REGIONAL SITUATION ASSESSMENT – SEASONAL INFLUENZA

Influenza season 2019–2020: early situation assessment

18 December 2019

Conclusions and options for response

- First detections for the 2019–2020 season indicate co-circulation of influenza types A (71%) and B (29%) viruses in the WHO European Region. All of the four influenza subtypes and lineages are circulating. Of the types A and B viruses detected, the A(H3) subtype and B/Victoria lineage have been dominant in north-western Europe and Central Asia, respectively.
- Genetically and antigenically diverse influenza A(H3N2) and B/Victoria virus strains are co-circulating in the Region.
- The season has started slightly earlier than usual. It is too soon to predict how the season will develop in terms of peak week, severity and duration.
- A(H3N2) is typically associated with serious health impact in older age groups. Some countries, such as the United Kingdom, are already seeing increased rates of influenza hospitalisation. There is no evidence of significant excess mortality at this early stage, however experience during past seasons suggests a significant mortality impact on the elderly during A(H3N2) dominated seasons.
- B virus circulation might be associated with a higher burden on younger age groups, as already observed in Portugal.
- Continued emphasis on vaccination programmes targeting the elderly and other eligible populations, such as individuals with pre-existing cardio-respiratory medical conditions, is strongly encouraged.
- Surge capacity of healthcare facilities should be reviewed in anticipation of probable increased patient flows in emergency care during the peak influenza weeks.
- The timely administration of neuraminidase inhibitor antivirals following national guidance is recommended to mitigate severe disease outcomes.
- Measures to communicate practices such as self-isolation when ill, respiratory etiquette and hand hygiene should be encouraged.

Public health issue

This situation update for seasonal influenza uses epidemiological and virological data to assess the seasonal increase of influenza cases in relation to disease severity and impact on healthcare systems. It is designed to assist forward planning in Member States.

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*Disclaimer: All experts have submitted declarations of interest and a review of these declarations did not reveal any conflict of interest.

Objectives

This situation assessment aims to inform national public health authorities and healthcare providers about the European seasonal influenza situation in order to inform decisions on interventions such as vaccination, antiviral drug use and infection prevention and control measures, as well as the allocation of appropriate health care resources in Member States.

The main objectives of the situation update are:

- to provide an early description of the epidemiological and virological situation for seasonal influenza in the first affected countries;
- to describe the antigenic and genetic characteristics of circulating viruses compared with the respective vaccine virus components in the 2019–2020 northern hemisphere vaccine;
- to describe the results of genotypic/phenotypic susceptibility of circulating viruses to neuraminidase inhibitors (NAIs).

Data sources

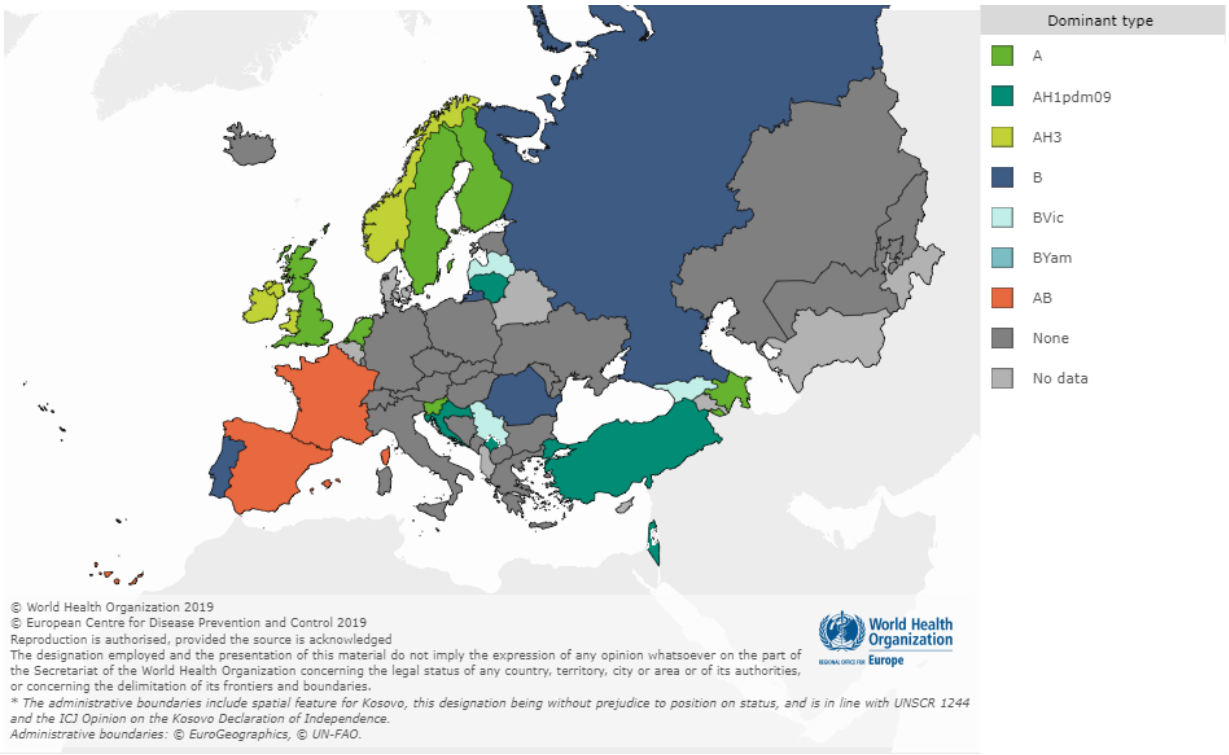
The data used for this assessment were reported by public health institutes and National Influenza Centres (NICs) of the WHO European Region on a weekly basis to The European Surveillance System (TESSy) at ECDC. The data were retrieved on 12 December 2019 and included reports from weeks 40–49/2019. We analysed clinical (influenza-like illness (ILI), acute respiratory infection (ARI), severe acute respiratory infection (SARI)) and data from primary and secondary healthcare settings (intensive care units (ICU) and non-ICU wards). Additional information was collected from peer-reviewed literature, national weekly bulletins, epidemic intelligence reports and EuroMOMO (European monitoring of excess mortality for public health action).

Reported influenza activity and subtype distribution

During weeks 40–49 of the 2019–2020 season, nearly all countries or territories reported influenza activity to be below baseline levels or of low intensity. However, until week 49/2019, Georgia and the United Kingdom (Northern Ireland) reported medium intensity activity and five countries or territories (Finland, Latvia, Portugal and the United Kingdom [Northern Ireland and Scotland]) reported geographically widespread influenza activity.

The dominant influenza virus type and subtype is variable across the Region (Figure 1). The most commonly reported dominance across the Region (18 countries) or territories) was influenza A. Six countries (Georgia, Latvia, Portugal, Romania, Russian Federation and Serbia) reported dominance of type B influenza virus, and two countries (France and Spain) reported co-dominance of types A and B by week 49/2019.

Figure 1. Dominant* virus type week 49/2019, WHO European Region



*The dominant influenza virus type, subtype or lineage is reported when 10 or more influenza-positive results per week (or weeks) are available, with the type (A or B) defined as minimum return. The threshold for dominance is set at 60% and the threshold for co-dominance is set between 40% and 60%.

Source: European Centre for Disease Prevention and Control/WHO Regional Office for Europe. Flu News Europe, Joint ECDC–WHO weekly influenza update week 49/2019 [1].

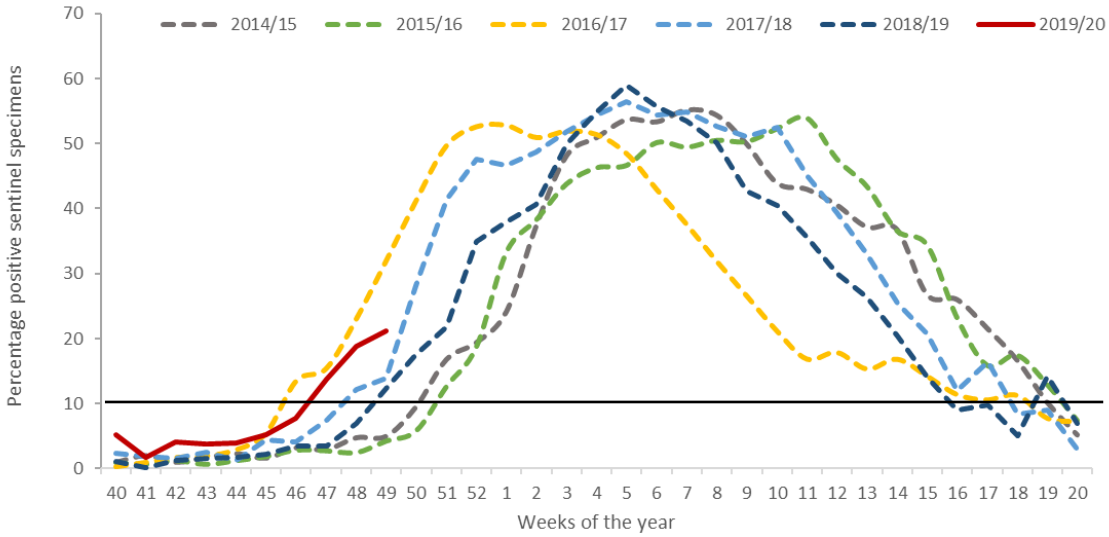
Syndromic and virological surveillance from primary care

Influenza-like-illness (ILI) and acute respiratory infections (ARI)

Influenza-like-illness (ILI) and Acute Respiratory Infections (ARI) rates are increasing in countries and territories of the WHO European Region. Based on syndromic surveillance data, ILI rates were above baseline levels in six countries and territories (Croatia, Ireland, Israel, Italy, Latvia and the United Kingdom (Northern Ireland)). One country (Armenia) reported an ARI rate above its baseline level by week 49/2019. In addition, the syndromic surveillance ILI indicator in United Kingdom (England) was at low intensity levels although the sentinel ILI indicator was still below baseline [2].

Across the Region, the designated season start threshold of 10% or more influenza-virus-positive sentinel specimens was crossed in week 47/2019. Compared to the previous five seasons, the only season in which the 10% threshold was crossed earlier by one week was in 2016–2017 (Figure 2). By week 49/2019, seven countries or territories (Israel, Kazakhstan, Kyrgyzstan, Norway and the United Kingdom [England, Northern Ireland and Scotland]) had reported 30% or more specimens from sentinel surveillance to have tested positive for influenza virus.

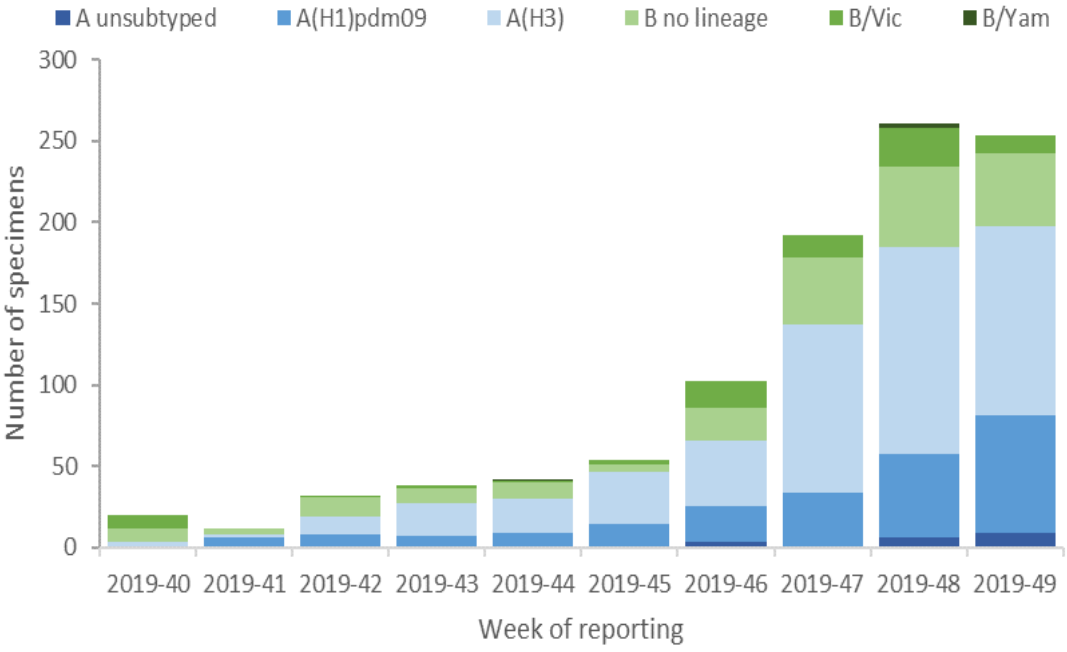
Figure 2. Proportions of primary care sentinel specimens testing positive for influenza virus by season, WHO European Region, 2014–2015 to 2019–2020 (week 49)



Distribution of virus subtypes from sentinel sources

From week 40/2019 to week 49/2019, 1 007 (9.8%) of 10 231 specimens tested positive for influenza (Figure 3). The majority (71%) of viruses were influenza type A, and 29% were influenza type B. Of the 700 type A viruses that were subtyped, 68% were A(H3) and 32% A(H1)pdm09. For type B viruses, 84 (29%) of the 288 viruses were reported with a lineage, with 80 (95%) being B/Victoria.

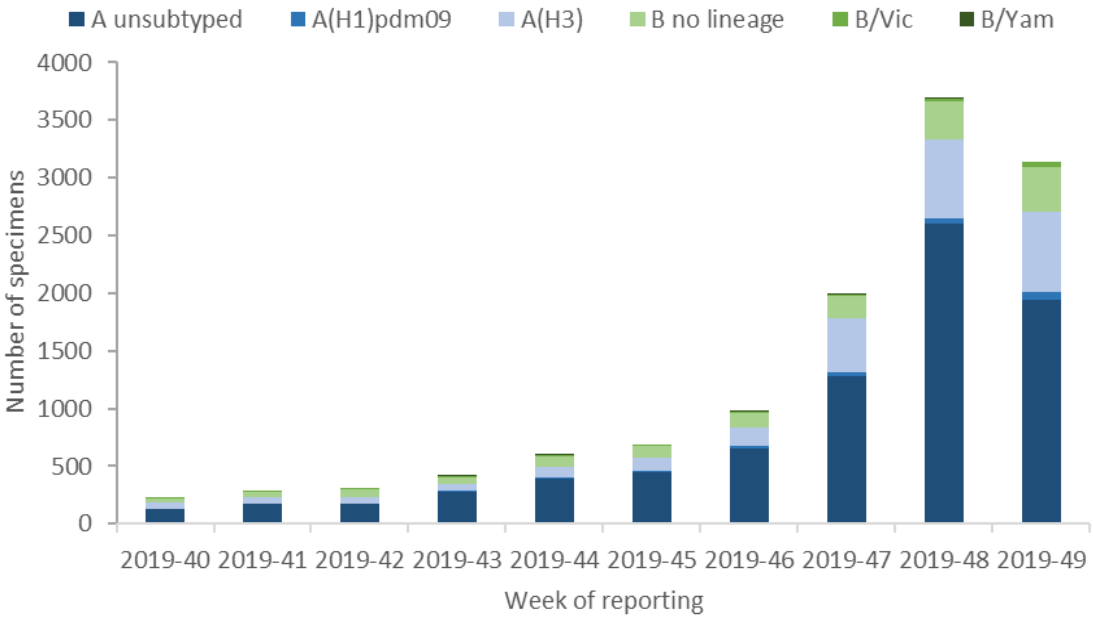
Figure 3. Number of influenza-positive sentinel specimens by week and type, subtype and lineage, WHO European Region, season 2019–2020



Circulating viruses from non-sentinel sources

More than 140 000 non-sentinel specimens have been tested. These are from a mixture of sources, such as patients tested in hospital or primary care settings as well as from outbreak investigations. Of these, 12 656 were positive for influenza virus. The vast majority (88%) were influenza type A; only 27% were subtyped, with 81% reported as A(H3). Of the type B viruses, both lineages were detected with nearly five times more B/Victoria (N=117) than B/Yamagata (N=24) viruses reported.

Figure 4. Number of influenza-positive specimens from non-sentinel sources by week and type, subtype and lineage, WHO European Region, season 2019–2020



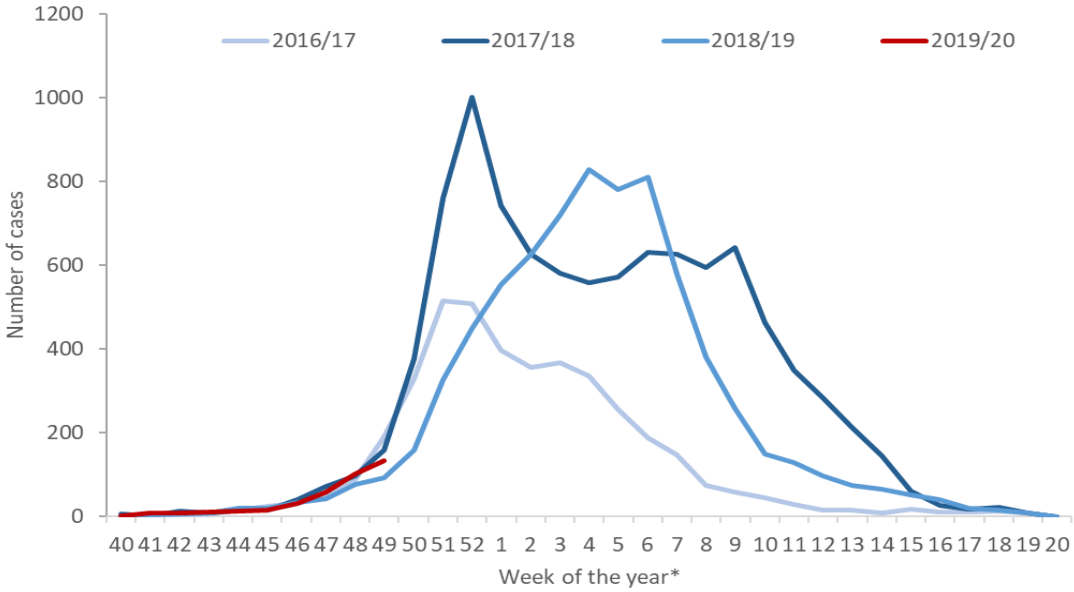
Hospital admissions in the WHO European Region

Intensive care units – ICU

As of week 49/2019, a total of 383 hospitalised laboratory-confirmed influenza cases admitted to ICUs had been reported from five countries (France, Ireland, Spain, Sweden and the United Kingdom (UK)), comparable to the same period in previous seasons (2016–17: 411; 2017–18: 423; 2018–19: 305; Figure 5). The UK reported 90% of all cases, comparable to previous seasons in which the UK, France and Spain were among the countries that reported cases from ICUs early in the season.

The majority of viruses were influenza type A (94%); of the 103 subtyped viruses, 71% were A(H3) and 29% A(H1)pdm09. For 37 cases, information on age was available: six (16%) were younger than 20 years, 14 (38%) were 20–59 years, 15 (41%) 60–79 years and two (5%) were over 80 years.

Figure 5. Number of hospitalised cases in intensive care units by week of reporting, season 2016–2017 to 2019–2020



Other wards – non-ICU

Five countries (Czech Republic, Ireland, Romania, Spain and Ukraine) reported 348 laboratory-confirmed influenza cases from non-ICU wards, the majority (89%) from Ireland. This is comparable to previous seasons in which Denmark and Spain also reported early cases from non-ICU wards.

Influenza type A was reported for 93% of the cases, and only 23 were reported as influenza type B. Of 156 subtyped influenza A viruses, 87% were A(H3) viruses and 13% A(H1)pdm09. Age was reported for all cases: 38% were younger than 20 years, 21% between 20 and 59 years, 26% 60–79 years and 15% over 80 years.

Severe acute respiratory infection - SARI

Since the beginning of the season, 8 363 hospital-admitted SARI cases from 17 countries, mostly from the south and east of the WHO European Region, have been reported. Of the 1 785 specimens tested, 105 were positive for influenza, with the majority (82%) typed as influenza B virus being reported from countries in the eastern part of the Region.

Virus characteristics

Since the beginning of the season, 247 influenza viruses have been characterised genetically (Table 1). To date, there is significant genetic diversity among circulating type A viruses in the European Region for the 2019–2020 influenza season. The majority of A(H1N1)pdm09 viruses belong to subgroups 6B.1A5A (67%) or 6B.1A5B (30%) and are considered to be antigenically similar to the vaccine virus A/Brisbane/02/2018 [3-5]. A(H3N2) viruses belong to subgroup 3C.2a1b (60%) or clade 3C.3a (40%). Viruses in clade 3C.3a are antigenically similar to the vaccine virus A/Kansas/14/2017 [3-5].

B/Victoria lineage viruses belong to clade 1A and fall in two subclades: subclade Δ3B (del 162-164) (94%) has three and subclade Δ2 (del 162-163) (6%) has two amino acid deletions in hemagglutinin compared to B/Brisbane/60/2008. The vaccine virus B/Colorado/06/2017 belongs to the Δ2 subclade and is antigenically different from the circulating Δ3B subclade viruses [3-5]. There is, however, evidence of some cross-reactivity by post-infection ferret antisera raised against the egg-propagated vaccine virus. All of the B/Yamagata lineage viruses belong to clade 3 and are antigenically similar to the vaccine virus B/Phuket/3073/2013 [3-5].

Table 1. Number of viruses assigned to each phylogenetic group, WHO European Region, weeks 40–49/2019

Phylogenetic group	Number of viruses
A(H1)pdm09 group 6B.1A5A, rep A/Norway/3433/2018	31
A(H1)pdm09 group 6B.1A7, rep A/Slovenia/1489/2019	1
A(H1)pdm09 group 6B.1A5B, rep A/Switzerland/3330/2018	14
A(H3) group 3C.2a1b+T135K-B, rep A/Hong Kong/2675/2019	27
A(H3) group 3C.3a, rep A/Kansas/14/2017 [a]	65
A(H3) group 3C.2a1b+T135K-A, rep A/La Rioja/2202/2018	5
A(H3) group 3C.2a1b+T131K, rep A/South Australia/34/2019	66
B(Vic)-lineage subclade 1A(△2) (del162-163 group), rep B/Colorado/06/2017 [a]	2
B(Vic)-lineage subclade 1A(△3)B (del162-164 group), rep B/Washington/02/2019	31
B(Yam)-lineage clade 3, rep B/Phuket/3073/2013 [b]	5

[a] *Vaccine component for 2019–2020 northern hemisphere.*
[b] *Vaccine component of quadrivalent vaccines for use in 2019–2020 northern hemisphere season.*
Rep: representing

Vaccine composition

The WHO vaccine recommendation for the components of influenza vaccines to be used in the 2019–2020 northern hemisphere influenza season [3,6] are as follows:

- an A/Brisbane/02/2018 (H1N1)pdm09-like virus (Clade 6B.1A1);
- an A/Kansas/14/2017 (H3N2)-like virus (Clade 3C.3a);
- a B/Colorado/06/2017-like virus (B/Victoria/2/87 lineage) (Subclade 1A_Δ2); and
- a B/Phuket/3073/2013-like virus (B/Yamagata/16/88 lineage) (Clade 3) (only in quadrivalent vaccines).

Data from vaccine effectiveness studies will not be available until later this season, once sufficient sample sizes are available. Therefore, the antigenic and genetic relatedness of the circulating viruses to the vaccine components are the only indication currently available.

While the A(H1N1)pdm09 viruses mainly fall within subgroups of subclade 6B.1A5 that are genetically different to that of the vaccine virus, A/Brisbane/02/2018 (6B.1A1), it is anticipated that the vaccine virus will be effective, based on HI assays conducted with post-infection ferret antisera raised against the vaccine virus [4,5,7].

The vaccine virus, A/Kansas/14/2017, falls within clade 3C.3a and viruses within this clade induce clade-specific antibodies in ferrets, so viruses falling in other clades/subclades may be less well covered by the vaccine [7]. Because of the inclusion of an H3 clade 3C.3a virus in the current vaccine, vaccine effectiveness is expected to be better against clade 3C.3a than clade 3C.2a A(H3N2) viruses. However, the highest proportion (60%) of characterised viruses in the Region so far belong to the 3C.2a clade. The vast majority of vaccine is still produced in hens' eggs and the changes in hemagglutinin associated with egg-adaptation have been shown to affect the antigenicity of vaccine viruses, thereby contributing to suboptimal vaccine effectiveness against currently circulating A(H3N2) viruses [4].

For the B/Victoria-lineage, viruses in the B/Colorado/06/2017 vaccine virus subclade 1A(Δ2) (del 162-163)) have been in the minority (6%). The antigenically distinct subclade 1A(Δ3)A/B (deletion 162-164) viruses (94%) are predominant among type B viruses in the Region. However, there is

evidence of some cross-reactivity with viruses in the 1A(Δ3)B subclade (94%) by post-infection ferret antisera raised against the egg-propagated vaccine virus, suggesting that the vaccine may provide some cross-protection against the circulating viruses [4,5,7].

B/Yamagata viruses seem to be less prevalent this season, although in Norway B/Yamagata viruses have been on the increase. The circulating viruses retain good reactivity with post-infection ferret antisera raised against the B/Phuket/3073/2013 vaccine virus, so the quadrivalent vaccine effectiveness against the B/Yamagata viruses is expected to be good. Some cross-protection from the B/Victoria virus that is included in the trivalent vaccine may also occur [8].

Antiviral resistance

There is no evidence of reduced susceptibility of circulating viruses to neuraminidase inhibitors (NAIs). Since the beginning of the season, 91 viruses have been tested: 52 A(H3N2), 27 A(H1N1)pdm09 and 12 type B viruses. All showed normal inhibition (NI) with both oseltamivir and zanamivir.

Mortality

EuroMOMO collects mortality data from EU countries to monitor the level of mortality from all causes during the influenza season. Up to week 49/2019, the reported levels of all-cause mortality from 23 EU countries were within expected ranges [9], as anticipated at this early stage of the season. Weekly mortality monitoring will be important to promptly detect any evidence of significant increases in excess all-cause mortality as the season progresses.

During the previous recent A(H3N2) dominated seasons, influenza-associated excess winter mortality among the elderly has been increased. During the 2014–2015 and 2016–2017 influenza A(H3N2) dominated seasons, with poor vaccine match, influenza-associated mortality among people aged 65 years and above was 147.41 and 129.90 per 100 000 population over the age of 64, respectively [10].

Global situation update

The epidemiology of 2019 influenza season was variable across the southern hemisphere. The season in South America started and peaked earlier than usual. Influenza A(H1N1)pdm09 virus was predominant among viruses that were typed and subtyped, although there was a later secondary peak for type B viruses. ILI and influenza activity ranged from moderate to high in different temperate countries of South America [11].

In South Africa, the 2019 influenza season peaked at the same time as in 2018, with influenza A(H3N2) viruses predominating. However, there was no secondary peak for type B viruses, in contrast to those observed in the South American 2019 season and the South African 2018 season. The percentage of specimens positive for influenza virus was classified as very high based on the epidemic threshold, while the impact of the season, as measured by influenza positive hospitalisations, was classified as moderate [11].

The 2019 influenza seasons in Australia and New Zealand both commenced and peaked one to two months earlier than usual. Both countries experienced seasons in which influenza A(H3N2) subtype viruses were predominant, with a later peak in B/Victoria-lineage viruses. In Australia the impact of the season, as measured by the number of occupied sentinel hospital beds and survey respondents absent from normal duties, was classified as low to moderate. Clinical severity, as measured through the proportion of patients admitted directly to ICU and deaths attributed to influenza, was low [12]. In New Zealand ILI activity was within the low seasonal level threshold and activity in ICU was low [13]. Antigenic analysis suggested that circulating influenza A(H1N1)pdm09 and influenza B/Yamagata-lineage viruses were well matched to the 2019 influenza vaccine, while some

A(H3N2) and B/Victoria-lineage viruses were less well matched. Preliminary estimates from primary care and sentinel hospitals in Australia indicated good vaccine effectiveness [12].

The 2019–2020 influenza season has commenced in temperate countries of the northern hemisphere. In the United States, the influenza season has begun in most of the country and activity was increasing as at week 49 [14], consistent with the timing of previous seasons. However, B/Victoria lineage viruses are predominant, which is unusual this early in a season. The influenza season has commenced in Canada and activity is increasing as expected for this time of the year: influenza A(H3N2) is the predominant circulating virus for the season-to-date, although the proportion of type B influenza (30%) is higher than usual [15].

In Japan, the Ministry of Health, Labour and Welfare reported that for the period 25 November to 1 December, approximately 30 000 patients were reported with influenza infection, which is six times higher than during the same period last season. Furthermore, around 900 schools have been closed due to influenza, a number nine times higher than last year. The peak period of influenza activity is expected in Japan about one month earlier (end of December to January) than in previous years [16].

ECDC/WHO assessment

The 2019–2020 influenza epidemic in the European Region started in week 47/2019 when the designated season threshold of 10% or more influenza-virus-positive sentinel specimens was crossed. This is earlier than the previous season but later than observed in 2016–2017, when there was co-circulation of influenza A and B viruses, with A(H3N2) virus dominant.

Overall, both influenza type A and B viruses have been reported across the Region. The highest number of A(H3) viruses in sentinel and non-sentinel specimens, as well as in hospital settings, has been seen in north -western Europe. Slightly higher proportions of A(H1) viruses were reported from countries providing ICU data compared with data from non-ICU wards. Influenza B has been the early dominant virus in some countries, particularly in eastern Europe, with the majority (95%) of the B/Victoria lineage.

The number of hospitalised cases with laboratory-confirmed influenza infection is comparable with previous seasons and all age-groups are affected. The majority (90%) of ICU cases have been reported by the UK and were caused by A(H3N2) viruses. However, no significant excess all-cause mortality data has been observed to date that coincides with increased influenza activity.

A number of countries, particularly in the eastern part of the WHO European Region, have reported type B virus dominance. A high proportion of type B viruses circulating early in the season has been seen before; during the 2017–18 season B/Yamagata-lineage viruses were dominant and the season started in week 48/2017.

The 2019–2020 influenza season has commenced in temperate countries of the northern hemisphere. In the United States, the influenza season has been underway for five weeks in most of the country and activity is increasing as at week 49 [14].; This is an early start to the season, although the timing is not unusual. However, the B/Victoria lineage viruses are predominant, which is unusual in the early stages of the season, followed by A(H1N1)pdm09 and A(H3N2) viruses. The influenza season has also commenced in Canada and activity is increasing, as expected for this time of the year. Influenza A(H3N2) virus is the predominant circulating virus for the season-to-date, although the proportion of influenza type B viruses influenza (30%) is higher than usual [15].

Vaccination remains the single most effective measure for preventing influenza infection and development of severe disease among the frail and vulnerable. High-risk groups for severe disease include the elderly, infants, pregnant women, immunosuppressed individuals or people with pre-existing cardio-respiratory or neurological medical

conditions. Healthcare workers should be encouraged to receive vaccination against influenza to reduce the risk of infecting vulnerable groups, in addition to protecting themselves. ECDC and WHO have produced support material and training for influenza vaccination campaigns [17,18].

Neuraminidase inhibitors (NAI) oseltamivir and zanamivir are the main authorised antiviral medicines available for use in Europe [19]. To date, there is no evidence of reduced susceptibility of circulating viruses to available NAIs and the prompt use of these medicines for eligible groups for treatment and prophylaxis according to national recommendations is strongly encouraged, including those at higher risk of severe disease.

Non-pharmaceutical countermeasures against influenza, such as voluntary self-isolation of patients, hand washing, and respiratory hygiene should be encouraged during the whole season [20].

Depending on the epidemiological situation in individual countries, those that have already exceeded their epidemic threshold may experience significant pressures on healthcare services during the upcoming holiday period. Immediate assessment of surge capacity in emergency departments will facilitate reorganisation of resources during the peak weeks of influenza. Elderly patients are known to be severely affected when A(H3) viruses are circulating and younger adults when A(H1) is circulating. Influenza B viruses have also been associated with high burden to children and adolescents in the past [21]. Special attention should be given to the early diagnosis and appropriate treatment of patients with influenza, particularly those with underlying clinical conditions, in accordance with national recommendations and guidelines [19].

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