



Public Health
England

Surveillance of influenza and other respiratory viruses in the United Kingdom: Winter 2013/14

About Public Health England

We work with national and local government, industry and the NHS to protect and improve the nation's health and support healthier choices. We address inequalities by focusing on removing barriers to good health.

We were established on 1 April 2013 to bring together public health specialists from more than 70 organisations into a single public health service.

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Executive summary

Low levels of influenza activity were seen in the community in the UK, with virological activity occurring late in the 2013/14 season and peaking in week 9 2014. Outbreaks were initially reported in care homes (mainly resulting from respiratory viruses other than influenza) followed by influenza A(H1N1)pdm09 outbreaks primarily in hospital settings. With the 2009 pandemic A(H1N1) virus predominating, the impact was largely seen in young adults as observed in 2010/11, with little impact in the elderly. Despite low levels of activity in the community, a considerable number of influenza-confirmed hospitalisations and ICU admissions were reported, with a higher peak seen compared to 2012/13. Levels of all-cause mortality have been low this season, with no significant excess seen in any age group.

Influenza vaccine uptake in 2013/14 in England was similar to recent seasons in the elderly (73.2%), in under 65 year olds in a pre-defined clinical risk group (52.3%) and in pregnant women (39.8%), while an increase was seen in healthcare workers (54.8%) compared to 2012/13 (45.6%). In 2013/14, the universal childhood influenza vaccine programme with live attenuated influenza vaccine (LAIV) commenced across the UK, targeting 2-3 year olds and varying pilot groups by country. In England, an uptake of 42.6% and 39.5% was achieved in 2 and 3 year olds respectively and an overall uptake of 52.5% in the primary school age pilot targeting 4-11 year olds. Data from several seasons will be needed to fully assess the impact of the LAIV programme as it is gradually rolled out.

Activity from other circulating seasonal respiratory viruses was similar to levels reported in recent years. Two novel respiratory viruses which emerged in 2012/13, Middle East Respiratory Syndrome coronavirus (MERS-CoV) in the Middle East and avian-origin influenza A(H7N9) in Eastern China, have continued to result in human cases in 2013/14. Surveillance and public health measures established in the UK for travellers from these regions returning with severe respiratory disease are on-going while the risk remains.

Background

Surveillance of influenza and other respiratory viruses in the United Kingdom (UK) is undertaken throughout the year by Public Health England (PHE) and collated by the Respiratory Diseases Department (RDD) of the PHE Centre for Infectious Disease Surveillance and Control, with regular outputs published during the winter season between October (week 40) and May (week 20) when influenza typically circulates¹. This is in collaboration with teams within PHE, with Health Protection Scotland², Public Health Wales³ and the Northern Ireland Public Health Agency⁴. A variety of data sources are collated to provide information on circulating influenza strains (including antigenic and genetic characterisation) and antiviral resistance monitoring, timing of influenza activity and to provide rapid estimates of burden within the community, on the health service and in relation to excess mortality. In addition, in-season and end-of-season monitoring of vaccine uptake and effectiveness is undertaken.

Background information on the data sources covered in this report has previously been described⁵, with data sources reported in 2012/13 continuing in 2013/14. The Moving Epidemic Method (MEM)⁶ as used by the European Centre for Disease Prevention and Control to standardise reporting of influenza activity across Europe has been adopted by the UK. For the first time in 2013/14, pre-epidemic thresholds were calculated and presented for GP influenza-like illness consultation rates for each UK scheme.

Additionally in 2013/14, the roll-out of a newly licensed live attenuated influenza vaccine (LAIV) to target all children aged 2 to 17 years was started. In 2013/14, LAIV was offered to all healthy two and three year olds in the UK and 4-11 year olds in seven geographically distinct pilot sites in England, varying types of pilot in 4-11 year olds in Scotland⁷, all children in primary year 6 in Northern Ireland (born between July 2003 and July 2004) and all children in school year 7 in Wales.

As well as influenza and typical circulating respiratory viruses, PHE carries out surveillance for novel respiratory viruses, including Middle East Respiratory Syndrome coronavirus (MERS-CoV) which was first recognised in September 2012 and influenza A(H7N9) which emerged in Eastern China in 2013.

This report describes influenza activity experienced in the UK in the 2013/14 season from week 40 2013 (w/c 30/09/2013) to week 20 2014 (w/c 12/05/2014), activity of other seasonal circulating respiratory viruses, observations from the newly introduced childhood influenza vaccination programme and commentary on UK surveillance work undertaken for novel respiratory viruses.

¹http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1287147913271

²<http://www.hps.scot.nhs.uk/resp/index.aspx>

³<http://www.wales.nhs.uk/sites3/page.cfm?orgid=457&pid=34338>

⁴<http://www.publichealth.hscni.net/>

⁵Health Protection Agency. Surveillance of influenza and other respiratory viruses in the UK: 2011-2012 report. Available from http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317134705939

⁶Vega T, et al. Influenza surveillance in Europe: establishing epidemic thresholds by the Moving Epidemic Method. *Influenza and Other Respiratory Viruses* 2012. doi: 10.1111/j.1750-2659.2012.00422.x.

⁷In Scotland, primary school based influenza vaccination pilots were conducted in 13 out of 14 NHS boards (four NHS boards targeted all P6 and P7 year groups and nine conducted whole school pilots in a subset of schools in their board). One NHS board conducted GP based pilots for primary school aged children.

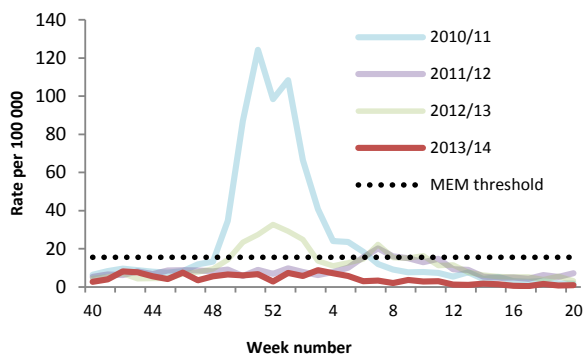
Observations

INFLUENZA

General Practitioner consultations

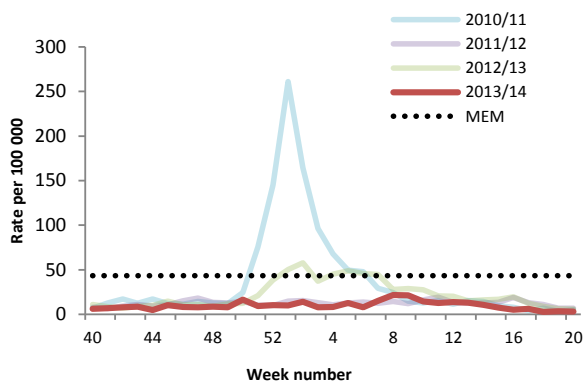
Weekly rates of General Practitioner (GP) consultations for influenza-like illness (ILI) through the Royal College of General Practitioners (RCGP) scheme⁸ were low in England during 2013/14 (Figure 1), with the MEM pre-epidemic threshold (15.6 per 100,000) not crossed and no discernible peak in activity. The highest rate was seen in week 3 2014 (8.7 per 100,000) which was lower than peak rates seen in 2012/13 (32.7 per 100,000 in week 52 2012) and 2011/12 (20.2 per 100,000 in week 7 2012).

Figure 1. Weekly all age GP influenza-like illness rates for 2013/14 and past seasons, England and Wales (RCGP)



Similarly across the devolved administrations, reported ILI rates in 2013/14 were lower than in 2012/13. In Scotland ILI rates peaked at 21.5 per 100,000 population in week 8 2014 (Figure 2) compared to a peak of 52.1 per 100,000 population in week 2 2013, well below the MEM pre-epidemic threshold (43.2 per 100,000 population). By age group, the highest rate was seen in the 15-44 and 45-64 year olds (28 per 100,000 population in week 9 2014).

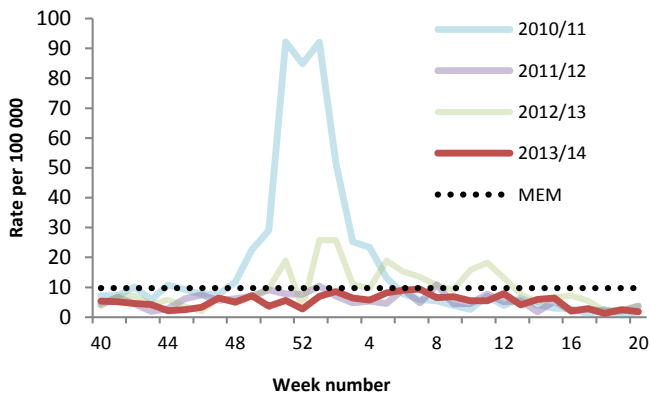
Figure 2. Weekly all age GP influenza-like illness rates for 2013/14 and past seasons, Scotland



⁸Royal College of General Practitioners Research and Surveillance Centre <http://www.rcgp.org.uk/clinical-and-research/research-and-surveillance-centre.aspx>

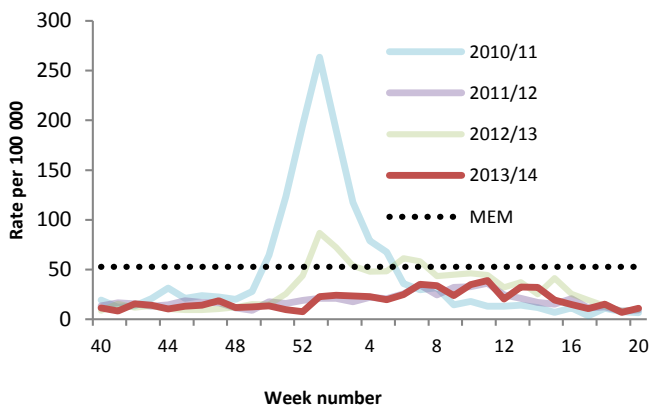
In Wales, no discernible peak in activity was seen (Figure 3) with ILI rates reaching a maximum of 9.4 per 100,000 in week 7 2014 compared to a peak the previous season of 25.8 per 100,000 in week 2 in 2013. This was just below the MEM pre-epidemic threshold of 9.7 per 100,000.

Figure 3. Weekly all age GP influenza-like illness rates for 2013/14 and past seasons, Wales



In Northern Ireland, ILI rates started to increase from week 52 and peaked at 39.2 per 100,000 in week 11 2014 below the MEM pre-epidemic threshold of 52.9 per 100,000 (Figure 4). As for the other GP consultation schemes, activity was considerably lower than seen in 2012/13, when rates peaked at 87.0 per 100,000 in week 1 2013.

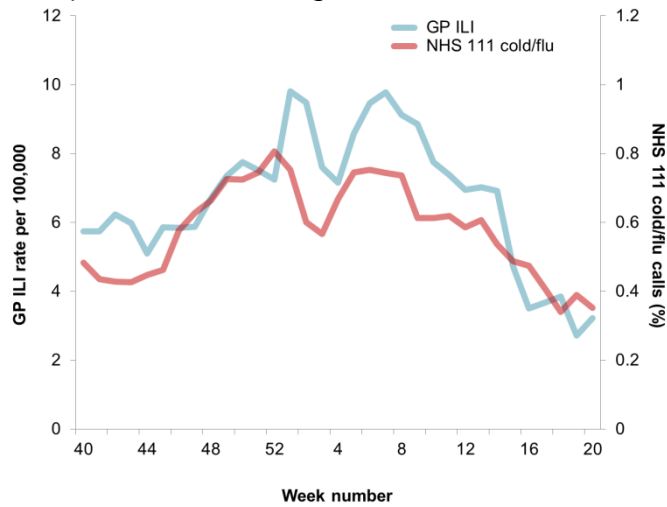
Figure 4. Weekly all age GP influenza-like illness rates for 2013/14 and past seasons, Northern Ireland



Syndromic surveillance

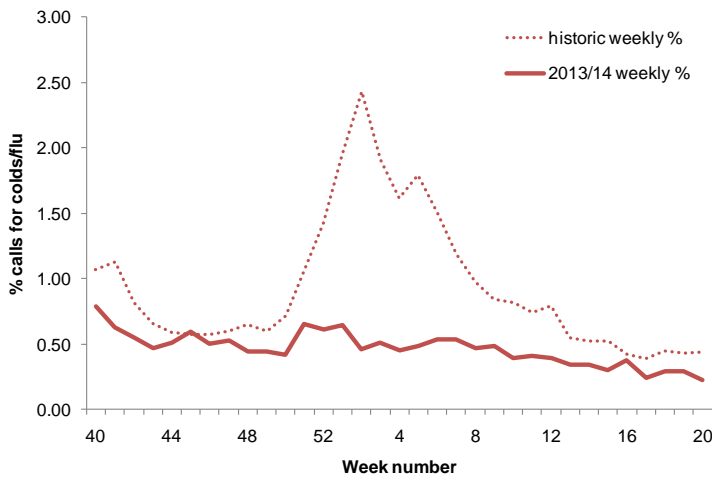
National PHE syndromic surveillance systems, including GP in hours and out of hours consultations, sentinel emergency department attendances (EDSSS) and NHS 111 calls monitor a range of syndromic indicators sensitive to community influenza activity e.g. NHS 111 cold/flu calls and GP consultations for ILI. In line with other national influenza surveillance systems, syndromic surveillance indicators for weekly GP ILI consultations peaked during week 2 2014, however NHS 111 cold/flu calls peaked a week earlier (Figure 5). A second peak was recorded during week 7 2014 (ILI) and 6 2014 (cold/flu) respectively.

Figure 5. Weekly all age GP influenza-like illness rates and NHS 111 cold/flu calls (% of total calls) for 2013/14, England



The weekly proportion of all calls in Scotland to NHS 24 which mention cold/flu was high at the beginning of the season (0.8% in week 40 2013), but consequently declined to 0.5% by week 43 and remained at low levels for the rest of season, with a slight increase seen in weeks 51 2013 and week 1 2014 to 0.7%. The higher number of calls relating to cold and flu at the start of the season may in part have been attributable to calls relating to influenza vaccination. The proportion of cold/flu calls for the season 2013/14 stayed below historic levels (with the exception of a minor fluctuation in week 45) as shown by the historic baseline in figure 6.

Figure 6. Proportion of calls for cold/flu (all ages) through NHS 24, Scotland, 2013/14*

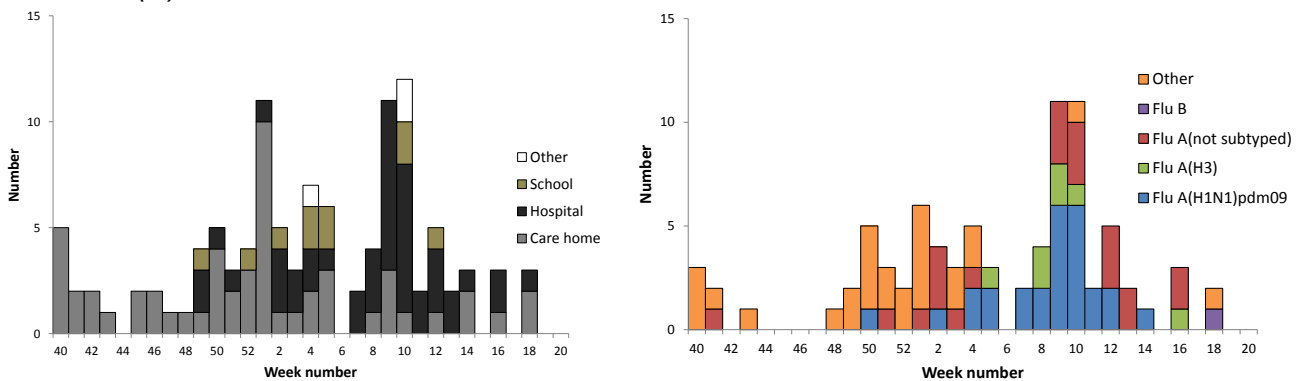


*The historic baseline is based on NHS 24 data collected from October 2010 to May 2013.

Outbreak reporting⁹

Between week 40 2013 and week 20 2014, 112 acute respiratory outbreaks in closed settings were reported across the UK with two distinct peaks observed (Figure 7). The first peak occurred in week 1 2014 with 11 outbreaks, with the majority (10/11) reported from care homes. An increasing number of outbreaks reported mainly from hospitals resulted in a second peak in week 10 2014 of 12 outbreaks (7/12 were from hospitals), after which numbers of outbreaks decreased. Overall, 49% of outbreaks were from care home settings, with 39% in hospitals, 9% in schools and 3% in other settings. Where information on virological testing was available, the majority of outbreaks in care homes resulted from viruses other than influenza, such as rhinovirus and Respiratory Syncytial Virus (RSV), while the majority in hospitals (34/44) resulted from influenza A(H1N1)pdm09 or influenza A(unsupported).

Figure 7. Weekly number of outbreaks by institution (A) and virological test results where available (B), 2013/14 UK



Community questionnaires

As in 2011/12 and 2012/13, a population-based two-stage telephone survey was conducted by PHE in England, Wales and Scotland before and after peak influenza activity in 2013/14 to determine self-reported ILI rates in the community. Households were recruited through quota sampling to ensure the sample was representative of the general population. Information was collected at enrolment from participants on background demography, influenza vaccination status, chronic health conditions and household composition. A total of 890 participants and their households were recruited in the pre-season survey in autumn 2013, with 648 participants successfully re-contacted post peak activity. The cumulative clinical attack rate for the WHO ILI case definition for those re-contacted was 4.2%. Further results will be published when available.

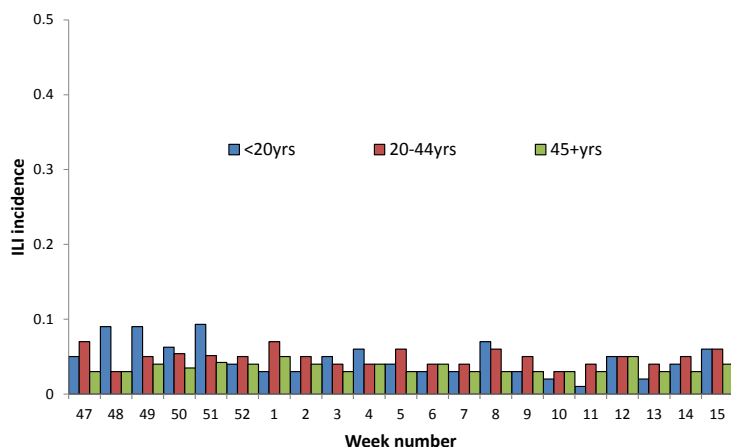
The Flusurvey¹⁰ project is run by the London School of Hygiene & Tropical Medicine, providing internet-based surveillance of ILI in the UK population. During the 2013/14 season, the proportion of online Flusurvey participants reporting ILI peaked in week 51 2013 in under 20

⁹<http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/SeasonalInfluenza/EpidemiologicalData/30influsourcesofUKfludata/#Outbreaks>

¹⁰<https://flusurvey.org.uk/>

year-olds (Figure 8). The overall incidence of ILI however was very low across age groups, even when compared to the previous year which also saw low ILI incidence levels.

Figure 8. Proportion of Flusurvey registered participants reporting ILI by week and age group, UK, 2013/14

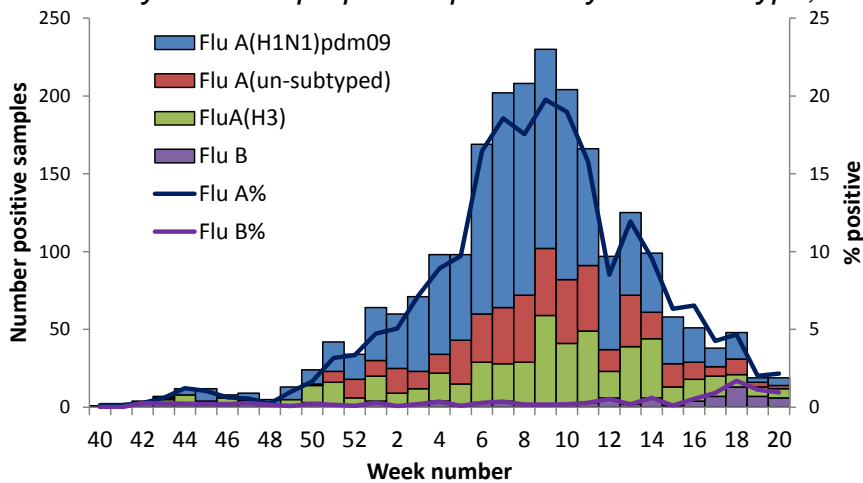


Virological surveillance

Unlike ILI consultation rate surveillance schemes, a clear peak in activity was seen through the DataMart¹¹ surveillance scheme in England in 2013/14, with overall influenza positivity increasing above 5% in week 1 2014. Influenza A (H1N1)pdm09 was the dominant circulating virus in the 2013/14 season in England, peaking at 12.9% positivity in week 7 2014 with the highest activity seen in the 15-44 year group (peak positivity of 19.7% in week 6 2014). Influenza A(H3) also circulated in the 2013/14 season but at a lower level than influenza A(H1N1)pdm09, peaking at 9.8% positivity in week 9 2014, with the highest activity seen in 45-64 year olds (10.5% in week 9 2013). This resulted in an overall influenza A peak positivity of 18.8% in week 9 2014 (Figure 9). Very low levels of influenza B circulated in the 2013/14 season, with positivity peaking at 1.8% in week 18 2014. This contrasts with activity in 2012/13 when influenza B peaked at 18.6% positive in week 52 2012, followed by influenza A(H3) peaking at 16.3% in week 8 2013. Influenza A(H1N1)pdm09 positivity only peaked at 4.1% in 2012/13.

¹¹Zhao H, Green H, Lackenby A, Donati M, Ellis J, Thompson C, Bermingham A, Field J, Sebastian Pillai P, Zambon M, Watson JM, Pebody R. A new laboratory-based surveillance system (Respiratory DataMart System) for influenza and other respiratory viruses in England: results and experience from 2009 to 2012. Euro Surveill. 2014;19(3):pii=20680. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20680>

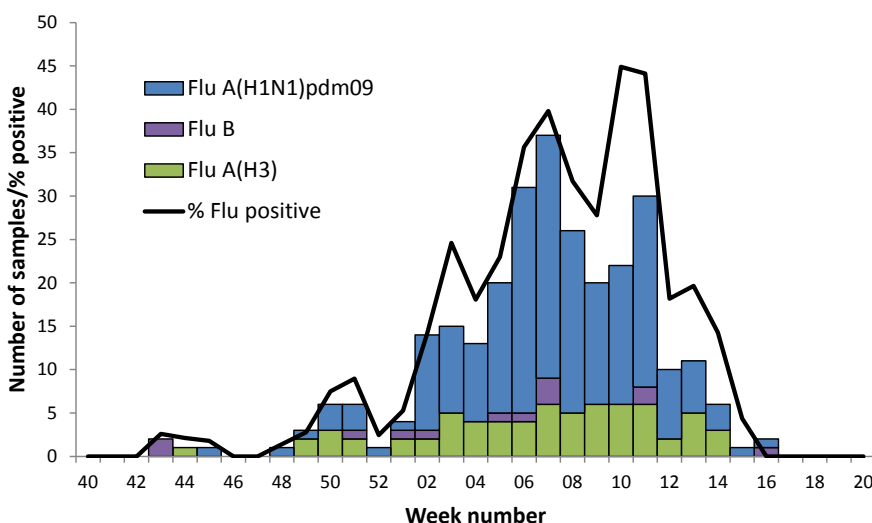
Figure 9. Weekly number of all age influenza positive samples by subtype through the DataMart system and proportion positive by influenza type, 2013/14, England



In Scotland, overall influenza positivity reported through non-sentinel sources (ECOSS) increased above 5% only in week 5 2014, reaching its peak of 15.5% in week 7 2014. As seen in the rest of UK, Influenza A (H1N1)pdm09 was the dominant circulating virus peaking at 13.2% in week 7 2014. Influenza A(H3) and Influenza B also circulated in the community peaking at 2.1% in week 9 2014 and 0.9% in week 19 2014 respectively. This contrasts with activity in 2012/13 when, in Scotland, the activity of influenza A(H3N2) peaked (15.8% in week 52 2012) prior to an increase in influenza B activity (peak at 10.4% in week 6 2013) and influenza A(H1N1)pdm09 positivity only peaking at 2.1% in week 11 2013.

As seen through DataMart, activity through GP-based sentinel swabbing schemes in England was dominated by A(H1N1)pdm09, though a higher proportion of influenza A(H3) was seen compared to DataMart. Following a sustained increase from week 52, overall influenza positivity peaked at 44.1% in week 10 2014, remaining above 5% until week 14 2014 (Figure 10).

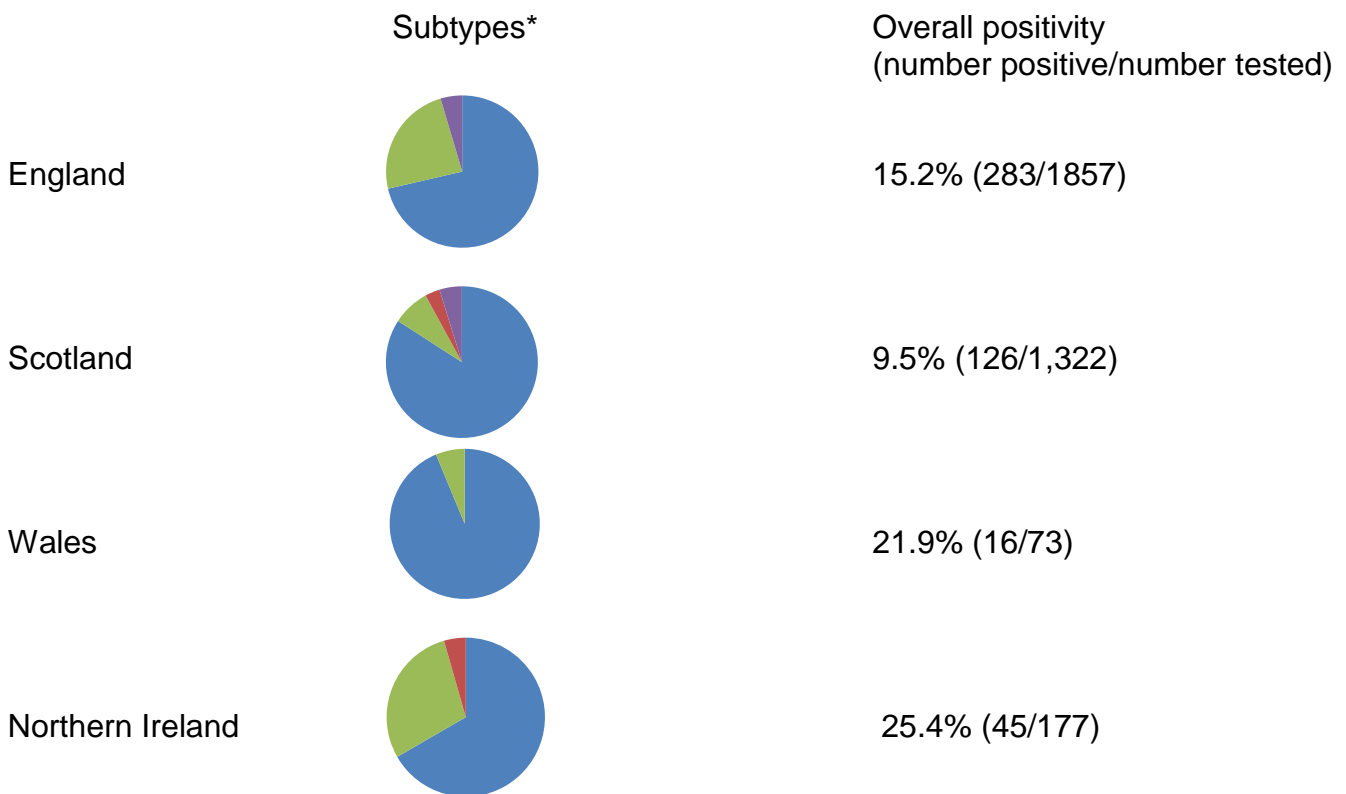
Figure 10. Weekly number of influenza positive sentinel virology samples by influenza subtype and % influenza positive, 2013/14, English swabbing schemes



An overall positivity of 15% was reached; higher than in Scotland (10%) and less than seen in Northern Ireland (25%) and Wales (22%), although the number of samples tested through

these two latter schemes was considerably less (Figure 11). Influenza A(H1N1)pdm09 was the dominant subtype across all schemes and countries, with a larger proportion of A(H3) seen in England and Northern Ireland compared to Scotland and Wales. Influenza B detections were only found in England and Scotland.

Figure 11. Proportion of influenza positive sentinel virology samples by influenza subtype for each scheme with overall positivity, 2013/14, UK



*Blue = A(H1N1)pdm09, green = A(H3), red = A(unsubtyped), purple = B

Influenza activity monitored through the GP Sentinel scheme in Scotland peaked at 32% in week 10 2014 with predominance of influenza A(H1N1)pdm09 (peak at 29.5% in week 11 2014), followed by Influenza A(H3N2) (peak at 8.3% in week 18 2014) and influenza B (peak at 2.6% in week 49). The overall swab positivity increased above 10% in week 5 2014 and fluctuated until the end of the season, with swab positivity above 10% observed until week 19 2014.

Virus characterisation

During the 2013/14 season, the PHE Respiratory Virus Unit (RVU) has isolated and antigenically characterised 411 influenza A(H1N1)pdm09 viruses from across the UK similar to the A/California/07/2009 vaccine component and 114 influenza A(H3N2) viruses, all antigenically similar to the A/Texas/50/2012 H3N2 vaccine strain. Of the few influenza B viruses isolated and characterised, ten belong to the B-Yamagata lineage (the same lineage as the influenza B virus included in the 2013/14 vaccine), whilst seven belong to the B-Victoria lineage. Globally as reported by WHO¹², the majority of influenza A viruses characterised during 2013/14 have been antigenically related to those contained in the WHO recommended

2013/14 trivalent influenza vaccine. Among the B viruses characterised globally, both the B-Yamagata and B-Victoria lineage circulated.

For the 2014/15 influenza season in the northern hemisphere, WHO have published the recommended composition¹². It is recommended trivalent vaccines contain the following strains: an A/California/7/2009 (H1N1)pdm09-like virus, an A/Texas/50/2012 (H3N2)-like virus and a B/Massachusetts/2/2012-like virus (Yamagata lineage). For quadrivalent vaccines, which contain two influenza B viruses, in addition to the above three viruses it is recommended they contain a B/Brisbane/60/2008-like virus.

Antiviral resistance

During 2013/14, 1,041 and 188 influenza A viruses have been tested for oseltamivir and zanamivir susceptibility, respectively, in the UK. 27 (3.0%) of 913 influenza A(H1N1)pdm09 viruses and one (1.7%) of 59 influenza A(H3) viruses have been found to be resistant to oseltamivir. No viruses were found to be resistant to zanamivir. Globally¹², WHO have reported only very low numbers of oseltamivir resistant viruses detected during the 2013/14 season.

Hospital surveillance of confirmed influenza cases¹³

Through the UK Severe Influenza Surveillance Scheme (USISS) mandatory ICU scheme, a total of 904 ICU/HDU admissions of confirmed influenza were reported across the UK from week 40 2013 to week 20 2014, including 98 (10.8%) deaths. This is a similar number of cases and proportion of deaths among ICU/HDU cases compared with the same scheme in 2012/13 when 946 admissions and 107 (11.3%) deaths were reported. As seen with DataMart and unlike ILI surveillance schemes, case numbers started increasing from week 51 2013 and peaked in week 7 2014 (Figure 12). In contrast to ILI activity through the RCGP scheme, the weekly number of hospitalised cases indicated that influenza activity was occurring in the community in England, albeit relatively late in the season (Figure 13). The peak in week 7 compares to weeks 1 and 7 in 2012/13 and week 7 in 2011/12.

The majority of ICU/HDU admissions were due to influenza A (890, 99%), with very few admissions due to influenza B (14, 2%). Of the influenza A admissions, 504 (56%) were due to A(H1N1pdm09), 344 (38%) A(not subtyped) and 14 (5%) A(H3N2). ICU/HDU admissions occurred in all age groups with the largest number seen in 15-64 year olds (30% in 15-44 year olds and 37% in 45-64 year olds). Influenza ICU/HDU deaths were reported with influenza A(H1N1pdm09) (78), influenza A(not subtyped) (14) and influenza A(H3N2) (6).

¹²World Health Organization. Recommended composition of influenza virus vaccines for use in the 2014-2015 northern hemisphere influenza season

http://www.who.int/influenza/vaccines/virus/recommendations/2014_15_north/en/

¹³<http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/SeasonalInfluenza/EpidemiologicalData/30influsSourcesofUKfludata/#hosp>

Figure 12. Weekly number of influenza confirmed admissions to ICU/HDU and subsequent deaths in 2013/14 and 2012/13 through the USISS mandatory scheme, UK

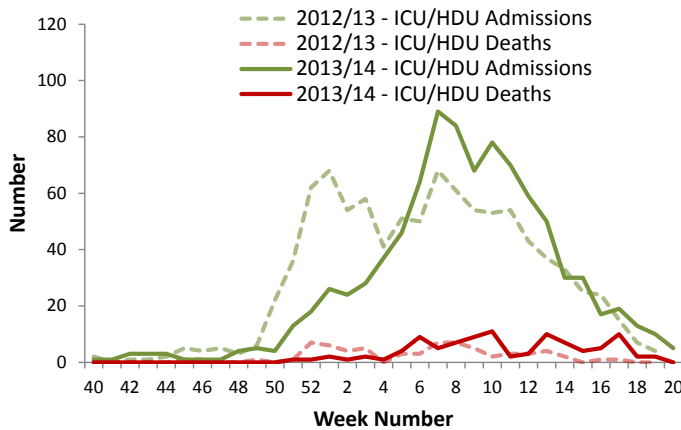
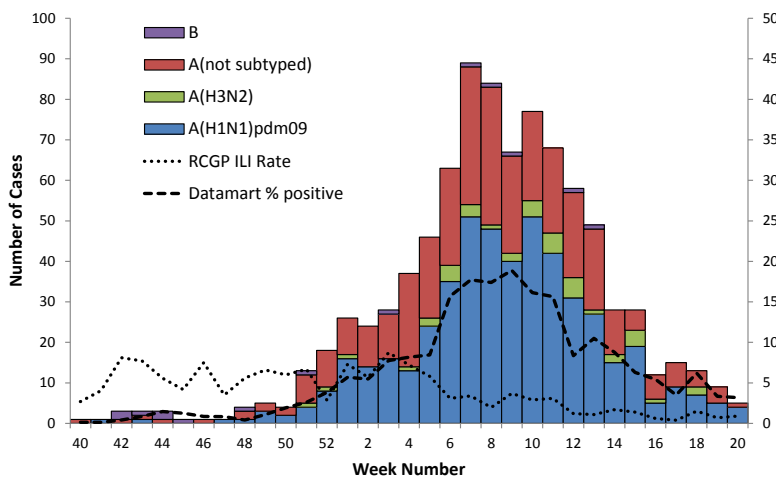


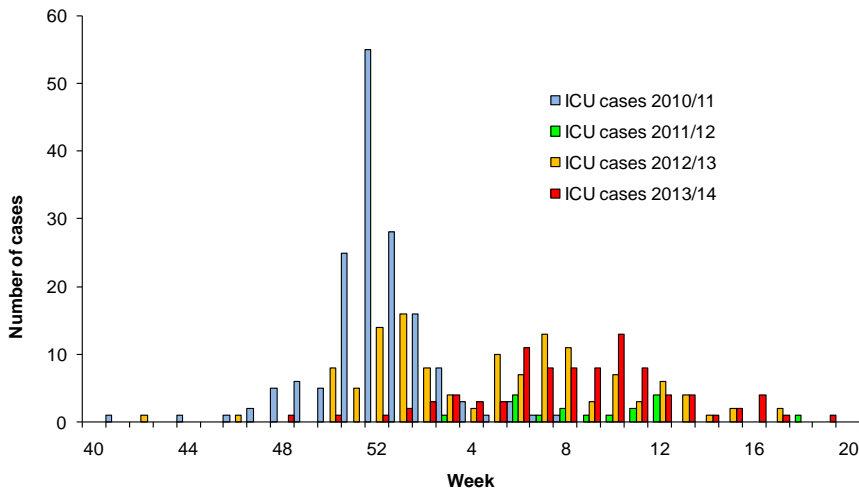
Figure 13. Weekly number of influenza confirmed admissions to ICU/HDU by influenza subtype through the USISS mandatory scheme (UK), weekly all age ILI consultation rate per 100,000 population through the RCGP scheme (England and Wales), and proportion of samples positive for influenza through the DataMart scheme(England), 2013/14



Similar to the rest of the UK, the majority of confirmed influenza cases requiring intensive care management reported in Scotland were due to influenza A(H1N1)pdm09 (91%). Similarly to previous years, the majority of the cases had underlying medical conditions that predisposed them to severe influenza infection (68%).

When comparing different seasons (see Figure 14), it is possible to see that each season had a different distribution in terms of length, peaks and week where the increased number of cases occurred. In the current season, there was a late increase in number of cases (week 3 2014) and the peak was reached in week 10 2014 (13 cases), compared with 2012/13 (characterised by a bi modal distribution with peaks in week 1 and 7 2013), 2011/12 (a late start was observed, however, this season was characterised by a small number of cases which peaked in week 6 and 12 2011) and 2010/11 (a large number of cases which peaked in week 52 2010 and were reported until week 8 2011).

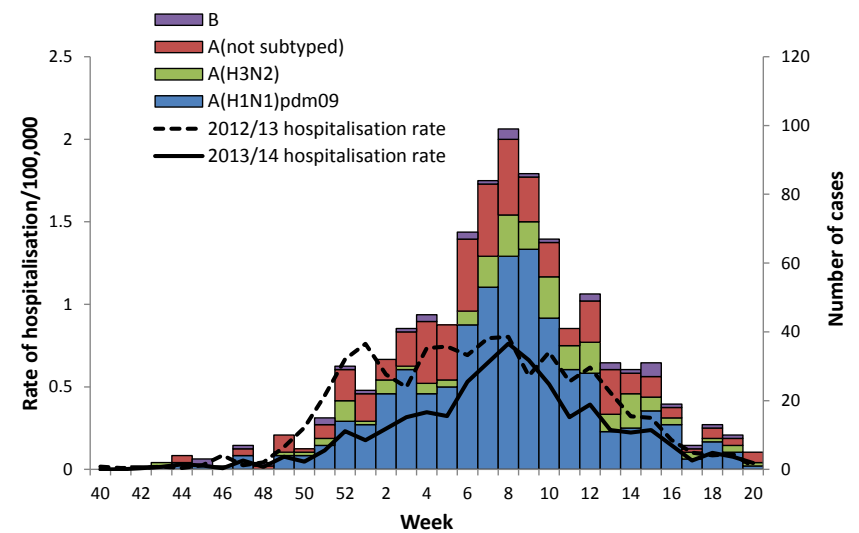
Figure 14. Number of laboratory confirmed influenza cases with severe infection requiring intensive care management (ICU cases) by week of hospital admission in Scotland, week 40 2013 to week 20 2014, compared to seasons 2010/11, 2011/12 and 2012/13.



In the USISS sentinel hospital surveillance scheme, a total of 906 hospitalised confirmed influenza cases were reported from the 35 participating sentinel NHS acute trusts across England during 2013/14. An average of 31/35 (89%) trusts reported each week. Compared to ICU/HDU admissions reported through the USISS mandatory scheme, subtyping information was available on a slightly higher proportion of hospitalised cases with influenza A (74% compared with 60%), and with A(H1N1)pdm09 still the clearly dominant subtype. The number and rate of hospital admissions peaked in week 8 2014 (99 admissions, 0.7/100,000 trust catchment area) (Figure 15). The rate of hospitalisation was similar to the peak seen during 2012/13 (0.8/100,000).

Out of the 906 hospitalised cases reported, 243 were in children under 17 years of age. Individual level data was available on 176 individuals, of whom one was reported to have died (0.6%). Of these cases, 60 had an underlying clinical risk factor (34%), of which chronic respiratory diseases were the most frequent.

Figure 15. Weekly number of influenza confirmed admissions to hospital by influenza subtype through the USISS sentinel scheme in England, with crude hospitalisation rate, 2013/14 and 2012-13



Seasonal influenza vaccine uptake

In England, the uptake of seasonal influenza vaccine is monitored by PHE. Cumulative uptake on influenza vaccinations administered up to Jan 31 2014 was reported from 99.8% of GP practices in England in 2013/14. This showed vaccine uptake of 73.2% in 65+ year-olds (compared to 73.4% in 2012/13) and 52.3% for those aged six months to under 65 years of age with one or more underlying clinical risk factor (excluding pregnant women without other risk factors and carers), compared to 51.3% in 2012/13) (Table 1). The more detailed final uptake reports are now publicly available¹⁴.

Between-country comparisons should be made with caution given that different methods are used.

In Scotland, the uptake of seasonal influenza vaccine is estimated by HPS throughout the season, based on automated weekly extracts from 99% of all Scottish GP practices¹⁵. Cumulative uptake in 2013/14 showed vaccine uptake of 76.9% in 65+ year olds (compared to 77.4% in 2012/13¹⁶) and 57.7% for those aged six months to under 65 year olds in one or more clinical at-risk groups (excluding pregnant women without other risk factors and carers) (compared to 59.2% in 2012/13¹⁶).

Provisional figures for Wales showed an uptake in 65+ years of 68.3% (compared to 67.7% in 2012/13) and 51.1% in under 65 year olds in a clinical risk group (compared to 49.7% in 2012/13).

In Northern Ireland the uptake of seasonal influenza vaccine is monitored by the PHA. Cumulative uptake of influenza vaccination administered up to 31st March 2014 was reported from 100% of GP practices in NI in 2013/14. In the population aged 65+ years uptake was 75.4% (compared to 75.0% in 2012/13) and in the population of under 65 years at risk the uptake was 76.4% (compared to 80.2% in 2012/13).

Uptake in all pregnant women in England reached 39.8% compared to 40.3% in 2012/13. The equivalent uptake in Northern Ireland was 58.0% compared to 64.6% in 2012/13.

In Scotland, the uptake in all pregnant women was 49.2%, lower than the uptake (54.1%) achieved in 2012/13, while in Wales uptake was 70.5%, compared to 43.6% in 2012/13, although data sources differed for these two seasons.

Uptake by frontline healthcare workers in England was 54.8% from 99.3% of Trusts. This is a considerable increase from the 45.6% vaccinated in 2012/13. In Northern Ireland uptake in frontline healthcare workers was 24.0% compared to 20.4% in 2012/13.

In Scotland, provisional uptake figures in healthcare workers across all territorial health boards was 34.7%; this compares with 33.7% in 2012/13. In Wales, uptake reached 40.6% compared to 35.5% in 2012/13.

¹⁴<https://www.gov.uk/government/collections/vaccine-uptake#seasonal-flu-vaccine-uptake>

¹⁵ At the end of the season this estimate is validated based on GP claims for payment to Practitioner Services Division (PSD). Please note that the figures provided for Scotland here are based on the HPS estimates as GP claims for payment data does not become available until later in the summer.

¹⁶The vaccine uptake for season 2012/13 was validated based on GP claims for payment to Practitioner Services Division (PSD).

Table 1. Seasonal influenza vaccination uptake by target group, UK, 2012/13 and 2013/14 seasons

	England		Scotland ¹		Wales ²		Northern Ireland	
	2012/13	2013/14	2012/13	2013/14	2012/13	2013/14	2012/13	2013/14
65+yrs	73.4	73.2	77.4	76.9	67.7	68.3	75.0	75.4
<65yrs at risk	51.3	52.3	59.2	57.7	49.7	51.1	80.2	76.4
no risk	38.8	38.2	52.9	47.9	42.1	xxx	xxx	xxx
Pregnant at risk	59.0	59.0	68.7	65.0	59.6	xxx	xxx	xxx
All	40.3	39.8	54.1	49.2	43.6	70.5	64.6	58.0
Healthcare workers	45.6	54.8	33.7	34.7	35.5	40.6	20.4	24.0

xxx = data not available

Between-country comparisons should be made with caution given that different methods are used.

¹Figures for Scotland are estimated because complete data is not available until later in the summer.²Figures for Wales are provisional. Data sources for influenza vaccination uptake for pregnant women differ between 2012/13 and 2013/14 seasons. For 2013/14 data refers to information collection from a five day point of delivery survey of women giving birth in Wales during 20/01/2014 and 24/01/2014. For 2012/13 influenza vaccination data in pregnant women is collected directly from General Practice using Audit+ Data Quality System.

Seasonal influenza vaccine effectiveness

A mid-season estimate of seasonal influenza vaccine effectiveness was produced for the UK in January 2014 using the established test-negative case-control method¹⁷. An overall adjusted vaccine effectiveness of 61% (95% CI -8% to 86%) was reached against all laboratory-confirmed influenza in primary care. This is within the expected range of effectiveness of a trivalent influenza vaccine. The numbers of samples were low by this point in the season, resulting in wide confidence intervals. An estimate for the end of the 2013/14 season is currently being prepared.

¹⁷McMenamin J, Andrews N, Robertson C, Fleming D, Durnall H, von Wissmann B, Ellis J, Lackenby A, Cottrell S, Smyth B, Zambon M, Moore C, Watson J, Pebody R. Effectiveness of seasonal 2012/13 vaccine in preventing laboratory-confirmed influenza infection in primary care in the United Kingdom: mid-season analysis 2012/13. Euro Surveill. 2013 Jan 31;18(5). pii: 20393.

LIVE ATTENUATED INFLUENZA VACCINE (LAIV) PROGRAMME FOR CHILDREN

Newly monitored this season was the uptake of LAIV in all GP-registered two and three year olds which was 42.6% and 39.5% respectively in England (Table 2) and 52.5% and 48.6% in Scotland (Table 2). Overall uptake for 2-3 year olds was 37.8% in Wales and 55.5% in Northern Ireland. A more detailed PHE report on LAIV uptake in England in two and three year olds is now publicly available¹⁸.

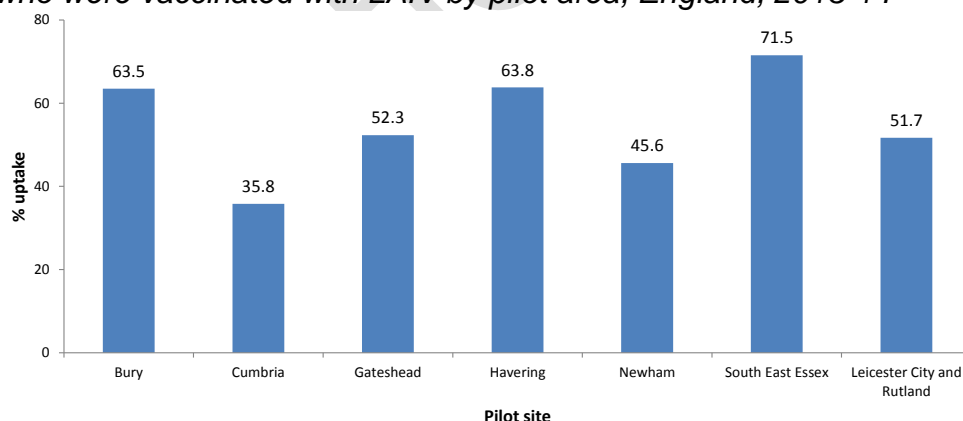
Table 2. Seasonal influenza vaccination uptake for two and three year olds by target group, UK, 2013/14

	England		Scotland		Wales	Northern Ireland
	2yrs	3yrs	2yrs	3yrs	2 and 3yrs	2 and 3yrs
Not in a clinical risk group	42.2	38.9	52.2	47.9	37.3	xxx
In a clinical risk group	56.1	56.8	64.5	68.0	54.1	xxx
Total	42.6	39.5	52.5	48.6	37.8	55.5

xxx = data not available. Data for Wales is provisional.

An estimated 104,792 primary school children aged 4-11 years in seven geographical pilots in England received at least one dose of influenza vaccine, mostly LAIV. With an estimated total target population for the pilots of 199,475, this results in an uptake of 52.5%. Reported uptake varied by pilot site (Figure 16). The cumulative uptake by year-group ranged from 56.1% in year group 0 (4-5 years) to 49.8% in year group 6 (10-11 years), with a consistent pattern of decreasing uptake with increasing age (Figure 17). With the rollout of the new LAIV programme for children across the UK, influenza surveillance systems have been adapted to be able to report impact of the programme in targeted and non-targeted groups compared to previous seasons. Some of these initial impact observations have been published¹⁹ and a report with more detailed information for England, including on vaccine uptake, will be published in summer 2014.

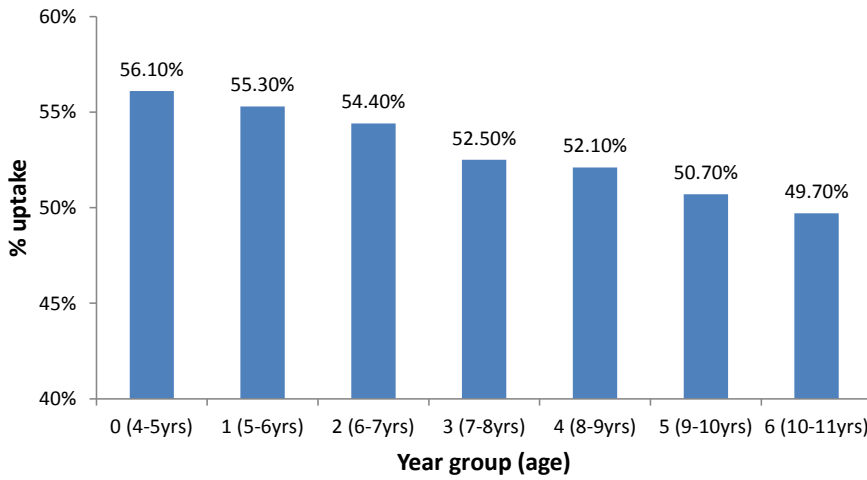
Figure 16. Estimated weekly proportion of primary school age children resident in pilot areas who were vaccinated with LAIV by pilot area, England, 2013-14



¹⁸<https://www.gov.uk/government/collections/vaccine-uptake#seasonal-flu-vaccine-uptake>

¹⁹Pebody RG, Green HK, Andrews N, et al. Uptake and impact of a new live attenuated influenza vaccine programme in England: early results of a pilot in primary school-age children, 2013/14 influenza season. Euro Surveill. 2014;19(22):pii=20823. <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20823>.

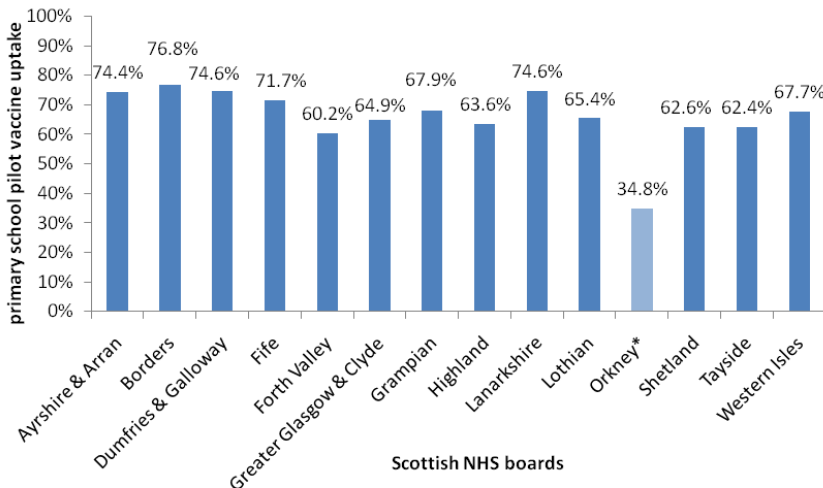
Figure 17. Total cumulative uptake of LAIV in pilot sites by year group, England, 2013-14



An estimated 73,310 primary school children aged 4-11 years enrolled in pilot schools / pilot year groups in Scotland received at least one dose of influenza vaccine. With an estimated total target population for the school based pilots of 109032, this resulted in an uptake of 67.2%, based on interim aggregate level uptake data. These figures are likely to be an underestimate since the estimated uptake from many NHS boards does not include data from children vaccinated in general practice. This data reconciliation will take place over the summer. The uptake data for the school based influenza pilots does not include data for NHS Orkney, which was the only one of the 14 Scottish boards who delivered an entirely GP based pilots for children in P5 and P6 and achieved an estimated uptake of 34.8% for 8 to 10 year olds, based on aggregate level GP extracts.

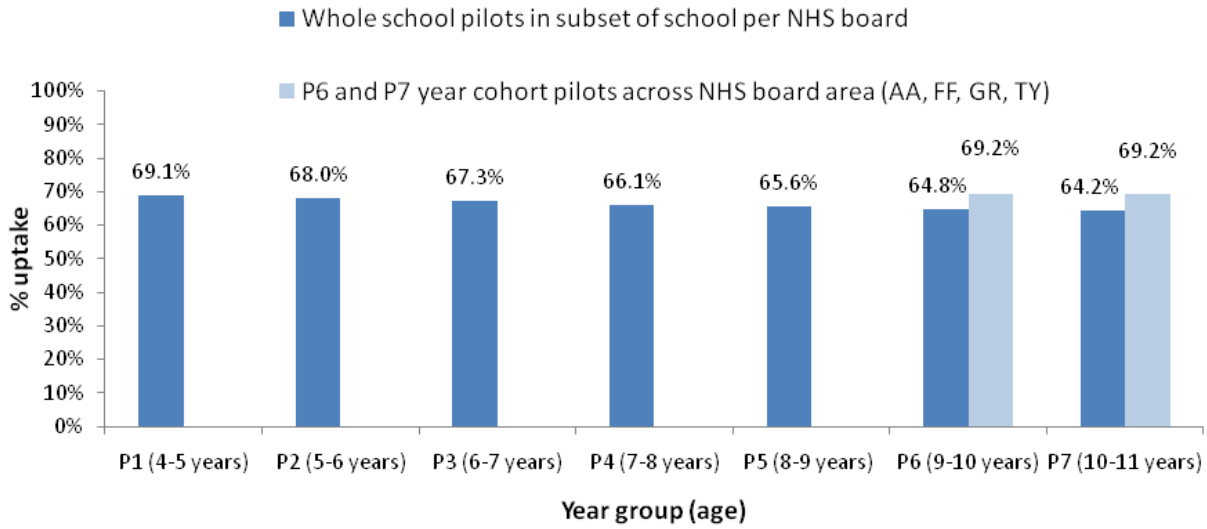
Reported uptake varied by pilot site (Figure 18). The cumulative uptake by year-group ranged from 69.1% in primary 1 (4-5 years) to 65.6% in primary 5 (8 - 9 years). For those schools in which whole school pilots were conducted, a continuing trend for decreasing uptake with increasing age group was observed, with an uptake of 64.8% and 64.2% in year groups P6 (9-10 years) and P7(10-11years) respectively (Figure 19). Those schools conducting pilots for P6 and P7 across all schools of their board area achieved a higher uptake of 69.2% in both P6 & P7. This resulted in an overall uptake of 67.3% and 67.1% in P6 and P7 respectively.

Figure 18: Estimated weekly proportion of primary school age children enrolled in pilot schools / pilot year groups who were vaccinated by NHS board, Scotland, 2013/14*



*NHS Orkney uptake data for 8 to 10 year olds for GP based pilots, estimated based on automated GP extracts)

Figure 19. Total cumulative influenza vaccine uptake in pilot schools / pilot year groups Scotland, 2013/14*



*Excludes 9 schools for which uptake data was not available by year group

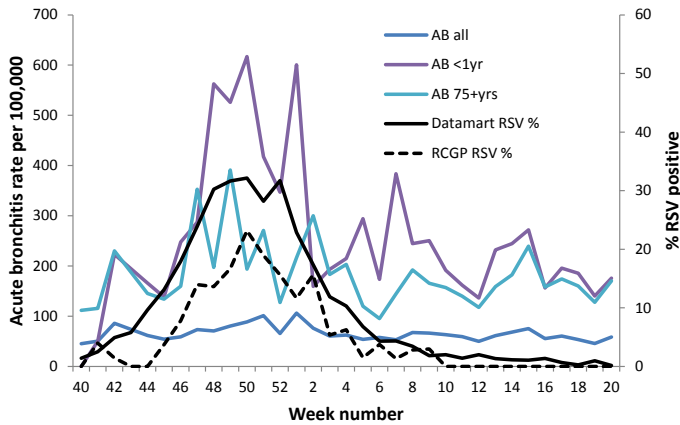
In Northern Ireland the LAIV was offered to all Primary 6 children (includes children born between July 2003 and July 2004) with an uptake of 80.5% reached.

OTHER RESPIRATORY VIRUSES

RSV reported through DataMart peaked in week 50 2013 at 32.2% positivity, with circulation above 10% between weeks 45 2013 and 4 2014 (Figure 20). This is similar to the peak seen in 2012/13 (33.2% in week 49 2012). The highest positivity was seen in children aged less than five years old, with a peak of 54.8% in week 50 2013 and the lowest peak positivity in 65+ year-olds (8.3% in the same week). RSV reported through the RCGP swabbing scheme similarly peaked in week 50 2013 at 23.2% (Figure 20).

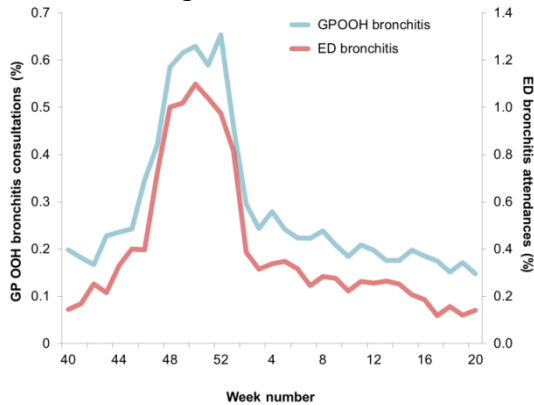
RSV activity in young children coincided with acute bronchitis GP consultation rates. RCGP GP acute bronchitis rates in under one year-olds peaked at 616.9 per 100,000 in week 50 2013 and 600.5 per 100,000 in week 1 2014, while rates in 75+ year-olds peaked at 391.2 per 100,000 in week 49 2013.

Figure 20. Weekly acute bronchitis consultation rates overall, in under one year-olds and 75+ year-olds through the RCGP scheme, England and Wales, and proportion of samples positive for RSV through the DataMart and RCGP schemes, England, 2013/14



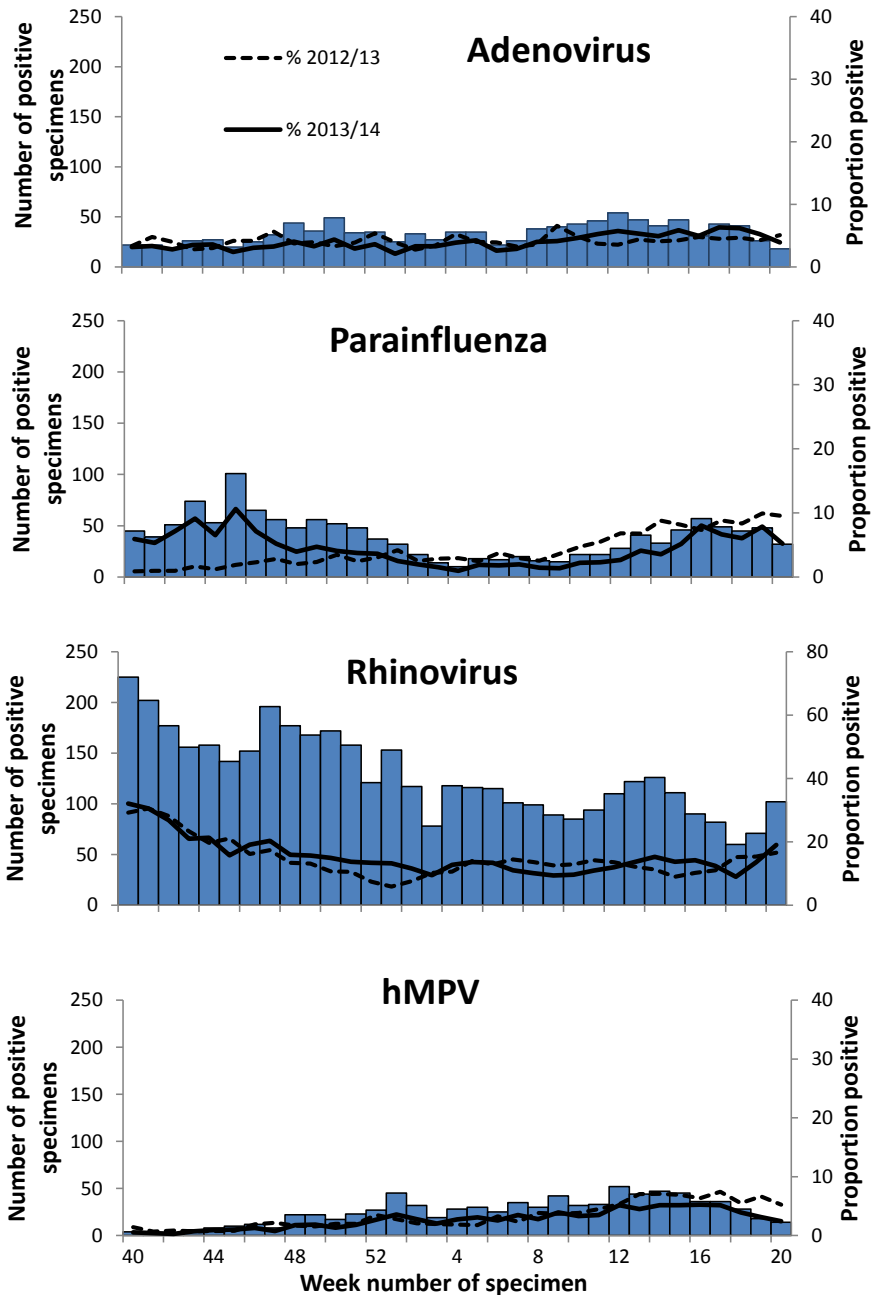
Syndromic surveillance of sentinel emergency department attendances and GP out of hours consultations for bronchitis/bronchiolitis increased sharply from week 46 2013, peaking from week 48 to 52, in line with the circulation of respiratory syncytial virus (Figure 21).

Figure 21. Weekly all age emergency department bronchitis/bronchiolitis attendances (% of total attendances) and GP out of hours bronchitis consultations (% of total OOH calls) for 2013/14, England



Of the other respiratory viruses monitored through DataMart, the highest activity was seen with rhinovirus (Figure 22) at the beginning and end of the season. Rhinovirus activity appears to be low during the winter months, particularly when influenza is circulating. Parainfluenza activity showed two waves in October-November 2013 and April-May 2014, with the first peak of 10.6% in week 45 2013 and second peak of 8.0% in week 16 2014; while in 2012/13 activity was low during the autumn. A low level of activity was observed for human metapneumovirus (hMPV) infections (as seen in previous seasons); positivity peaked at 5.3% at the end of the season in week 16 2014 compared to a peak of 7.4% the previous year in week 17 2013. Low levels of activity for adenovirus were observed all year round with no clear seasonality seen in 2013/14.

Figure 22. Number and proportion of samples positive for adenovirus, parainfluenza, rhinovirus and human metapneumovirus through the DataMart scheme, England, 2013/14



In Scotland, the most common non-influenza respiratory pathogens circulating in the 2013/14 season as detected through the GP sentinel scheme were rhinovirus (213 positive samples, 44.7% of non-influenza detections), RSV (73 positive samples, 15.3% of non-influenza detections) and seasonal coronavirus (69 positive samples, 14.5% of non-influenza detections). The peak number of rhinovirus, RSV and seasonal coronavirus samples detected through the GP sentinel system occurred in week 46 2013, week 50 2013 and week 4 2014 respectively. Levels of parainfluenza were low and observed mainly in the first half of the season, between week 40 and week 52. Low levels of adenovirus and hMPV were observed throughout the season in samples from the GP sentinel scheme.

The pattern of non-influenza respiratory pathogens detected through non-sentinel sources (ECOSS) differed slightly to that seen in sentinel samples. Rhinovirus was still the most detected non-influenza pathogen (3307 positive samples, 35% of detections), however, the proportion of RSV detections was larger than the rest of non-influenza pathogens (2681 positive samples, 28.4% of detections). Adenovirus was detected in 12.7% (1378 positive samples), whereas seasonal coronavirus only accounted for 5% (542 samples positive) of non-sentinel pathogens detected. Both hMPV (673, 6.2% of detections) and parainfluenza virus (746, 6.9% of detections) also contributed significant proportions. *Mycoplasma pneumoniae* was only detected in a low proportion of samples (118, 1.2% of detections). Similar to the pattern over time observed in sentinel samples, the peak number of rhinovirus, RSV and seasonal coronavirus samples detected through non-sentinel sources, occurred in week 48 2013, week 52 2013 and week 5 2014, respectively. The levels of rhinovirus were high throughout the season and above the levels seen in previous seasons. The peaks of hMPV, adenovirus and parainfluenza detections occurred later in the season, in weeks 11, 11 and 19 respectively, and the levels of detections of these pathogens were similar to those seen in previous seasons. As seen in England, parainfluenza levels increased in the beginning of the season, decreased between week 3 2014 and week 14 2014 and then increased again.

EXCESS ALL-CAUSE MORTALITY SURVEILLANCE

Mortality by week of death registration

The Office for National Statistics (ONS) provides estimated numbers of weekly all-cause registered deaths²⁰. PHE uses this data to statistically estimate through Serfling regression the expected number of weekly death registrations for a given week in the year. Allowing for variation, we can then determine if the number of deaths is higher than expected, resulting in excess all-cause mortality.

The number of deaths during 2013/14 was low, in contrast to 2012/13 when the number was considerably higher than expected²¹. Only 3/32 (9%) weeks were above the upper limit which allowing for variation and that these followed weeks with bank holidays and fewer days when deaths were registered, and so are likely to be artificial (Figure 23). This is compared to 14/32 weeks in excess (44%) in 2012/13. No significant excess death registrations above the upper limit were estimated to have occurred in 2013/14 (Table 3).

Figure 23. Weekly number of estimated all-age all-cause and respiratory ONS death registrations by week of registration, England and Wales, 2013/14

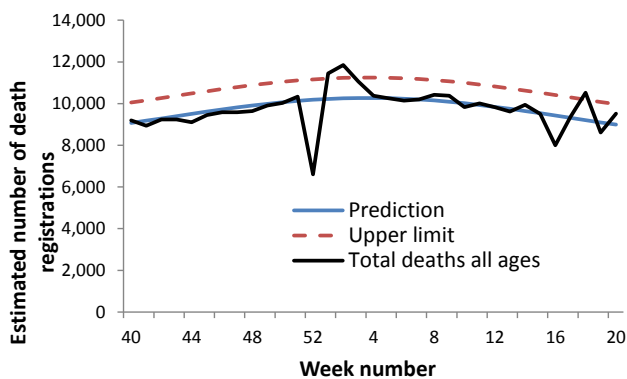


Table 3. Number and proportion of excess death registrations in England and Wales in influenza seasons from 2004/05 to 2013/14

Season	Excess above threshold (95% CI)	Total number of deaths	% deaths in excess
2004/05	1760 (1493 to 2027)	372,259	0.5
2005/06	Not detected	361,910	0.0
2006/07	Not detected	353,322	0.0
2007/08	16 (0 to 283)	356,960	0.0
2008/09	9217 (8951 to 9484)	327,334	2.8
2009/10	2062 (1796 to 2329)	315,931	0.7
2010/11	2472 (2205 to 2739)	317,876	0.8
2011/12	Not detected	315,330	0.0
2012/13	5140 (4072 to 6207)	333,821	1.5
2013/14	Not detected	347,260	0.0

²⁰<http://www.ons.gov.uk/ons/rel/vsob2/weekly-provisional-figures-on-deaths-registered-in-england-and-wales/index.html>

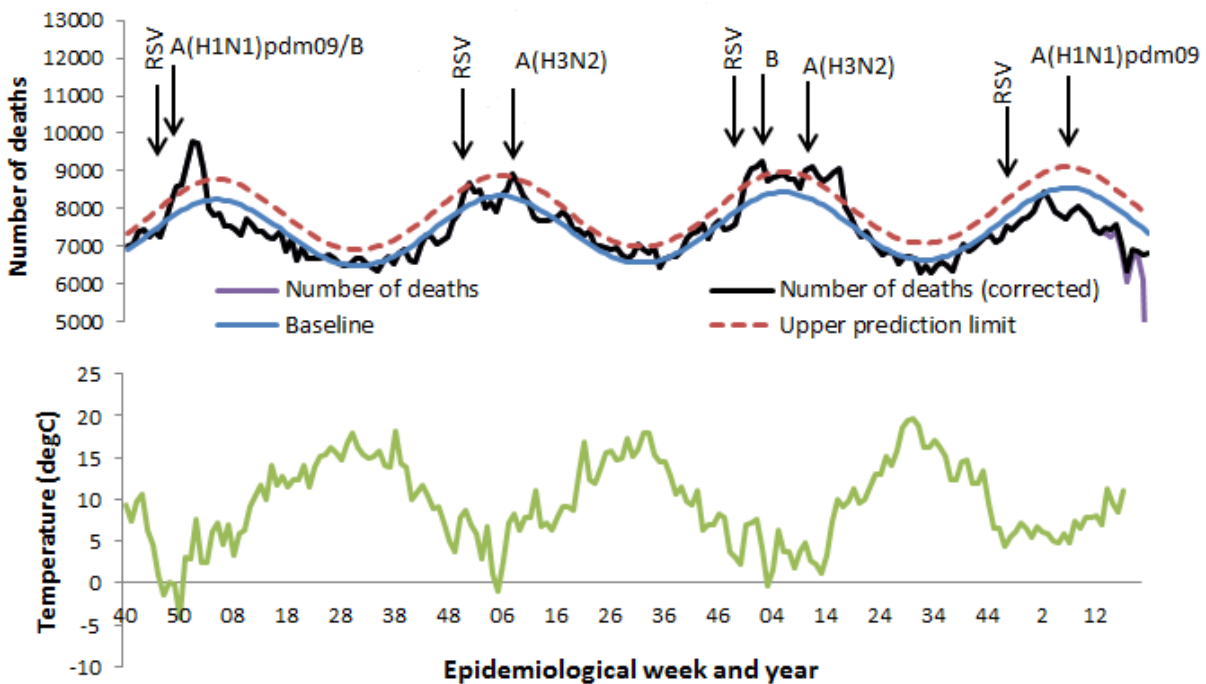
²¹https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/229819/Excess_winter_mortality_2012.pdf

Mortality by week of death

Standardised reporting through the EuroMOMO mortality monitoring algorithm²² occurs across a European network and enables a direct comparison between excess mortality estimation in countries within the UK. The number of deaths is corrected by reporting delay and excess determined by week of death, avoiding impact of bank holidays as illustrated above. During 2013/14, no significant excess mortality was seen across England overall and by PHE Region. When age group was modelled, no significant excess was seen.

All-cause mortality is modelled and can be descriptively compared to factors that may explain an increase in numbers (Figure 24). Compared to previous seasons, the temperatures seen over winter were comparatively milder and unusually weekly mean Central England Temperature²³ did not go below 0°C.

Figure 24. Weekly number of estimated all-cause deaths by week of death in 65+ year-olds, England, and weekly mean Central England Temperature, week 40 2010 to week 20 2013/14. Week of peak virus activity through Datamart is indicated.



Excess all-cause mortality was calculated weekly with the same EuroMOMO algorithm in each country in the UK, enabling standardised reporting of all-cause excess mortality across the countries. As seen for England, no significant excess mortality was seen in Northern Ireland, Wales and Scotland during 2013/14.

²²<http://www.euromomo.eu/>

²³<http://www.metoffice.gov.uk/hadobs/hadcet/>

NOVEL RESPIRATORY VIRUSES

Human MERS-CoV infections

Since WHO first reported cases of Middle Eastern Respiratory Syndrome Coronavirus (MERS-CoV) in September 2012²⁴, a total of 614 laboratory-confirmed cases of infection with MERS-CoV have been reported globally up to 21 May 2014, including 181 deaths (case fatality ratio of 30%). Most cases have either occurred in the Middle East or have direct links to a primary case infected in the Middle East. Local secondary transmission following importation has been reported from the United Kingdom, France, and Tunisia.

Since April 2014, the number of cases reported has sharply increased, particularly in hospitals in the Middle East. Following a recently convened WHO Emergency Committee, it was concluded that “the seriousness of the situation had increased in terms of public health impact, but that there is no evidence of sustained human-to-human transmission²⁵.” However it was emphasised concern about the situation had significantly increased.

As for 2012/13, PHE has continued to monitor potential cases for travellers returning from the Middle East with severe respiratory disease, with individuals tested for MERS-CoV if they met the suspect case definition²⁶. Up to June 2014, 195 suspected cases amongst returning travellers have been identified in the UK and tested for MERS-CoV, with two positive in 2013. A further two secondary cases with non-sustained transmission in the UK were linked to the second UK case in Spring 2013. No positive cases have been reported in the UK since February 2013.

PHE remains vigilant, closely monitors developments in countries where new cases emerge and continues to liaise with international colleagues to assess whether recommendations need to change. The risk of infection to UK residents in the UK remains very low. The risk of infection to UK residents in the affected areas, is slightly higher, but is still considered to be low. There remains a risk of imported cases from affected countries; however, this risk remains low. For further PHE information on management and guidance of possible cases, please see information online²⁷.

Human influenza A(H7N9) infections

The first human infection with avian influenza A(H7N9) was reported in China in March 2013 and up to 21 May 2014, 439 cases have been reported, including 156 deaths giving an overall case fatality ratio of 36%. The majority of cases have been reported from China (426) with other exported cases reported in Hong Kong (10), Taiwan (two) and Malaysia (one). Most cases are presumed to have contracted the infection directly from infected animals or their environment, particularly as a result of visiting live animal markets. Only a few small clusters with possible human-to-human transmission have occurred among family members, but there

²⁴http://www.who.int/csr/don/2012_09_23/en/

²⁵http://www.ecdc.europa.eu/en/press/news/_layouts/forms/News_DispatchForm.aspx?List=8db7286c-fe2d-476c-9133-18ff4cb1b568&ID=1002

²⁶http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317136270914

²⁷<http://www.hpa.org.uk/webw/HPAweb&Page&HPAwebAutoListName/Page/1317136202637>

has been no evidence of sustained human-to-human transmission to date²⁸. There have been two main periods of activity, April 2013 – August 2013 and September 2013 – May 2014. Although a larger number of cases have been reported in the second period and the geographical spread has varied, the case fatality ratio has remained consistent. For further updates, please see the WHO website and for PHE advice on clinical management, please see information available online²⁹.

²⁸http://www.who.int/influenza/human_animal_interface/20140131_background_and_summary_H7N9_v1.pdf?ua=1

²⁹<http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/AvianInfluenza/Guidelines/influaAvianInfluenzaGuidanceandAlgorithms/>

Conclusions

Low levels of influenza activity were seen in the community in the UK in 2013/14, with the 2009 pandemic A(H1N1) virus predominating in young adults. Influenza circulation occurred late this season with virological activity peaking in week 9 2014. Admissions to hospital and intensive care were observed, with peak ICU/HDU numbers higher than seen in the previous year.

The start of the 2013/14 influenza season, as seen in 2010/11 when A(H1N1)pdm09 also predominated, occurred with severe presentation of disease. This occurred through confirmed intensive care unit admissions throughout the UK and increases in proportion of samples positive for influenza through Datamart and other virological schemes in the UK. ILI GP consultations remained very low throughout the season. Outbreaks initially were reported in care homes predominantly resulting from other viruses, followed by influenza A(H1N1)pdm09 outbreaks mainly in hospitals, coinciding with reports from other surveillance systems. Unlike 2010/11, no significant excess all-cause mortality was seen across the UK in any age group; this likely resulted from a combination of mild winter temperatures and the subtype of influenza virus circulating predominantly impacting on young adults, rather than the elderly.

Vaccine uptake was similar to previous years in the elderly, in individuals in a pre-defined clinical risk group and in pregnant women, while an increase was seen in healthcare workers compared to 2012/13 in England. Interim vaccine effectiveness estimates showed this season's trivalent vaccine was within the expected range of effectiveness.

The new childhood LAIV programme was successfully initiated in 2013/14 in 2-3 year olds in primary care and a series of geographical pilots targeting 4-11 year olds in England to evaluate different models of delivery. While influenza activity has been low this season making it difficult to assess the impact of the programme both on the vaccinated cohorts (direct impact) and the unvaccinated groups (indirect impact), there are promising initial observations through established surveillance systems³⁰. Further work and observations from future seasons will be critical to evaluate this programme and to inform an optimal rollout to children.

Activity from other typical circulating respiratory viruses, including RSV, rhinovirus, adenovirus, parainfluenza and hMPV, was overall similar to that seen in the previous two seasons. Surveillance continues within the UK for the two novel respiratory viruses which emerged in 2012/13: MERS-CoV and influenza A(H7N9), both of which have high reported case fatality ratios. Monitoring of returning travellers with severe respiratory systems will continue while the risk persists. No further imported laboratory confirmed MERS-CoV infections since those reported in 2012/13 have been identified in the UK, with no imported laboratory confirmed cases of influenza A(H7N9) infection detected.

In conclusion, although influenza activity overall was low, particularly in the elderly, the level of severe disease due to influenza leading to hospitalisation and ICU admission was not insignificant, further highlighting the impact of the A/H1N1pdm09 virus. Data from several seasons will be needed to fully assess the impact of the new universal childhood LAIV programme as it is gradually rolled out.

³⁰Pebody RG, Green HK, Andrews N, Zhao H, Boddington N, Bawa Z, Durnall H, Singh N, Sunderland A, Letley L, Ellis J, Elliot AJ, Donati M, Smith GE, de Lusignan S, Zambon M. Uptake and impact of a new live attenuated influenza vaccine programme in England: early results of a pilot in primary school-age children, 2013/14 influenza season. *Euro Surveill.* 2014;19(22):pii=20823. Available online: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20823>

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⁴Public Health, Wales

⁵Public Health Agency, Northern Ireland

⁶Real-time Syndromic Surveillance Team, Public Health England

⁷Flusurvey, London School of Hygiene & Tropical Medicine

⁸RVU, VRD, MS Colindale, Public Health England

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