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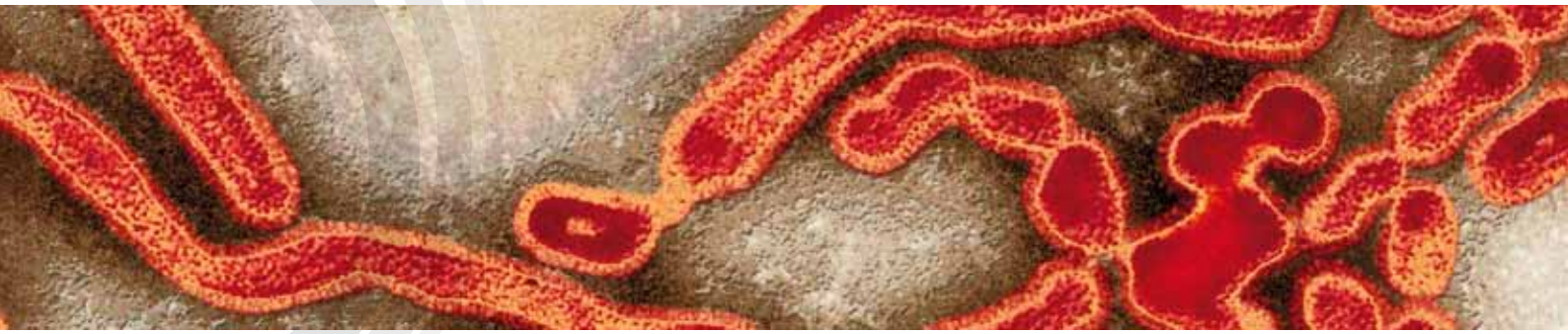

Influenza Surveillance in Europe

2010–2011

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ECDC SURVEILLANCE REPORT

Influenza surveillance in Europe 2010–2011

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Stockholm, December 2011

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Abbreviations

ARI	Acute respiratory infection
CNRL	Community Network of Reference Laboratories for Human Influenza in Europe
EISN	European Influenza Surveillance Network
EISS	European Influenza Surveillance Scheme
EU/EEA	European Union Member States, Iceland, Liechtenstein and Norway
EWRS	Early Warning and Response System
ILI	Influenza-like illness
RSV	Respiratory syncytial virus
SARI	Severe acute respiratory infection
TESSy	The European Surveillance System

Summary

The 2010/11 influenza season in Europe, which began in early December 2010 and was largely over by the end of March 2011, manifested the same west to east progression as in a number of earlier seasons. This was an important season as it was the first after the 2009 pandemic and therefore indicated possible characteristics of the new inter-pandemic (seasonal) influenza.

Influenza A(H1N1)2009 was by far the most commonly detected virus, with influenza type B co-circulating throughout most of the season. Unlike North America and the north of Asia, there were few reports of A(H3N2) influenza. Neither were there any confirmed infections reported with the pre-2009 seasonal A(H1N1).

Children featured commonly among those presenting to primary care. The A(H1N1)2009 virus behaved in much the same way as during the pandemic in terms of the age groups most affected and the clinical pattern of illness. Among those diagnosed with influenza and severe disease adults under 65 years of age were most commonly affected . Most of the severe cases diagnosed were in people with underlying medical conditions although there was a significant number of cases with no reported underlying conditions. This was different from the pattern seen in the last inter-pandemic period when most severe and fatal cases occurred in people over 65 years of age with underlying conditions.

The impact of the influenza season on hospital services in some areas was consistent with that seen during the winter pandemic of 2009–10. However, in some countries, most notably in the United Kingdom, Ireland, Denmark and later Greece, the peak pressures were higher and certain intensive care were placed under pressure by large numbers of cases requiring ventilatory support. In other countries with surveillance in intensive care units, this was not the case.

More than 95% of viruses detected in Europe were antigenically similar to those included in the seasonal trivalent influenza vaccine.

Antiviral resistance to oseltamivir in influenza A(H1N1)2009 remained at a low level. Most reports of resistance were from people with severe conditions on antiviral therapy. However, there were some cases of resistance associated with the H275Y substitution in the virus neuraminidase where there was no history of exposure to antiviral medications, indicating low-level community transmission of resistant viruses.

1 Background

The winter of 2010/2011 was an especially important season for influenza surveillance, as it was the first in Europe after the 2009 pandemic and provided indications of the characteristics of the new inter-pandemic (seasonal) influenza. Sentinel surveillance of influenza-like illness (ILI) and/or acute respiratory infection (ARI), with virological testing for a subset of cases, had already been introduced in a number of European countries when the European Commission launched an initiative in 1989, aimed at fostering international collaboration between national sentinel networks. This subsequently led to the formation of the European Influenza Surveillance Scheme (EISS) [1]. In 2003, those responsible for EISS established the Community Network of Reference Laboratories for Human Influenza in Europe (CNRL) to standardise virological methods across Europe and regularly assess the quality of CNRL laboratory performance [2]. In 2008, the coordination of influenza surveillance in Europe came under the aegis of ECDC and the former EISS became the European Influenza Surveillance Network (EISN). CNRL coordination was then outsourced to a consortium currently led by the UK National Influenza Centre [3].
The broad aims of influenza surveillance are to describe the epidemiology of influenza; to monitor intensity, geographic spread and trends and to identify the influenza types and sub-types in circulation and check whether they are susceptible to antiviral treatment and how well they match the vaccine strains recommended by WHO, thereby providing information relevant to vaccine updates. Finally, surveillance represents a means of monitoring the burden, spectrum of influenza disease and associated clinical risk factors. The surveillance outputs are linked to a series of specific public health and clinical objectives with related actions (Table 1) [4].

Table 1: Objectives of seasonal influenza surveillance in Europe

Objectives: Detecting and determining	Public health purpose
Early detection of influenza viruses	Supplying information on start and circulation of influenza in and between the countries
Duration, shape, number and tempo of the waves of infection across Europe	Informing countries yet to be affected
Antigenic type and phenotype	Supplying isolates to WHO to collectively review and update the annual vaccine. Detection of new variants (untypable) – potential emergence of pandemic strain, animal-to-human transmissions
Susceptibility/resistance to antiviral drugs	Detecting the emergence of resistant viruses indicating a need to amend recommendations for the use of antiviral drugs
Age and clinical groups most infected and affected	Reviewing and changing recommendations on the groups to be targeted for immunisation and antivirals (risk and other target groups)
Susceptibility in the population – age groups with most transmission (seroepidemiology)	Reviewing and changing recommendations on the groups to be targeted for immunisation and antivirals (risk and other target groups)
Clinical presentation of severe disease, complicating other infections and underlying disease (including cerebrovascular and cardiovascular)	Informing testing and case-detection policies Alerting clinicians to new clinical presentations
Precise clinical case definition including sub-clinical infections and unusual features	Informing testing and case-detection policies Alerting clinicians to new clinical presentations
Complicating conditions (super-infections etc.)	Informing testing and case-detection policies Alerting clinicians to new clinical presentations
Pathogenicity (case/infection-fatality rates)	Estimating burden of disease and helping inform policy on interventions including vaccination
Excess premature mortality by age-group and with diagnoses	Estimating burden of disease and helping inform policy on interventions including vaccination
'Impact and severity' of the pandemic (a complex variable best seen as a matrix)	Alerting clinicians and managers on whether to implement contingency plans
Effectiveness of interventions and counter-measures including influenza vaccines and antiviral pharmaceuticals – detecting treatment and preventive failure.	Informing decisions on vaccines and antivirals for regulatory agencies, clinicians, the public, researchers and industry.

2 Methods

2.1 Time and place

By convention, the influenza surveillance season in Europe is considered to last from week 40 of any given year to week 20 of the following year. In between these seasons, limited information is gathered on the virological characteristics of circulating viruses, quantitative clinical data and severe acute respiratory infections. ECDC also maintains an epidemic intelligence function to detect unusual events. This report describes data and analyses for the period from week 40/2010 to week 20/2011. Data were received from all EU Member States, Iceland and Norway, but not all participating countries contributed to each component of the surveillance system every week.

2.2 Primary care surveillance

2.2.1 Clinical surveillance

ILI/ARI surveillance is carried out by nationally organised sentinel networks of physicians, mostly general practitioners, covering at least 1% and up to around 6% of the population in their countries. Depending on each country's choice, every sentinel physician reports the weekly number of patients seen with ILI, ARI or both, to a nominated national focal point (Table 2). From the national level, both numerator and denominator data are reported to the European Surveillance System (TESSy) database. Most countries use population denominators while some use the number of physician consultations as the denominator (Table 2).

In addition to ILI/ARI rates, semi-quantitative and only partly standardised indicators of intensity, geographic spread and trend of influenza activity are reported. The intensity is assessed by comparing current ILI/ARI rates with country-specific baseline rates outside of the influenza season and with historical values. The intensity can range from *low* (below or at baseline), *medium* (above baseline but still within the range previously seen), *high* (higher than previously seen) to *very high* (much higher than observed during previous years).

The geographic spread can range from no activity, sporadic, local or regional to widespread activity. *No activity* is characterised by baseline or below baseline ILI/ARI rates with no laboratory confirmations. *Sporadic activity* is reported if there are isolated cases of laboratory-confirmed influenza in a region or an outbreak in a single institution, with clinical activity remaining at or below baseline. *Local activity* refers to locally increased ILI/ARI rates or outbreaks in two or more institutions within a region, in conjunction with laboratory-confirmed cases of influenza. Levels of activity in the remainder of the region and other regions of the country remain at or below baseline. *Regional activity* is defined by ILI/ARI rates above baseline, and laboratory-confirmed influenza infections, in one or more regions comprising less than 50% of the country's total population. Levels of activity in other regions of the country remain at or below baseline. Regional activity generally does not apply to countries with a population of less than 5 million, unless the country is large with geographically distinct regions. Finally, *widespread activity* is reported if one or more regions comprising 50% or more of the country's population are seeing ILI/ARI rates above baseline, in conjunction with laboratory-confirmed influenza infections.

The trend is assessed by comparing current influenza activity with that in previous weeks and can be increasing, decreasing or stable.

Table 2: Clinical influenza surveillance numerator and denominator by country

Country	Numerator	Denominator
Austria	ARI, ILI	Population
Belgium	ILI, ARI	Population
Bulgaria	ARI	Population
Cyprus	ILI	Encounters
Czech Republic	ILI, ARI	Population
Denmark	ILI, ARI	Population
Estonia	ILI, ARI	Population
Finland	–	–
France	ARI	Population
Germany	ARI	Population
Greece	ILI	Population
Hungary	ILI	Population
Iceland	ILI	Population
Ireland	ILI	Population
Italy	ILI	Population
Latvia	ILI, ARI	Population
Lithuania	ILI, ARI	Population
Luxembourg	ILI, ARI	Encounters
Malta	ILI	Encounters
Netherlands	ILI	Population
Norway	ILI	Population
Poland	ILI	Population
Portugal	ILI	Population
Romania	ILI, ARI	Population
Slovakia	ILI, ARI	Population
Slovenia	ILI, ARI	Population
Spain	ILI	Population
Sweden	ILI	Population
UK - England	ILI, ARI	Population
UK - Northern Ireland	ILI, ARI	Population
UK - Scotland	ILI, ARI	Population
UK - Wales	ILI	Population

2.2.2 Virological surveillance

The sentinel physicians take nasal and/or pharyngeal swabs from a subset of their ILI/ARI patients (according to nationally defined sampling strategies). The specimens are sent to the respective country's CNRL laboratory or regional laboratory coordinated by the CNRL laboratory, for influenza virus detection, typing and sub-typing, antigenic and/or genetic characterisation and antiviral susceptibility testing. Influenza viruses detected in samples collected in different healthcare settings for diagnostic purposes are also reported as non-sentinel detections. Some laboratories also test these specimens for the presence of respiratory syncytial virus (RSV) and other respiratory viruses (data not reported to TESSy). Laboratory results, including those obtained for non-sentinel specimens, are uploaded to TESSy by nominated national focal points every week.

2.3 Hospital surveillance

During the fourth European meeting on surveillance and studies in a pandemic, organised by ECDC in Stockholm at the start of the 2009 pandemic, it was agreed to introduce the monitoring of severe acute respiratory infection (SARI) and to focus case-based reporting on the more severe influenza A(H1N1) 2009 cases, i.e. those requiring hospital care in the EU/EEA countries, and influenza related deaths [4]. Hence shortly before the start of the 2009–10 influenza season, hospital-based surveillance of SARI had been introduced and this was sustained in 2010–11. Monitoring was broadly in accordance with WHO Regional Office for Europe's guidance for sentinel influenza surveillance in humans, issued in 2009 [5]. In addition to the pre-existing primary care surveillance, several EU/EEA Member States agreed to collect case-based data on SARI and related fatalities using sentinel hospital networks. Several options were proposed to determine the population coverage and to ensure the representativeness of the sentinel hospitals, i.e. the population covered by the hospital.

A SARI case was defined as:

- sudden onset of fever over 38°C, and
- cough or sore throat in the absence of any other diagnosis, and
- shortness of breath or difficulty breathing and
- requiring hospital admission.

Data were uploaded weekly to TESSy at the same time as the ILI and ARI data.

Collected variables were demographic data (age, gender, vital status), clinical data (underlying conditions, clinical presentation, oxygen support, complications), virological data (influenza type, sub-type, other respiratory pathogen), level of hospital care (ICU, wards), antiviral treatment (including prophylaxis) and vaccination status. Cases were reported by the so-called 'date used for statistics' which is a date applied by the reporting country for the publication of data at national level. This date could be the date of onset, notification, hospitalisation or any other date.

2.4 Country reports

To supplement the limited hospital surveillance, ad-hoc country reports on severe disease and mortality were requested during the 2010–11 season and relevant publications were included, if they complemented the information from formal surveillance.

2.5 Data analysis

Syndromic, virological and SARI surveillance data were retrieved from TESSy. The intensity of influenza activity was colour-coded and displayed in a cross tabulation of country and week of reporting. Countries were ordered by geographic longitude of the centroid (centre) of their territory, to assess spatial patterns in peak intensity over time. The values for this were obtained from the US Central Intelligence Agency's World Fact Book and the US National Geospatial Intelligence Agency [6, 7].

A graph of the overall progression of ILI/ARI in Europe was developed, based on data reported to TESSy on a weekly basis by the sentinel networks in the Member States. It displays the average weekly proportion of the total seasonal ILI/ARI caseload. Each weekly point is compiled by taking the overall country caseload (reported throughout the season) as the denominator and the actual number of cases reported that week per country as the numerator. The average of the weekly proportion is then calculated. For each country either ILI or ARI cases are used, depending on the first numerator (Table 2).The underlying assumption that the sentinel reporting practices are constant throughout the period is generally true, although in some settings at the peak of the season and high workload, reporting completeness declines. The sentinel catchment area also remains constant throughout the period.

Since this proportion of the weekly caseload is a surrogate measure of the relative pressure each country's sentinel network was under each week, the average of all Member States' weekly proportionate caseloads illustrates the overall pressure throughout the EU region.

Numbers of sentinel swabs, crude and (sub)type-specific proportions of influenza-positive sentinel swabs, and (sub)type-specific numbers of influenza-positive non-sentinel swabs were plotted by week of reporting. Cumulative absolute and relative frequencies of antigenic virus characterisation results were determined.

Basic demographic characteristics of the SARI cases were described. Age distribution of the cases and age-specific case-fatality ratios were calculated.

3 Results

The 2010/11 influenza season in Europe, the first season after the 2009 pandemic, started in week 48 with informal reports of unusual numbers of influenza cases requiring intensive care management in England and Scotland [8].

3.1 Primary care

3.1.1 Clinical surveillance

Substantial transmission of influenza in the 2010–11 season in Europe started around week 50/2010 when four countries reported medium intensity (Figure 1). It lasted for a median of 10 weeks (range 2 – 13) in each affected country and ended in week 13/2011. From this week on, no country reported medium or higher intensity up to week 20/2011, which is the end of the period covered by this report (Figure 1). As with the majority of previous seasons and during the pandemic, there was a broad progression of national epidemics from west to east during the 2010/2011 season, with a moderate correlation (ρ= 0.4457) between the modal week and the longitude of the country – i.e. the epidemics started earlier in the western countries (Figure 1) [9, 10]. Of 28 countries uploading weekly clinical influenza data during the winter 2010–11, very high intensity was reported by one country, in contrast with nine countries during the previous, pandemic year. High intensity was reported by 13 countries and the UK (England and Northern Ireland), with six countries reporting high intensity for three or more weeks. The maximum number of weeks with high intensity was six, reported by Sweden. Thirteen countries and the UK (Scotland and Wales) reported medium intensity as their maximum intensity during the season.

Figure 1: Intensity of influenza activity in the European Union, Iceland and Norway during the 2010/11 season, by country (ordered by geographic longitude west to east) and week of reporting.

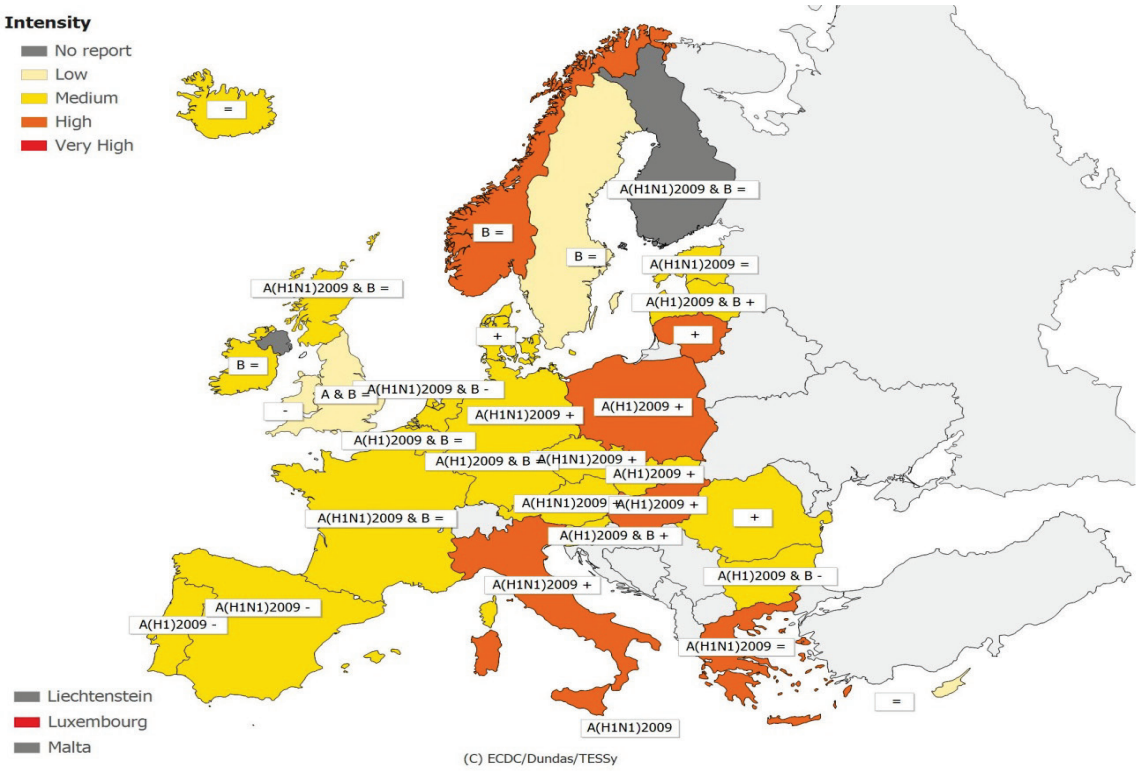
Colour code	Intensity
	Low
	Medium
	High
	Very high
	No data

Cyprus was the one country reporting only low intensity at the peak of its season. The modal peak week, when seven countries reported high or very high intensity, was week 5/2011 (Figure 2). The same week also had the highest average proportion of reported ILI/ARI caseload (Figure 3).

Age group-specific ILI and/or ARI rates were reported by 22 countries. In 20 of these the most affected age group was children under 15 years of age. In Austria and Norway, 15-64 year olds were most affected.

In Hungary, Romania, Slovenia and the UK (England) the rate of ILI and/or ARI was higher during the 2010–2011 season than during the previous (pandemic) season 2009–2010, while in Bulgaria, Czech Republic, France, Ireland, Latvia and Slovakia the rate of ILI and/or ARI was very similar to that in 2009–2010, although the peak occurred around 10 weeks later.

Figure 2: Distribution of intensity of influenza activity by country, EU/EEA countries, week 5/2011



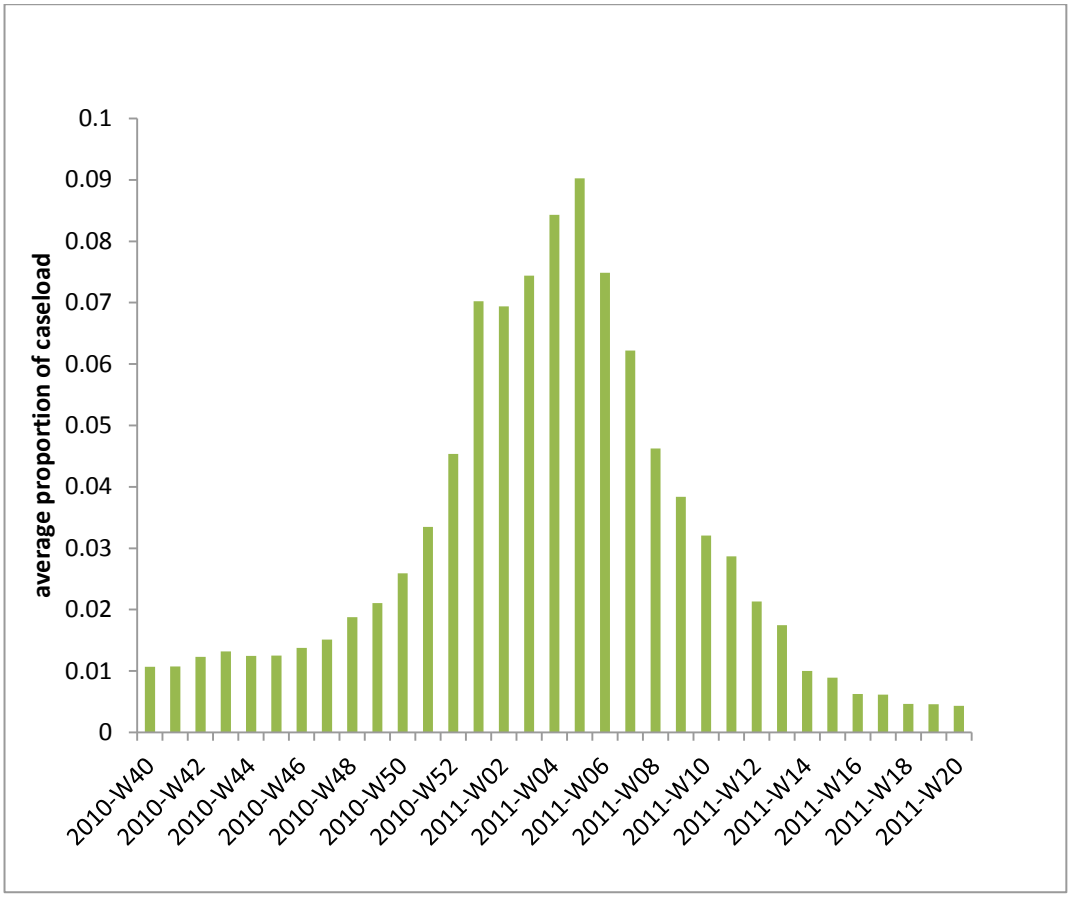
(C) ECDC/Dundas/TESSy

* A type/subtype is reported as dominant when > 40 % of all samples are positive for the type/subtype.

Legend:

Low	No influenza activity or influenza at baseline levels	-	Decreasing clinical activity
Medium	Usual levels of influenza activity	+	Increasing clinical activity
High	Higher than usual levels of influenza activity	=	Stable clinical activity
Very high	Particularly severe levels of influenza activity	**A & B**	Type A and B
		A(H1)2009	Type A, Subtype (H1)2009
		A(H1)2009 & B	Type B and Type A, Subtype (H1)2009
		A(H1N1) 2009	Type A, Subtype (H1N1)2009
		A(H1N1) 2009 & B	Type B and Type A, Subtype (H1N1)2009
		B	Type B

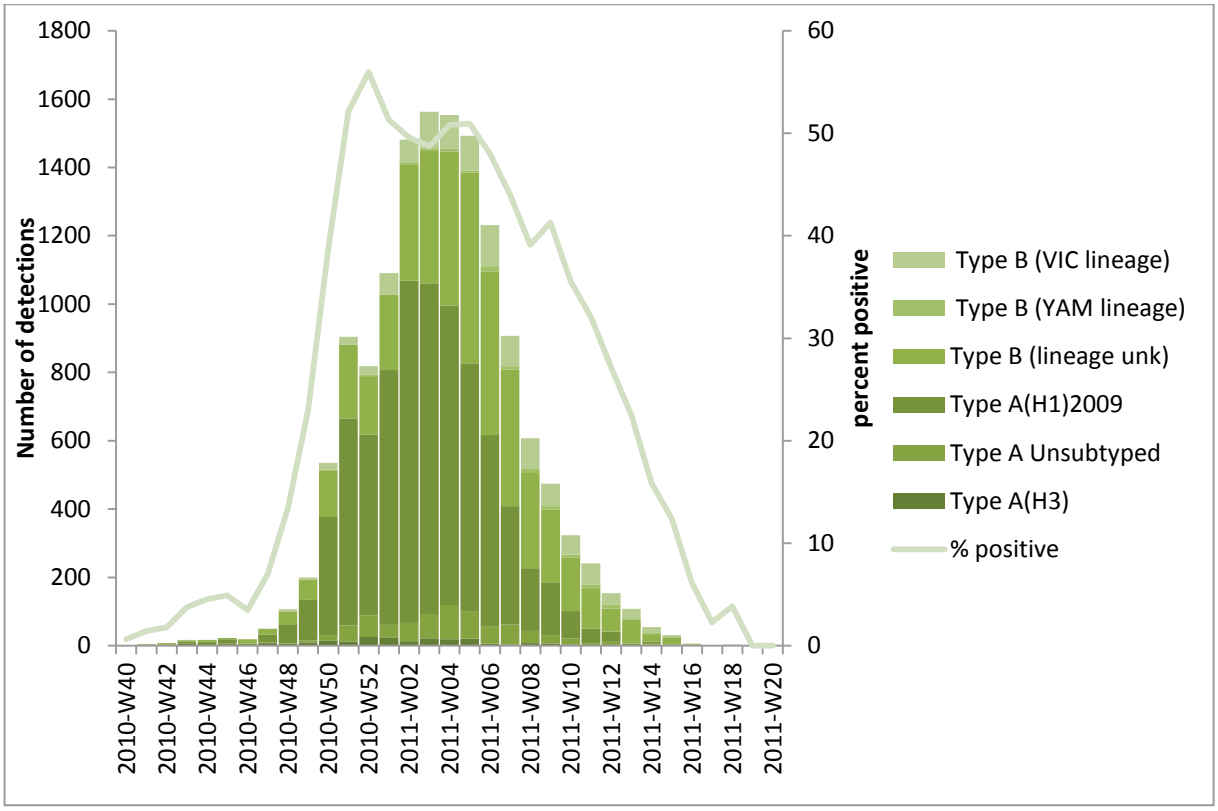
Figure 3: Distribution of the average proportion of reported ILI/ARI caseload by week, weeks 40/2010 to 20/2011, EU/EEA (28 countries).



3.1.2 Virological surveillance

In the 2010–2011 surveillance period, sentinel physicians in Europe collected 35 267 respiratory specimens, of which 14 030 (39.8%) tested positive for influenza virus. A total of 8 365 (59.6%) were type A and 5 665 (40.4%) were type B. Of the 7 672 sentinel type A viruses which were sub-typed, 7 445 (97.0%) were influenza A(H1N1)2009 viruses and 227 (3.0%) were A(H3). The weekly percentage of sentinel samples testing positive for influenza peaked at around 50% during weeks 51/2010 - 06/2011 (Figure 4). In addition, of 43 358 non-sentinel specimens found to be positive, 29 462 (68.0%) were type A, and 98.8% of the 19 321 A viruses sub-typed were the pandemic strain.

Figure 4: Distribution of number and percentage of sentinel samples positive for influenza, by week and type, weeks 40/2010–20/2011, EU/EEA (29 countries).



From week 40/2010 to week 20/2011, 8 4641 influenza viruses were detected from sentinel and non-sentinel specimens, mostly type A (Figure 5). Of these 4 535 influenza viruses were characterised antigenically (Figure 6), mostly as A/California/7/2009 (H1N1)-like or B/Brisbane/60/2008-like (Victoria lineage). Overall, 95.9% of the characterised viruses were antigenically similar to those included in the seasonal trivalent influenza vaccine [11].

Figure 5: Distribution of number of sentinel and non-sentinel samples positive for influenza, by week and type, weeks 40/2010-20/2011, EU/EEA (29 countries)

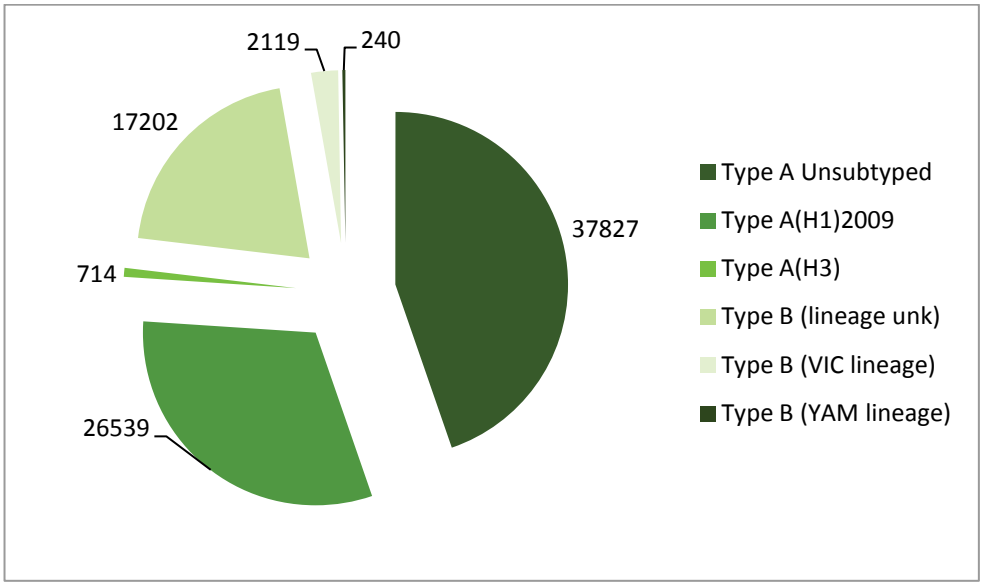
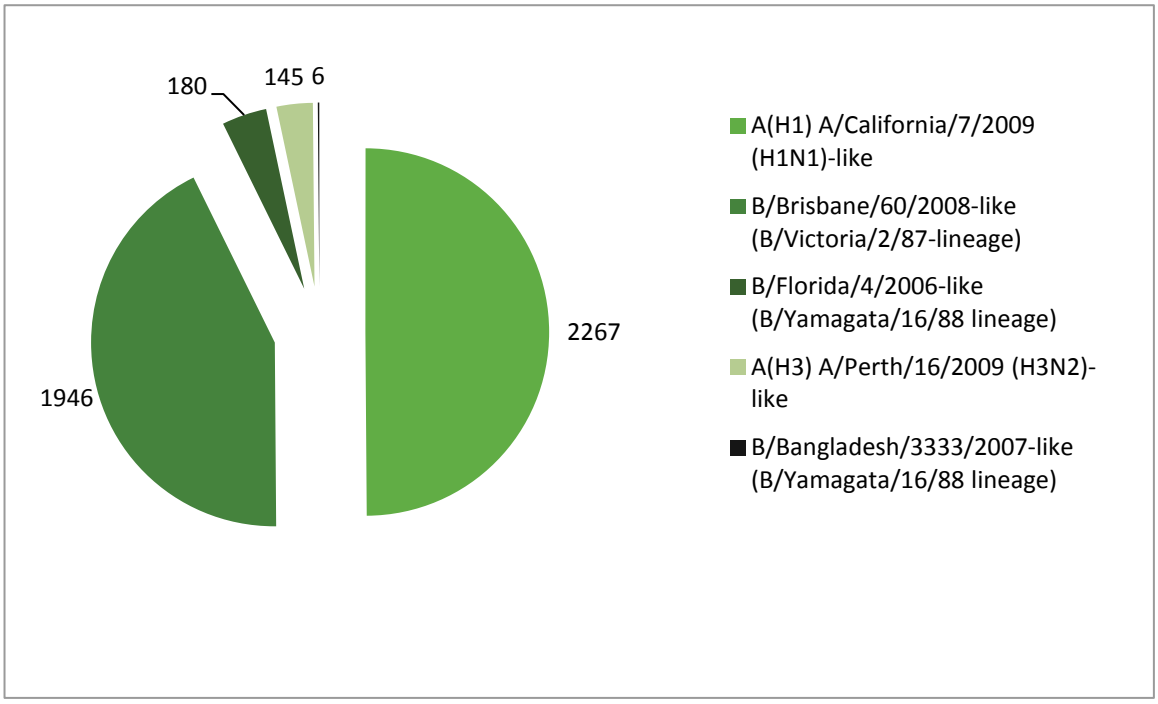


Figure 6: Distribution of specimen by antigenic characterisations of sentinel and non-sentinel influenza virus isolates, weeks 40/2010–20/2011, EU/EEA countries.



From week 40/2010 to week 20/2011, 21 countries reported antiviral resistance data to TESSy (Table 3). One hundred and eleven (3.2%) of 3 431 influenza A(H1N1)2009 viruses tested were resistant to oseltamivir, but all viruses tested remained sensitive to zanamivir. All resistant viruses carried the NA H275Y substitution. Of 58 patients infected with resistant viruses and for whom information about possible exposure to antivirals was available, 17 (29.3%) had not been treated with oseltamivir.

Table 3: Antiviral resistance by influenza virus type and sub-type, week 40/2010 to week 20/2011, EU/EEA countries.

Virus type and sub-type	Resistance to neuraminidase inhibitors				Resistance to M2 inhibitors	
	Oseltamivir		Zanamivir			
	no. tested	no. resistant (%)	no. tested	no. resistant (%)	no. tested	no. resistant (%)
A(H3N2)	90	0	88	0	43	43 (100)
A(H1N1)	0	0	0	0	0	0
A(H1N1) 2009	3431	111 (3.2)	3420	0	261	261 (100)
B	460	0	447	0		

3.2 Hospitalisations and deaths due to influenza

From week 40/2010 to week 20/2011, ten countries reported 5 072 cases as meeting the SARI case definition. Of these cases, 486 (9.6%) had a fatal outcome. An influenza virus infection was laboratory-confirmed in 3 690 SARI cases, of which 3 374 (91.4%) were type A and 316 (8.6%) were type B. Of the 2 971 influenza A viruses sub-typed, 2 948 (99.2%) were A(H1)2009 and 23 (0.8%) were A(H3).

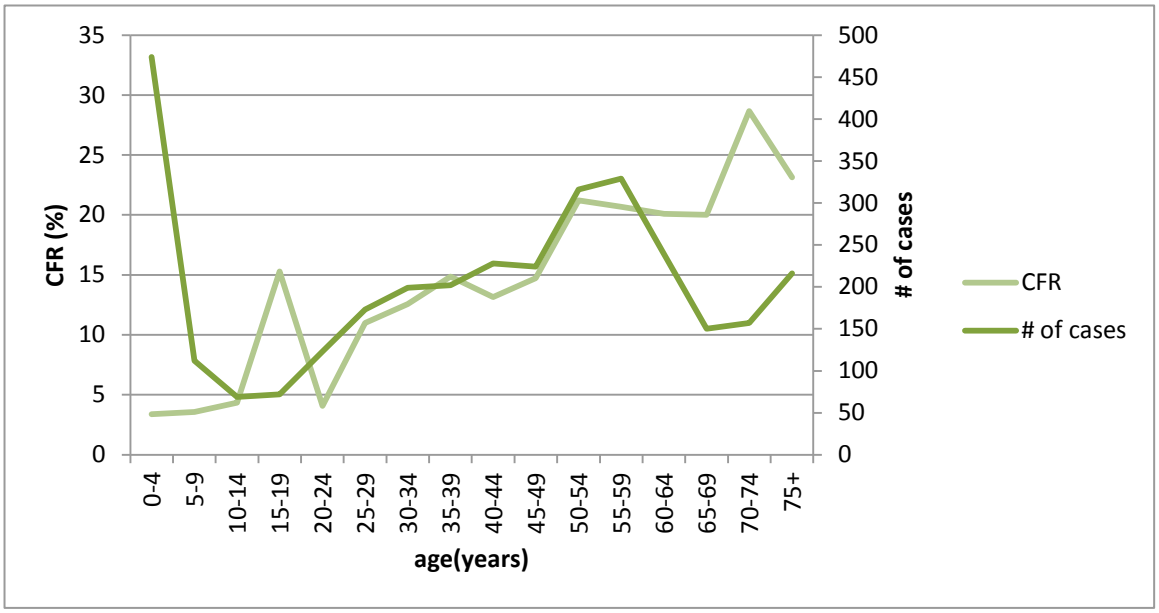
The distribution of SARI cases by age peaked in infants younger than one year and in patients aged 50–59 years, whereas the case fatality ratio increased with age (Figure 7).

The median age of in-patients infected by A(H1N1)2009 virus admitted to common care was 40 years (inter-quartile range (IQR) 16–59) compared to 49 years (IQR 33–59) for patients admitted to ICU. The male/female ratio was 1.3 in both groups. In patients admitted to ICU, the presence of at least one underlying condition was associated with a higher mortality: a fatal outcome was reported for 197 (31.8%) of 619 patients infected by

A(H1N1)2009 virus with at least one underlying condition, as compared to 27 (14.7%) of 184 patients without any underlying condition ($\chi 2 = 20.74$, $p<0.001$).

The risk groups for severe A(H1N1)2009 influenza were similar to the pandemic and unlike those for the preceding season's influenza. Cases requiring intensive care or resulting in a fatal outcome were more often young and middle-aged adults than would have been expected prior to 2009. Of the 3 283 cases for which age data are available, only 16% were over the age of 64 years. Elderly people were less likely to be infected, but when infected, there were more likely to have serious outcome. Of 3 642 severe cases with information on underlying conditions, 62% had at least one recognised risk factor for severe disease, most commonly chronic respiratory disease or asthma. Vaccination status was reported for 2 835 cases, 2 360 (83.2 %) of whom had not been vaccinated against influenza during the season.

Figure 7: Distribution of SARI cases and case-fatality ratio (CFR) by age group, week 40/2010 to week 20/2011, EU/EEA countries.



During the 2010-2011 influenza season, the EUROMOMO system for monitoring mortality in 14 EU/EFTA countries observed an increase in all-cause deaths in the age groups 15–64 years and 65 years and over around the turn of the year. However, it would be wrong to ascribe this excess mortality to influenza alone as it could also have been due to severe cold weather around that time of year, as well as the commonly observed excess mortality around Christmas and New Year [12].
Few countries have as yet formally reported their laboratory-confirmed influenza deaths or statistical estimates of any excess premature mortality attributable to seasonal influenza. The UK is an exception. It noted that the season of 2010–11 was marked by an increase in the number of confirmed influenza-related fatalities compared to the 2009–10 season. At the same time, a higher excess in all-cause mortality than during the previous season was briefly recorded in England and Wales [8].

3.3 Impact

No country reported their primary care services to have been under particular stress as a result of influenza. In parts of the UK and Ireland, however, there were reports of a heightened demand for vaccination when it became apparent that severe cases of influenza were occurring. This led to pressure on general practitioners and vaccine shortages [8]. Some networks of intensive care units reported being stressed by the high numbers of admissions attributable to influenza and the prolonged care required for cases with acute respiratory distress syndrome. In the UK [8], Ireland, Denmark and Greece [13], point prevalence rates of severe influenza cases peaked at over 1.0 per 1 000 000 population. While other European countries also reported fatalities and severe cases requiring intensive care management, those that collected national or population-based data (France, the Netherlands and Norway) all reported rates below 1.0 per 1 000 000[14].

Discussion and conclusions

In the first post-pandemic influenza season, influenza A(H1N1)2009 continued to circulate widely and was the dominant type A virus. However, in contrast to the pattern observed during the pandemic, the virus co-circulated with B viruses, which persisted through the season, to become predominant at the European level after week 6/2011. However, this was not the case in other parts of the Northern Hemisphere. For example, in both the USA and Canada, the dominant circulating virus was A(H3N2) [15, 16]. Such heterogeneity was seen in the previous inter-pandemic period (1977 to 2008). There were no confirmed reports of the previous seasonal A(H1N1) circulating. If its absence is sustained globally in 2011 and in the 2011–2012 Northern Hemisphere season, it should be possible to omit the '2009' or 'pdm' suffix of A(H1N1)2009 for ease of communication, while noting that the current proper nomenclature is A(H1N1)pdm09. The timing of virus circulation returned to the pattern observed during the previous inter-pandemic period (1977–2008) with only limited out-of-season community transmission reported in temperate countries across the Northern Hemisphere. However, the pattern of infection and the association between severe disease and age was similar to that observed in the pandemic and different to the 1977–2008 period. The pandemic strain, influenza A(H1N1)2009, continued to cause disease mainly among young and middle-aged adults. The majority of these were people with underlying conditions and some pregnant women [8]. The burden of severe disease was less than that previously reported in adults over the age of 65 years partly because of the very limited circulation of influenza A(H3N2) virus. It was observed in the pandemic that the burden of severe disease shifted to younger age groups, because older people (over age 65 years) possessed some immunity to A(H1N1)2009 due to earlier exposure to a similar virus[17]. However, older people who did become infected with A(H1N1)2009 during the pandemic were more likely to experience severe disease [10]. This pattern seemed to be repeated in the 2010/2011 season thus recommending influenza immunisation to older people as a risk group continues to be justified.

A few countries that dealt with a large number of severe cases reported considerable impact on hospital services and pressure on intensive care services in particular. In fact, severe cases admitted to intensive care were the first indicator that the season was beginning. This was most notable in the UK but also occurred in Ireland, Denmark, France and later Greece. However, it was not the case in other countries where ICU surveillance was in operation, such as the Netherlands. It is not clear to what extent these observations are novel, as surveillance for severe disease has not been routinely carried out in intensive care services in Europe. This experience suggests that such surveillance should be maintained and further developed. Both in the light of this and in anticipation of the recommendations of the WHO Review Committee on the Functioning of the International Health Regulations (2005) in relation to Pandemic (H1N1) 2009 [18], ECDC and its collaborators undertook a rapid risk assessment of the 2010–2011 epidemics, and its Director issued two warnings about the severity of the season, emphasising the importance of vaccination[19-21]. Working with the Member States and the WHO Regional Office for Europe, ECDC now makes an annual risk assessment with seasonal influenza epidemics[19,22], even if the epidemic appears to be less severe.

All three circulating viruses demonstrated very little antigenic drift over the last year and were closely related to the three strains contained in the seasonal influenza vaccine. In addition, all but a very small percentage of viruses tested remain sensitive to neuraminidase inhibitors. Most of the reports of resistant viruses were from people with severe conditions who were on antiviral therapy. Nevertheless, there were some cases of resistance associated with the H275Y mutation where there was no history of exposure to antiviral medications, indicating some community transmission of a resistant virus[23,24]. This re-emphasises the need to continue vaccinating and treating patients at high risk of developing severe disease promptly with antivirals. This includes both the elderly and the very young (noting that infants under six months, people suffering from chronic conditions and pregnant women do not benefit from immunisation).

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