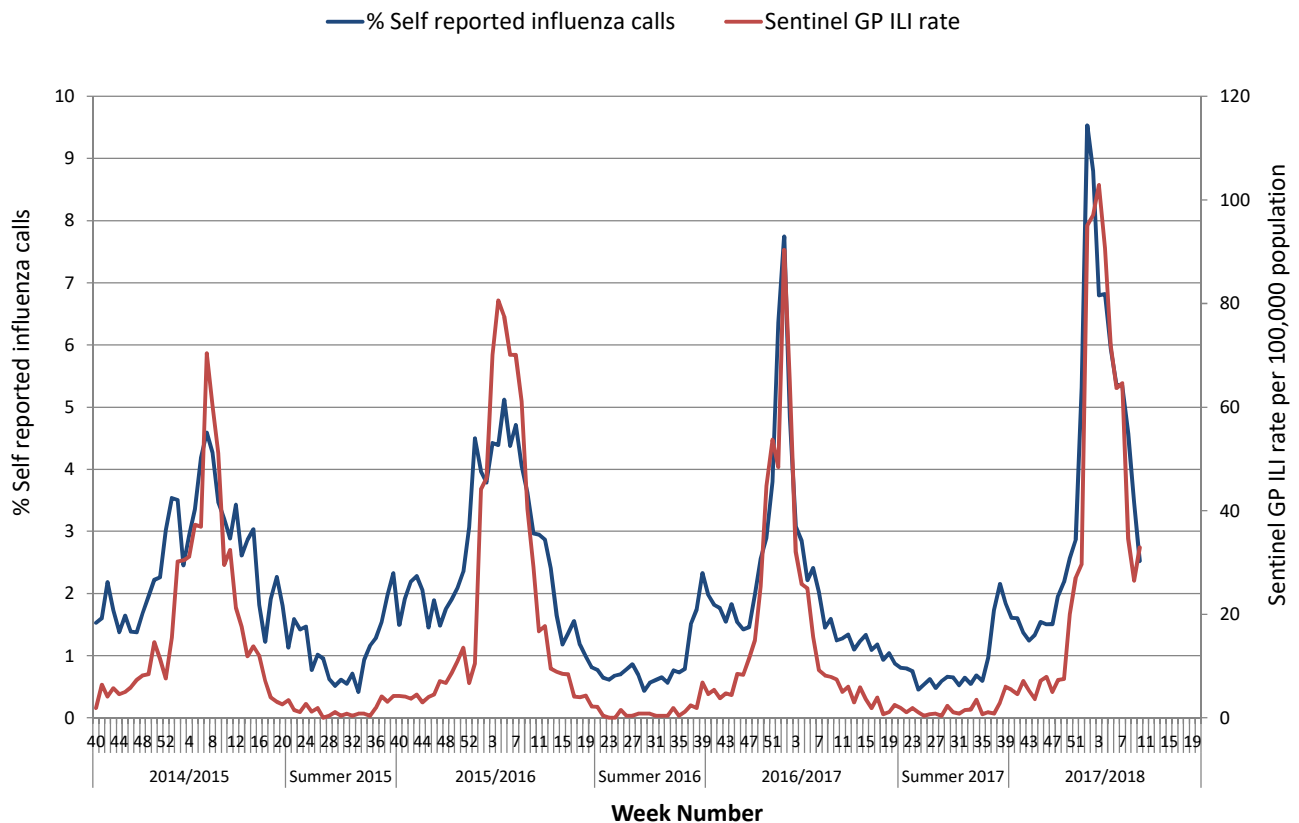


Figure 8: Self-reported influenza-related calls as a proportion of total calls to Out-of-Hours GP Co-ops and sentinel GP ILI consultation rate per 100,000 population by week and season. Source: GP Out-Of-Hours services in Ireland (collated by HSE-NE) & ICGP.

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 increased during week 10 2018, to 652, compared to 566 in the previous week. The increase observed in week 10 2018, compared to week 9 2018, was expected due to late notifications. These late notifications occurred following severe weather conditions in Ireland during week 9 2018 which affected access to health care facilities and impacted on testing and reporting levels.
- During week 10 2018, 311 (47.7%) cases were associated with influenza A [58 A(H3N2), 38 A(H1N1)pdm09 and 215 A (not subtyped)], 337 (51.7%) cases were associated with influenza B, and 4 (0.6%) 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, 9794 confirmed influenza cases have been notified to HPSC: 3861 (39.4%) cases were associated with influenza A [1236 A(H3N2), 379 A(H1N1)pdm09, 2246 A (not subtyped)], 5894 (60.2%) 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 remained at low levels during week 10 2018, with 44 cases notified, compared to 25 notified cases during week 9 2018.

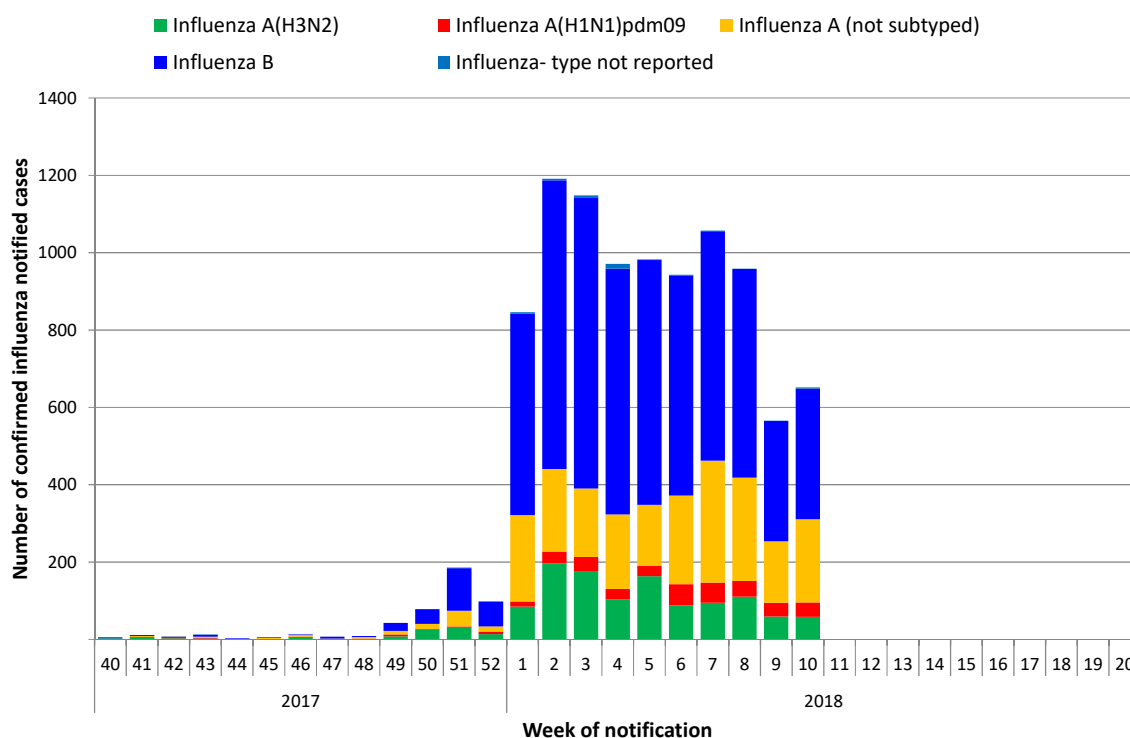


Figure 9: Number of confirmed influenza cases notified on Ireland’s Computerised Infectious Disease Reporting System by influenza type/subtype and by week of notification for the 2017/2018 season. *Source: Ireland’s Computerised Infectious Disease Reporting System (CIDR).*

6. Influenza Hospitalisations

- 249 confirmed influenza hospitalised cases were notified during week 10 2018, a significant decrease compared to peak levels of 490 notified during week 2 2018. Of typed influenza viruses notified during week 10 2018, 47% were associated with influenza A and 53% with influenza B.
- For the 2017/2018 influenza season to date, 3731 confirmed influenza hospitalised cases have been notified to HPSC: 1572 (42.1%) were associated with influenza A [401 associated with A(H3N2), 160 with A(H1N1)pdm09, 1011 with A (not subtyped)], 2134 (57.2%) with influenza B and 25 (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.

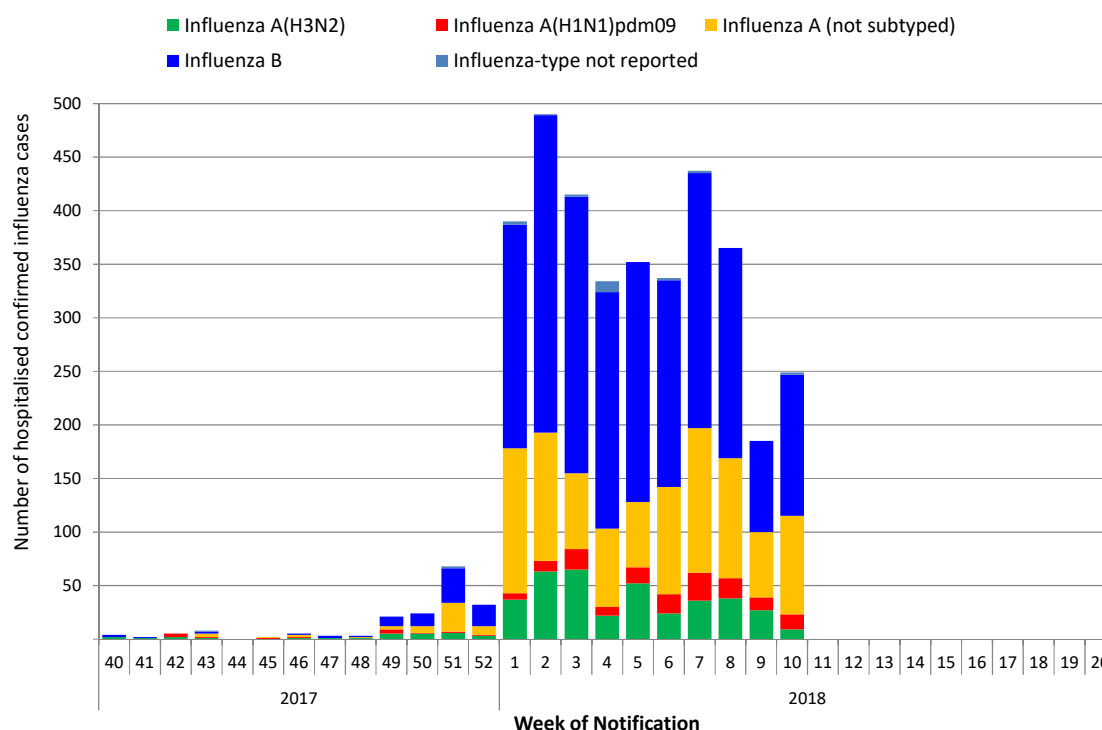


Figure 10: Number of confirmed influenza cases hospitalised by influenza type/subtype and by week of notification.
 Source: Ireland's Computerised Infectious Disease Reporting System (CIDR).

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.

- 165 confirmed influenza cases were admitted to critical care units and reported to HPSC during weeks 40 2017 – 10 2018, 50% associated with influenza A and 50% with influenza B: 25 A(H3N2), 11 influenza A(H1N1)pdm09, 47 A - not subtyped and 82 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, with 59% of cases aged 55 years and older.

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.

Age (years)	Hospitalised		Admitted to ICU	
	Number	Age specific rate per 100,000 pop.	Number	Age specific rate per 100,000 pop.
<1	119	191.1	9	14.5
1-4	346	128.5	8	3.0
5-14	357	52.9	15	2.2
15-24	125	21.7	4	0.7
25-34	141	21.4	4	0.6
35-44	234	35.5	17	2.3
45-54	228	36.4	11	1.8
55-64	359	70.5	28	5.5
≥65	1820	285.5	69	10.8
Unknown Age	2		0	
Total	3731	78.4	165	3.5

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/>

- 148 deaths in notified influenza cases have been reported to HPSC during weeks 40 2017 – 10 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 49% and influenza type was not reported for 10%.
- All-cause excess mortality was reported in Ireland in those aged 65 years and older during weeks 52 2017 - 5 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.
- Excess mortality from all causes has been raised significantly over recent months in the south-western part of the European region, notably in the elderly. However, mortality seems to be declining. <http://www.euromomo.eu/>

9. Outbreak Surveillance

- Eleven influenza/ARI general outbreaks were notified to HPSC during week 10 2018, from HSE-East, - Midlands, -Northeast, -Northwest, -Midwest, -Southeast and -South. Four of these outbreaks were associated with influenza A, five with influenza B and two with respiratory syncytial virus (RSV). Four outbreaks were reported in acute hospital settings, six were in residential care facilities/long stay units and the setting was reported as other for one outbreak during week 10 2018.
- For the 2017/2018 influenza season to date, 192 influenza/ARI general outbreaks have been notified: 170 associated with influenza (reported from all HSE-Areas; 42% were in HSE-East), nine associated with RSV (in HSE-East, -Northeast, -Midwest, -Northwest and -South) and 13 ARI outbreaks (the majority associated with rhinovirus) in HSE-East, -Midlands, -Northwest, -Southeast, -South, and -West. Of the 170 influenza outbreaks notified, 63 were associated with influenza A [25 with A(H3N2), four with A(H1N1)pdm09 and 34 with influenza A-not subtyped], 84 with influenza B, 13 with both influenza A and B and 10 with no influenza type reported. Twenty-nine influenza outbreaks were reported in acute hospital settings, one in a school, one in a childcare facility, 132 in residential care facilities/other residential setting, four 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.*

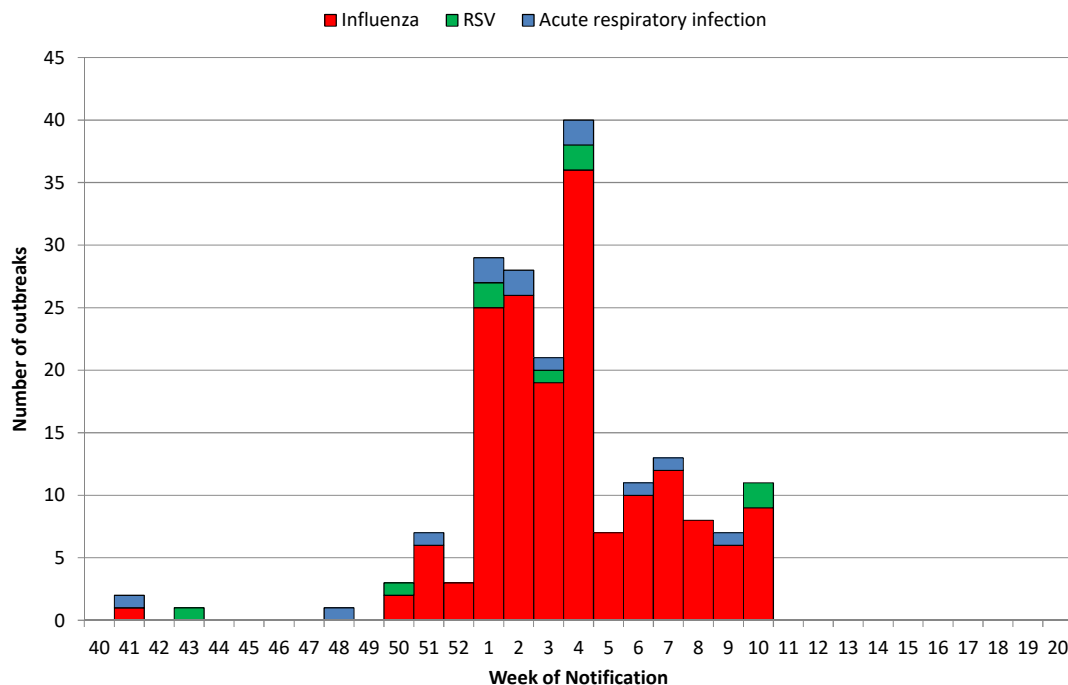


Figure 10: Number of acute respiratory infection, influenza and RSV outbreaks notified by week of notification. Source: Ireland's Computerised Infectious Disease Reporting System (CIDR).

10. International Summary

- During week 9 2018, influenza continued to circulate widely in the European Region, with both influenza A and B co-circulating. A higher proportion of influenza B compared to influenza A viruses has been detected, representing a high level of circulation of influenza B viruses compared with previous seasons. Different patterns of dominant influenza type and subtype were observed between the countries of the Region. 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. The majority of severe cases admitted to non-ICU hospital wards were adults infected with influenza B. For severe cases admitted to ICU, 50% were adults infected with influenza A 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, 60% 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 3% to clade 3C.3a. Viruses in both clades 3C.2a and 3C.2a1 are antigenically similar.
- As of March 5th 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 and B accounted for a similar proportion of influenza detections. The majority of countries have reported influenza-like illness reaching moderate levels in comparison with previous years. Some countries, however, have reported levels of hospitalisation and ICU admissions reaching or exceeding peak levels of previous influenza seasons.
- [ECDC and WHO Europe issued a joint press statement](#) in February 2018 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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