

# Influenza Surveillance in Ireland - Weekly Update

Influenza Week 14 2010 (5<sup>th</sup> to 11<sup>th</sup> April 2010)



## Summary

- All indicators of influenza activity in Ireland remained at low levels during week 14 2010:
  - ♦ The sentinel GP influenza-like illness (ILI) consultation rate was 2.2 per 100,000 population during week 14, a decrease compared to the updated rate of 4.1 per 100,000 reported during week 13\*. This rate is well below the Irish baseline threshold of 17.8 per 100,000 population.
  - ♦ ILI consultation rates were at low levels in all age groups.
  - ♦ No influenza positive specimens were reported during week 14 2010.
  - ♦ No cases of confirmed pandemic (H1N1) 2009 were admitted to hospital or ICU.
  - ♦ No pandemic (H1N1) 2009, influenza or ILI outbreaks were reported.
  - ♦ No respiratory syncytial virus (RSV) positive specimens were reported.
- Based on surveillance of laboratory confirmed cases of pandemic (H1N1) 2009 since the beginning of the pandemic:
  - ♦ 4,585 confirmed cases were notified in Ireland, as of 10<sup>th</sup> April 2010
  - ♦ Children and young adults were the most affected groups; 80.0% of cases were less than 35 years of age.
- Twenty-five deaths in confirmed cases of pandemic (H1N1) 2009 have been reported to date (14<sup>th</sup> April 2010).

## Introduction

In order to monitor influenza activity in Ireland a number of surveillance systems are in place:

1. Irish College of General Practitioners (ICGP) sentinel surveillance system
2. GP out-of-hours system
3. Virological data from the National Virus Reference Laboratory (NVRL), Cork University Hospital (CUH) and University College Hospital, Galway (UCHG)
4. Enhanced surveillance system for pandemic (H1N1) 2009 using the Computerised Infectious Disease Reporting system (CIDR)
5. Outbreak reporting (CIDR)
6. Pandemic (H1N1) ICU enhanced surveillance system

Details of these surveillance systems are provided in Appendix A at the back of this report.

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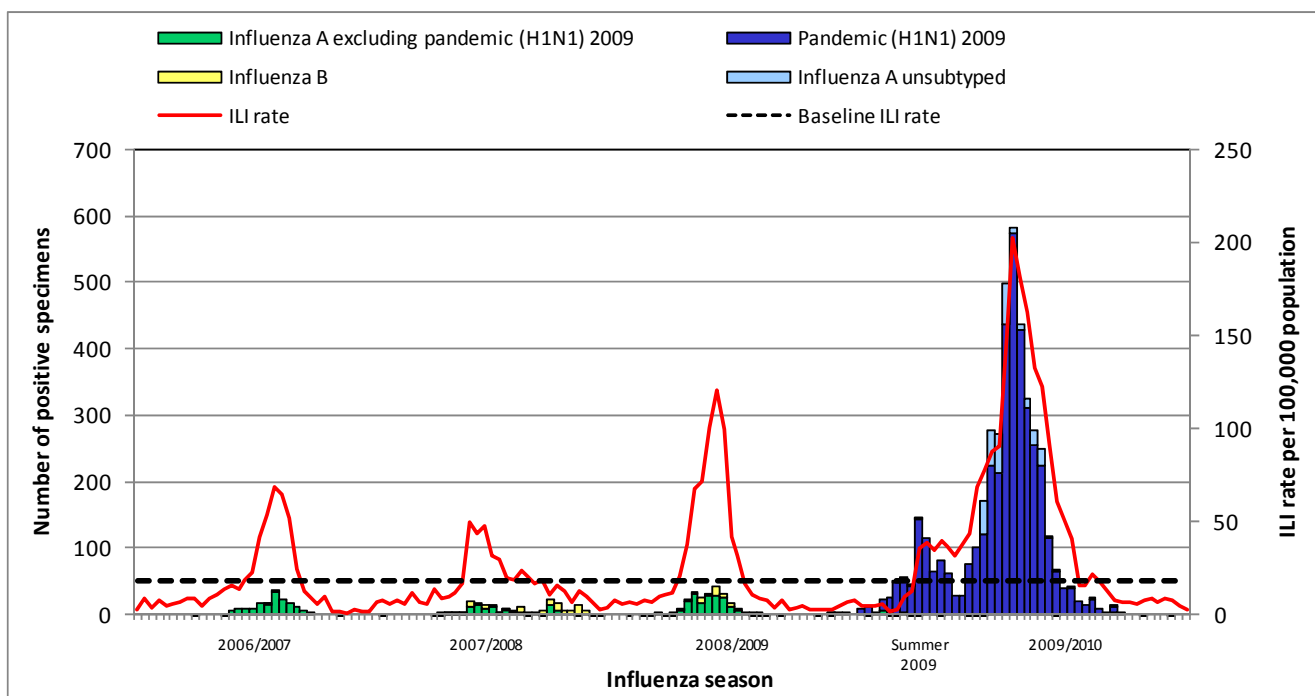
\* Since the last report, extra information on the number of ILI consultations and positive influenza specimens was provided by sentinel GPs and the NVRL and rates were adjusted accordingly.

## 1. GP sentinel surveillance system

### Clinical Data

During week 14 2010, 58 of 60 (96.7%) ICGP sentinel general practices provided data, with five practices (8.3%) reporting influenza-like illness (ILI) cases and 55 (91.7%) practices reporting no ILI cases. Five ILI cases were reported during week 14 2010, corresponding to an ILI consultation rate of 2.2 per 100,000 population, which is a decrease compared to the updated rate of 4.1 per 100,000 population reported during week 13 2010 and is well below the Irish baseline threshold<sup>†</sup>.

Figure 1 shows the ILI consultation rates, the baseline threshold rate and the number of positive specimens detected by the National Virus Reference Laboratory (NVRL), Cork University Hospital (CUH) and University College Hospital, Galway (UCHG). CUH and UCHG have reported influenza positive non-sentinel specimens since weeks 31 and 36, 2009, respectively and these are included in figure 1. Influenza A untyped isolates (probable pandemic (H1N1) 2009) are specimens that are awaiting laboratory confirmation as pandemic (H1N1) 2009.



**Figure 1: ILI GP consultation rates per 100,000 population, baseline ILI threshold rate, and number of positive influenza specimens, by influenza week and season<sup>‡</sup>**

Source: NVRL, CUH and UCHG laboratory data and ICGP clinical ILI data

During week 14 2010, sentinel GPs reported four cases in the 15-64 year age group (2.5 per 100,000 population) and one case in those aged 65 years and older (3.9 per 100,000 population) as shown in figure 2. No cases were reported in the 0-4 and 5-14 year age groups.

<sup>†</sup> Since the last report, extra information on the number of ILI consultations and positive influenza specimens was provided by sentinel GPs and the NVRL and rates were adjusted accordingly

<sup>‡</sup> Please note that virological data for NVRL is for all seasons, for CUH is from week 31 2009 and for UCHG is from week 36 2009.

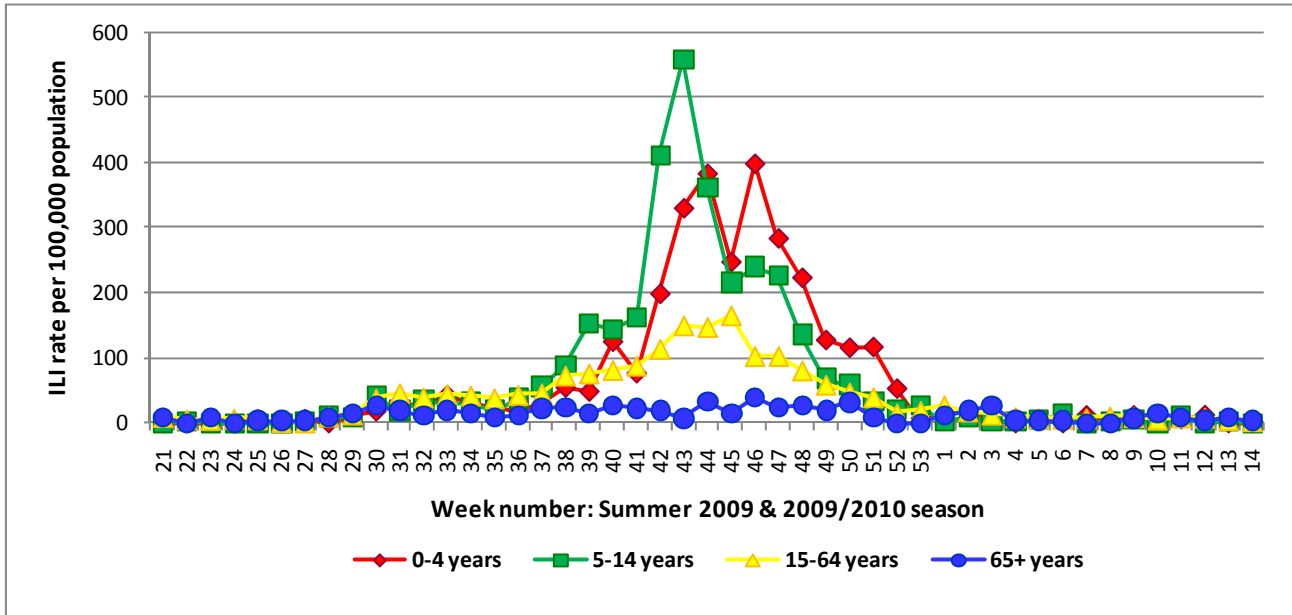


Figure 2: Age specific sentinel GP consultation rate for ILI per 100,000 population by week during the Summer 2009 and 2009/2010 influenza season

Source: ICGP ILI clinical data

### Regional Influenza Activity by HSE-Area

Influenza activity is reported on a weekly basis from the Departments of Public Health in each HSE area. Influenza activity is based on sentinel GP ILI consultation rates, laboratory confirmed influenza cases and ILI/influenza outbreaks. During week 14 2010, no influenza activity was reported by HSE-E, -M, -NW, and -S while sporadic activity (due to isolated cases of ILI and/or isolated laboratory confirmed cases of influenza) was reported by HSE-MW, -NE, -SE and -W (figure 3).

### Sentinel hospitals and schools

The Departments of Public Health have established at least one sentinel hospital in each HSE area (n=8), to report data on total hospital admissions, total emergency admissions and total respiratory admissions by age group on a weekly basis. Sentinel primary and secondary schools were also established in each area, in close proximity to the sentinel GPs, to report absenteeism data on a weekly basis. Data were received from four HSE areas during week 14 2010. No significant increases in the proportion of respiratory admissions were reported by sentinel hospitals during week 14 2010. No absenteeism data were available from sentinel schools during weeks 13 and 14 2010 due to school holidays.

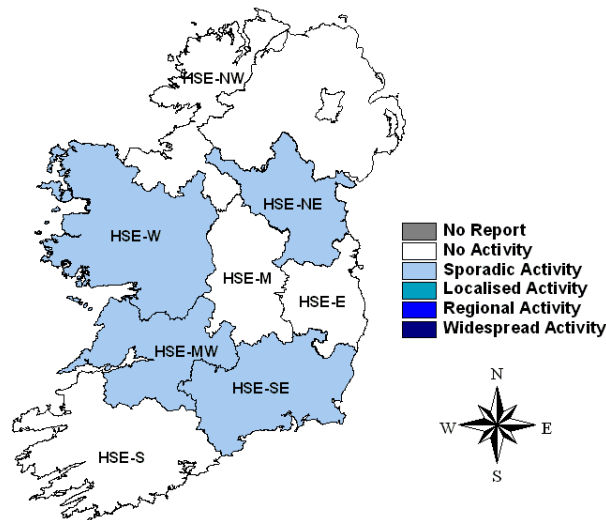


Figure 3: Map of provisional influenza activity by HSE area during influenza week 14 2010

## 2. GP Out-Of-Hours services surveillance

The Department of Public Health in the HSE-NE is collating national data on calls to nine of thirteen GP Out-of-Hours services in Ireland. Clinical details from all calls are recorded. Records with clinical symptoms reported as flu or influenza are extracted for analysis. This information may act as an early indicator of increased ILI activity. However, data are self-reported by callers and are not based on coded influenza diagnoses. The percentage of flu-related calls was 1.4% during week 14, which remains stable compared to the proportion (1.4%) reported during week 13 (figure 4).

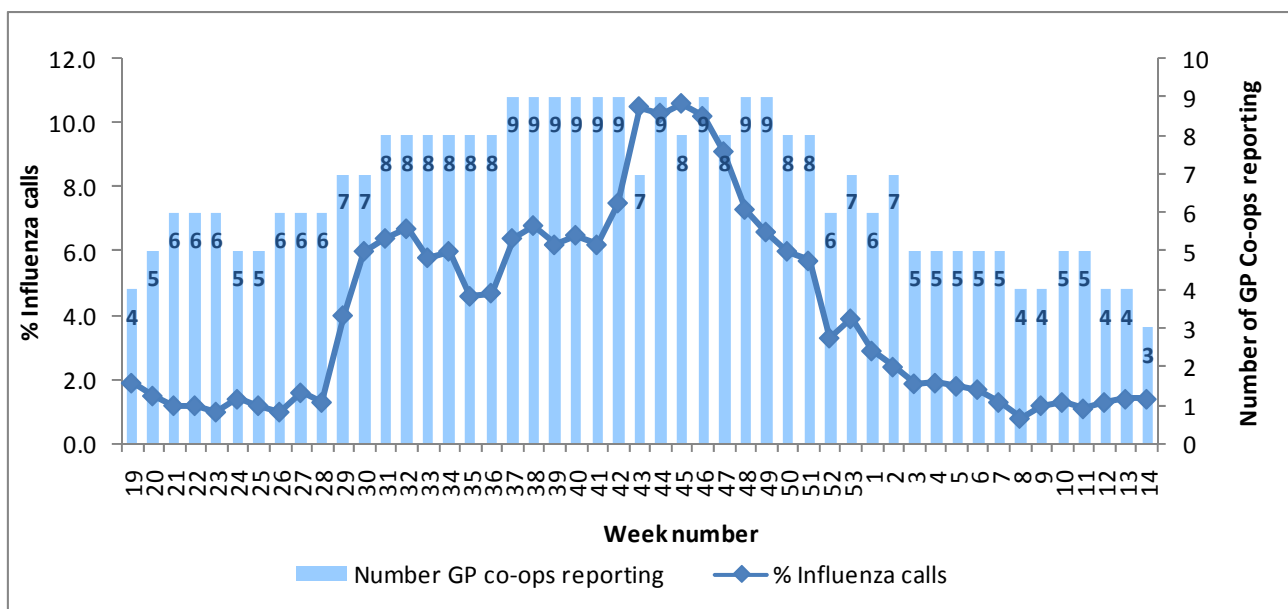


Figure 4: Flu-related calls as a proportion of total calls to out-of-hours GP Co-ops by week Source: HSE-NE.

### 3. Virological Data from the National Virus Reference Laboratory (NVRL), Cork University Hospital (CUH) and University College Hospital, Galway (UCHG)

During week 14 2010, no specimens from the National Virus Reference Laboratory (NVRL), Cork University Hospital (CUH) or University College Hospital, Galway (UCHG) were positive for influenza.

Two specimens from sentinel GPs were tested by the National Virus Reference Laboratory (NVRL) during week 14 2010, both were negative for influenza.

The NVRL also tested 52 non-sentinel specimens taken during week 14, all of which were negative for influenza. Four (7.7%) non-sentinel specimens (tested by the NVRL) were positive for parainfluenza virus type 3. No specimens were positive for RSV, adenovirus or parainfluenza viruses type 1 and 2 (table 1 and table 3). Figure 5 shows the number and percentage of non-sentinel RSV positive specimens detected by the NVRL during the 2009/2010 influenza season compared to the 2008/2009 influenza season.<sup>5</sup>

UCHG tested one non-sentinel specimen taken during week 14 2010, which was negative for influenza. No data were provided by CUH for week 14 2010 (table 2).

During the 2009/2010 influenza season, pandemic (H1N1) 2009 has been the sole influenza virus circulating. Figure 6 shows the number of sentinel specimens tested by the NVRL for influenza and non-sentinel specimens tested by the NVRL, CUH and UCHG for influenza and the percentage of specimens positive for influenza by week number for Summer 2009 and the 2009/2010 influenza season.

To date, the NVRL has performed neuraminidase sequencing on 23 non-sentinel pandemic (H1N1) 2009 isolates. Oseltamivir susceptibility results are available for 23 isolates, of which all were susceptible to oseltamivir. Zanamivir susceptibility results are available for 17 isolates, of which all were susceptible to zanamivir.

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<sup>5</sup> Please note that non-sentinel specimens (i.e. specimens other than sentinel specimens) from the NVRL may include more than one specimen from each case

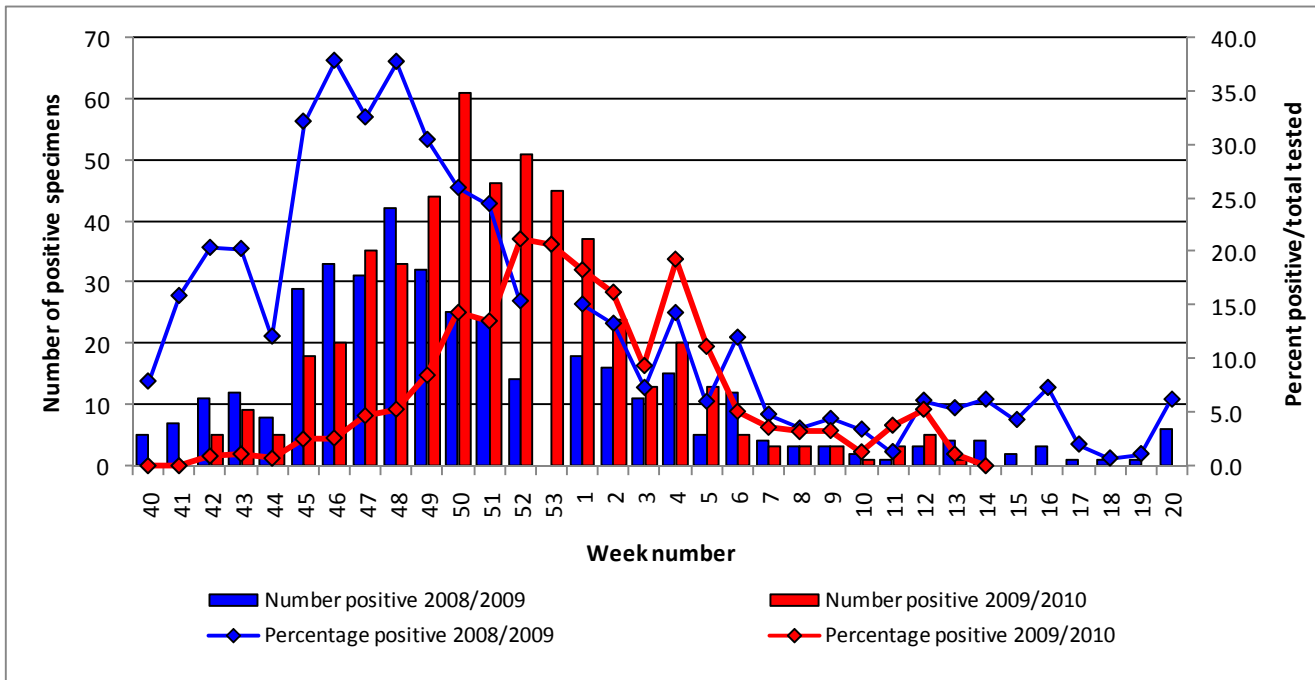


Figure 5: NVRL non-sentinel RSV activity for influenza season 2009/2010 compared to influenza season 2008/2009\*\*  
 Source: NVRL

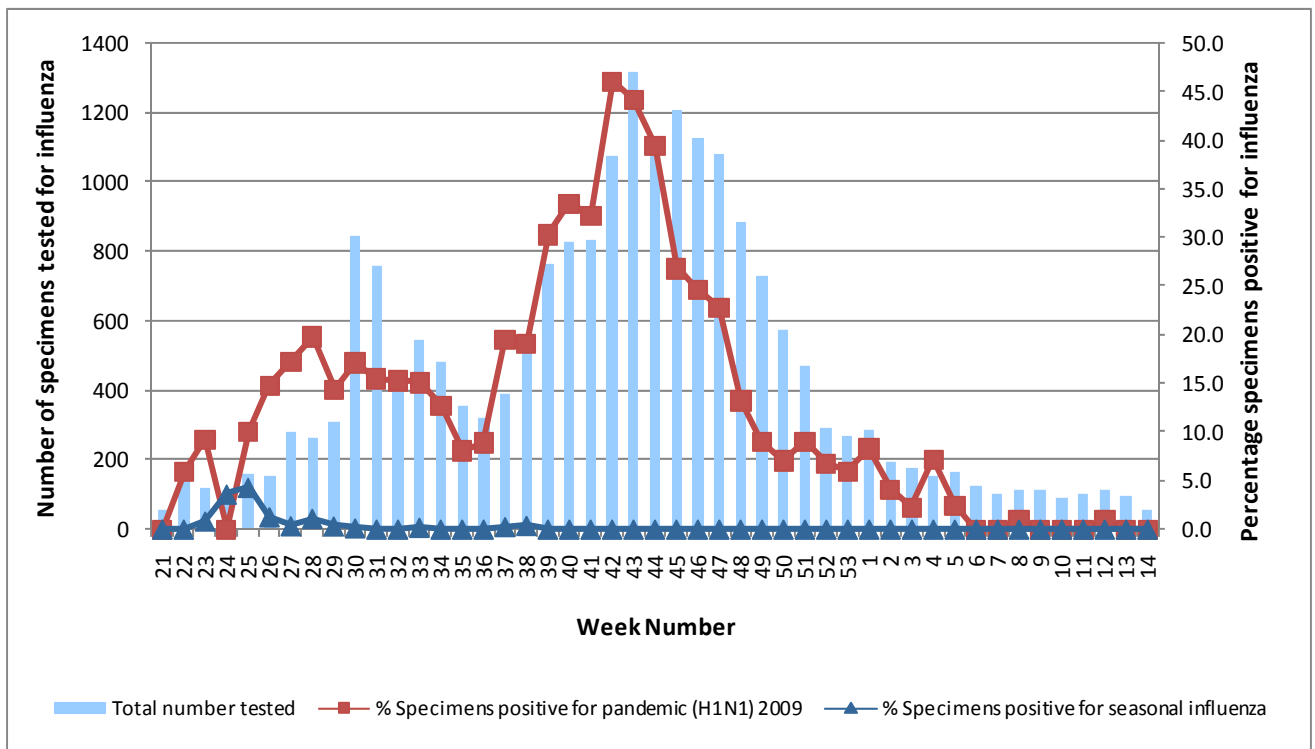


Figure 6: Number of sentinel and non-sentinel specimens tested for influenza and percentage influenza positive\*\*  
 Source: NVRL, CUH & UCHG

\*\* Please note there was no week 53 in 2008.

\*\* Virological data for NVRL is from week 21 2009, for CUH is from week 31 2009 and for UCHG is from week 36 2009.

**Table 1: Number of sentinel and non-sentinel respiratory specimens tested and positive results, influenza week 14 2010 and Summer 2009 & 2009/2010 season to date<sup>††</sup> Source: NVRL, CUH and UCHG**

Week number	Specimen type	Total Specimens tested for influenza	Number Influenza Positive	% Influenza Positive	Confirmed Pandemic (H1N1) 2009	Probable Pandemic (H1N1) 2009	Influenza A(H3)	Influenza A(H1)	Influenza A (unsubtyped)	Influenza B	% Pandemic (H1N1) 2009
<b>14 2010</b>	Sentinel	2	0	0.0	0	0	0	0	0	0	0.0
	Non-sentinel	53	0	0.0	0	0	0	0	0	0	0.0
	<b>Total</b>	<b>55</b>	<b>0</b>	<b>0.0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.0</b>
<b>Summer 2009 &amp; 2009/2010 season to date</b>	Sentinel	2249	773	34.4	770	0	3	0	0	0	99.6
	Non-sentinel	19459	3907	20.1	3582	300	0	0	22	3	99.4
	<b>Total</b>	<b>21708</b>	<b>4680</b>	<b>21.6</b>	<b>4352</b>	<b>300</b>	<b>3</b>	<b>0</b>	<b>22</b>	<b>3</b>	<b>99.4</b>

**Table 2: Number of non-sentinel respiratory specimens tested and positive results by laboratory, influenza week 14 2010 and Summer 2009 & 2009/2010 season to date<sup>§§</sup> Source: NVRL, CUH and UCHG**

Week number	Laboratory	Total Specimens tested for influenza	Number Influenza Positive	% Influenza Positive	Confirmed Pandemic (H1N1) 2009	Probable Pandemic (H1N1) 2009	% Pandemic (H1N1) 2009	Influenza A (unsubtyped)	Influenza B
<b>14 2010</b>	NVRL	52	0	0.0	0	0	0.0	0	0
	CUH	NR	NR	NR	NR	NR	NR	NR	NR
	UCHG	1	0	0.0	0	0	0.0	0	0
	<b>Total</b>	<b>53</b>	<b>0</b>	<b>0.0</b>	<b>0</b>	<b>0</b>	<b>0.0</b>	<b>0</b>	<b>0</b>
<b>Summer 2009 &amp; 2009/2010 season to date</b>	NVRL	15145	2591	17.1	2562	5	99.1	21	3
	CUH	3028	833	27.5	538	295	100.0	0	0
	UCHG	1286	483	37.6	482	0	99.8	1	0
	<b>Total</b>	<b>19459</b>	<b>3907</b>	<b>20.1</b>	<b>3582</b>	<b>300</b>	<b>99.4</b>	<b>22</b>	<b>3</b>

**Table 3: Number of non-sentinel specimens tested by the NVRL for other respiratory pathogens and positive results, influenza week 14 2010 and Summer 2009 & 2009/2010 season to date. Source: NVRL**

Week number	Total specimens	RSV	% RSV Positive	Adenovirus	% Adenovirus positive	Parainfluenza virus type 1	% Parainfluenza virus type 1	Parainfluenza virus type 2	% Parainfluenza virus type 2	Parainfluenza virus type 3	% Parainfluenza virus type 3
<b>14 2010</b>	52	0	0.0	0	0.0	0	0.0	0	0.0	4	7.7
<b>Summer 2009</b>	6093	21	0.3	4	0.1	4	0.1	0	0.0	6	0.1
<b>2009/2010 season to date</b>	9052	503	5.6	7	0.1	7	0.1	3	0.03	8	0.1

†† Please note that virological data for NVRL is from week 21 2009, for CUH is from week 31 2009 and for UCHG is from week 36 2009.

#### 4. Laboratory confirmed cases of pandemic (H1N1) 2009 (CIDR)

During the current pandemic phase, testing is focused on cases hospitalised for influenza, cases with severe clinical illness and in other situations such as clusters of ILI in institutions or unusual clusters of serious illness. As of 10<sup>th</sup> April 2010, a total of 4,585 confirmed cases of pandemic (H1N1) 2009 infection were reported. Figure 7 shows the number of confirmed pandemic (H1N1) 2009 cases by week of notification and hospitalisation status.

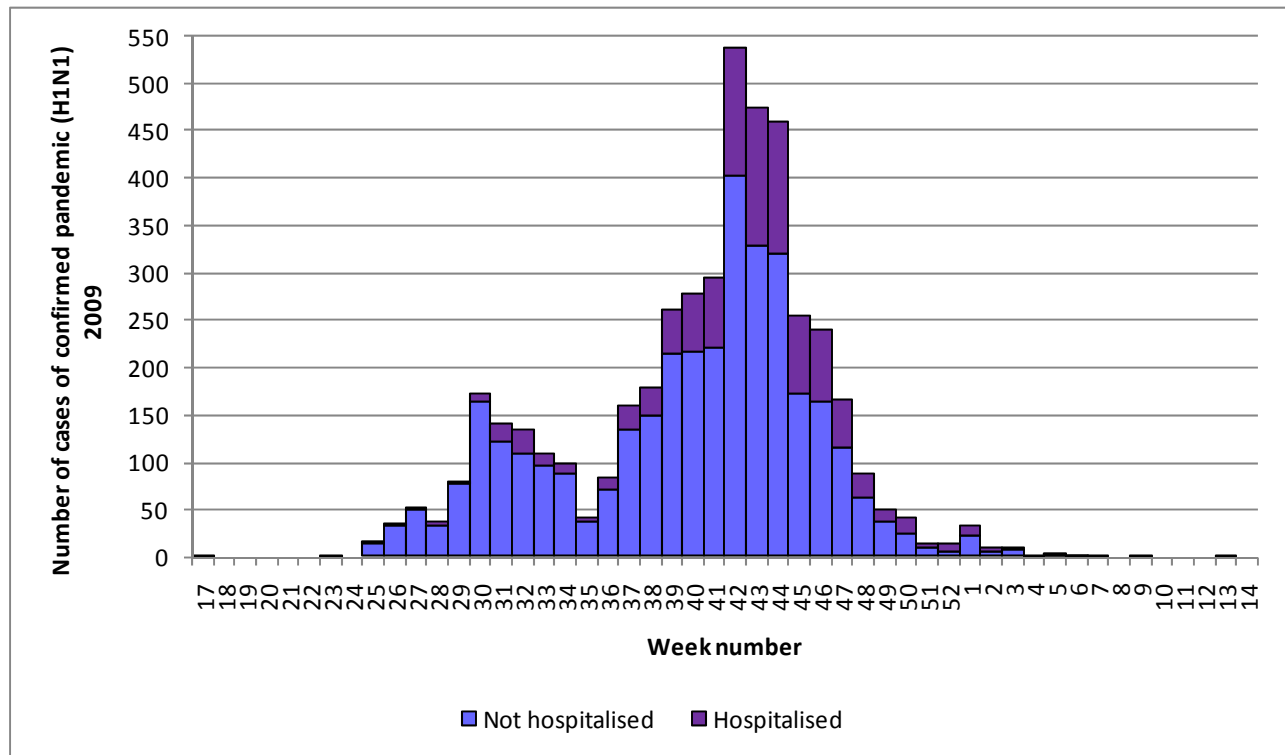


Figure 7: Number of confirmed cases of pandemic (H1N1) 2009 by week of notification and hospitalisation status<sup>55</sup>  
 Source: CIDR

#### Age and Sex

Of the 4,585 confirmed pandemic (H1N1) 2009 cases reported (as of 10<sup>th</sup> April 2010), 2,440 were female (53.2%), 2,122 were male (46.3%) and sex was not reported for 23 cases (0.5%). The median age of cases was 18 years (range: 0-84 years) and 80.0% were less than 35 years of age.

#### Severity of illness

To date, 25 patients with confirmed pandemic (H1N1) 2009 have died, 11 males and 14 females. Nineteen (76%) deaths were in adults 35 years of age and older (Table 4). Underlying medical conditions (including pregnancy) were reported for 24 of the 25 deaths (96%) and one death had no reported underlying condition. Some cases had more than one underlying condition. Underlying conditions included chronic respiratory disease (n=11), chronic neurological disease (n=9), immunosuppression (n=5), chronic heart disease (n=3), chronic liver disease (n=2), asthma (n=2), chronic renal disease (n=1), pregnancy (n=1) and severe obesity i.e. BMI ≥40 (n=1).

<sup>55</sup> Week number on figure 7 is based on infectious disease notification week number, which was one week behind the international influenza week number during 2009. Therefore weeks 17-52 above are equivalent to weeks 18-53 on the influenza system. Epidemiological and influenza week numbering systems are the same for 2010.



**Table 4: Number of deaths in confirmed cases of pandemic (H1N1) 2009 by age group**

Age group (years)	Total Number	Percentage of Total
<b>0-4</b>	0	0.0
<b>5-14</b>	3	12.0
<b>15-24</b>	2	8.0
<b>25-34</b>	1	4.0
<b>35-44</b>	5	20.0
<b>45-54</b>	3	12.0
<b>55-64</b>	6	24.0
<b>65+</b>	5	20.0
<b>Unknown</b>	0	0.0
<b>All ages</b>	<b>25</b>	<b>100.0</b>

### Hospitalised cases

Of the 4,585 confirmed cases, 1,069 (23.3%) were admitted to hospital. Of these, 100 (9.4%) were admitted to ICU. No laboratory confirmed cases were admitted to hospital or ICU during week 14 2010. For hospitalised patients, the highest age-specific rates were in the 0-4 year age group. Of the 1,069 confirmed cases hospitalised, 465 (43.5%) had pre-existing clinical conditions.

### 5. Outbreak surveillance (CIDR)

No new outbreaks of pandemic (H1N1) 2009, influenza or ILI were reported during week 14 2010. As of 10<sup>th</sup> April 2010, 109 general outbreaks of pandemic (H1N1) 2009 and ILI have been reported in Ireland since week 23 2009. These outbreaks involved 2,578 people in total, of which 204 (7.9%) were laboratory confirmed cases of pandemic (H1N1) 2009. The number ill per outbreak has ranged between two and 150 people.

### 6. International summary

The total numbers of confirmed pandemic (H1N1) 2009 deaths reported worldwide by the World Health Organization (WHO) region are shown in table 5.

**Table 5: Reported number of confirmed pandemic (H1N1) 2009 deaths by WHO region**

Source: WHO <http://www.who.int/csr/disease/swineflu/updates/en/>

WHO Region	Cumulative total as of 4 <sup>th</sup> April 2010
	Deaths
<b>Africa (AFRO)</b>	167
<b>Americas (AMRO)</b>	At least 8217
<b>Eastern Mediterranean (EMRO)</b>	1019
<b>Europe (EURO)</b>	At least 4763
<b>South-East Asia (SEARO)</b>	1733
<b>Western Pacific (WPRO)</b>	1801
<b>Total</b>	<b>At least 17700</b>

## United Kingdom

During week 13 2010, overall pandemic influenza activity was low and stable across the UK. GP ILI consultation rates decreased in England, Scotland and Northern Ireland and remained stable in Wales. No specimens collected through GP sentinel systems tested positive for influenza virus in week 13. Forty of 6,124 pandemic viruses tested have been confirmed to carry a mutation which confers resistance to the antiviral drug oseltamivir; 15 are phenotypically resistant to the drug but retain sensitivity to zanamivir. There have been 457 deaths reported due to pandemic (H1N1) 2009 in the UK (342 in England, 69 in Scotland, 28 in Wales and 18 in Northern Ireland). [http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb\\_C/1243928258754](http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb_C/1243928258754)

## Europe

For the fifth consecutive week, all reporting countries experienced low intensity of influenza activity. During week 13 2010, all countries reported no or sporadic activity, except for Italy who reported localised activity. Of the 49 influenza viruses detected from sentinel and non-sentinel sources during week 13 2010, 27 (55%) were type B viruses. Influenza activity caused by the 2009 pandemic influenza A (H1N1) virus is well past its winter peak in EU/EEA countries. However, transmission of the pandemic virus and B influenza viruses continues at low levels. Only some ILI cases in EU/EEA countries are currently due to influenza virus.

<http://ecdc.europa.eu/en/publications/Pages/Publications.aspx>

## USA

During week 13 2010, influenza activity decreased slightly in the U.S. The proportion of outpatient visits for ILI was below the national baseline. During week 13 2010, 3.7% of specimens tested positive for influenza. All subtyped influenza A viruses reported to CDC were 2009 influenza A (H1N1) viruses. The proportion of deaths attributed to pneumonia and influenza was below the epidemic threshold. One paediatric death associated with laboratory confirmed influenza A was reported; the subtype was undetermined.

<http://www.cdc.gov/flu/weekly/>

## Canada

Overall influenza activity has remained low in Canada for at least 15 consecutive weeks. During week 13 2010, all influenza indicators were still below expected levels for this time of year. The proportion of tests that were positive for influenza during week 13 (0.32%, 6/1,858) remained at a very low level for this time of year. Of the six positive specimens, four were positive for pandemic H1N1 2009 and two were unsubtyped influenza A. To date, only 14 hospitalisations and two deaths with pandemic H1N1 2009 have occurred since the beginning of 2010. <http://www.phac-aspc.gc.ca/fluwatch/index-eng.php>

## Other countries

As of 4<sup>th</sup> April 2010, more than 213 countries and overseas territories or communities have reported laboratory confirmed cases of pandemic influenza H1N1 2009, including over 17,700 deaths. The most active areas of pandemic influenza virus transmission continue to be in parts of Southeast Asia, West Africa and in the tropical zone of the Americas. In Chile, there is evidence of early localised pandemic influenza virus transmission in advance of the usual start of the southern hemisphere winter influenza season. Seasonal influenza type B viruses continue to actively circulate in East Asia, but are also being detected at low levels across other parts of Asia and Europe. Sporadic detections of seasonal influenza H3N2 viruses continue to be reported across Asia, Africa, Australia, and the Americas, however, the most active (but overall low) circulation of seasonal H3N2 viruses has been reported in Indonesia. <http://www.who.int/csr/disease/swineflu/updates/en/>

### **Avian influenza (H5N1):**

As of 9<sup>th</sup> April 2010, 493 confirmed human cases and 292 (59.2%) deaths from avian influenza A (H5N1) have been reported to the WHO from Azerbaijan, Bangladesh, Cambodia, China, Djibouti, Egypt, Indonesia, Iraq, Lao Peoples Democratic Republic, Myanmar, Nigeria, Pakistan, Thailand, Turkey and Viet Nam. To date in 2010, Egypt, Indonesia and Vietnam have all reported human H5N1 infections.

Further information on avian influenza is available on the following websites:

[http://www.who.int/csr/disease/avian\\_influenza/country/en/](http://www.who.int/csr/disease/avian_influenza/country/en/)

[http://www.who.int/csr/disease/avian\\_influenza/en/](http://www.who.int/csr/disease/avian_influenza/en/)

<http://www.hpsc.ie/hpsc/A-Z/Respiratory/Influenza/AvianInfluenza/>

[http://ecdc.europa.eu/en/healthtopics/Pages/Avian\\_Influenza.aspx](http://ecdc.europa.eu/en/healthtopics/Pages/Avian_Influenza.aspx)

### **Northern hemisphere influenza vaccine for the 2010/2011 season:**

For the 2010/2011 influenza season in the Northern Hemisphere, the members of the WHO Collaborating Centres on Influenza have recommended that seasonal influenza vaccines contain the following strains:

- an A/California/7/2009 (H1N1)-like virus
- an A/Perth/16/2009 (H3N2)-like virus<sup>\*\*\*</sup>
- a B/Brisbane/60/2008-like virus

[http://www.who.int/csr/disease/influenza/recommendations2010\\_11north/en/index.html](http://www.who.int/csr/disease/influenza/recommendations2010_11north/en/index.html)

[http://www.who.int/csr/disease/influenza/201002\\_Recommendation.pdf](http://www.who.int/csr/disease/influenza/201002_Recommendation.pdf)

**Further information on influenza in Ireland and internationally can be found on the following websites:**

Ireland [www.hpsc.ie](http://www.hpsc.ie)

Northern Ireland <http://www.cdscni.org.uk/>

Europe – ECDC <http://ecdc.europa.eu/>

Europe – EISN <http://ecdc.europa.eu/en/activities/surveillance/EISN/Pages/home.aspx>

World Health Organization <http://www.who.int/topics/influenza/en/>

### **Acknowledgements**

**HPSC wishes to thank the Departments of Public Health, HSE-NE, ICGP, NVRL, CUH and UCHG for providing data for this report**

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<sup>\*\*\*</sup> A/Wisconsin/15/2009 is an A/Perth/16/2009 (H3N2)-like virus and is a 2010 southern hemisphere vaccine virus.

## Appendix A

### **Sentinel surveillance for influenza**

This is the tenth season of influenza surveillance using computerised sentinel general practices in Ireland. The Health Protection Surveillance Centre (HPSC) is working in collaboration with the Irish College of General Practitioners (ICGP), the National Virus Reference Laboratory (NVRL) and the Departments of Public Health on this sentinel surveillance project. Sixty sentinel general practices covering 5.6% of the national population have been recruited to report on the number of patients with ILI on a weekly basis.

ILI is defined as the sudden onset of symptoms with a temperature of 38°C or more, with two or more of the following: headache, sore throat, dry cough and myalgia.

Sentinel GPs send a combined nasal and throat swab, to the NVRL, on at least five patients per week where a clinical diagnosis of ILI is made during the influenza season.

Influenza test results from the NVRL are provided on both sentinel and non-sentinel specimens. Influenza test results from Cork University Hospital (CUH) and University College Hospital, Galway (UCHG) are also provided on non-sentinel specimens.

### **Laboratory confirmed pandemic (H1N1) 2009**

Since the end of April 2009, a case-based surveillance system for pandemic (H1N1) 2009 has been in operation in Ireland following the declaration by World Health Organization (WHO) of a public health emergency of international concern due to the virus. Basic demographic data are collected on all laboratory confirmed cases and additional enhanced data are collected on all hospitalised laboratory confirmed cases. Data are collated on the Computerised Infectious Disease Reporting (CIDR) system using information available from the National Virus Reference Laboratory (NVRL), Departments of Public Health, clinicians and a number of other laboratories. Data presented in this report are based on details recorded on the CIDR system.

### **ICU enhanced surveillance system:**

On October 5<sup>th</sup> 2009, enhanced ICU surveillance system of confirmed cases of pandemic (H1N1) 2009 commenced in Ireland. It is a collaborative project between ICU medical and nursing staff, hospital administrators, departments of public health and the Health Protection Surveillance Centre. Forty hospitals (35 public and 5 private) currently participate in the surveillance scheme.

This system relates to adult, paediatric and neonatal confirmed and probable cases of pandemic (H1N1) 2009 admitted to intensive care units (ICU). The principal aim of the surveillance system is to report on the demographic profile (age, sex,) of all cases of pandemic (H1N1) 2009 admitted to ICU with details of predisposing risk factors, medical interventions and complications and clinical outcome. This information is used in conjunction with surveillance data from a number of other sources as follows: mortality data, data on laboratory confirmed cases, virology data and data on ILI consultation rates from sentinel GP practices.

A more detailed description of this system is available at:

<http://ndsc.newsweaver.ie/newepiinsight/rqng2ayeg0sugy02flxkl0>