



## The influenza pandemic

Global epidemics (pandemics) with influenza A occur in connection with the emergence of new influenza viruses that spread by sustained human-to-human transmission. Pandemics occur a few times every century; the previous pandemic was the Hong Kong influenza in 1968/69 which was caused by a novel type of influenza A(H3N2). When the new influenza A(H1N1) was identified as the cause of the 21<sup>st</sup> century's first pandemic, a number of factors were instrumental in helping to control the course of the epidemic:

-Denmark, as most other countries, had implemented a number of pandemic influenza preparedness measures. Owing to such measures, the world was better prepared than ever before to counter a pandemic.

- The new pandemic unexpectedly started in North America, and therefore data on the characteristics of the disease were published relatively early.

- As the pandemic started in the spring, its initial wave ("the summer influenza") had limited impact on public health in the majority of the countries of the Northern Hemisphere. Concurrently, reliable data on the pandemic became available as the winter season of the Southern Hemisphere passed, facilitating a downgrading of worst case scenarios. However, some uncertainty concerning morbidity and mortality remained, and several scenarios needed to be taken into account as the next steps were planned.

- The timing of the epidemic meant that vaccines were available by November 2009, when the second and more widespread wave hit Europe. As pandemic vaccines cannot be produced until the new pandemic virus has been identified, it is far from certain that vaccines will be available when needed.

- It was a distinctive feature that did not entail considerable disease occurrence among the weakened elderly who typically have a high influenza mortality risk. At present, the epidemic has not caused overall excess mortality in the population. The overall picture we are starting to see is that of a mild pandemic. It would, however, be premature to draw such conclusion at present. It is expected that the novel influenza A(H1N1) will become the new seasonal influenza in years to come,

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but the epidemiology of the shift from pandemic to seasonal influenza is poorly understood. In the case of the Hong Kong influenza, the excess mortality was highest the year after identification of the pandemic. It is therefore too early to prepare final estimates of the disease burden of the current pandemic.

### Current status in Denmark

It is estimated that approx. 500,000 Danes have had influenza A(H1N1), including nearly 5,000 verified cases. A minimum of 1,000 have been admitted to hospital, including 80 to an intensive care unit. Nearly 30 cases of laboratory-confirmed influenza, the vast majority of whom were unvaccinated persons with chronic disease, have currently been registered as influenza-associated deaths. The large number of admissions calls for further comment: Children aged 5-14 years of age contribute heavily to admissions. This is in line with the fact that this age-group kick-started the epidemic and that this age group suffered from the largest disease burden.

### Vaccination efforts

As mentioned above pandemic vaccines were available, even though the interval from initiation of vaccination to the peak of the epidemic should, ideally, have been longer. The epidemic started among children and only later affected adults. Thanks to considerable effort from primarily GPs, vaccination of a large proportion of the risk group below 65 years of age – the group with the highest risk of life-threatening disease – was thus achieved.

The vaccines, the decision-process and the scope of the efforts made have been a subject of discussion in the media. In comparison to several of the countries with which we normally compare ourselves, Denmark ordered fewer vaccines. This is so, among others, because the pandemic was assessed to be relatively mild. Consequently, the primary objective of the efforts made have been the protection of chronically ill persons, health staff and a limited number of key persons occupying posts of societal importance. In relation to the latter groups, efforts remain relevant, as cases of influenza A(N1H1) will keep occurring during the winter and early spring, and A(H1N1) is

expected to cause seasonal influenza by the coming winter.

At one point, it was questioned if the low number of vaccines ordered by Denmark compared to e.g. Norway and Sweden was justifiable. Currently, the opposite position sets the trend: Nearly regardless of how the last part of the vaccination efforts turns out, there will be more vaccines than needed. However, supply during the autumn was proportional to the overall number of ordered vaccines, and consequently risk-groups would have been in a poorer position if Denmark had ordered fewer vaccines. The current beneficial vaccine situation is also explained by the fact that the vaccine proved to be effective already after the first dose. This change could not be reflected in planning assumptions as contracts on pandemic vaccines were negotiated much earlier. 2010 will see an assessment of the efforts made, and in such context it will be assessed how we may further improve Danish preparedness measures for new epidemics.

### The Danish Vaccination Register

In 2009, the establishment of a national Danish Vaccination Register was initiated. The register will serve several purposes. Citizens and physicians will gain access to an electronic vaccination card comprising all received vaccinations, which is a measure of considerable practical importance. Furthermore, the register will provide an excellent basis for monitoring and research. The register is used for registration of some pandemic vaccines, EPI-NEWS 45/09.

### Improved surveillance of infectious diseases

2009 saw the establishment of a nation-wide microbiological database: The Danish Microbiology Database. This was possible thanks to well-functioning cooperation with Danish microbiology departments. An important goal for 2010 is to start using the new resource to improve surveillance. Furthermore, it will be analysed how clinical surveillance based on the microbiology database may be modernised. (K. Mølbak, Department of Epidemiology)

## Individually notifiable diseases

Number of notifications received in the Department of Epidemiology, SSI (2009 figures are preliminary)

| Table 1                        | Week 53<br>2009 | Cum.<br>2009 <sup>1)</sup> | Cum.<br>2008 <sup>1)</sup> |
|--------------------------------|-----------------|----------------------------|----------------------------|
| AIDS                           | 0               | 43                         | 40                         |
| Anthrax                        | 0               | 0                          | 0                          |
| Botulism                       | 0               | 0                          | 1                          |
| Cholera                        | 0               | 0                          | 1                          |
| Creutzfeldt-Jakob              | 0               | 9                          | 5                          |
| Diphtheria                     | 0               | 0                          | 0                          |
| Food-borne diseases            | 3               | 517                        | 848                        |
| of these, infected abroad      | 2               | 93                         | 136                        |
| Gonorrhoea                     | 6               | 568                        | 393                        |
| Haemorrhagic fever             | 0               | 0                          | 0                          |
| Hepatitis A                    | 0               | 34                         | 49                         |
| of these, infected abroad      | 2               | 25                         | 28                         |
| Hepatitis B (acute)            | 0               | 24                         | 24                         |
| Hepatitis B (chronic)          | 0               | 155                        | 179                        |
| Hepatitis C (acute)            | 1               | 16                         | 6                          |
| Hepatitis C (chronic)          | 2               | 273                        | 258                        |
| HIV                            | 1               | 259                        | 263                        |
| Legionella pneumonia           | 0               | 132                        | 125                        |
| of these, infected abroad      | 0               | 32                         | 46                         |
| Leprosy                        | 0               | 0                          | 0                          |
| Leptospirosis                  | 1               | 0                          | 8                          |
| Measles                        | 0               | 9                          | 11                         |
| Meningococcal disease          | 0               | 67                         | 64                         |
| of these, group B              | 0               | 38                         | 32                         |
| of these, group C              | 0               | 22                         | 18                         |
| of these, unspec. + other      | 0               | 8                          | 14                         |
| Mumps                          | 0               | 16                         | 26                         |
| Neuroborreliosis               | 0               | 61                         | 57                         |
| Ornithosis                     | 0               | 13                         | 6                          |
| Pertussis (children < 2 years) | 0               | 105                        | 97                         |
| Plague                         | 0               | 0                          | 0                          |
| Polio                          | 0               | 0                          | 0                          |
| Purulent meningitis            |                 |                            |                            |
| Haemophilus influenzae         | 0               | 5                          | 5                          |
| Listeria monocytogenes         | 0               | 5                          | 1                          |
| Streptococcus pneumoniae       | 0               | 68                         | 83                         |
| Other aethiology               | 0               | 9                          | 21                         |
| Unknown aethiology             | 0               | 18                         | 21                         |
| Under registration             | 1               | 28                         | -                          |
| Rabies                         | 0               | 0                          | 0                          |
| Rubella (congenital)           | 0               | 0                          | 4                          |
| Rubella (during pregnancy)     | 0               | 0                          | 0                          |
| Shigellosis                    | 1               | 107                        | 85                         |
| of these, infected abroad      | 0               | 82                         | 68                         |
| Syphilis                       | 1               | 292                        | 147                        |
| Tetanus                        | 0               | 0                          | 2                          |
| Tuberculosis                   | 4               | 364                        | 386                        |
| Typhoid/paratyphoid fever      | 0               | 27                         | 32                         |
| of these, infected abroad      | 0               | 22                         | 26                         |
| Typhus exanthematicus          | 0               | 0                          | 0                          |
| VTEC/HUS                       | 1               | 149                        | 146                        |
| of these, infected abroad      | 0               | 34                         | 52                         |

<sup>1)</sup> Cumulative number 2009 and in corresponding period 2008

## Selected laboratory diagnosed infections

Number of specimens, isolates, and/or notifications received in SSI laboratories

| Table 2                         | Week 53<br>2009 | Cum.<br>2009 <sup>2)</sup> | Cum.<br>2008 <sup>2)</sup> |
|---------------------------------|-----------------|----------------------------|----------------------------|
| Bordetella pertussis (all ages) | 6               | 194                        | 196                        |
| Gonococci                       | 10              | 458                        | 376                        |
| of these, females               | 5               | 121                        | 79                         |
| of these, males                 | 5               | 337                        | 297                        |
| Listeria monocytogenes          | 3               | 96                         | 50                         |
| Mycoplasma pneumoniae           |                 |                            |                            |
| Resp. specimens <sup>3)</sup>   | 4               | 105                        | 103                        |
| Serum specimens <sup>4)</sup>   | 4               | 145                        | 108                        |
| Streptococci <sup>5)</sup>      |                 |                            |                            |
| Group A streptococci            | 4               | 147                        | 134                        |
| Group B streptococci            | 3               | 127                        | 125                        |
| Group C streptococci            | 1               | 35                         | 23                         |
| Group G streptococci            | 5               | 174                        | 125                        |
| S. pneumoniae                   | 38              | 1047                       | 916                        |

| Table 3                                | Week 51<br>2009 | Cum.<br>2009 <sup>2)</sup> | Cum.<br>2008 <sup>2)</sup> |
|--|-----------------|----------------------------|----------------------------|
| MRSA                                   | 9               | 749                        | 786                        |
| Pathogenic int. bacteria <sup>6)</sup> |                 |                            |                            |
| Campylobacter                          | 10              | 3250                       | 3429                       |
| S. Enteritidis                         | 2               | 595                        | 635                        |
| S. Typhimurium                         | 5               | 768                        | 1975                       |
| Other zoon. salmonella                 | 7               | 735                        | 1004                       |
| Yersinia enterocolitica                | 1               | 219                        | 328                        |
| Verocytotoxin-producing E. coli        | 2               | 166                        | 158                        |
| Enteropathogenic E. coli               | 4               | 219                        | 213                        |
| Enterotoxigenic E. coli                | 1               | 324                        | 416                        |

<sup>2)</sup> Cumulative number 2009 and in corresponding period 2008

<sup>3)</sup> Resp. specimens with positive PCR

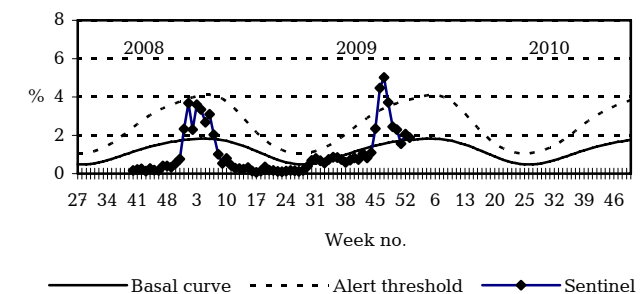
<sup>4)</sup> Serum specimens with pos. complement fixation test

<sup>5)</sup> Isolated in blood or spinal fluid

<sup>6)</sup> See also [www.germ.dk](http://www.germ.dk)

## Sentinel surveillance of the influenza activity

Weekly percentage of consultations, 2008/2009/2010



Sentinel: Influenza consultations (as percentage of total consultations)

Basal curve: Expected frequency of consultations under non-epidemic conditions

Alert threshold: Possible incipient epidemic

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