

Editorial

INFLUENZA SURVEILLANCE IN AUSTRALIA

Kate Pennington, Christina Bareja, Sheena G Sullivan, Lucinda J Franklin, Jane Raupach

This issue of *Communicable Diseases Intelligence* contains a brief overview of the influenza surveillance systems in Australia as well as an original article on influenza coverage among pregnant Indigenous women in the Northern Territory and a short report on the timing of influenza vaccination in an Australian community-based surveillance system. The overview describes the systems based on the aspect of influenza activity that they represent, as well as their respective strengths and limitations in describing the epidemiology of influenza in Australia.

Influenza infection can manifest in a variety of ways, from mild to severe illness or even death. Although most people are susceptible to infection, individuals at the extremes of the age spectrum and populations with comorbidities tend to be the most vulnerable to more severe illness and complications. Globally, it is estimated that seasonal influenza affects 5% to 15% of the population annually, resulting in between 250,000 and 500,000 deaths.^{1,2} Although rare, the emergence of a pandemic can result in large numbers of infections due to population susceptibility, with varying proportions of severity. For example the 1918 influenza pandemic caused an estimated 20–50 million deaths worldwide, whereas subsequent pandemics have resulted in many fewer deaths despite a large proportion of the world's population being susceptible to infection.² Economically, influenza is associated with both direct and indirect costs through health care costs and productivity losses.

The public health significance of influenza is derived from the rate with which the virus undergoes antigenic change, allowing it to evade immune recognition,³ resulting in ongoing variability in population susceptibility and disease severity. Minor antigenic changes occur regularly in a process known as antigenic drift. This is the reason for annual, seasonal epidemics and also the reason why the World Health Organization (WHO) reviews the composition of influenza vaccines in the lead up to each hemisphere's season. In Australia's temperate climates, seasonal epidemics occur mainly during winter while in tropical and sub-tropical localities, influenza exhibits more complex, less clearly defined patterns.⁴ Less frequently, the viruses undergo an abrupt antigenic shift causing the emergence of an antigenically

distinct virus, which is generally unrecognised by the population and tends to have more extreme outcomes, such as pandemics.

Influenza immunisation remains the most important intervention in preventing or attenuating influenza infection and mortality.⁵ To keep pace with antigenic drift, continued protection requires annual vaccination with vaccine containing the most recent and closely matched virus strains to those circulating in the community. The Australian Government funds annual influenza vaccination under the National Immunisation Program to mitigate the impact of influenza on populations most vulnerable to severe disease: persons aged 65 years or over; persons with medical conditions placing them at risk of the more serious complications of influenza; pregnant women; and Indigenous Australians aged 6 to 59 months or 15 years or over.⁶ Additionally, annual influenza vaccination is recommended for any persons aged 6 months or older to reduce the likelihood of becoming ill with influenza.⁵

The broad aim of public health surveillance is to ensure the systematic collection, analysis, interpretation, and dissemination of data regarding a health issue for use in public health action.⁷ Effective and functional nationally representative surveillance data are critical for estimating the impact of influenza across the population. These data enable evidence-based decisions for public health action, the planning of appropriate control and intervention measures, and the effective allocation of resources.⁸ Influenza surveillance is made complex by the non-specific disease presentation, including asymptomatic infections, and the volume of cases. It is not feasible, nor necessary, to identify every influenza infection. Moreover, no single system can adequately capture the variations in severity, circulating strains and population susceptibility.

In Australia, the National Influenza Surveillance Scheme (the Scheme) began in 1994.⁹ Over time, the surveillance systems incorporated into the Scheme have evolved but have continued to focus on ensuring an understanding of influenza incidence, severity and virology. The 2007 and 2009 influenza seasons tested Australia's influenza surveillance systems, especially in terms of disease severity measurement capability and data collec-

tion sustainability. Influenza activity is currently captured through a collection of representative and stable surveillance systems that incorporate both syndromic and laboratory confirmed influenza infection identified in the community, general practices, hospitals and among deaths.

The National Influenza Surveillance Committee, a sub-committee of the Communicable Diseases Network Australia,¹⁰ plays an important role in ensuring the influenza surveillance systems in Australia are effective, including improving performance, integration and interpretation, as well as the scalability of the systems in response to a pandemic. During the influenza season, the Australian Government Department of Health compiles data from each of the surveillance systems contributing to the Scheme, as well as international surveillance data, and publishes the *Australian Influenza Surveillance Report*¹¹ on its web site each fortnight. These reports are regularly utilised by Australia's international counterparts and data are used to inform the WHO's fortnightly assessment of regional and global influenza activity.^{12,13} A more detailed description and analysis of the Scheme, including surveillance systems that function outside the Scheme, is provided in the paper *A Summary of Influenza Surveillance Systems in Australia, 2015*,¹⁴ available on the Australian Government Department of Health web site.

Author details

Kate Pennington¹
Christina Bareja¹
Sheena G Sullivan²
Lucinda J Franklin³
Jane Raupach⁴

1. Vaccine Preventable Diseases Surveillance Section, Health Protection Policy Branch, Office of Health Protection, Department of Health, Canberra, Australian Capital Territory
2. WHO Collaborating Centre for Reference and Research on Influenza, Melbourne, Victoria
3. Communicable Disease Epidemiology and Surveillance, Health Protection Branch, Regulation, Health Protection and Emergency Management Division, Department of Health and Human Services, Melbourne, Victoria
4. Communicable Disease Control Branch, SA Department of Health and Ageing, Adelaide, South Australia

References

1. World Health Organization. Influenza: Report by the Secretariat. Fifty-sixth World Health Assembly, Provisional agenda item 14.14; 2003.
2. World Health Organization. Influenza (Seasonal) – Fact sheet N°211. 2014. Accessed on 17 August 2016. Available from: <http://www.who.int/mediacentre/factsheets/fs211/en/>
3. Hale BG, Albrecht RA, Garcia-Sastre A. Innate immune evasion strategies of influenza viruses. *Future Microbiol* 2010;5(1):23–41.
4. Patterson Ross Z, Komadina N, Deng YM, Spirason N, Kelly HA, Sullivan SG, et al. Inter-seasonal influenza is characterized by extended virus transmission and persistence. *PLoS Pathog* 2015;11(6):e1004991.
5. Australian Government Department of Health. *The Australian Immunisation Handbook*. 10th edn 2013. Canberra: Australian Government.
6. Australian Government Department of Health. Immunise Australia Program – Influenza (Flu). 2016. Accessed on 2 August 2016. Available from: <http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/immunise-influenza>
7. German RR, Lee LM, Horan JM, Milstein RL, Pertowski CA, Waller MN, et al. Updated guidelines for evaluating public health surveillance systems: recommendations from the Guidelines Working Group. *MMWR Recomm Rep* 2001;50(RR-13):1–35; quiz CE31–37.
8. World Health Organization. Global epidemiological standards for influenza. 2013. Accessed on 2 August 2016. Available from: http://www.who.int/influenza/resources/documents/WHO_Epidemiological_Influenza_Surveillance_Standards_2014.pdf?ua=1
9. National Influenza Surveillance 1994. *Commun Dis Intell* 1994;18(11):261–267.
10. Communicable Diseases Network Australia. About the Communicable Diseases Network Australia. 2015. Accessed on 4 August 2016. Available from: <http://www.health.gov.au/internet/main/publishing.nsf/content/cda-cdna-cdna.htm>
11. Australian Government Department of Health. Australian Influenza Surveillance Report and Activity Updates. 2016. Accessed on 2 August 2016. Available from: <http://www.health.gov.au/flureport>
12. World Health Organization. Influenza updates. 2016. Accessed on 4 August 2016. Available from: http://www.who.int/influenza/surveillance_monitoring/updates/en/
13. World Health Organization Western Pacific Region. Influenza Situation Update. 2016. Accessed on 4 August 2016. Available from: http://www.wpro.who.int/emerging_diseases/Influenza/en/
14. Sullivan SG, Pennington K, Raupach J, Franklin LJ, Bareja C, de Kluyver R, et al. A Summary of Influenza Surveillance Systems in Australia, 2015. 2016. Accessed on 17 August 2016. Available from: <http://www.health.gov.au/flureport#nat-scheme>