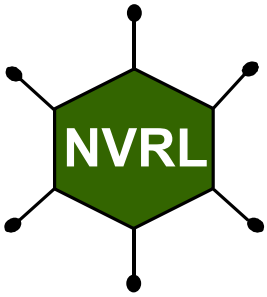
Summary Report of Influenza Season 2002/2003



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Summary Report of Influenza Season 2002/2003

Summary

This is the third year of influenza surveillance using computerised sentinel general practices in Ireland. The National Disease Surveillance Centre (NDSC) is working in collaboration with the National Virus Reference Laboratory (NVRL) and the Irish College of General Practitioners (ICGP) on this sentinel surveillance scheme. Influenza activity in Ireland was mild during the 2002/2003-influenza season, peaking in February 2003. A total of 347 influenza-like illness cases were reported by sentinel GPs during the 2002/2003 season. Eighty-six of the 247 swabs from sentinel GPs were positive for influenza virus this season. Influenza B was the predominant circulating strain.

Background to sentinel surveillance in Ireland

Clinical data

Thirty-four general practices were recruited to report electronically, on a weekly basis, the number of patients with influenza-like illness (ILI). ILI is defined as the sudden onset of symptoms with a temperature of 38^0C or more, with two or more of the following: headache, sore throat, dry cough and myalgia. Patients were those attending for the first time with these symptoms.

In total, the 34 sentinel general practices cover an estimated total practice population size of 93,859, representing 2.4% of the population (2002 population census). The 34 sentinel general practices include 56.5 general practitioners. Practices are located in all health boards with their location based on the population of each health board (table 1).

Table 1: Number of sentinel GPs by health board, percentage of total practice population and percentage of population in each health board, 2002/2003 season

Health Board/Authority	Number of GPs (n=34)	% of total practice population (n=93,859)	% of population (n=3,917,203*)
ERHA	12	28.2	35.8
MHB	1	3.1	5.8
MWHB	2	4.5	8.7
NEHB	3	14.9	8.8
NWHB	2	4.7	5.7
SEHB	6	29.7	10.8
SHB	6	9.9	14.8
WHB	2	4.9	9.7
Total	**34**	**100.0**	**100.0**

**Source: CSO 2002 population census*

The influenza surveillance period runs from week 40 in October to week 20 in May, with the week running Monday to Sunday. Sentinel GPs send an electronic report to the ICGP every Tuesday. All data received is anonymous. Information recorded includes the general practitioner ID number and patient data (date of birth, gender, date seen, diagnosis, weekending, week number and health board). If there are no cases of ILI, zero reporting is required.

Virological data
Sentinel GPs are requested to send a combined nasopharyngeal and throat swab on one patient per week where a clinical diagnosis of ILI was made. All materials necessary for swabbing, including instructions, easily identifiable laboratory forms and stamped addressed envelopes complying with An Post regulations, were supplied by the NVRL at the commencement of the surveillance season. Swabs were sent to the NVRL for testing using Shell Vial and PCR techniques. The NVRL supplied results on a weekly basis on the number of swabs received from each of the practices. The date of swab receipt, sex, date of birth and positive or negative results by PCR and/or Shell Vial by type and subtype are all reported.

Regional influenza activity
The Departments of Public Health send an influenza activity index (no report, no activity, sporadic-, localised-, regional- or widespread activity) every week, to NDSC. The activity index is analogous to that used by the WHO global influenza surveillance system and the European Influenza Surveillance Scheme. The index is based on sentinel GP ILI consultation rates, laboratory confirmed cases of influenza, sentinel hospital admissions data and/or sentinel school absenteeism levels. Sentinel hospital data are based on: total admissions, total A & E admissions and total respiratory admissions per week (the definition of respiratory illness in this instance includes upper respiratory tract infection, lower respiratory tract infection, pneumonia, asthma, chronic bronchitis and exacerbations of chronic obstructive airways disease). One sentinel hospital was located in each health board. Sentinel primary and secondary schools in each health board are located in close vicinity to the sentinel GPs. Each sentinel school reports absenteeism data on a weekly basis. The activity index by health board is included in a map of Ireland in the weekly influenza report.

Weekly influenza surveillance report
NDSC is responsible for producing a weekly influenza report, which is sent to all those involved in influenza surveillance in Ireland and also posted on the NDSC website each Thursday. Results of clinical and virological data are reported, along with a map of influenza activity and a summary of influenza activity worldwide.

Results for the 2002/2003 influenza season

Clinical data

GP consultations for influenza-like illness (ILI) were reported on a weekly basis per 100,000 population from week 40 2002 to week 20 2003 (figure 1). Influenza activity was very mild during the 2002/2003 influenza season, similar to the 2001/2002 season. The peak GP consultation rate occurred during week 8, with a rate of 52.6 per 100,000 population. This is compared to a peak rate of 29.0 per 100,000 in the 2001/2002 season and 121.0 per 100,000 in the 2000/2001 influenza season. The peak age specific consultation rate during the 2002/2003 season was in the 10-14 year age group (figure 2), coinciding with an increase in influenza B and increased sentinel school absenteeism associated with ILI. A total of 347 ILI cases were reported by sentinel GPs during the 2002/2003-influenza season, compared to 279 in the 2001/2002 season and 672 in the 2000/2001 season. Please note that the number of sentinel general practices has increased from 20 in 2000/2001, to 32 in 2001/2002 and 34 in 2002/2003.

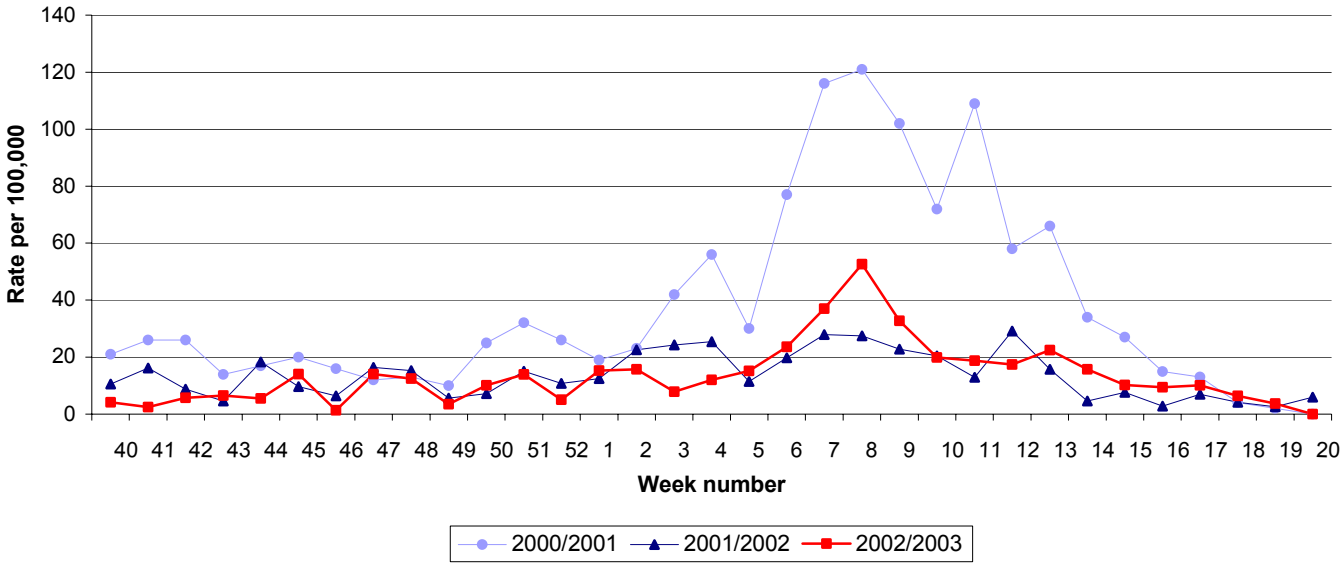

Figure 1: GP consultation rate for influenza-like illness per 100,000 population by report week, during the 2000/2001, 2001/2002 and 2002/2003 influenza seasons.

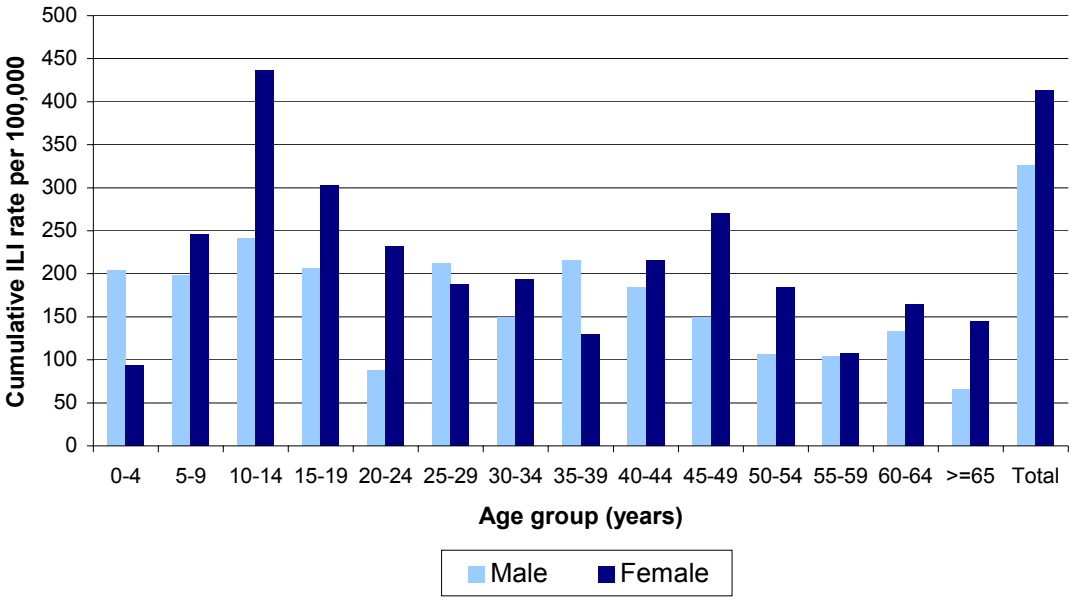

Figure 2: Cumulative age and sex specific ILI rate per 100,000 population from week 40 2002 to week 20 2003. *The denominator used in the age and sex specific consultation rate is from the 2002 census data; this assumes that the age and sex distribution of the sentinel general practices is similar to the national age and sex distribution.*

Virological data

Since the start of the 2002/2003-influenza season, the NVRL have tested 249 sentinel specimens for influenza virus, 86 (34.5%) were positive: 27 influenza A and 59 influenza B (tables 2 & 3). Influenza B was the predominant circulating influenza virus type this season, circulating between weeks 2 and 15 2003. This was followed by detection of influenza A between weeks 3 and 17 2003. The highest number of positive swabs detected this season was during weeks 6, 7, & 8 with between 52.4%-75.0% of swabs positive (figure 3), coinciding with the period of peak clinical activity. Influenza A accounted for 31.4% of positive swabs this season: 6 influenza A (H1) and 21 influenza A (H3N2). Influenza B accounted for 68.6% of positive swabs. Positive influenza virus detections peaked in the 10-14 year age group, mainly infected with influenza B (figure 4).

The NVRL tested a total of 1032 non-sentinel respiratory specimens mostly from hospitals during the 2002/2003 influenza season. Four (0.39%) were positive for Adenovirus, 303 (29.4%) for respiratory syncytial virus (RSV), 4 (0.39%) for parainfluenza virus type 1, 1 (0.10%) for parainfluenza virus type 2, 4 (0.39%) for parainfluenza virus type 3 and 1 (0.10%) for influenza A virus.

Table 2: Sentinel GP influenza results by type and season for the 2000/2001, 2001/2002 & 2002/2003 influenza seasons.

Season	Total swabs	Positive swabs	% Positive	Influenza A	Influenza B
2000/2001	329	140	42.6	55	85
2001/2002	242	65	27.0	64	1
2002/2003	**249**	**86**	**34.5**	**27**	**59**
Total	820	291	35.5	146	145

Table 3: Sentinel GP influenza results by type, subtype and report week for the 2002/2003 influenza season

Week number	Total swabs	Positive swabs	Percentage positive	Influenza A (H1)	Influenza A (H3N2)	Influenza B
40	4	0	0.0	0	0	0
41	1	0	0.0	0	0	0
42	4	0	0.0	0	0	0
43	3	0	0.0	0	0	0
44	3	0	0.0	0	0	0
45	7	0	0.0	0	0	0
46	1	0	0.0	0	0	0
47	4	0	0.0	0	0	0
48	6	0	0.0	0	0	0
49	3	0	0.0	0	0	0
50	5	0	0.0	0	0	0
51	8	0	0.0	0	0	0
52	5	0	0.0	0	0	0
1	7	0	0.0	0	0	0
2	11	1	9.1	0	0	1
3	9	1	11.1	0	1	0
4	15	3	20.0	0	2	1
5	16	5	31.3	0	1	4
6	16	12	75.0	1	0	11
7	17	11	64.7	1	0	10
8	21	11	52.4	0	1	10
9	12	9	75.0	0	2	7
10	9	7	77.8	0	0	7
11	8	3	37.5	0	0	3
12	7	4	57.1	0	3	1
13	10	5	50.0	2	2	1
14	10	4	40.0	0	3	1
15	8	7	87.5	2	3	2
16	7	0	0.0	0	0	0
17	6	3	50.0	0	3	0
18	4	0	0.0	0	0	0
19	2	0	0.0	0	0	0
20	0	0	0.0	0	0	0
Total	**249**	**86**	**34.5**	**6**	**21**	**59**

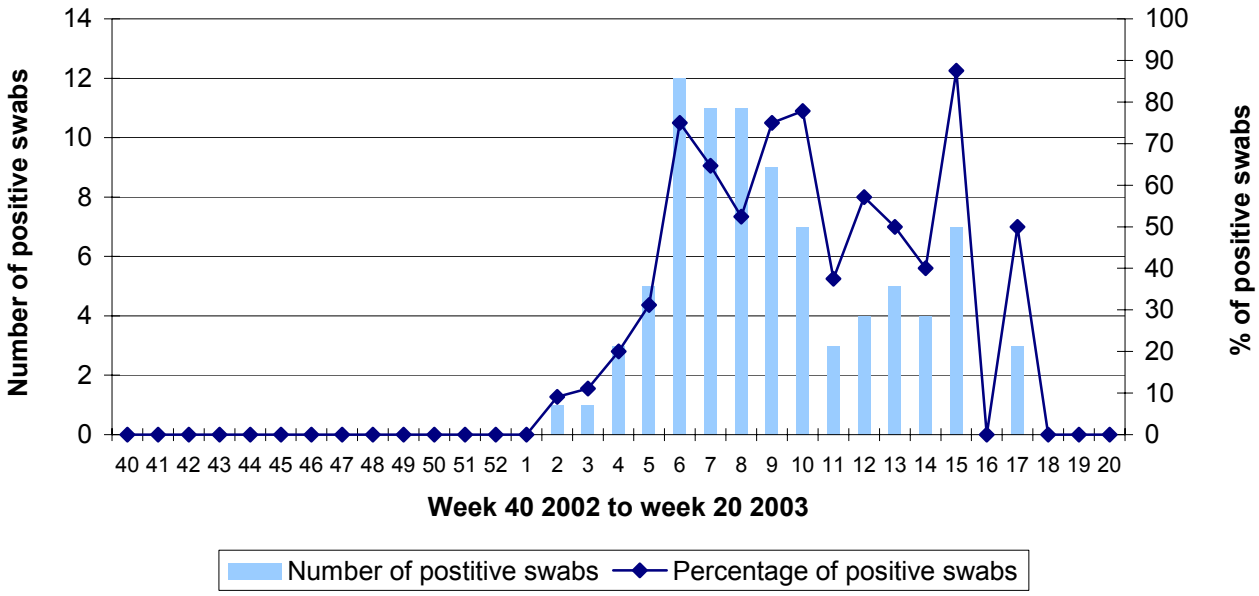

Figure 3: Number and percentage of sentinel influenza virus positive detections during the 2002/2003-influenza season.

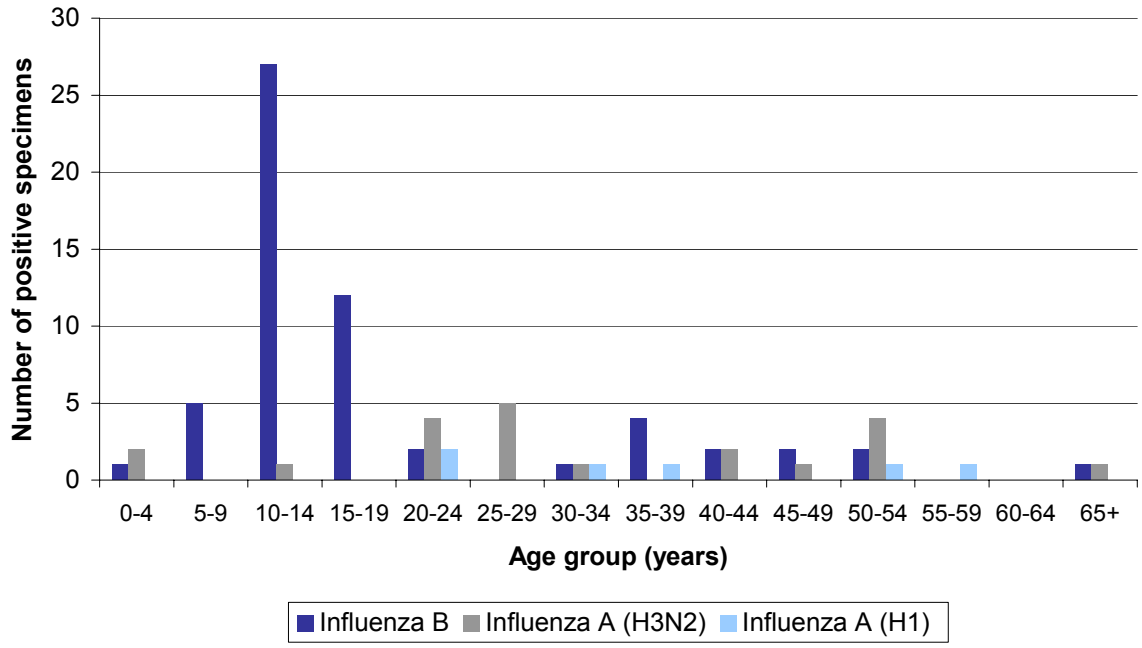

Figure 4: Number of sentinel swabs positive for influenza virus by type, subtype and age group (years), between week 40 2002 and week 20 2003.

Antigenic characterisation
The NVRL referred one influenza B and 2 influenza A (H3N2) virus isolates to the World Health Organisation Laboratory in London for antigenic characterisation. The influenza B virus was antigenically closely related to B/Hong Kong/330/2001-like virus. The 2 influenza A (H3N2) isolates were antigenically closely related to A/Panama/2007/99. All isolates were covered by the 2002/2003 influenza vaccine.

Vaccination status
Of the 86 positive influenza virus cases, 64 (74.4%) were not vaccinated, 2 (2.3%) were vaccinated and 20 (23.3%) were of unknown vaccination status (table 4).

Table 4: Influenza vaccination status of influenza virus positive cases during the 2002/2003-influenza season (n=86)

Influenza type/subtype	Unknown vaccination status	Vaccinated	Not vaccinated	Positive cases
Influenza A (H1)	4	0	2	6
Influenza A (H3N2)	12	1	8	21
Influenza B	4	1	54	59
Total	**20**	**2**	**64**	**86**

Influenza activity by health board/authority
Regional or widespread influenza activity was not reported during the 2002/2003-influenza season. Prior to week 47 2002, up to 2 health boards reported sporadic influenza activity weekly, with the remaining health boards reporting no influenza activity. Between weeks 47 2002 and 4 2003, 1 to 4 health boards reported sporadic activity weekly. Influenza activity peaked between weeks 5 and 13 2003, with 4 to 7 health boards reporting sporadic activity weekly. During week 8, the period of peak clinical activity, localised influenza activity was reported from the NEHB, with 6 other health boards reporting sporadic activity (figure 5). After week 13 2003, little or no influenza activity was reported in Ireland.

The influenza activity index is compiled using sentinel GP ILI consultation rates, laboratory confirmed cases of influenza, sentinel hospital admissions data and/or sentinel school absenteeism levels. In some health boards increases in the number of ILI cases were reflected by increases in hospital respiratory admissions and also occasionally by increases in school absenteeism. Between weeks 6 and 8, increased absenteeism was reported in several sentinel primary and secondary schools in the ERHA, NEHB and the SEHB, often associated with ILI. One school with increased absenteeism during week 7; reported symptoms including GI tract manifestations and headaches. GI tract manifestations are uncommon for influenza in adults but have been reported in school outbreaks of influenza B and influenza A (H1N1) in the US.

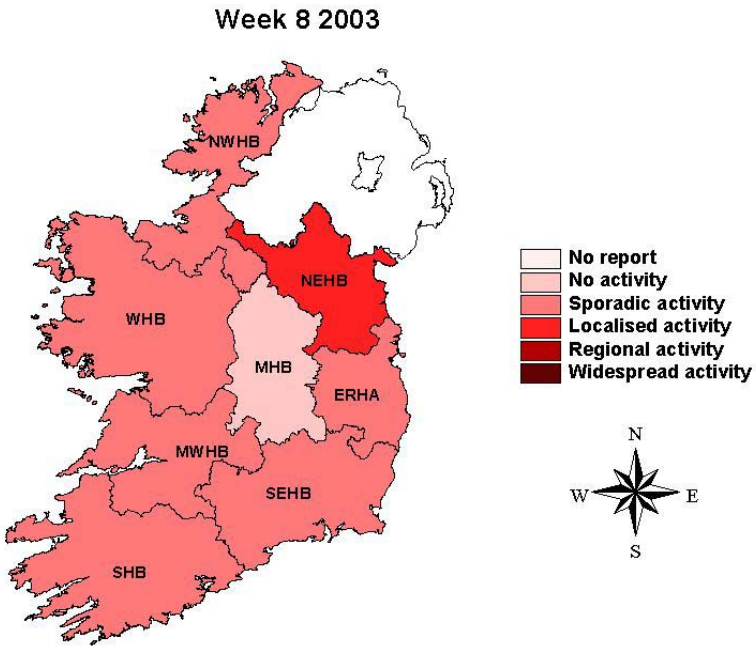

Figure 5: Map of influenza activity by health board during week 8 2003, the period of peak influenza activity

Respiratory Syncytial Virus

RSV is the single most important cause of hospitalisation for viral respiratory tract disease in infants and young children and is a major cause of nosocomial infection. The NVRL have been collecting data on RSV positive specimens since September 1988. RSV data from the NVRL provides comprehensive surveillance of RSV infection in infants treated in hospitals and is a good indicator of seasonal patterns. Between October 2002 and May 2003, the number of RSV positive detections from hospital respiratory specimens referred to the NVRL reached the highest level on record. Three hundred and three RSV positive specimens were detected (figure 6), peaking in weeks 48 and 49 2002, earlier than normal. RSV usually peaks in late December /early January each year. Prior to the 2002/2003 season, the highest number of RSV positive specimens detected by the NVRL was 250 in the 1998/1999 season. Of the 303 positive RSV cases identified between October 2002 and May 2003, 11.2% (34) were less than 1 month old, 67.7% (205) were between 1 and 6 months, 16.8% (51) were between 7 and 12 months and 2.3% (7) were over 12 months old.

During the 2002/2003 season, the NVRL carried out a pilot study to assess the incidence of RSV in sentinel specimens. All sentinel specimens received at the NVRL, from week 40 2002 to week 5 2003 (n=77), which tested negative for influenza were included in the study. This timeframe coincided with the RSV season for 2002/2003. The pilot was carried out using molecular technology. Of the 77 sentinel swabs tested, 7 (9.1%) were positive for RSV. Subsequent subtype analysis identified 4 of the samples as RSV A and 3 as RSV B viruses. These results confirm international experience and suggest that consideration should be given to expanding the respiratory screen in sentinel specimens to include RSV in future surveillance.

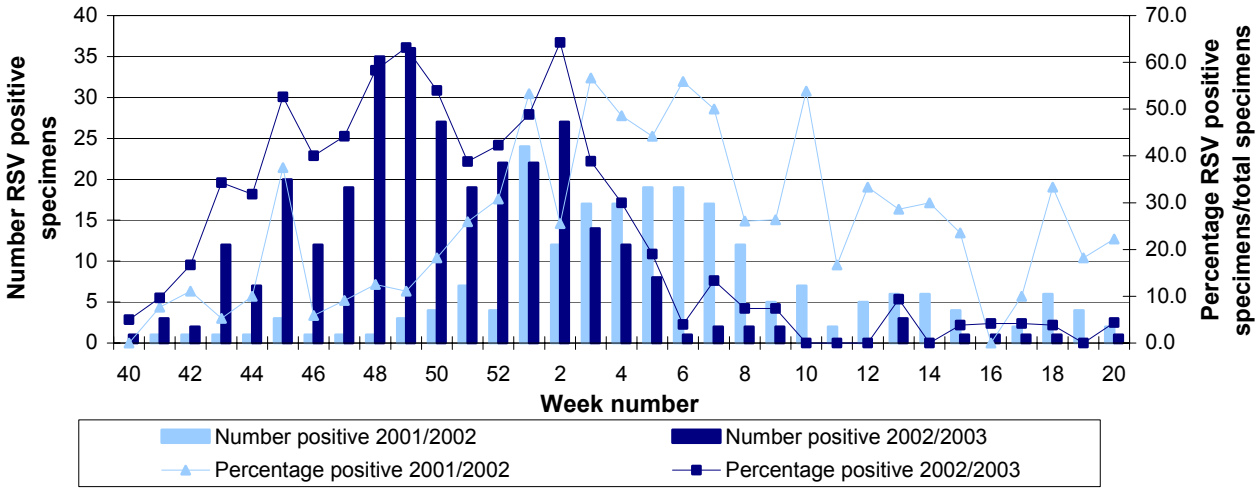

Figure 6: Number and percentage of non-sentinel RSV positive specimens detected during the 2001/2002 and 2002/2003 influenza seasons.

Influenza activity worldwide

Northern Ireland

In Northern Ireland, morbidity levels for influenza and ILI were low during the 2002/2003. Sentinel GP consultation rates were higher overall than those recorded during the previous 2 seasons. However, consultation rates for influenza have remained consistently low, since the enhanced surveillance system for influenza began in 2000. Influenza B predominated in Northern Ireland during the 2002/2003 season. Laboratory confirmed RSV infection peaked in weeks 50 and 51, 2 to 3 weeks earlier then expected, as in the Republic of Ireland.

England, Scotland & Wales

In England, Scotland and Wales, ILI consultation rates peaked in January 2003. Highest consultation rates were amongst children, in the 0-4 year age group in week 51 2002 and the 5-14 year age group in week 4 2003. Influenza B was the predominant influenza type circulating for most of the season. During late January and early February 2003, influenza B outbreaks were reported in schools in southern and central England. Influenza A detections increased early in 2003, with influenza A (H3N2) being the major subtype. The majority of isolations were confirmed as similar to the 2002/2003 vaccine strains.

Europe

Across Europe, influenza activity remained low during the 2002/2003 season. Influenza B was the dominant type until week 6 2003, mainly circulating in the south west and west of Europe. From week 7 2003, influenza A was the dominant type, mainly circulating in Central Europe. Overall, the number of influenza A positives was higher than the number of influenza B positives in sentinel respiratory specimens reported to the European Influenza Surveillance Scheme (EISS) during the 2002/2003 influenza season.

More than 99% of the viruses detected through the EISS network have been closely related to the 2002/2003 influenza vaccine strains. A very small number of influenza A (H3N2) viruses (detected in England, Norway, and Switzerland) have, however, shown reduced reactivity to

A/Panama/2007/99 antiserum (similar to A/Fujian/411/2002). Considering that these viruses are uncommon and there is no A/Fujian/411/2002-like virus suitable as a vaccine candidate isolated in embryonated eggs, the composition of the 2003/2004 influenza vaccine in the Northern Hemisphere will remain the same as the 2002/2003 season.

US, Canada & Hong Kong

In the US, the 2002/2003 influenza season was also mild, with influenza A (H1) and B viruses circulating widely, and the predominant virus varying by region and time of season. Influenza morbidity peaked during early to mid February 2003. In Canada, influenza A (H1N2) was the predominant circulating strain during the 2002/2003 season; all viruses identified in Canada this season were closely related to the current vaccine strains.

In Hong Kong, influenza activity was mild to moderate during the 2002/2003 season, with influenza positive detections peaking in March 2003. Influenza B predominated between October 2002 and January 2003, followed by influenza A (H3N2) predominating between February and May 2003.

Influenza A (H7N7) in the Netherlands

In February 2003, outbreaks of highly pathogenic avian influenza, influenza A (H7N7), were reported in several Dutch poultry farms. Following this, avian cases were reported in Belgium and Germany. Human cases of conjunctivitis and ILI, including one death, were associated with the outbreaks. There was also evidence of human-to-human transmission in the Netherlands and Belgium. These outbreaks involved the culling of approximately 30 million birds.

Influenza A (H5N1) in Hong Kong

In February 2003, an outbreak of influenza A (H5N1) in Hong Kong was limited to two cases, one of whom died; both cases were members of the same family. The influenza virus that infected these two cases contained no human genes (the virus genes were purely avian in origin); therefore the risk of human-to-human transmission was very low and unlikely to lead to an epidemic. The virus belongs to a different genetic lineage then that of a similar H5N1 virus that caused an outbreak in Hong Kong in 1997, resulting in 18 human cases and six deaths.

2003/2004 Northern Hemisphere influenza vaccine

On February 28th 2003, WHO published a recommendation on the composition of influenza vaccines for use in the 2003-2004 influenza season:

- A/New Caledonia/20/99(H1N1)-like virus
- A/Moscow/10/99(H3N2)-like virus*
- B/Hong Kong/330/2001-like virus**

* The widely used vaccine strain is A/Panama/2007/99

** Currently used vaccine strains include B/Shandong/7/97, B/Hong Kong/330/2001, B/Hong Kong/1434/2002

Discussion

Influenza activity has been mild in Ireland during the 2002/2003 influenza season, similar to the 2001/2002 season. This low level of influenza activity was also reflected in Northern Ireland, England, Scotland and Wales and throughout much of Europe. Influenza B was the predominant virus type circulating this season in Ireland. It is of interest to note that the majority of influenza B cases identified in Ireland were aged between 10 and 19 years of age, corresponding with the highest GP consultation rates for ILI. The peak in influenza B detections also coincided with increases in school absenteeism associated with ILI in sentinel schools in some health boards. In England, influenza B outbreaks were also reported in day and boarding schools. Among school children absenteeism due to ILI is a useful indirect measure of influenza morbidity.

In some health boards during the 2002/2003 season, increases in the number of ILI cases were reflected by increases in hospital respiratory admissions. Studies have revealed increases in both the number of emergency room admissions and the proportion of those attending with respiratory symptoms during influenza epidemics. However, due to the low incidence of ILI this season a direct relationship between increases in hospital admissions and the incidence of ILI was difficult to ascertain. This will however be a good indicator in the future of influenza morbidity levels, in particular during influenza epidemics.

Further expansions and improvements in the present influenza surveillance system in Ireland are now being put in place for the forthcoming season, including an increase in the number of sentinel GPs and the number of sentinel swabs. The detection of influenza A (H7N7) in the Netherlands and influenza A (H5N1) in Hong Kong during the 2002/2003-influenza season has emphasised the importance of timely national surveillance systems for influenza.

Acknowledgements

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