Influenza(-like illness)
Topic owner: National Influenza Centre (National Influenza Centre) (1970-2013)

Introduction

Influenza is an important health care and public health problem. Influenza has been linked to an increase in the number of consultations and visits by GPs, as well as to an increased workload in health care and nursing institutions, an extra load on hospitals as a result of more referrals and admissions and an increase in the mortality rate. In addition, absenteeism due to influenza means loss of production from the workforce and pupils not attending school.

Cases of influenza occur every year in the Netherlands and throughout the rest of the world. The usual ‘influenza season’ runs from week 40 to week 20 of the following year. In the so-called inter pandemic situation an influenza epidemic actually only occurs in the winter in the northern hemisphere. A pandemic also may occur outside this season and this phenomenon did happen in 2009. Since registration of influenza-like illness (ILI) began, the influenza epidemics have always started between mid-November and the beginning of March, except for the pandemic in 2009, that lead to an epidemic from the beginning of October (week 41) in the Netherlands, earlier than ever before over the 43 years of registration of ILI in the sentinel practices.

The history of well-described outbreaks of respiratory infections dates from 1173-1174. The incidence of airway infection described in that winter is considered to be a good description of an influenza epidemic. Since the end of the 12th century a number of descriptions of (sometimes worldwide) outbreaks of what appeared to be influenza do exist.

In the 20th and 21st century the world was hit by four pandemics (the Spanish flu (1918-1919), the Asian flu (1957-1958), the Hong Kong flu (1968-1970) and the Mexican flu (2009-2010) of which the flu outbreak in 1918-1919 made the most impression and left frightened people in its wake:
approximately 40 million dead throughout the entire world.

In 1933 various pieces of the influenza puzzle started to fall into place and the influenza virus was identified and held responsible for small or larger outbreaks of acute respiratory infections where it was not unusual for the infected person to die. It was also proven that influenza could be transmitted from animal to animal, from animal to human and from human to human.

After the 2nd World War the newly set up World Health Organisation decided in 1949 to monitor influenza. National Influenza Centres were established to track the occurrence of influenza and report to the WHO. However, it was only at the start of the 1960s that sentinel doctors began to register the occurrence of influenza among the population (in England and Wales). Other European countries followed. For example, the Netherlands set up the Sentinel Practices in 1970 as a representative national network that succeeded the local networks in a number of large cities.

At the start of the 1990s the quality of the influenza surveillance system was further improved. From 1992/1993, sentinel GPs in an increasing number of European countries took a nose and/or throat swab from patients with an influenza-like illness (ILI) or an acute respiratory infection. These swabs were then sent for further tests at the laboratory of the National Influenza Centre for virological determination. This procedure is also applied in the Netherlands.

**Method**

The GPs register patients who consult them for an acute influenza-like illness known as ILI, that meets the Pel criteria.\(^6\) These are defined as follows: (Pel.1965)\(^*\)

1. An acute start, so a maximum prodromal stage of three to four days (included pre-existing infection of the respiratory system at not-ill-making level).
2. The infection should also involve rise in temperature of at least 38\(^\circ\), Celsius, rectal.
3. At least one of the following symptoms should occur: cough, nasal catarrh, sore throat, frontal headache, retrosternal pain, myalgia.
The age of the patient is also recorded. The doctor is asked to take a nose and throat swab from 2 patients with ILI per week which are then sent for further testing to the National Institute for Public Health (RIVM) (Infectious Diseases Diagnostics and Screening Laboratory). In case no patient with ILI consults the GP in a week the GP is requested to swab a patient with another acute respiratory tract infection (ARI) for virological determination. The registration form accompanying the swabs contains besides the diagnosis (ILI or ARI) also information about symptoms, influenza vaccination (yes or no), use of antivirals and recent travel history. In the RIVM laboratory the swabs are additionally assessed for respiratory syncytial virus (RSV), rhinovirus and enterovirus since 2008. The number of pathogens for which tests are performed may be adapted when necessary. The results are analysed and reported throughout the year but they are presented in this report from week 40 to week 20 of the following year.

**Results**

In the 2013/2014 season the baseline above which an excess level of flu activity can be observed, was maintained at 51 per 100,000. This line is based on statistical analysis of the incidence of ILI during the last 10 seasons outside the epidemic period. Increased influenza activity is defined as the incidence of ILI exceeding the baseline of 51 per 100,000 for two consecutive weeks and if samples sent to RIVM are found to contain influenza viruses in a substantial percentage. The method for calculation of the baseline was developed by the previously functioning European Influenza Surveillance Scheme (EISS) in order to harmonize the baselines of the various European Countries, taking into account the variety in health systems.

The season 2013/2014 was characterized by a mild influenza epidemic from week 4 to and including week 11 in 2014. The incidence of influenza like illness (ILI) fluctuated around the epidemic baseline for several weeks in the respiratory season 2013/2014. In week 7 of 2014 the peak of the mild
epidemic was recorded with 8.6 per 10,000 population after which the incidence decreased fairly fast to baseline levels in week 12. Also in weeks 2, 15 and 16 the incidence was above the epidemic baseline. The cumulative ILI incidence was in the season 2013/2014 comparable to the seasons 2010/2011 and 2011/2012, but lower than the incidence in the seasons 2009/2010 and 2012/2013. The ILI incidence was almost the entire season for the youngest age group of 0-4 years (Figure 5.1).

Between week 40 of 2013 through week 20 2014 340 ILI and 483 ARI swabs were sent to the RIVM by the sentinel GPs. In total influenza virus was found in 68 ILI and ARI swabs of which 37 times (54%) A(H3N2), 24 times (35%) A(H1N1)pdm09 and 7 times (10%) type B. This season was dominated by type A influenza viruses, especially type A(H3N2).

Remarkable was the low percentage of influenza virus (17%) found in the swabs of sentinel GPs during the first 6 weeks of the influenza epidemic 2013/2014 compared to three previous epidemics (40% in 2009/2010, 58% in 2010/2011 and 54% in 2012/2013). In contrast to three previous epidemics a high percentage of rhinovirus (15%) and respiratory syncytial virus (RSV,19%) was found during the epidemic 2013/2014; rhinovirus was found in 15% of the swabs in 2009/2010, 3% in 2010/2011 and 5% in 2012/2013 and RSV in 2% of the swabs in 2009/2010, 9% in 2010/2011 and 6% in 2012/2013. In week 9 to and including week 18 the percentage of swabs containing influenza virus (average 31%, range 10-45%) was more comparable to previous epidemics. The incidence of ILI fluctuated around the epidemic baseline during this period. This season was dominated by influenza virus type A(H3N2) after a domination of influenza virus type B in the previous season. Virologically the season was surprising due to a relatively low percentage of swabs containing influenza virus and a relatively high percentage of swabs containing rhinovirus and RSV. All but one of 37 A(H3N2), 24 A(H1N1)pdm09 and 7 type B influenza viruses tested for the susceptibility of antiviral drugs oseltamivir and zanamivir proved to be normally sensitive. One influenza virus A(H1N1)pdm09 strain showed a strongly decreased sensitivity to neuraminidase inhibitors.

Marked regional differences in influenza activity were observed this season. The highest ILI incidence (12.5 per 10,000 inhabitants, figure 5.2) was noted
in week 8 in the eastern part of the country.
The incidence was the highest in the rural area (Figure 5.3). As usual, the highest ILI incidence did occur in the age group 0-4 years, which was not vaccinated this season, like the previous two seasons (Figure 5.4). Detailed analyses of viruses in the NIC (location EMC) and the WHO-collaborating centre in London showed that the viruses in this season’s flu vaccine were similar to the circulating viruses, so vaccinated persons were relatively well protected.

Figure 5.1  Number of incidental patients with influenza-like illness per week per 10,000 inhabitants, for the Netherlands in, 2011/2012, 2012/2013 and 2013/2014
Figure 5.2  Number of incidental patients with influenza-like illness per week per 10,000 inhabitants, according to population density in 2013/2014

Figure 5.3  Number of incidental patients with influenza-like illness per week per 10,000 inhabitants, per province group in 2013/2014
Figure 5.4  Number of incidental patients with influenza-like illness, per 10,000 per age group, season 2013-2014

Table 5.1  Number of incidental patients with influenza(-like illness), per 10,000 inhabitants, 2003-2013

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<tr>
<td>total</td>
<td>71</td>
<td>208</td>
<td>109</td>
<td>141</td>
<td>168</td>
<td>309</td>
<td>130</td>
<td>171</td>
<td>170</td>
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<td>highest weekly incidence per 'season'</td>
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<td>8</td>
<td>7</td>
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<td>15</td>
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Extrapolation

Table 5.2  Extrapolation of incidence rates influenza like illness to the Dutch population

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<tr>
<td>total</td>
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<td>(m+f)</td>
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influenza like illness

<table>
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<th>year</th>
<th>total</th>
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<td>2004</td>
<td>71</td>
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<td>2005</td>
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<td>2012</td>
<td>170</td>
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<tr>
<td>2013</td>
<td>256</td>
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* number influenza like complaints per 10,000 men and/or women (data from sentinel practices)

** extrapolation of the incidence rates to the Dutch population as a whole (for the year in question), rounded off to the nearest thousand

Discussion

The season 2013/2014 was characterized by a late mild epidemic of 8 weeks dominated by influenza virus type A(H3N2). This season a relatively low percentage of influenza virus was found in swabs sent by sentinel GPs during
the first 6 weeks of the epidemic compared to three previous epidemics. After week 8 in 2014 the percentage of influenza positive swabs increased and the ILI incidence was fluctuating around the epidemic baseline. The epidemic started in week 4 of 2014 and lasted for eight weeks. The peak incidence was reached in week 7 of 2014; 8.6/10,000 were reported that week by the GPs. Thereafter the incidence decreased fairly fast and fluctuated for several weeks around the epidemic baseline. As usual the highest incidence did occur in the age group 0-4 years. The incidence among persons ≥65 years was relatively low. Analyses of viruses isolated in the Netherlands showed that the viruses of this season's influenza vaccine showed similarity with the circulating influenza viruses, thus vaccinated persons were relatively well protected.

This topic will be continued.

References

6 This must meet the following criteria (Pel, 1965):
   a An acute beginning, therefore a prodromal phase of not more than three to four days (including pre-existing airway infections at a non-pathogenic level).
   b The infection must be accompanied by a rectal temperature increase of at least 38º C.
   c At least one of the following symptoms must be present: cough, coryza, sore throat, frontal headache, retrosternal pain, myalgins.

Publications based fully or partly on data of NIVEL Primary Care Database, Sentinel Practices


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