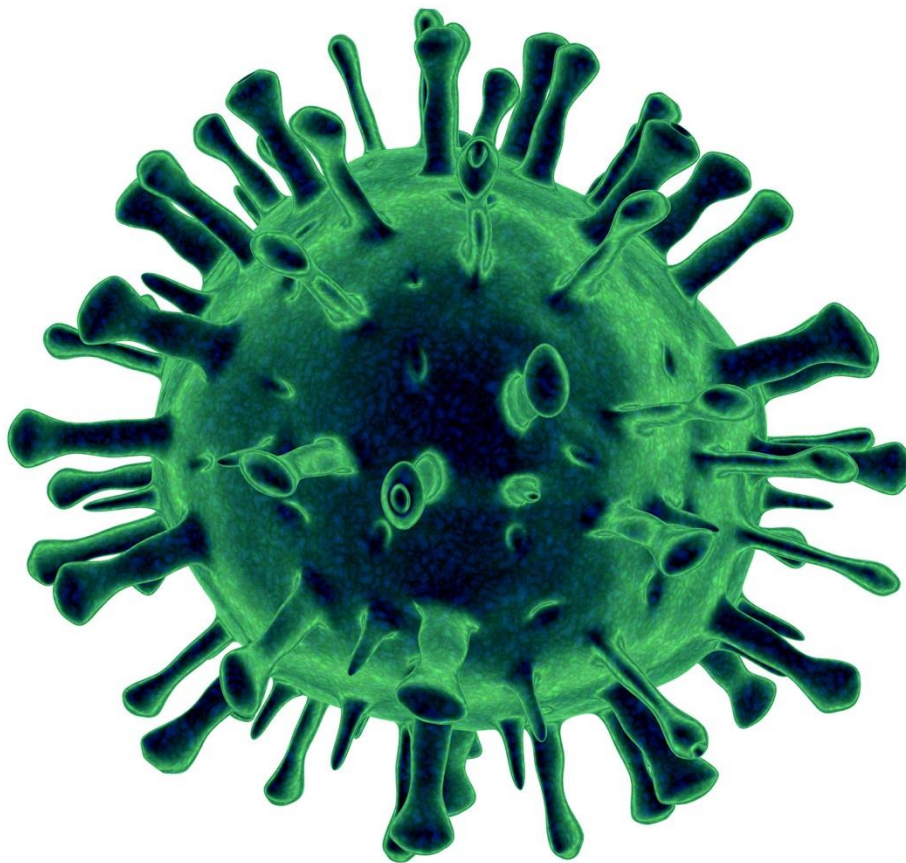


**Surveillance of influenza in Northern
Ireland:
2017 – 2018 season**



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Executive summary

The 2017 to 2018 influenza season was characterised by higher than usual levels of activity in the community and hospitals, with greater excess mortality. The peak of the season occurred in January/February 2018.

Primary care activity started to increase in late December, 2017 with 'flu/flu-like-illness' (flu/FLI) rates peaking in early January, 2018. The NI baseline Moving Epidemic Method (MEM) threshold was exceeded in week 52, 2017 (≥ 22.6 per 100,000), before increasing above the medium intensity threshold in week 1, 2018 (≥ 26.6 per 100,000). Activity remained above the baseline threshold for nine consecutive weeks this season. Peak 'flu/FLI' rates were over three times higher than those seen in both the 2016/17 and 2015/16 seasons.

The highest level of influenza activity was most frequently seen in the elderly population, peaking at 89.9 per 100,000 in week 2, 2018 for the 45-64 year olds. This age group had the highest level of influenza activity for 21 out of 33 weeks this season.

12,585 respiratory samples were tested from all sources (12,042 from non-sentinel sources and 543 from sentinel sources). Overall, 26% (3,322/12,585) of samples were positive for the influenza virus, a significant increase when compared with 2016/17 when 12% of samples tested positive for the virus. The number of tests from GP sentinel practices was higher than the previous two seasons and subsequently the overall proportion of positive influenza samples from GP sentinel practices was also higher at 54% (293/543) compared to 34% in 2016/17 and 43% in 2015/16. The proportion of samples positive for influenza from non-sentinel sources was also higher at 25% (3029/12,042) in 2016/17 compared with 11% in 2016/17 and 13% in 2015/16. Influenza A(H3) was the predominant circulating virus at the beginning of the season, accounting for 40% of all positive specimens, with influenza B being the predominant strain circulating later and accounting for 44% of all positive specimens. It is expected that the majority of the 455 positive influenza A (untyped), making up 14% of all positive specimens, are influenza A(H3). Influenza A(H1N1) pdm09 cases made up a small fraction of those detected positive (2%).

This season there were 39 confirmed influenza outbreaks. This is a significant increase on

2016/17 and 2015/16 when there were 15 and seven confirmed influenza outbreaks, respectively. All of the respiratory outbreaks in 2017/18 were in care homes.

The number of laboratory confirmed influenza cases in Intensive Care Units/High Dependency Units (ICU/HDU) was higher this season than the previous two seasons at 119 cases compared to 52 in 2016/17 and 113 in 2015/16. A total of 22 of these individuals died, giving a fatality rate of 18%. This compares to 21% in 2016/17 and 14% in 2015/16. The proportion of cases with confirmed influenza in ICU/HDU with co-morbidities (78%) was similar to 2016/17 (79%) but higher than 2015/16 (64%). Of the 119 cases with confirmed influenza, 60 (50%) were eligible to receive the Influenza vaccine and 30 (50%) of those eligible were vaccinated.

Levels of excess all-cause mortality were reported in nine weeks this season, compared to seven weeks in 2016/17 and three in 2015/16. In 2017/18 the majority of these excess deaths were in those aged 65 years and older.

Influenza vaccine uptake in 2017/18 was marginally lower across the majority of the target cohorts compared to 2016/17. The vaccination uptake rate in those aged less than 65 years in a clinical risk group was 56% (compared to 57.1% in 2016/17), and among pregnant women was 56.7% (compared to 58.6% in 2016/17). The vaccination uptake rate for pre-school children aged two to four years old was 50.6% (compared to 52.6% in 2016/17), and for children in primary school (aged approximately four to 11 years old) was 76.5% (compared to 78.3% in 2016/17). Vaccine uptake remained stable in those aged 65 years and older at 71.8% (compared to 71.9% in 2016/17), and increased in frontline healthcare workers to 33.4% (compared 28% in 2016/17).

Introduction

In Northern Ireland, surveillance of influenza and other respiratory viruses is carried out by the Influenza Surveillance Team at the Health Protection Directorate of the Public Health Agency (PHA). Data are collated from a number of surveillance systems to provide information on the type of influenza strains circulating in the region, the timing of influenza activity, the burden of influenza on the community and health services, the degree of excess mortality and the uptake of influenza vaccine. Outputs from the surveillance activities are used to produce timely reports that are distributed to the Department of Health, Health and Social Care Board, Health and Social Care Trusts, health professionals, the media, and the public. Surveillance is carried out all year, with output reports published weekly or fortnightly from week 40, 2017 (commencing 02/10/2017) to week 20, 2018 (ending 20/05/2018).

This report describes the influenza activity in Northern Ireland for the 2017/18 season from week 40, 2017 to week 20, 2018.

Enhanced influenza surveillance systems

In-hours GP Practice surveillance

This is the first season that in-hours GP Practice surveillance has been reported from 98% of the population (325 GP practices) instead of 11.6% of the population from the sentinel GP scheme (~37 GP practices).

The new system automatically extracts the number of clinical consultations for confirmed influenza and flu-like illness ('flu/FLI') and acute respiratory infections (ARI) from GP practices on a daily basis, facilitated by Apollo, Wellbeing Software. Denominator data for each GP practice population was provided by BSO at the beginning of the season using 2017 mid-year population estimates. These allowed for combined 'flu/FLI' GP consultations rates per 100,000 population to be calculated.

Practices participating in the sentinel GP system continued to submit weekly manual returns during the 2017/18 season as backup in the event of technical difficulties obtaining automatic

data. In future flu seasons, the manual returns will stop but the sentinel GP scheme will continue to obtain nose and throat swabs to enable community virological surveillance.

Every year the baseline Moving Epidemic Method (MEM) threshold for 'flu/FLI' GP consultation rates in Northern Ireland is calculated to standardise reporting of seasonal influenza activity. Further thresholds are also calculated for low, moderate, high and very high activity¹. The threshold is used by the European Centre for Disease Prevention and Control (ECDC) and has been adopted by the United Kingdom (UK) devolved administration schemes to standardise reporting of influenza activity across the UK and Europe. Further details of the method have been previously described (Vega et al, 2012).

GP Out-of-Hours surveillance

The GP Out of Hours (OOH) surveillance system automatically extracts the number of clinical consultations for 'flu/FLI' and 'ARI' from all GP OOH Centres in Northern Ireland (n=5) on a weekly basis. Combined 'flu/FLI' and 'ARI' GP consultations rates per 100,000 population are calculated similar to the in-hours GP practice surveillance using 2017 mid-year population estimates provided by BSO at the beginning of the season.

Virological surveillance

The Regional Virology Laboratory (RVL) tests respiratory samples that are submitted from the sentinel GP scheme, and from HSC Trust hospitals, GP practices outside the sentinel GP scheme and from Care Home outbreaks (latter known as "non-sentinel" sources).

Swabbing from the sentinel GP scheme runs throughout the normal influenza season and provides information on patients presenting to primary care with ILI who are positive for influenza. HSC Trusts hospitals and GP practices submit respiratory samples from patients if clinically recommended on the basis of presenting symptoms.

All respiratory samples are tested by real-time (RT) PCR for influenza A and its main subtypes (AH1 and AH3), influenza B and Respiratory Syncytial Virus (RSV). Selected respiratory

¹2017/18 MEM thresholds: baseline 22.6 per 100,000; low activity 22.6 to <26.6; moderate activity 26.6 to <85.1; high activity 85.1 to <142.4 and very high activity >142.4 per 100,000.

samples are also tested for other respiratory organisms using RT PCR including: *mycoplasma pneumoniae*, *legionella pneumophila* and *chlamydia pneumoniae*, *bordetella pertussis*, *pneumocystis jirovecii*, metapneumovirus, respiratory adenovirus, coronavirus, parainfluenza, rhinovirus and bocavirus.

This season one of the HSC Trust laboratories has also introduced influenza testing for patients where the clinician suspects flu. Respiratory samples are tested for influenza A, B and RSV using a rapid enzyme immunoassay (EIA) test (Cepheid®). Samples positive for influenza A are sent to RVL for confirmation and further characterisation.

The influenza team collects and collates the number of patients tested, along with their results for influenza and RSV viruses from RVL and the local HSCT Laboratory. The number and proportion of samples positive for influenza and RSV are reported on a weekly basis. It is not useful to report on other respiratory viruses due to the variation in testing methods from year to year.

Outbreak surveillance

Respiratory-related outbreaks in institutional settings (e.g. care homes, hospitals, and schools etc.) are reported to the PHA Health Protection duty room. The duty room collects epidemiological data using a standardised proforma at the beginning, during, and at the end of each influenza outbreak. Respiratory sampling and testing is recommended for all outbreaks, with samples sent to RVL. The influenza team collates and reports aggregate data on the number of outbreaks and other relevant epidemiological and virological information.

Intensive Care Unit/High Dependency Unit surveillance

Since 2011/12, Northern Ireland has participated in the mandatory UK Severe Influenza Surveillance System (USISS). This is a national mandatory collection that collects the weekly number of laboratory confirmed influenza cases admitted to Intensive Care Unit (ICU) and High Dependency Units (HDU) and number of confirmed influenza deaths in ICU/HDU.

Epidemiological information on laboratory-confirmed cases of influenza admitted to ICU/HDU are collected and collated weekly, in collaboration with the Critical Care Network for Northern

Ireland (CCANNI). Aggregate data on the number of cases, deaths and other relevant epidemiological information are reported weekly.

Mortality surveillance

The Northern Ireland Statistics and Research Agency (NISRA) provide data to the influenza team on the number of all-cause and selected respiratory infection death registrations by registration week. Selected respiratory infections are obtained by searching death certificates for keywords associated with influenza, including; bronchiolitis; bronchitis; influenza; and pneumonia. The number and proportion of selected respiratory infection death registrations are reported weekly. Due to delays in death registrations, the number of registered deaths in a week will not equal the number of deaths that actually occurred that week.

In addition, Public Health England (PHE) calculates excess mortality on behalf of the influenza surveillance team, using the Mortality Monitoring in Europe (EuroMOMO) model. EuroMOMO is a project coordinated by the Statens Serum Institut in Denmark to provide a common approach to analysing mortality data and comparing across the UK and Europe. The model produces weekly expected and observed number of deaths, corrected for reporting delay and standardised for the population by age group and region. Excess mortality is reported if the number of observed deaths exceeds the number of expected deaths. Despite delay correction, reported mortality data is still provisional due to the time delay in registration and observations can vary from week to week.

Vaccine uptake surveillance

Every year, policy for the Seasonal Flu Vaccination Programme is set by the Department of Health in line with recommendations from the Joint Committee on Vaccination and Immunisation (JCVI), including regional targets for immunisation uptake. In 2017/18, the following flu vaccines and targets were recommended.

Trivalent Inactivated Vaccine (TIV):

- All individuals aged 65 years and older (75%)
- Individuals aged 6 months – 2 years and 18 - 65 years in a clinical at-risk group (75%), including pregnant women (60%)

- Frontline Health and Social Care Workers (40%)

Quadrivalent Live Attenuated Influenza Vaccine (LAIV):

- All pre-school children aged 2 years or older on 1 September 2017 (60%)
- All primary-school aged children (4 to 11 years of age) (75%)
- Post-primary school aged children (11 to 17 years of age) in a clinical risk group, unless contraindicated

The flu surveillance team collects data on the number vaccinated in each target group at regular intervals between the start and end of the season. Vaccine uptake rates are calculated using age-specific denominators and presented for Northern Ireland and by Health and Social Care Trusts (HSCT).

Data is collected from different data sources depending on the target group, including GP practices via electronic software (Apollo, Wellbeing Software), GP claim numbers from the Health and Social Care Board (HSCB) and HSCT, and School Nursing and Occupational Health Departments.

Northern Ireland GP 'flu/FLI' consultation rates

The weekly GP consultation rate for 'flu/FLI' started to increase from pre-season levels in week 48, 2017 (November/December 2017), rising from 10.1 to 22.7 per 100,000 between week 50 and 51, 2017 and continuing to increase to a peak of 65.2 per 100,000 in week 2, 2018. In week 9, 2018 the rate fell to 16.7 per 100,000 and continued to decrease until the end of the season in week 20 (2.2 per 100,000). The baseline MEM threshold² was exceeded in week 52, 2017 and increased above the medium intensity threshold³ in week 1, 2018. Rates remained above the baseline MEM threshold for nine consecutive weeks (Figure 1).

Consultation rates for 2017/18 followed a similar pattern to 2016/17 and 2015/16 at the start of the season but rates for these seasons did not exceed their baseline MEM thresholds at any point. In both the previous two seasons, peak rates occurred in week 1; 18.1 per 100,000 in 2016/17 and 16.7 per 100,000 in 2015/16.

Age-specific GP consultation rates fluctuated in all age groups throughout this season, with the peak rates among all age groups being higher than in 2016/17 and 2015/16. The highest level of influenza activity was most frequently seen in the those aged over 45 years old, peaking at 89.9 per 100,000 in week 2, 2018 for those 45-64 year olds and 75.1 per 100,000 for those aged 65 years and older in the same week (Figure 2).

² Equal to or greater than 22.6 per 100,000

³ Equal to or greater 26.6 per 100,000

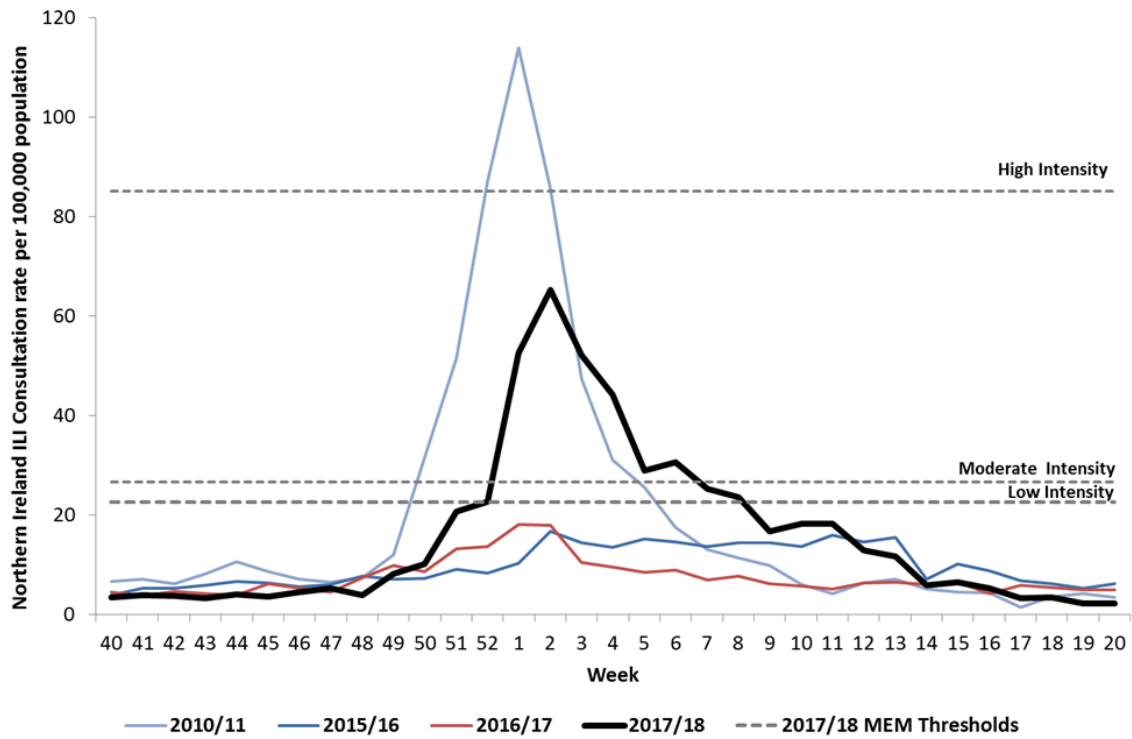


Figure 1: Northern Ireland GP consultation rate per 100,000 population for combined flu and flu-like illness 2015/16 – 2017/18

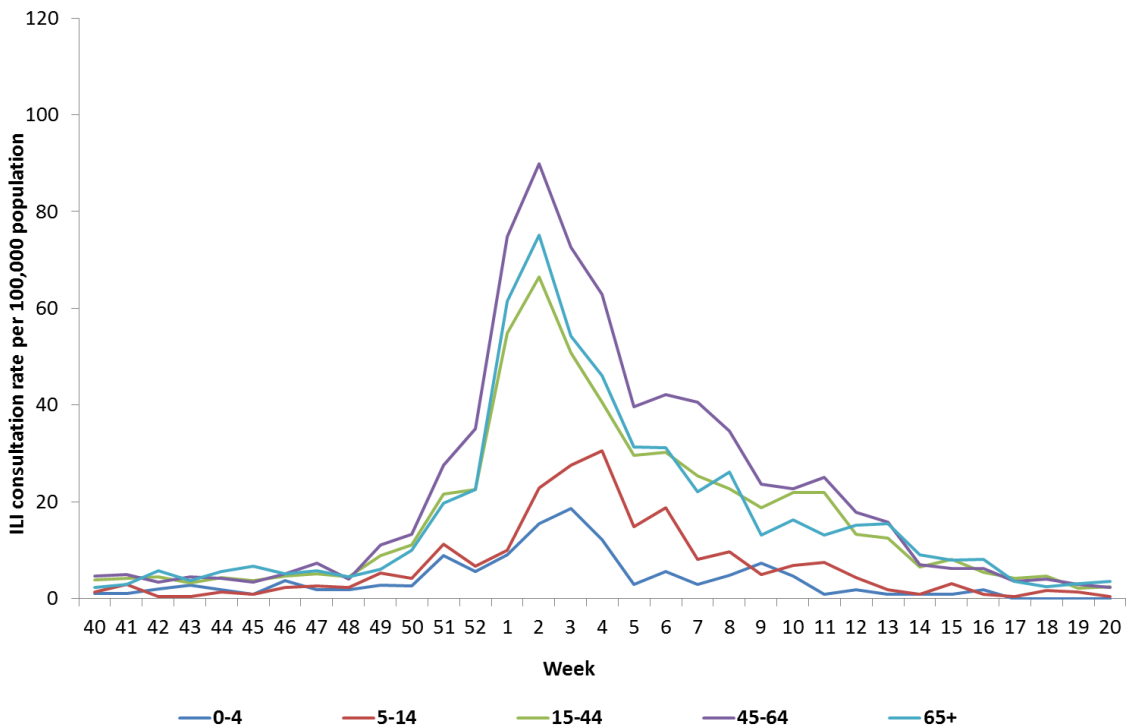


Figure 2: Northern Ireland GP age-specific consultation rates per 100,000 population for combined flu and flu-like illness from weeks 40 - 20, 2017/18

GP Out-of-Hours 'flu/FLI' consultation rates

GP OOH 'flu/FLI' consultation rates began to increase in week 51, 2017, peaking in week 52 at 37.2 per 100,000. This compares to a peak of 16.7 per 100,000 in 2016/17 and 13.2 per 100,000 in 2015/16. Since week 15, 2018 OOH consultation rates have remained low and stable (Figure 3).

The proportion of 'flu/FLI' calls to total calls was higher this season compared to previous seasons, peaking at 5.2% in week 1, 2018. This compares to a peak of 1.8% in 2016/17 and 1.7% in 2015/16. Outside of the peak (between week 50, 2017 to week 14, 2018), 'flu/FLI' calls as a proportion of total calls remained steady ($\leq 1\%$).

By age group, the highest consultation rates were reported in the 15-44 year olds, peaking at 42.4 per 100,000 in week 52, 2017 (Figure 4).

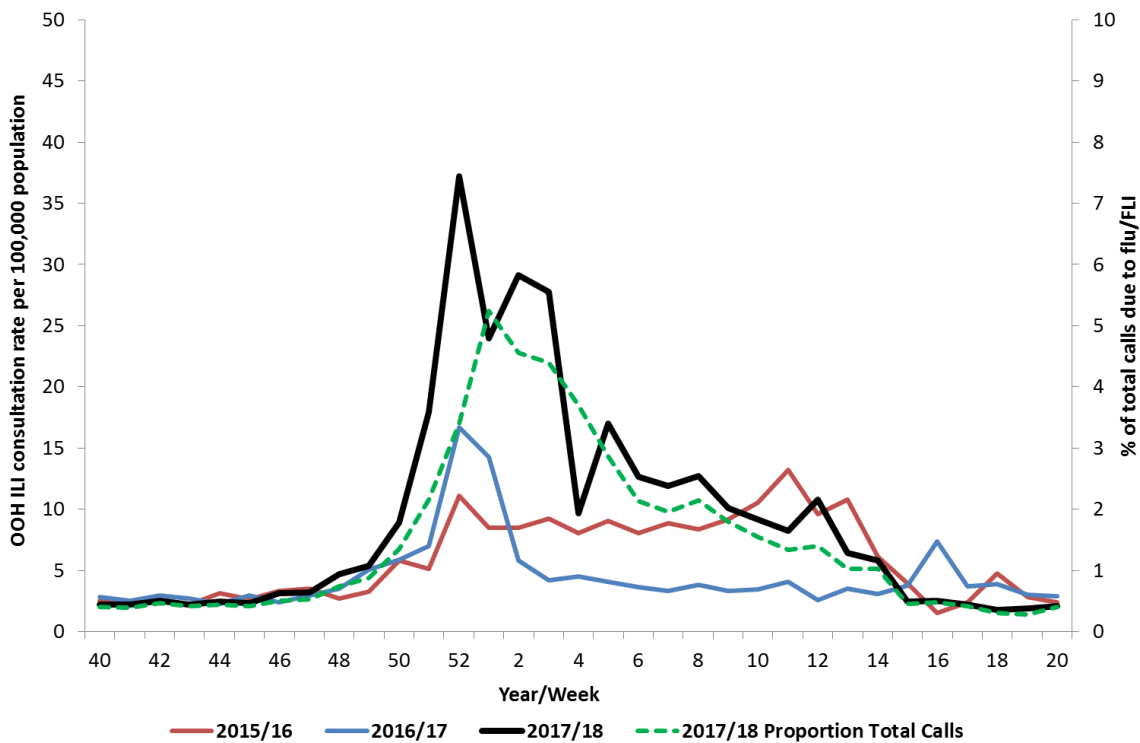


Figure 3: OOH consultation rate per 100,000 population and proportion of total OOH calls for combined flu and flu-like illness 2015/16 - 2017/18

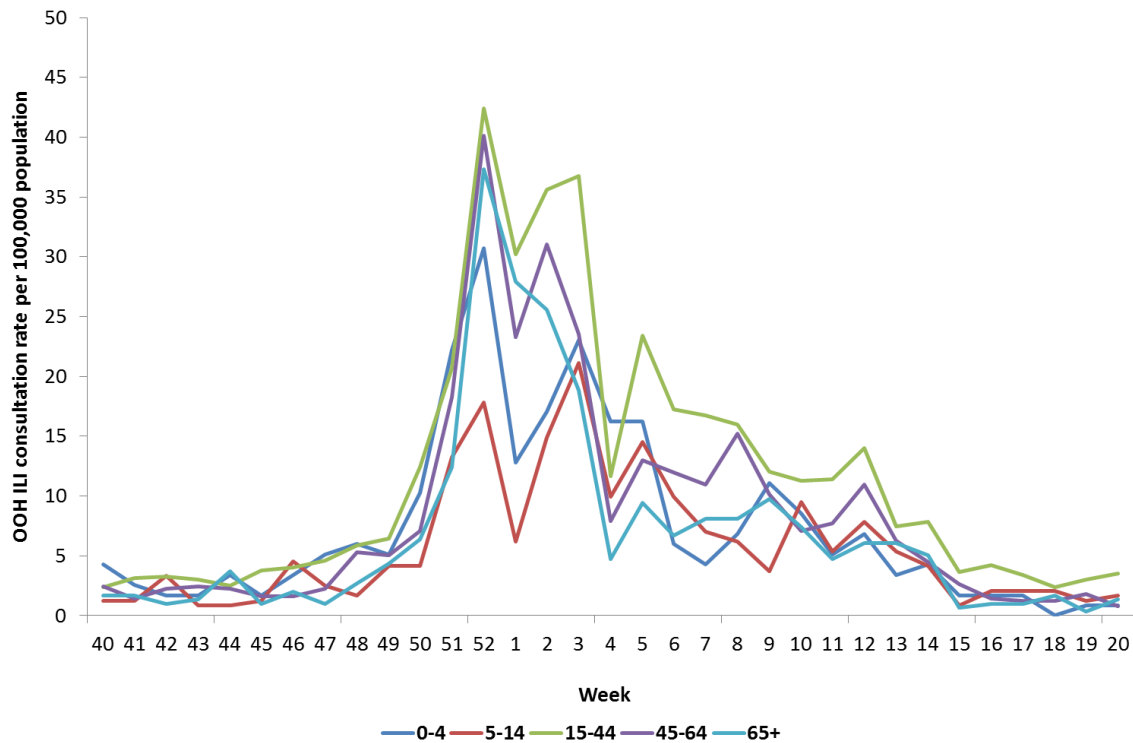


Figure 4: OOH call rates per 100,000 population for combined flu and flu-like illness by age-group from weeks 40- 20 2017/18

Virological Activity

Across Northern Ireland, 12,585 respiratory samples from any source were tested (543 sentinel GP scheme; 12,042 non-sentinel sources). Overall, 26% (3,322/12,585) of samples were positive for influenza virus. The proportion of positive influenza samples from the sentinel GP scheme was 54% (293/543) and 25% (3,029/12,042) from non-sentinel sources.

Influenza A(H3) was the predominant circulating virus at the beginning of the season, accounting for 40% (1,332/3,322) of influenza isolates, with influenza B the predominant strain circulating later in the season, accounting for 44% (1,454/3,322) of influenza isolates. It is assumed that un-typed influenza A isolates (455; 14% of isolates) were influenza A(H3). Influenza A(H1N1) pdm09 accounted for only 2% of influenza isolates (81/3,322).

The relative proportion of influenza isolates followed a similar pattern in GP sentinel and non-sentinel samples (Table 1).

Table 1: Number and proportion of influenza strains to positive influenza samples according to sample source, during week 40 2017 to week 20 2018

| | All Sources (n=3322) | GP Sentinel Practices (n=293) | Non-Sentinel Sources (n=3029) |
|----------------------------|-------------------------|----------------------------------|----------------------------------|
| Influenza A(H3) | 1332 (40%) | 107 (37%) | 1225 (40%) |
| Influenza A(H1N1)pdm09 | 81 (2%) | 13 (4%) | 68 (2%) |
| Influenza A (not subtyped) | 455 (14%) | 17 (6%) | 438 (14%) |
| Influenza B | 1454 (44%) | 156 (53%) | 1298 (43%) |
| Total Positive | 26% | 54% | 25% |

The distribution of influenza positive detections compared to previous seasons is shown in Figure 5. It clearly illustrates the increase in positive detections this season compared to previous seasons.

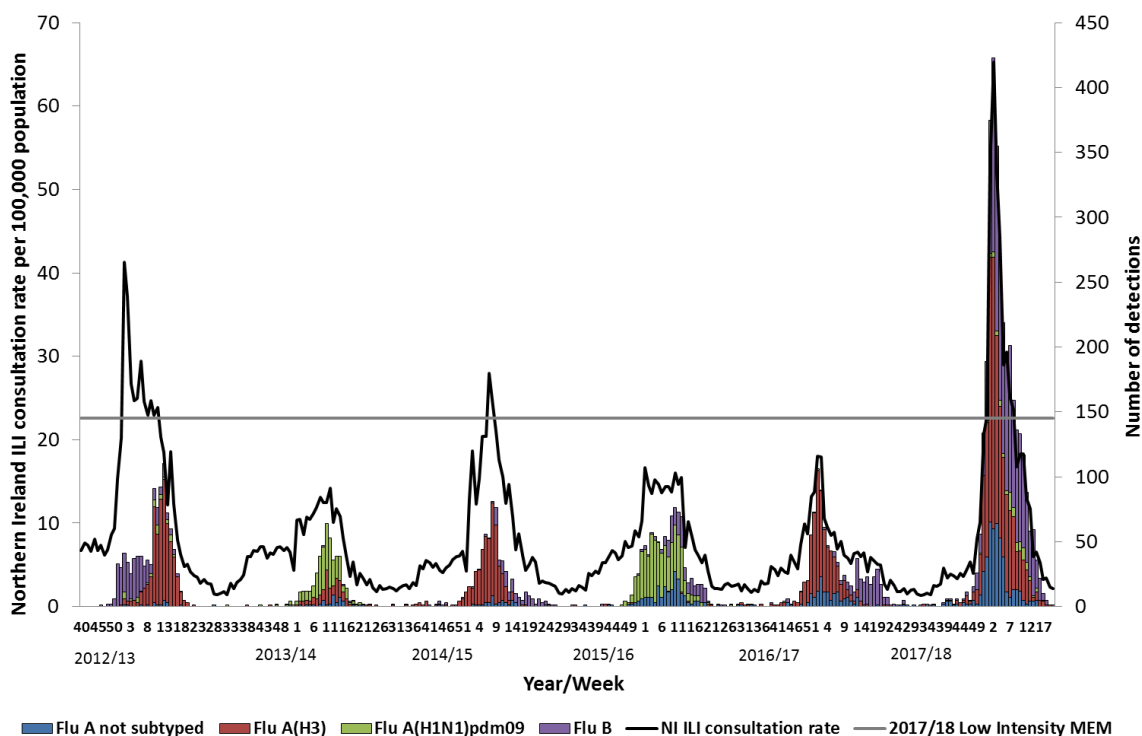


Figure 5: Northern Ireland GP consultation rates for flu/ILI and number of influenza positive detections 2012/13 – 2017/18

Both the first influenza A(H3) and influenza B detection were reported in week 40 2017. The proportion positivity for all samples began to increase in week 48, 2017 and peaked in week 1, 2018 (375/787; 48%). This was a similar pattern to the 2016/17 season, though the proportion positivity for all sources peaked at 30% in week 1, 2017 (Figure 6).

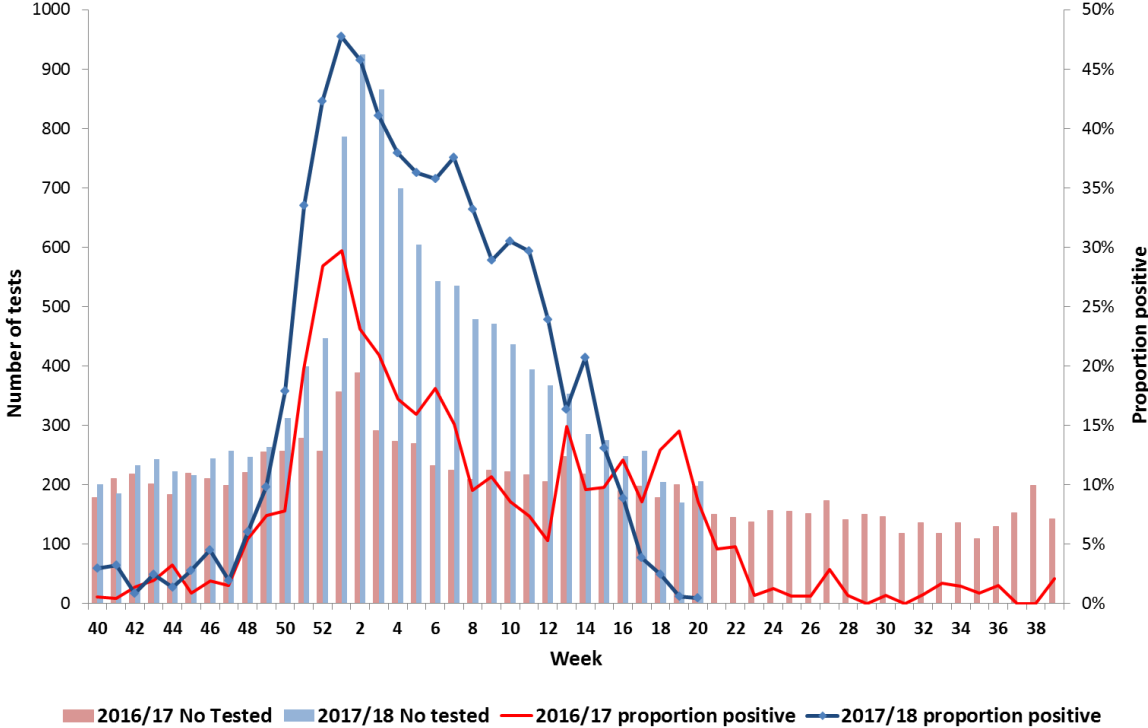


Figure 6: The number of samples tested (all sources) for influenza in Northern Ireland from weeks 40-20, 2016/17 & 2017/18 with the proportion positive

Overall, the highest proportion positivity for all samples was in those aged 65 years and older (51%), with influenza A(H3) most frequently reported in this age group (Table 2). The median age for confirmed cases of influenza A(H3) was 69.5 years (range 0 to 101 years).

Table 2: Proportion of positive influenza samples by age group, all sources, during week 40 2017 to week 20 2018

| | 0-4 yrs | 5-14 yrs | 15-44 yrs | 45-64 yrs | Over 65 yrs |
|-----------------------------------|-----------------|-----------------|------------------|------------------|-------------------|
| Influenza A(H3) | 45 (38%) | 33 (36%) | 210 (33%) | 272 (35%) | 771 (46%) |
| Influenza A(H1N1)pdm09 | 8 (7%) | 1 (1%) | 16 (3%) | 26 (3%) | 30 (2%) |
| Influenza A (not subtyped) | 26 (22%) | 11 (12%) | 86 (14%) | 102 (13%) | 230 (14%) |
| Influenza B | 41 (34%) | 47 (51%) | 323 (51%) | 382 (49%) | 659 (39%) |
| Total Positive* | 120 (4%) | 92 (19%) | 635 (24%) | 782 (3%) | 1690 (51%) |

**Due to rounding, total percentages do not add-up to 100%*

** 3 positive with unknown age group*

Respiratory Syncytial Virus

Across Northern Ireland, 12,585 respiratory samples from any sources were tested, with overall RSV positivity of 5% (587/12,585). The principal activity period occurred from week 42, 2017 to week 3, 2018 with the proportion of positive samples peaking in week 48, 2017 at 21% (75/270) (Figure 7). Overall RSV activity was down compared to 2016/17.

The majority (339/587; 58%) of RSV detections were in the 0-4 year age group. This is lower than the proportion seen in this age group for 2016/17 and 2015/16 (64% and 71% respectively).

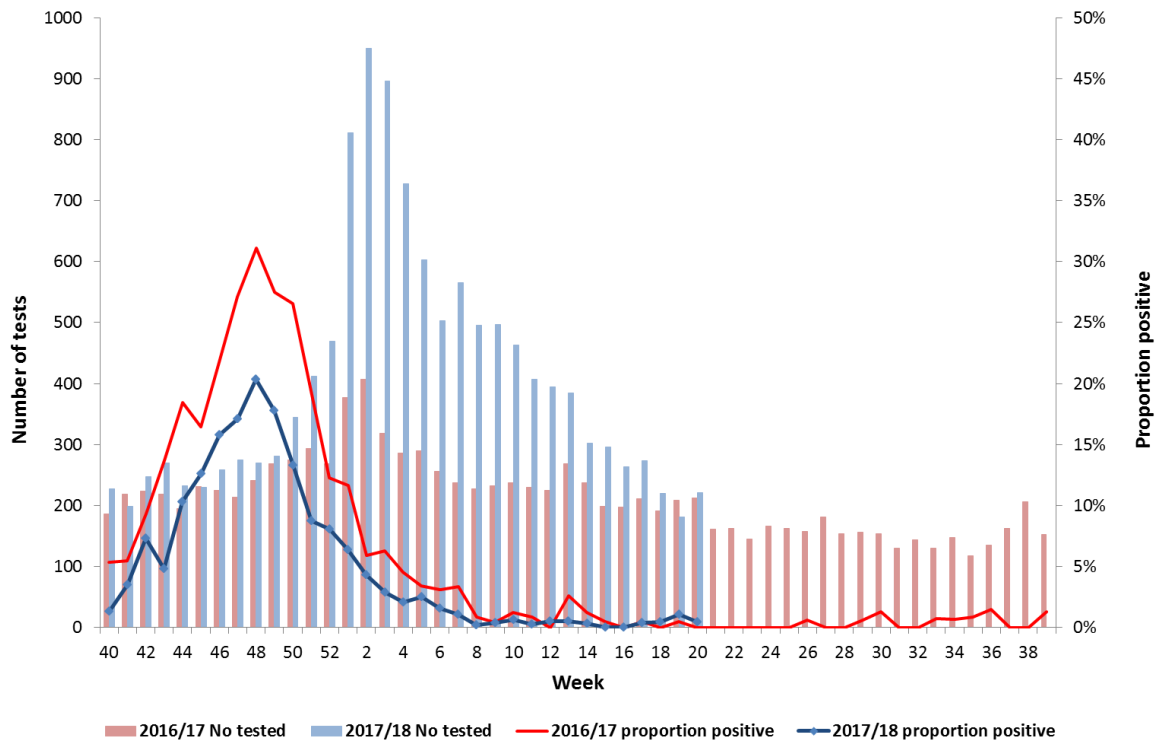


Figure 7: Number of samples tested for RSV and proportion positive in Northern Ireland 2016/17 and 2017/18

Genetic typing

This year, 24 influenza A(H3), 4 influenza A(H1NI)pdm09 and 6 influenza B isolates were sent to the Crick Worldwide Influenza Centre, London, for genetic sequencing.

For influenza A(H3), sequencing was completed in 21/24 isolates for the haemagglutinin (HA) gene and in 17/24 isolates for the neuraminidase (NA) gene. Of the HA gene, 81% (17/21) were in subclade 3C.2a2, 14% (3/21) in subclade 3C.2a1b and one in 3C.3a clade. The NA gene sequencing showed similar clustering, except for one sample that had a 3C.2a2 HA gene with an NA gene forming a cluster with viruses with HAs in the 3C.2a1b subclade. This virus probably represents a distinct reassortment event.

For influenza A(H1NI)pdm09, sequencing was completed for 2/4 and identified the HA gene within in the 6B.1 clade for both. For influenza B, all six were identified as the B/Yamagata lineage with HA and NA genes within clade 3.

Thirty-five late season flu virus isolates have been sent to the Crick Worldwide Influenza Centre, London, though results are not currently available at the time of writing (August 2018).

Respiratory Outbreaks

Fifty-two respiratory-related outbreaks were reported to the duty room of which 39 (75%) were laboratory-confirmed influenza. This is an increase from 15 confirmed flu outbreaks in 2016/17 and seven in 2015/16. Over two-thirds (69%; 27/39) of flu outbreaks were caused by influenza A, with a further 11 (28%) caused by influenza B and one from influenza A and B.

All 39 flu outbreaks occurred in care homes, including residential homes, nursing homes and/or homes for adults with specialist needs.

Outbreaks were notified to the PHA between weeks 49, 2017 and week 15, 2018 peaking in week 1 (n=13) (Figure 8).

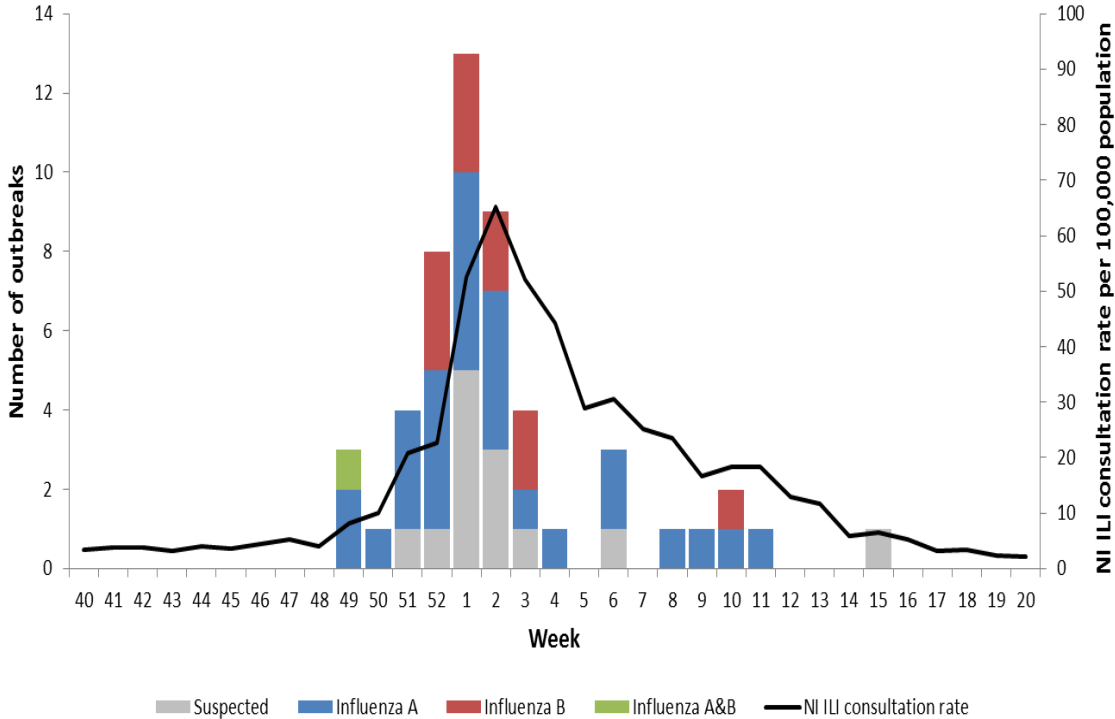


Figure 8: Number of influenza outbreaks by subtype per week, with GP consultation rate, 2017/18

ICU / HDU surveillance

The number of laboratory confirmed influenza cases in ICU/HDU was 119, compared to 52 in 2016/17 and 113 in 2015/16. The predominant strain was influenza A(H3) (53/119; 45%), followed by influenza B (48/119; 40%). The remaining virus strains included influenza A (untyped) (14/119; 12%), influenza A(H1N1) pdm09 (3/119; 3%) and one dual influenza A & B (1/119; 1%) (Figure 9 and Table 3). The highest number of confirmed influenza cases in ICU/HDU was reported in week 2, 2018 (18/119; 15%), of which the majority (11/18; 61%) was reported as influenza A(H3).

This season, a high proportion (93/119; 78%) of cases were recorded as having a co-morbidity, similar to 2016/17 (79%) but higher than 2015/16 (64%). Of the eligible cases for the influenza vaccine (60/119; 50%), half received it (30/60; 50%) (Table 3).

Case Fatality Rate (CFR) of ICU/HDU cases was 18% (22/119 deaths), compared to 21% (11/52 deaths) in 2016/17 and 14% (16/113 deaths) in 2015/16.

The median age of cases admitted to ICU/HDU was 64 years old (range 0 to 88 years); 57/119 (48%) over 65 years old and 93/119 (78%) over 45 years old. The proportion of cases under 15 years of age was lower this season (11/119; 9%) compared to last (6/52; 12%).

The majority of positive influenza A(H3) was reported among those aged 45 years and older (50/53; 94%). Similarly the majority of positive influenza B was also reported among this age group (35/48; 73%). The remaining virus strains were fewer in total so breakdown by age group was not feasible.

Over half of those reporting a co-morbidity were aged 65 years and older (50/93; 54%). Similarly, the majority in a clinical risk group were also aged 65 years and older (50/60; 83%). Just over half of those in this group were also vaccinated (27/50; 54%) (Table 3).

The majority of deaths reported in ICU/HDU this season were in those aged 65 years and older (16/22; 73%). However, 6/22 (27%) deaths were in those aged 15-64 years old, of which 5/6 (83%) did not report a co-morbidity and 4/5 (80%) of these deaths were in those age under 40 years old.

Nearly three-quarters of those that died had one or more co-morbidities (16/22; 73%), with 12 eligible for influenza vaccine (12/16; 75%), of which less than half (5/12; 42%) had received the 2017/18 influenza vaccine.

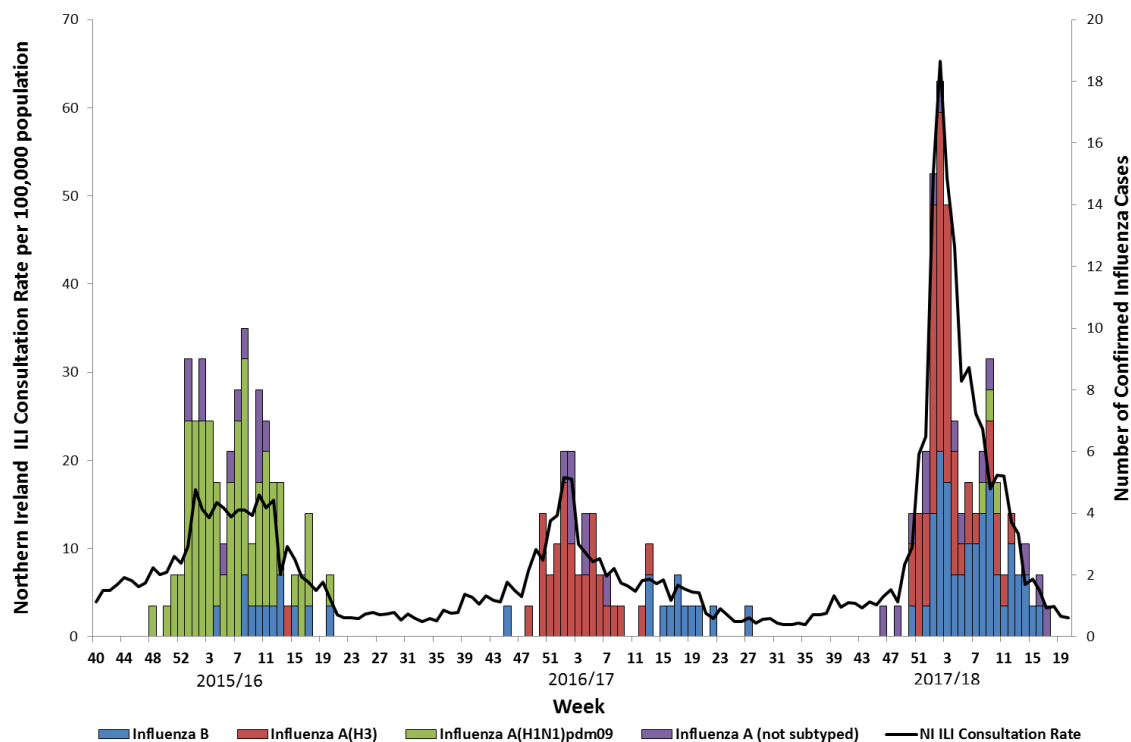


Figure 9: Confirmed ICU/HDU influenza cases by week of specimen, with GP consultation rate, 2015/16 - 2017/18

Table 3: Cumulative ICU/HDU admissions confirmed as influenza positive, week 40-20, 2017/18

| Age Group | No. of patients | Flu A(H3) | Flu B | Flu A (untyped) | Flu A(H1N1) pdm09 | Flu A & B | Co-morbidity | Flu vaccine clinical risk group | Vaccinated if in clinical risk group | Deaths * |
|-----------|-----------------|-----------|-------|-----------------|-------------------|-----------|--------------|---------------------------------|--------------------------------------|----------|
| 0-4 | 6 | 1 | 2 | 3 | 0 | 0 | 2 | 1 | 0 | 0 |
| 5-14 | 5 | 1 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| 15-44 | 15 | 1 | 7 | 4 | 2 | 1 | 6 | 1 | 0 | 4 |
| 45-64 | 36 | 18 | 16 | 2 | 0 | 0 | 31 | 8 | 3 | 2 |

| | | | | | | | | | | |
|------------|------------|-----------|-----------|-----------|----------|----------|-----------|-----------|-----------|-----------|
| 65+ | 57 | 32 | 19 | 5 | 1 | 0 | 50 | 50 | 27 | 16 |
| All | 119 | 53 | 48 | 14 | 3 | 1 | 93 | 60 | 30 | 22 |

**Includes deaths in critical care patients who have confirmed influenza, however these deaths may not necessarily be due to influenza.*

Mortality

The proportion of registered deaths with respiratory keywords to all-cause death registrations was 32% (3507/11,126), compared to 30% in 2016/17. The proportion of weekly registered deaths with respiratory keywords peaked at 43% (205/481) in week 1, 2018, compared to 38% in week 52, 2016 (Figure 10).

Excess all-cause mortality was calculated for nine weeks during the season (weeks 49, 51-5, and 7), compared to seven weeks in 2016/17 (Figure 11).

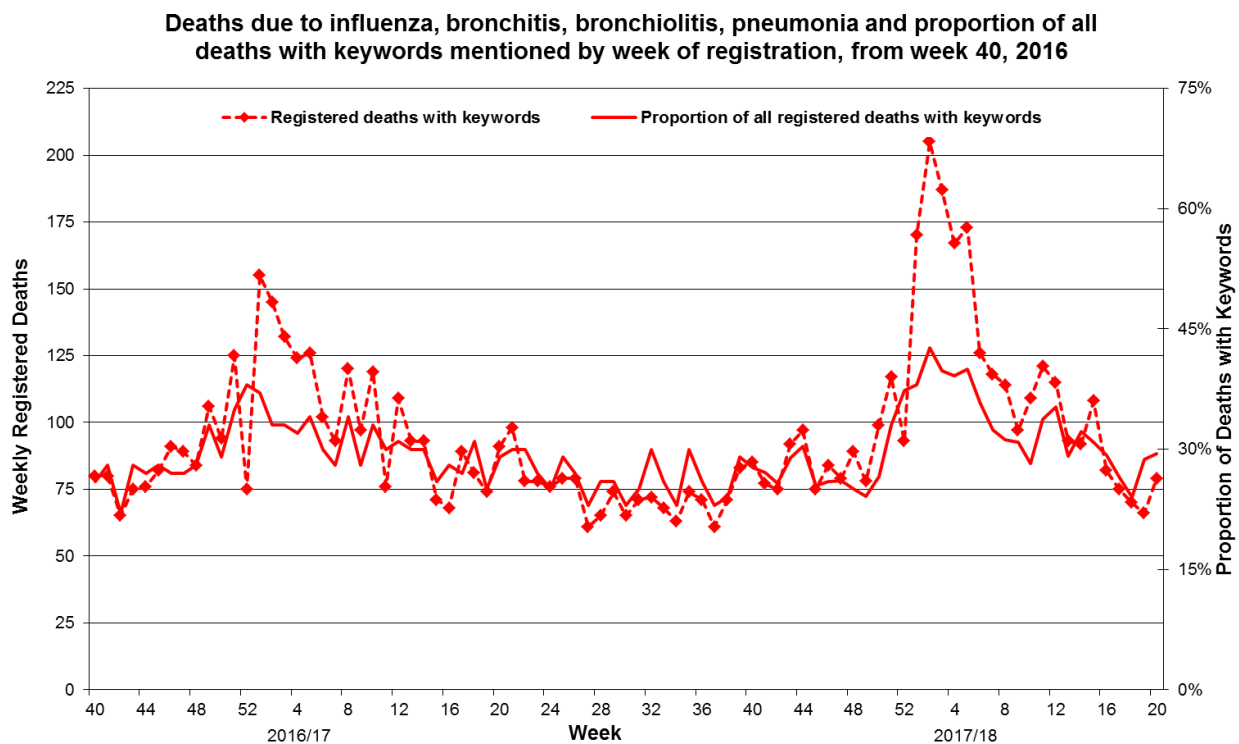


Figure 10: Deaths due to influenza, bronchitis, pneumonia and proportion of all deaths with keywords mentioned by week of registration, from week 40 2016

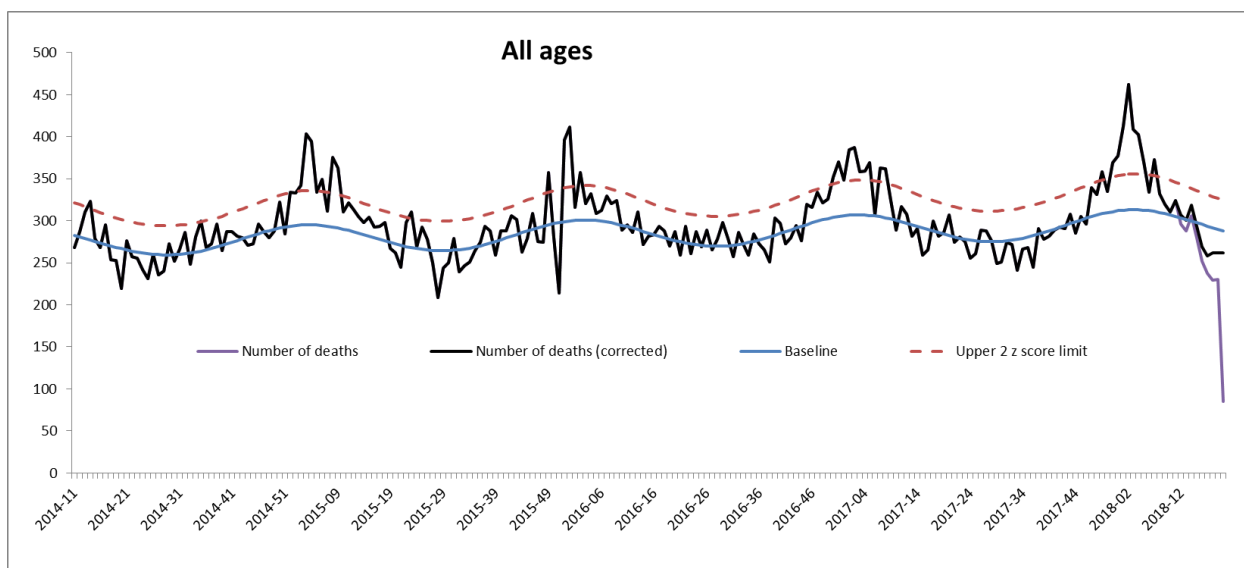


Figure 11: All age excess all-cause mortality by week of death, Northern Ireland 2014-2018 (calculated using the standardised EuroMOMO algorithm)

Seasonal Influenza Vaccine uptake

The 2017/18 end of season influenza vaccine uptake rates in adults were: 71.8% in those 65 years and older; 56.0% in under 65 years in clinical risk groups and 56.7% in pregnant women. Uptake rates are collected separately for individuals with a body mass index (BMI) of greater than 40 kg/m² without other co-morbidities; uptake for this group was 22.8% (table 4).

During the previous three years the number of individuals in adult target groups (denominator) has increased over time, in particular those under 65 years in clinical risk groups. This year, across all target groups, the number of vaccines administered increased compared to previous years. Uptake was unchanged in those 65 years and older. However, despite the increased numerator data, there was still a slight fall (1.1%) in the under 65 year olds in clinical risk groups and in those with BMI > 40 kg/m² (4.3%), which is most likely to be as a result of the increasing target group population.

It has always been difficult to obtain accurate denominator data on the number of pregnant women eligible for the flu vaccine during a season. For this reason, uptake is estimated. Next year the flu surveillance team will be analysing data from the Northern Ireland Maternity Administrative System (NIMATs) which should provide more accurate vaccine uptake rates.

The 2017/18 end of season influenza vaccine uptake in Trust frontline Health and Social Care Workers (HSCWs) was 33.4%. As a result of changes to the data collection, the number of eligible HSCWs was higher than in previous years. Despite this, due to an increased number of HSCWs vaccinated, the rate increased by 4.4% compared to 2016/17. Unlike the rest of the UK, Northern Ireland collects and includes information on Social Care Workers in frontline HSCW uptake rates. Data collection guidance for Trusts has been revised for next season, which should standardise definitions across the Trusts and allow greater comparability with other devolved administrations.

The 2017/18 end of season influenza vaccine uptake in children was: 76.5% in primary school children and 50.6% in pre-school children (two to four years old) (Table 4). Uptake marginally fell in both groups compared to 2016/7, 1.8% and 2.0% respectively.

Table 4: Seasonal Influenza vaccine uptake 2015/16 – 2017/18

| Northern Ireland GP Influenza Vaccine Coverage Data (1st October 2017 to 31st March 2018) | | | |
|--|----------------|----------------|----------------|
| | 2017/18 | 2016/17 | 2015/16 |
| Number of practices in Northern Ireland | 336 | 344 | 349 |
| Number of practices submitting return (percentage) | 332 (98.8%) | 343 (99.7%) | 349 (100%) |
| Number of 65+ receiving influenza vaccine | 220,853 | 215,738 | 222,905 |
| Registered number of 65+ population | 307,439 | 299,873 | 299,465 |
| End of season uptake rate for 65+ population | 71.8% | 71.9% | 74.4% |
| Number of under 65 "at risk" receiving influenza vaccine | 151,677 | 146,320 | 149,079 |
| Registered number of "at risk" population under 65 years | 270,971 | 256,469 | 248,970 |
| End of season uptake rate for under 65 "at risk" population | 56.0% | 57.1% | 59.9% |
| End of season uptake rate for Trust frontline HSCWs | 33.4% | 29.0% | 24.6% |

| | | | |
|--|--------------|--------------|--------------|
| Number of preschool children receiving influenza vaccine | 26,946 | 28,054 | 28,386 |
| Registered number of preschool children population | 53,286 | 53,378 | 56,160 |
| End of season uptake rate for preschool children * | 50.6% | 52.6% | 50.5% |
| Number of primary school children receiving influenza vaccine | 131,585 | 134,545 | 131,118 |
| Number of primary school children offered the vaccine | 172,018 | 171,777 | 170,721 |
| End of season uptake rate for primary school children[†] | 76.5% | 78.3% | 76.8% |

**preschool cohort includes children aged 2-4 years*

[†]primary school cohort includes all children in primary school

United Kingdom and Republic of Ireland Summary

During the 2017/18 season, moderate to high levels of influenza activity were seen in the UK and Republic of Ireland (RoI). Influenza A(H3) and influenza B were the predominant co-circulating viruses, with some influenza A(H1N1) pdm09 circulation. Northern Ireland, England and Scotland reported influenza A(H3) followed by influenza B later in the season, while RoI and Wales reported influenza B followed by influenza A(H3) later in the season.

The health impact was predominantly seen in older adults, with increased numbers of care homes outbreaks and excess mortality seen particularly in those aged 65 years and older. Activity within general practice varied across countries, with peak activity reaching the moderate threshold in England, Scotland, NI and RoI, and the high threshold in Wales. All devolved administrations experienced a higher number of admissions from influenza to hospital and ICU/HDUs compared to previous seasons.

Influenza vaccine uptake varied across devolved administrations with uptake generally higher or similar to the last season in all targeted groups. In England, uptake rates were higher than the previous season in those aged 65 years and older, pregnant women, school age children and healthcare workers, and remained similar to last season for <65 year olds at risk. In Scotland, uptake in those aged 65 years and older, healthcare workers and pregnant woman with other risk factors was higher than previous season and the other target groups had similar or slightly lower uptakes. In Wales, uptake in target groups was slightly higher than the previous season with the exception of pregnant women. RoI reported an increase in uptake in target groups with the exception of the uptake in those aged <65 years at risk. RoI currently do not have a similar childhood school vaccination programme as in the UK.

Conclusion

The 2017/18 flu season was characterised by higher than usual levels of activity in the community and hospitals, and co-circulation of influenza A(H3) and influenza B. GP activity was above baseline threshold for nine consecutive weeks with peak 'flu/FLI' rates over three times higher than those seen in previous seasons. The health impact was predominantly seen in older adults, with increased numbers of care homes outbreaks, ICU/HDU confirmed cases and excess all-cause mortality particularly in those over 65 years of age.

Influenza vaccine uptake was marginally lower or similar across all targeted groups compared to 2016/17, except among frontline health and social care workers which was higher. The importance of ensuring high uptake in targeted groups of the national influenza vaccination programme remains.

Acknowledgements

Compiled by M O'Doherty, J Johnston & M Sartaj
Contributions from the Influenza Surveillance Team

Public Health Agency wish to thank NISRA, the sentinel GPs, Out-of-Hours Centres, Regional Virus Laboratory, Health and Social Care Trusts, Health and Social Care Board, Critical Care Network Northern Ireland, Public Health England and all who have contributed to the surveillance system and who have contributed towards this report.

References

- EuroMOMO, European Monitoring of Excess Mortality for Public Health Action. Available online: <http://www.euromomo.eu/>
- Management of Seasonal Flu in Northern Ireland 2017/18. Available online: <https://www.health-ni.gov.uk/sites/default/files/publications/health/hss-md-17-2017.pdf>
- Seasonal Influenza Vaccination Programme 2017/18. Available online: <https://www.health-ni.gov.uk/sites/default/files/publications/health/hss-md-14-2017.pdf>
- Surveillance of influenza and other respiratory viruses in the UK: 2017-18 report Available online: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/710483/Surveillance_of_influenza_and_other_respiratory_viruses_in_the_UK_2017_to_2018.pdf
- Vega T, Lozano JE, Meerhoff T, et al. Influenza surveillance in Europe: establishing epidemic thresholds by the moving epidemic method. *Influenza Other Respir Viruses*. 2013;7:546-58. doi: 10.1111/j.1750-2659.2012.00422.x.
- World Health Organization (2017): Recommended composition of influenza virus vaccines for use in the 2017-2018 northern hemisphere influenza season. Available online: http://www.who.int/influenza/vaccines/virus/recommendations/2017_18_north/en/