Annapurna Nori
MBBS, FRACGP, MSc, FAFPHM, is Public Health Medical Officer, Nunkuwarrin Yunti of South Australia Inc, Adelaide, South Australia.
annapurnan@nunku.org.au

Mary-Anne Williams
BSc(Nurs), GradDip(Immun), is Local Immunisation Coordinator, Adelaide Western General Practice Network, South Australia.

Pandemic preparedness

Risk management and infection control for all respiratory infection outbreaks

Background
There has been substantial effort and activity in regards to pandemic planning, preparedness and response, mainly in the realm of public health. However, general practitioners and other primary care providers are important players in the health response to a pandemic.

Objective
To discuss the importance of general practice preparedness for managing respiratory infection outbreaks and to provide a model for the general practice response.

Discussion
Pandemic planning and preparedness in general practice is ultimately a crucial risk management exercise, the cornerstone of which is sound infection control. As planning will be significantly aided by, and should extend to, other respiratory outbreaks, we propose a framework for managing outbreaks of respiratory infections with a focus on planned, practised and habitual infection control measures, and a stepwise response according to the extent and severity of the outbreak.

Pandemic influenza (PI) planning has been a priority for Australian health authorities since the 2003 SARS epidemic and subsequent overseas outbreaks of avian influenza. While this has been mainly in the realm of public health, South Australian PI planning has specifically engaged with general practitioners, recognising their significant role in the primary care response to a pandemic.[1,2] However, GPs have considerations beyond simply being part of a public health response to a serious outbreak.

Pandemic planning in general practice

There are several reasons why GPs should be prepared for pandemics that have not been clearly articulated in numerous recent pandemic related peer reviewed articles.

Business continuity is an important reason for, and an essential component of, planning. It was identified as one of 6 issues that could derail Australia's pandemic response.[3] Business continuity should take into account employee absenteeism and the recently described phenomenon of 'presenteeism' – the loss of productivity due to employees coming to work, but not being fully functional because of illness or injury. A study commissioned by Medibank Private[4] found that the economic cost of presenteeism was nearly four times that of absenteeism, with respiratory disorders (other than asthma) accounting for 4% of the causes. Australian pandemic statistical models estimate that staff absenteeism could be 30–50%, with a simultaneous significantly increased caseload in general practice.[5]

Under South Australian Occupational Health and Safety legislation,[6] 'employers must provide a safe working environment for their employees, and must provide such information, instruction, training and supervision as are reasonably necessary to ensure that each employee is safe from injury and risks to health'. Australian and Canadian surveys of GPs' willingness to assist in pandemic outbreaks showed that GPs were willing to provide services but felt unprepared.[7,8] More recently, there have been anecdotal reports from

general practice administrative staff that successful fit testing for N95 masks increased their sense of protection and their willingness to work during a pandemic.

Good planning and implementation will lead to fewer employees being afraid to come to work[9] and also minimise illness and deaths in the community. A key element in controlling a pandemic is early action.[10] Pandemic planning in general practice is both a vital risk management tool and a public health matter. This perspective is needed when general practice attempts to tackle the practical and financial implications of pandemic preparedness. The risk management approach may assist with the inertia around pandemic preparedness, which was well documented in a recent report.[11] The extra resources required cannot be borne either by individual GPs or through public funds, but in a partnership between general practice and public health authorities.

Infection control

While antiviral agents and vaccines will be important in containing a pandemic, there are problems associated with both. Antiviral agents will be in limited supply, and there are also concerns around emerging resistance to neuraminidase inhibitors.[12] A vaccine could take several months to develop and distribute. The SARS virus does not at present have such specific prophylaxis available.

Good infection control maintenance is a well known cornerstone of disease management and needs to be the focus of general practice management of respiratory outbreaks. Infection control refers to all policies, procedures and activities that aim to prevent or minimise the risk of transmission of infectious diseases.[13] This includes simple measures such as adequate hand washing and restricting respiratory secretion spread, to more involved measures such as personal protective equipment (PPE).[14,15]

The mode of transmission for seasonal influenza is via droplets, smaller particle aerosols (including droplet nuclei) and fomites.[16] The mode of transmission for pandemic influenza is likely to be similar. The SARS virus was spread mainly through droplet transmission, although fomite and possibly aerosol transmission were also documented.[17] Aerosols are generated through coughing and sneezing. They are capable of travelling longer distances in the air and of settling in the lower respiratory tract – thereby increasing viral infectivity. Surgical and procedure masks reduce the spread of respiratory droplets but do not offer reliable protection against the smaller particle aerosols. Particulate respirator masks such as P2/N95 are recommended to protect against aerosols.[16]

Hand hygiene is a general term that applies either to hand washing or use of an antiseptic hand wash, an antiseptic hand rub (ie. a waterless, alcohol based product) or a surgical hand scrub.[18] Cough etiquette refers to measures taken to decrease the spread of respiratory secretions (eg. using tissues). Despite hand washing being widely advocated, there is limited rigorous evidence for the effectiveness of this measure,[19–22] and limited evidence for interventions that will improve hand hygiene.[22] Literature also indicates that there is variable, and generally suboptimal, adherence to infection control practices among health care workers and patients.[22–24] High levels of adherence may result in around a 16% reduction in respiratory infections.[25]

Infection control within the waiting room is an area over which GPs have control. Hand hygiene and cough etiquette practices may be difficult to achieve in certain primary care settings (eg. remote communities because of housing, water and sanitation problems; and for providers of care to the homeless); however planning for such services should take this into account.

For infection control measures to be applied effectively, they need to have been planned and practised; they need to have become habitual. Habits will not suddenly develop when a serious outbreak surfaces.[26]

Managing outbreaks of all respiratory infections

Seasonal influenza is an annual event with significant morbidity. Australia also experiences regular outbreaks of other infections with a respiratory mode of transmission, such as pertussis, varicella and measles. There are also adenovirus infections, which are a common cause of work and school absenteeism.

The general practice waiting room is a potential source of infection spread.[27] A safety climate (ie. consistent application of infection control measures) in an interpandemic period will assist in preparation for more significant outbreaks; it will also reduce the incidence of common and/or cyclical respiratory infections. Post SARS epidemic literature shows that factors influencing infection control compliance include facilities having clear policies and protocols, the importance given to occupational health and safety by management, and adequate staff training in infection control procedures.[28–30]

A framework for general practice

A PI preparedness exercise conducted in the Limestone Coast Division of General Practice, 'Exercise hawk flu', uncovered gaps in the pandemic preparedness of a general practice in areas of triage, signage, surge capacity, patient hygiene practices and communication with the state public health authority. The current H1N1 outbreak also demonstrates this, with GPs expressing a sense of being unprepared.[31]

We propose a framework for managing outbreaks of respiratory infection that includes:

- governance and risk management (*Table 1*)
- planned, practised and habitual infection control (*Table 2*), and
- a stepwise response for routine management of respiratory infections, minor outbreaks, seasonal outbreaks and major outbreaks (pandemics) (*Table 3*).

Previously published checklists and recommendations for PI planning will complement this framework.[32,33]

Table 3 shows a suggested graded increase in clinic infection control practices corresponding to an increase in the seriousness of the outbreak. The recommendations are based on World Health Organization, Federal and South Australian Government infection control guidelines and relevant literature.[5,18,35,36]

Table 1. Governance and risk management

A safety climate is aided by:

- Appointment of an infection control coordinator and respiratory outbreak response team
- Clear policy outlining separate procedures for routine infection control during minor outbreaks, during seasonal outbreaks and during a major outbreak
- Clearly defined procedures for communication within the practice, with patients, with public health authorities and local general practice networks. This should include how such communication will occur, who gets informed and what happens as a result
- Shared understanding of the above among all practice staff
- Clear, culturally appropriate and sensitive education of patients regarding infection control procedures and communication procedures

Table 2. Infection control

Infection control should cover areas of:

- Communication
- Patient flow
- Respiratory hygiene (hand hygiene and cough etiquette)
- Clinic hygiene
- Spatial separation of sick individuals
- Occupational health and safety
- Annual influenza immunisation
- Pneumococcal immunisation for at risk people

Table 3. Levels of infection control according to severity of outbreak

		Routine management (or for occasional upper respiratory illnesses)	Minor outbreaks (eg. adenovirus)	Seasonal outbreaks (eg. influenza, varicella)	Major outbreaks (eg. pandemic influenza, SARS)
Communications	**Professional** Ensure communication channels are defined and in order	As usual		• Ensure staff awareness • Ensure appropriate notification to communicable diseases branch	• PLUS: be actively receptive to public health and other emergency communications
	With patients Inform patients of proposed infection control practices	• Hand hygiene/ cough etiquette signage • Consider audiovisual means of education	• PLUS: 1 metre separation of sick individuals and signage about masks	• PLUS: health alert display • PLUS: signage 'quarantining' of sick individuals	• Pandemic health alerts and directions
Patient flow/triage	**Professional** Reception staff should have clear grasp of triaging procedure	As usual	Appointment at less busy time (avoid full waiting room)	• Home visit preferable • Appointment at less busy time	• Avoid nonessential clinic visits for all patients • Home visit recommended for febrile patients
Respiratory hygiene		• At all times – cough etiquette (using tissues to contain respiratory secretions, disposing of tissues in specified receptacle) – hand hygiene after contact with respiratory secretions			
Clinic hygiene		• Usual hygiene practices • Supply of facial tissues • Receptacle for soiled tissues	• Wipe all potentially contaminated surfaces after sick patient visit • PLUS: sick individuals to avoid touching magazines and toys		• Remove all magazines and toys • Wipe surfaces/door handles between each patient visit
Surgical masks for patients		All febrile individuals with respiratory symptoms			All patients presenting to clinic during pandemic
Spatial separation of sick patients		Seating 1 metre apart		Consider separate 'quarantine' area	'Quarantine' area vital
Annual influenza immunisation		At all times (patients and staff)			
Pneumococcal immunisation of at risk individuals		At all times			

Table 3. Levels of infection control according to severity of outbreak (continued)

	Routine management (or for occasional upper respiratory illnesses)	Minor outbreaks (eg. adenovirus)	Seasonal outbreaks (eg. influenza, varicella)	Major outbreaks (eg. pandemic influenza, SARS)
Occupational health and safety*	**Physical environment**	Provide a physical barrier between reception staff and patients (eg. clear perspex screen at reception desk)		
	Procedures for dealing with unwell staff	A febrile staff member with respiratory symptoms should absent themselves from the workplace until regarded as noninfectious		
	PPE for staff • Maintain 1–2 weeks stockpile of PPE including: – gloves – gowns – N95 masks (ensure fit testing) – goggles • Ensure staff have practised donning and doffing of PPE	Advise use of surgical/procedure mask when examining febrile patients with respiratory symptoms	Advise use of surgical/procedural masks; however particulate respirator masks may be considered in certain circumstances (eg. unimmunised staff member in very close contact with sick individual)	Particulate respirator masks and full PPE for staff with clinical responsibilities
	• Immunisation of staff (annual influenza and pneumococcal immunisation of staff at risk)	At all times		
	• Maintain immunisation register	As usual	PLUS: monitor staff for symptoms of illness	
	• Staff roster	As usual	Consider rostering immunised staff to attend to febrile patients 'At risk' staff (eg. pregnant or immunocompromised) should not be allocated febrile patients	'At risk' staff should not be allocated febrile patients

* Ensure OH&S policy includes infection control. Ensure all staff are up-to-date with policy and details

Summary

Pandemic planning in general practice is not only a vital public health matter but also a crucial risk management exercise, with infection control as its cornerstone. Good governance with planned, practised and habitual infection control for all respiratory outbreaks, together with a stepwise response, will tackle the practical and financial implications of pandemic preparedness in general practice.

Conflict of interest: none declared.

References

1. Government of South Australia Department of Health. Pandemic influenza: A summary of health's operational plan. 2007. Available at www.pandemicinfluenza.sa.gov.au/LinkClick.aspx?fileticket=H6wF0tzp9x8%3d&tabid=61 [Accessed July 2009].
2. Government of South Australia Department of Health. Primary care management in an influenza pandemic. 2009. Available at www.pandemicinfluenza.sa.gov.au/LinkClick.aspx?fileticket=ipOP4GOtOng%3d&tabid=61 [Accessed July 2009].
3. Yates A. What could go wrong with Australia's pandemic planning and response. Address to the Corporate Pandemic Planning Congress. July, 2006.
4. Econtech for Medibank Private. Economic modelling of the cost of presenteeism in Australia, 2007. Available at www.econtech.com.au/information/Social/Medibank_Presenteeism_FINAL.pdf.
5. Department of Health and Ageing. Australian health management plan for pandemic influenza. 2008. Available at www.flupandemic.gov.au/internet/panflu/publishing.nsf/Content/ahmppi [Accessed July 2009].

6. Occupational Health, Safety and Welfare Act, South Australia, 1986.
7. Hogg W, Huston P, Martin C, Soto E. Enhancing public health response to respiratory epidemics: Are family physicians ready and willing to help? Can Fam Physician 2006;52:1254–60.
8. Shaw K, Chilcott A, Hansen E, Winzenberg T. The GP's response to pandemic influenza: a qualitative study. Fam Pract 2006;23:267–72.
9. Sibbald B. Right to refuse work becomes another SARS issue (news report). CMAJ 2003;169:141.
10. McKinnon M. Clinical scenarios. Med J Aust 2006;185:S32–4.
11. US Government Accountability Office. Influenza pandemic: Sustaining focus on the nation's planning and preparedness efforts. Report GAO–09–334. April 2009. Available at www.gao.gov/new.items/d09334.pdf [Accessed July 2009].
12. Sheu TG, Deyde VM, Okomo-Adhiambo M, et al. Surveillance for neuraminidase inhibitor resistance among human influenza A and B viruses circulating worldwide from 2004 to 2008. Antimicrob Agents Chemother 2008;52:3284–92.
13. World Health Organization. Infection control. Available at www.wpro.who.int/health_topics/infection_control/ [Accessed July 2009].
14. Collignon P, Carnie J. Infection control and pandemic influenza. Med J Aust 2006;185(10 Suppl):S54–7.
15. Gamage B, Moore D, Copes R, Yassi A, Bryce E. The BC Interdisciplinary Respiratory Protection Study Group. Protecting health care workers from SARS and other respiratory pathogens: A review of the infection control literature. Am J Infect Control 2005;33:114–21.
16. Tellier R. Review of aerosol transmission of influenza A virus. Emerg Infect Dis 2006;12:1657–62.
17. Centres for Disease Control and Prevention. Severe acute respiratory syndrome fact fheet. Available at www.cdc.gov/ncidod/sars/pdf/factsheet.pdf [Accessed July 2009].
18. Department of Health and Ageing. Interim infection control guidelines for pandemic influenza in healthcare and community settings (June 2006). DoHA, 2006.
19. Smith SM. A review of hand washing techniques in primary care and community settings. J Clin Nurs 2009;18:786–90.
20. Jefferson T, Foxlee R, Del Mar C, et al. Physical interventions to interrupt or reduce the spread of respiratory viruses: Systematic review. BMJ 2008;336:77–80.
21. Aiello AE, Coulborn RM, Perez V, Larson EL. Effect of hand hygiene on infectious disease risk in the community setting: A meta-analysis. Am J Public Health 2008;98:1372–81.
22. Gould DJ, Chudleigh JH, Moralejo D, Drey N. Interventions to improve hand hygiene compliance in patient care. Cochrane Database Syst Rev 2007; Art. No.: CD005186. DOI: 10.1002/14651858.CD005186.pub2.
23. Pittet D, Simon A, Hugonnet S, Pessoa-Silva CL, Sauvan V, Perneger TV. Hand hygiene among physicians: Performance, beliefs, and perceptions. Ann Intern Med 2004;141:1–8.
24. MacIntyre CR, Epid MA, Cauchemez S, et al. Face mask use and control of respiratory virus transmission in households. Emerg Infect Dis 2009;15:233–41.
25. Rabie T, Curtis V. Handwashing and risk of respiratory infections: A quantitative systematic review. Trop Med Int Health. 2006;11:258–67.
26. Schull M, Redelmeier D. Infection control for the disinterested. CMAJ 2003;169:122–3.
27. South Eastern Sydney Public Health Unit. Outbreak report: Measles cluster in south-eastern Sydney with transmission in a general practice waiting room. Commun Dis Intell 2001;25:19.
28. Hogg W, Huston P. Controlling droplet-transmitted respiratory infections: Best practices and cost. Can Fam Physician 2006;52:1229–32.
29. Larsen E. Warned, but not well armed: Preventing viral upper respiratory infections in households. Public Health Nurs 2007;24:48–59.
30. Moore D, Gamage B, Bryce E, Copes R, Yassi A. Protecting health care workers from SARS and other respiratory pathogens: Organizational and individual factors that affect adherence to infection control guidelines. Am J Infect Control 2005;33:88–96.
31. Australian Medical Association. Media release: GPs' flu pandemic plans hamstrung. Available at www.ama.com.au/node/2523 [Accessed July 2009].
32. Collins N, Litt J, Moore M, Winzenberg T, Shaw K. General practice: Professional preparation for a pandemic. Med J Aust 2006;185:S66–9.
33. Collins N, Litt J, Winzenberg T, Shaw K, Moore M. Plan your pandemic. A guide for GPs. Aust Fam Physician 2008;37:794–804.
34. Government of South Australia Department of Health. South Australian infection control guidelines. 2007.
35. World Health Organization. Aide-memoire – for infection prevention and control in a healthcare facility. Available at www.who.int/injection_safety/en/.AM_InfectionControl_Final.pdf [Accessed July 2009].
36. World Health Organization. Avian influenza, including influenza A (H5N1), in humans: WHO interim infection control guideline for health care facilities. Available at www.wpro.who.int/NR/rdonlyres/EA6D9DF3-688D-4316-91DF-5553E7B1DBCD/0/AI_Inf_Control_Guide_10May2007.pdf [Accessed July 2009].

AFP CORRESPONDENCE afp@racgp.org.au