

The influenza pandemic and Europe: the social impact and public health response

John Paget

Netherlands Institute for Health Services Research (NIVEL), Utrecht, The Netherlands

Correspondence to: Dr W. John Paget, Netherlands Institute for Health Services Research (NIVEL), PO Box 1568, 35000 BN Utrecht, The Netherlands. E-mail: J.Paget@nivel.nl

Introduction

Influenza is unpredictable. It is a virus that spreads globally and each season viruses emerge with different virological, clinical and epidemiological characteristics. Usually influenza affects 5-20% [1] of the population but sometimes a pandemic virus emerges which spreads on a worldwide scale and infects a larger proportion of the human population.

On 11 June 2009 WHO announced that the world was confronted with a pandemic virus – pandemic (H1N1) 2009 virus. This virus was first detected in two children in the United States in March 2009 but had its epidemiological origins in Mexico City in January-March 2009 [2]. The virus quickly spread to the US and Canada, and then further afield. In the European Union and EEA countries, there are currently 9453 cases and four deaths and globally there are now over 79,000 cases and 332 deaths (3 July 2009) [3].

The epidemiology of pandemic viruses is also unpredictable. During the 20th century there were three pandemics (1918-19, 1957-58 and 1968-69), each with its own virological, clinical and epidemiological signature. For example, there were an estimated 20-50 million deaths during the 1918-19 pandemic, 1-4 million during the 1957-58 pandemic and 1-4 million during the 1968-69 pandemic.

This review deals with the first pandemic of the 21st century – the pandemic H1N1 2009 virus. As information regarding the pandemic is continually changing and being updated, the text is based on knowledge up to 6 July 2009.

Social impact

The social impact of a pandemic is considerable. There can be important morbidity in the community which impacts the economy, disrupting businesses and society in general. Studies have estimated that the 1918-19 pandemic led to a GDP loss (in percentage terms) of -16.9% to 2.4%, the 1957-58 pandemic of -3.5% to 0.4%

and the 1968-69 pandemic of -0.4% to -1.5% [4].

Another feature of past pandemics is that they do not affect all age groups in the same way: the 1918-19 pandemic mainly affected young adults, the 1957-58 pandemic mainly affected children and the 1968-1969 affected all age groups. The current pandemic, which is generally characterised by mild clinical symptoms, is mainly affecting young persons aged 10-29 in Europe [5].

Public Health Response

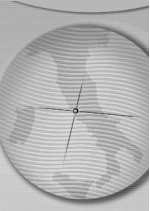
The initial response to the current influenza pandemic focused on information (e.g. providing the latest information to reassure the population), surveillance (clinical, epidemiological and virological), containment (at a local level e.g. closing schools and distribution of antivirals) and preparations for the pandemic (e.g. preparing for the distribution of antivirals and vaccination campaigns).

The public health response will depend on the spread of the pandemic virus in each country, so surveillance is of critical importance. Pandemics are usually associated with 2-4 pandemic waves [6], so the public health response needs to plan for the long-term, with peaks and ebbs in their intensity.

Currently, the world is in the first wave of the pandemic, with some countries being affected earlier than others. Mexico [2], the US [7] and Canada [8] have experienced or are experiencing their first pandemic waves, the UK's pandemic wave is starting [9] and other countries in Europe are still having sporadic but frequent cases. In each country, the public health response and surveillance system has been adapted to the epidemiological situation, so there are currently differing responses around the world.

Improvements to national and international responses

On the surveillance front, the current pandemic has highlighted the importance of local, national,



regional and international surveillance, so that the best public health decisions can be made. Information needs to be better shared and made more easily available to all levels of the public health response chain (local, national, regional and international).

Evolutionary studies have shown that the pandemic virus comes from pigs and was circulating in pigs for some time now [10]. Whilst considerable efforts have been made to establish and harmonise surveillance systems around the world (e.g. in South East Asia, where most experts thought the next pandemic would start), less attention has been paid (globally) to pigs and the interaction between pigs and humans. This is an area that will need strengthening in the future.

Another point that has been highlighted during the current pandemic is the paucity of evidence regarding some of the preventive measures that are being taken by countries to slow the spread of the pandemic. For example, what is the effect of putting tourists into quarantine or of closing schools on the progression of the pandemic? Considering there will be further waves in the future and the consequences of these public health interventions can be considerable (e.g. the closing schools), this is another issue that needs further attention.

Winter of 2009-2010

It is very likely that there will be at least two waves of the pandemic H1N1 2009 virus. Some countries saw the first wave at the start of 2009 (Mexico), or are currently experiencing a summer wave (e.g. USA and Canada) and others will experience it in the autumn or even the winter of 2009-2010. Countries in the Northern Hemisphere that had a summer wave (e.g. USA), may experience a second wave during the winter of 2009-2010.

Countries in Europe that are currently experiencing sporadic cases (e.g. Italy and the Netherlands) hope that the first wave starts as late as possible, and public health containment measures are being implemented in order to postpone the first wave. The objective is to gain as much time as possible before vaccines become available (these are planned for August/September 2009). Some believe that as temperatures rise over the summer, children stop going to school and people are more often outdoors (e.g. on holiday) the transmission of pandemic H1N1 2009 influenza virus will be slowed in Europe providing extra time for the vaccination campaign.

Vaccination and antivirals

Antivirals play a very important role in the public health response to the pandemic H1N1 2009 virus. They are being used to treat patients and as part of containment strategies (prophylaxis for family members and close contacts), sometimes in combination with social distancing strategies e.g. the closing of schools. Vaccination will play an important role in the future when vaccines become available in the autumn of 2009.

The main advantage of influenza vaccination is that it is a public health measure that protects the whole population. Influenza vaccines are effective (70-90%), and reduce complications (e.g. hospitalisations and deaths) [11]. The vaccines under development are currently being tested but their usage will need to be carefully monitored to avoid a situation like in 1976 when a swine flu vaccination program in the US had to be stopped due to the emergence of side effects [12].

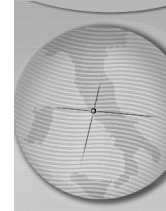
In comparison to previous pandemics, antivirals are available this time round and this is a considerable advantage. Many countries in Europe have large stockpiles which cover 30% or more of the population. Considering there will be a number of pandemic waves, there will be challenges with their distribution, the management of supplies (so that we do not run out of supplies) and possibly also with resistance [13]. Whilst resistance was observed with the H1N1 virus during the 2008-2009 season [14], fortunately only one case has been observed in Europe with the pandemic H1N1 2009 virus [15].

Conclusions

In conclusion, this is a challenging time for public health in Europe. A pandemic raises many very serious concerns, especially in the light of the 1918-19 pandemic. Fortunately, the clinical impact of the pandemic H1N1 2009 virus remains mild [5] and Europe is much better prepared than in previous pandemics [16]: pandemic plans and antiviral drugs are available, there is a much better health care infrastructure and a vaccine will probably be available in the autumn of 2009.

Acknowledgements

The author would like to thank a number of persons who kindly reviewed earlier versions of this text: Akke Albada (NIVEL), Katy Balderson (SDI, USA), Tamara Meerhoff (NIVEL), Richard Marquet (NIVEL), Prof. Koos van der Velden (University of Nijmegen), Stefan Visscher (NIVEL) and Marieke Zwaanswijk (NIVEL).



References

- 1) Centers for Disease Control and Prevention. Key Facts About Seasonal Influenza (Flu). Available from: <http://www.cdc.gov/flu/keyfacts.htm> [Accessed July 13, 2009].
- 2) Centers for Disease Control and Prevention. Outbreak of swine-origin influenza A (H1N1) virus infection - Mexico, March-April 2009. *MMWR Morb Mortal Wkly Rep.* 2009 May 8;58(17):467-70.
- 3) WHO. Pandemic (H1N1) 2009 - update 56. Available from: http://www.who.int/csr/don/2009_07_01a/en/index.html [Accessed July 3, 2009].
- 4) World Health Organization. Pandemic Influenza Preparedness and Response. WHO, Geneva, 2009.
- 5) Update on influenza A(H1N1), European Region of the World Health Organization: April-May 2009. WHO Euro. Available from: http://www.euro.who.int/influenza/AH1N1/20090523_1 [Accessed July 6, 2009].
- 6) U.S. Institute of Medicine; Stacey L. Knobler, Alison Mack, Adel Mahmoud, Stanley M. Lemon (editors) (2005). *The Threat of Pandemic Influenza: Are We Ready?*. National Academies Press. p.60. ISBN 0-309-09504-2. Available from: <http://www.nap.edu/books/0309095042/html/60.html> [Accessed XXXX].
- 7) Centers for Disease Control and Prevention. 2008-2009 Influenza Season Week 26 ending July 4, 2009. Available from: <http://www.cdc.gov/flu/weekly/fluactivity.htm> [Accessed July 13, 2009].
- 8) FluWatch. Pandemic (H1N1) 2009 virus Surveillance and Epidemiology: June 28, 2009 to July 4, 2009 (Week 26). Available from: http://www.phac-aspc.gc.ca/fluwatch/08-09/w23_09/index-eng.php [Accessed July 13, 2009].
- 9) WHO Euro - EuroFlu Weekly Electronic Bulletin. High influenza activity in England and continued pandemic H1N1 influenza detections in the European Region. 10 July 2009, Issue N° 313. Available from: www.euroflu.org [Accessed July 13, 2009].
- 10) Smith GJD, Vijaykrishna D, Bahl J, Lycett SJ, et al. Origins and evolutionary genomics of the 2009 swine-origin H1N1 influenza A epidemic. *Nature* 2009; 459: 1122-1125.
- 11) European Centre for Disease Prevention and Control. Seasonal Human Influenza and Vaccination - The Facts. Accessed 13 July 2009. Available from: http://www.ecdc.europa.eu/pdf/071203_seasonal_influenza_vaccination.pdf [Accessed July 13, 2009].
- 12) Sencer DJ, Millar JD. Reflections on the 1976 Swine Flu Vaccination Program. *Emerging Infectious Diseases* 2006 Jan; 12(1):29-33.
- 13) Fleming DM, Elliot AJ, Meijer A, Paget WJ. Influenza resistance to Oseltamivir: what are the implications? *European Journal of Public Health* 2009.
- 14) Meijer A, Lackenby A, Hungnes O, Lina B, et al. Oseltamivir-resistant influenza virus A(H1N1), Europe, 2007-2008 season. *Emerging Infectious Diseases* 2009; 15(4):552-60.
- 15) ECDC. First isolation of a secondary oseltamivir-resistant A(H1N1)v strain in Denmark. 01 July 2009. Available from: http://www.ecdc.europa.eu/en/files/pdf/Health_topics/0907_Influenza_AH1N1v_Resistance_TA_Oseltamivir.pdf [Accessed July 13, 2009].
- 16) Paget WJ. Commentary: Europe's preparedness for an influenza pandemic. *European Journal of Public Health* 2006; 16(2): 121.