SURVEILLANCE REPORT

Annual Epidemiological Report for 2016

Seasonal influenza

Key facts

- Compared with the last three seasons, the influenza season 2016–2017 started three weeks earlier.
- The duration of the season was similar to previous seasons. Influenza activity started in week 46 of 2016, peaked between weeks 52/2016 and 4/2017 and returned to baseline levels in week 17/2017.
- In most EU/EEA countries, ILI/ARI primary care consultation rates were dominated by influenza A(H3N2), which was similar to previous seasons.
- Of all detected sentinel viruses, 94% were influenza A viruses and 6% were B viruses.
- The vast majority (98%) of typed A viruses were A(H3N2).
- Influenza B viruses, mostly of the B/Yamagata lineage, circulated later during the season, but numbers were very low.
- The vast majority of influenza cases admitted to intensive care were 65 years of age or older and infected with influenza A(H3N2).
- Excess mortality from all causes was reported by the majority of 20 EU countries concurrently with the circulation of influenza A(H3N2). Excess mortality was mainly observed in people aged 65 years or older but was also considerable among 40–64-year-olds.
- The vast majority of influenza viruses tested were susceptible to neuraminidase inhibitors.
- For the composition of the 2017–2018 influenza vaccine, WHO has recommended that only the A(H1N1)pdm09 virus should be replaced.

Methods

This report includes 2015 events and data and does not follow the entire winter season pattern. For a detailed description of methods used to produce this report, please refer to the *Methods* chapter [1].

An overview of the national surveillance systems is available online [2].

Additional data on influenza are accessible from ECDC's online *Surveillance atlas of infectious diseases* [3].

The surveillance of influenza in 30 EU/EEA countries is carried out by the European Influenza Surveillance Network (EISN), coordinated by the European Centre for Disease Prevention and Control (ECDC).

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EU/EEA influenza surveillance is based on weekly data reported to ECDC by sentinel general practitioners (in some countries also other physicians, such as paediatricians) and national influenza reference laboratories from week 40 to week 20 of the following year.

Surveillance data include:

- Qualitative indicators of influenza activity, namely intensity, geographic spread and trend. Intensity, ranging from low activity, i.e. no activity or activity at baseline level, to very high, is an indicator of the level of influenza activity. Geographic spread, ranging from no activity to widespread, refers to the number of affected areas in a given country. Trend – increasing, stable or decreasing – compares the level of ILI/ARI sentinel consultations with the previous week.
- The aggregate number of influenza-like illness (ILI) and/or acute respiratory infection (ARI) cases seen by sentinel physicians[1] [2]. Each country also reports denominator data (population covered by sentinel surveillance) to enable calculation of weekly ILI and ARI consultation rates.
- The aggregate number of sentinel specimens obtained from a systematic sample of ILI/ARI patients and testing positive for influenza, by type, A subtype and B lineage [2]. Overall positivity rates of sentinel specimens are used to estimate the start, the duration and the end of influenza activity; a 10% threshold is used to indicate the start of the seasonal epidemic.
- Antigenic and genetic characterisation and strain-based antiviral susceptibility data for a subset of influenza viruses detected in sentinel and non-sentinel specimens [2].
- Case-based hospital data reported by a subset of countries on a voluntary basis[2], including demographic, clinical and virological data [2].

Since the 2014–2015 season, influenza surveillance in the 53 countries of the WHO European Region has been jointly coordinated by ECDC and the WHO Regional Office for Europe. Results are disseminated through a joint weekly bulletin (www.FlunewsEurope.org).

This report presents data from 30 EU/EEA countries and the EuroMOMO project [4] which monitors weekly all-cause excess mortality in Europe. Archived weekly data from October 2014 onwards are available from: http://www.flunewseurope.org/Archives. Seasonal data in this report, covering the period from week 40/2016 to 20/2017, were extracted from the database during week 33/2017.

Sentinel surveillance

In week 46/2016, i.e. during mid-November, the weekly percentage of sentinel specimens positive for influenza crossed the 10% threshold marking the beginning of the seasonal epidemic (Figure 1). This happened earlier than in the last three seasons when the threshold was never exceeded before week 49. Countries with a positivity rate higher than 10% during week 46 were Finland, France, Ireland, the Netherlands, Norway, Portugal and Spain (Figure 2). The overall percentage of positive specimens peaked between weeks 52/2016 and 4/2017 and returned to baseline levels in week 17/2017.

In week 46, all EU/EEA countries but the Netherlands reported low intensity of influenza activity. Increases in other qualitative indicators were also reported, but later. ILI and ARI rates in primary care settings were at baseline levels in all reporting countries during week 46.

[1] ILI and a denominator were reported by Austria, Belgium, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and the UK. ARI and a denominator were reported by Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, Germany, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Romania, Slovakia, Slovenia, and the UK.
[2] Czech Republic, Finland, France, Ireland, Romania, Slovakia, Spain, Sweden, and the UK.

Figure 1. Weekly proportion of sentinel specimens positive for influenza virus and number of detections by type and subtype, EU/EEA, 2016–2017

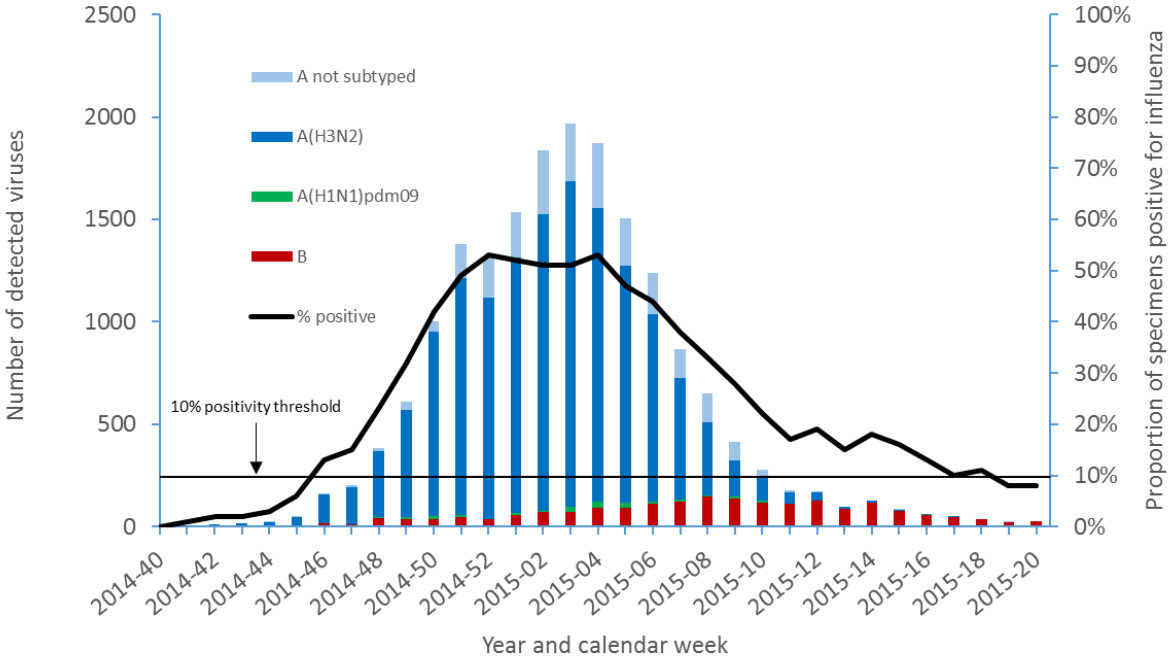
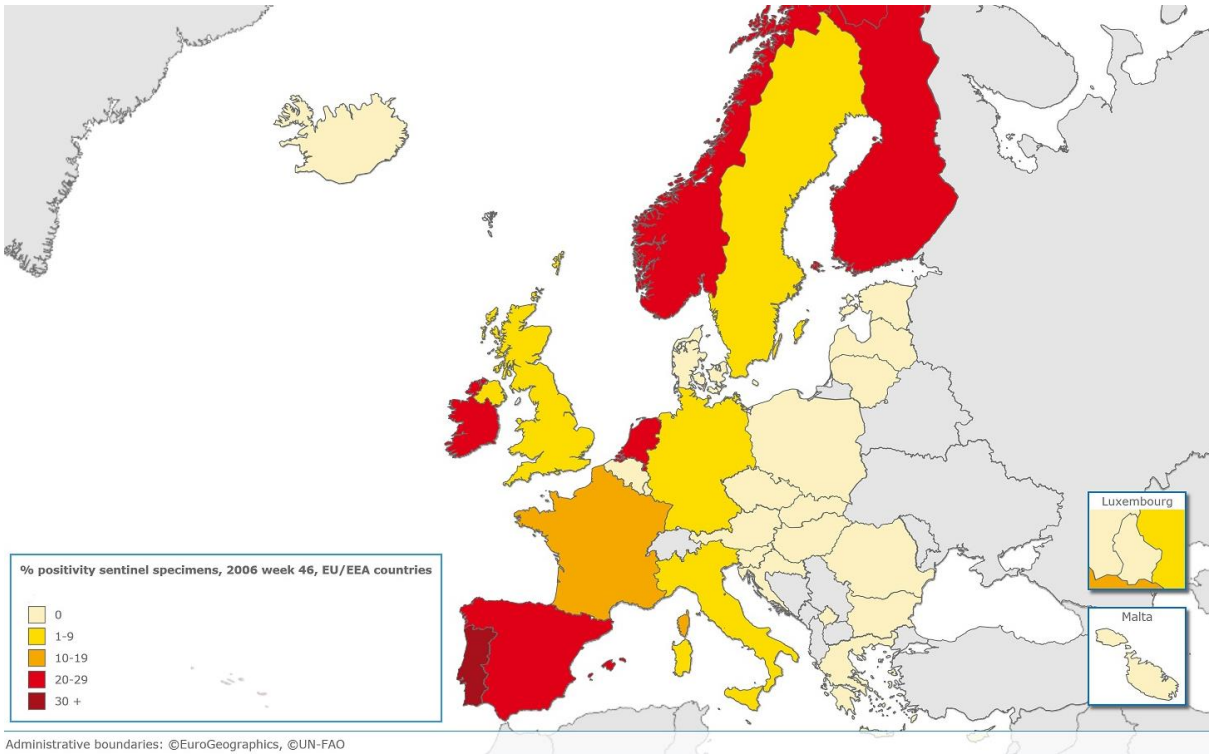


Figure 2. Proportion of sentinel specimens positive for influenza, by country, EU/EEA, week 46/2016



During the 2016–2017 season, 33 853 specimens from sentinel primary care providers were tested; 13 578 (40%) were positive for influenza virus. Of the positive specimens, 12 726 (94%) were type A, and 852 (6%) were type B.

Of 10 407 A viruses subtyped, 10 235 (98%) were A(H3N2) viruses, and 172 (2%) were A(H1N1)pdm09 viruses.

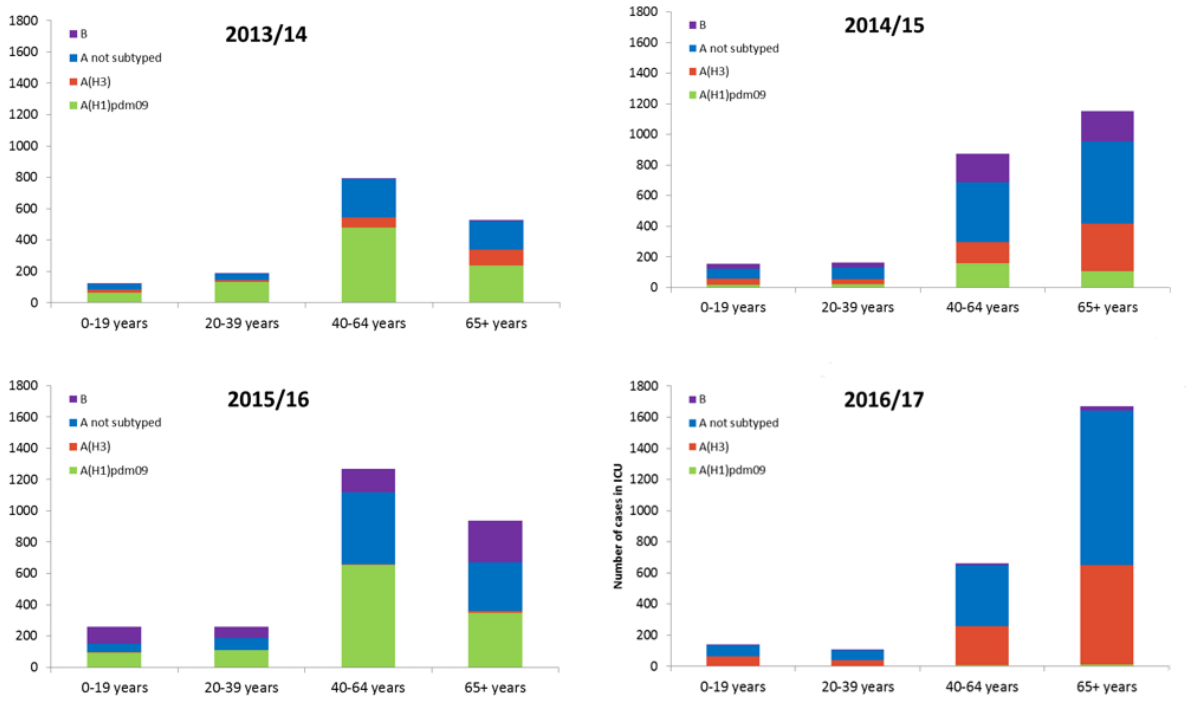
Influenza B viruses circulated later during the season, but numbers were very low. Of 571 influenza B viruses ascribed to a lineage, 454 (80%) were B (Yamagata) and 117 (20%) were B (Victoria) viruses.

Hospitalisations due to influenza

Nine countries reported a total of 7 526 laboratory-confirmed hospitalised influenza cases during the 2016–2017 influenza season. The age group 65 years or older was affected the most, similar to the 2014–2015 season, which had also been predominated by A(H3N2) virus (Figure 3).

Of the cases reported in ICUs in 2016–2017, influenza virus type A was detected in 96% of all cases and type B in the remaining 4%. Among ICU cases, A(H3N2) was dominant in most age groups and accounted for the highest proportion of cases in patients 65 years of age and over. Of 4 987 ICU patients with known vaccination status, 3 212 (64%) had not been vaccinated with the seasonal 2016–2017 vaccine.

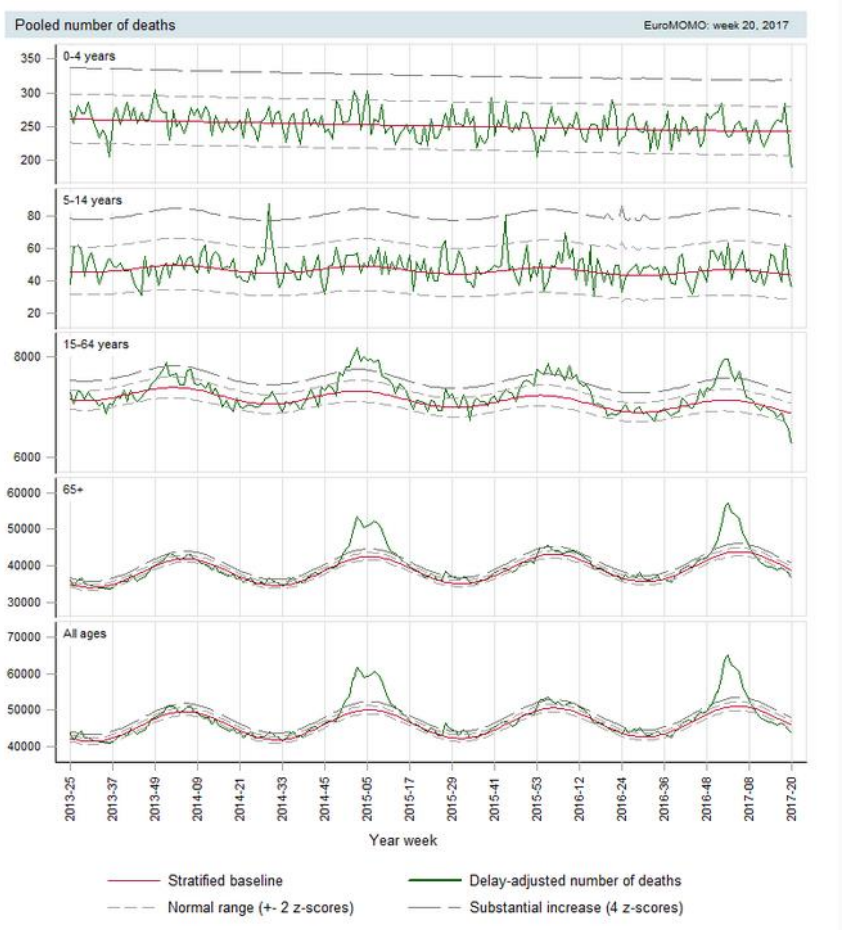
Figure 3. Number of laboratory-confirmed influenza cases admitted to ICU, by (sub)type; eight EU countries (seasons 2013–2016) and nine EU countries (season 2016–2017)



All-cause excess mortality

Pooled data from 20 EU countries or regions reporting to the EuroMOMO project showed an excess mortality from all causes between the beginning of January 2017 and the end of February 2017 [5]. This excess mortality coincided with circulation of influenza A(H3N2) viruses and was mainly observed in people aged 65 years or older, but to a lesser extent among those 15–64 years of age.

Figure 4. Mortality from all causes by age groups, EuroMOMO, 2013–2017



Virus characterisations and antiviral susceptibility

Among 3 621 A(H3N2) viruses genetically characterised since week 40/2016, 1 020 fell in the vaccine component clade (3C.2a) and 2 576 (71%) in the new emergent 3C.2a1 subclade defined by N171K amino acid substitution, often with N121K, in the haemagglutinin. Viruses from these two clades were antigenically similar, but both clades were evolving rapidly, with the emergence of several virus clusters defined by additional amino acid substitutions in the haemagglutinin, thereby requiring continued monitoring of antigenic characteristics. In most reporting countries, B/Yamagata predominated over B/Victoria-lineage viruses, with only two reported viruses belonging to the new 'deletion subgroup' that is antigenically distinct from the vaccine virus. Six A(H3N2), one A(H1N1) and 15 B/Yamagata viruses did not fall within the reporting categories [6].

There was little antiviral resistance to neuraminidase inhibitors detected (<1%). Vaccine effectiveness against laboratory-confirmed influenza A(H3N2) was estimated at 28% in Sweden [7], 32% in Finland [7] and 42% in Europe (multicentre study) [8].

Discussion

The influenza season 2016–2017 was similar in intensity and duration to previous seasons. When the overall 10% positivity rate was exceeded, all EU/EEA countries but the Netherlands reported low intensity of influenza activity, suggesting a lower sensitivity of intensity as indicator of influenza activity.

In primary care, influenza A(H3N2) virus circulated almost exclusively in all reporting countries, followed by low numbers of B viruses, mainly of the Yamagata lineage.

As in 2014–2015, a season dominated by A(H3N2), ICU cases and excess mortality from all causes were mainly observed in persons aged 65 years and over. However, the number of ICU cases and excess mortality in persons aged 40 to 64 years was also considerable.

Two thirds of circulating A(H3N2) viruses fell in the new genetic subclade 3.2a1, but remained antigenically similar to the vaccine strain. However, vaccine effectiveness estimates against this subtype were low to moderate.

On 2 March 2017, WHO announced the recommended vaccine composition for the 2017–2018 season in the northern hemisphere [9]. The recommendations match those for the 2016–2017 season, except for the A(H1N1)pdm09 component, which was changed to an A/Michigan/48/2015-like virus (clade 6B.1).

Public health implications

Based on the past season, two public health conclusions can be drawn:

- Despite moderate vaccine effectiveness, influenza vaccination should continue to be recommended along the lines of national vaccination recommendations, as it remains the best preventive measure against influenza. Additionally, close follow-up of severe cases, antigenic characterisation of viruses, and appropriate use of neuramimidase inhibitors should be continued.
- Regarding influenza vaccine for 2017–2018, WHO has recommended, as in the southern hemisphere for 2018, that the A(H1N1)pdm09 vaccine virus A/California/7/2009 should be replaced by A/Michigan/45/2015 virus. In addition, as this was the third consecutive season in which the circulating B virus was dissimilar from the B strain included in the most widely used trivalent vaccine, close monitoring of circulating B viruses is also needed. B/Brisbane/60/2008 (Victoria) vaccine virus is recommended for the trivalent vaccine and in addition to B/Victoria virus, B/Yamagata is recommended for the quadrivalent vaccine. The latter, which included viruses from both B-lineages, provides better protection when both lineages are circulating.

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