

Thinking Locally About Pandemic Influenza

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The February 2004 release of the Canadian Pandemic Influenza Plan¹ is a wake-up call to those who provide local health, public health, and emergency services. The possibility of a novel highly pathogenic influenza virus affecting 15-35% of our population has profound implications. This calls for planning at not only international, national and provincial levels of government, but also “on the ground” where health care providers will need to take care of unprecedented numbers of sick people.

The Canadian Pandemic Influenza Plan was developed to assist in the “planning, preparedness and response to pandemic influenza.” The goal of this plan is “first, to minimize serious illness and overall deaths, and second to minimize societal disruption among Canadians as a result of an influenza pandemic.” It assigns roles and responsibilities according to the World Health Organization classification of phases of a pandemic,² level of government, and by major activities: surveillance, vaccine programs, anti-virals, health services, emergency services, public health measures and communications.

The Canadian Pandemic Influenza Plan is a wake-up call for two reasons. First, by adopting the World Health Organization (WHO) phases of pandemic, it quickly becomes apparent that we are already on the slope that may lead to a pandemic. “Phase 0” is the interpandemic phase that has three levels. Level 1 is the identification of a novel virus. Since December 2003, eight Asian countries have confirmed outbreaks of a highly pathogenic avian influenza, H5N1. WHO recently noted that over 100 million birds either have died or been culled in Asia – a figure greater than the total number of poultry affected in the world’s five largest outbreaks combined.³ We are currently in the Interpandemic Phase 0, Level 2, which means that a novel virus has infected two or more persons. As of the end of February 2004, avian influenza H5N1 had infected 32 people worldwide and caused 22 deaths.³

The second wake-up call is that there is already a large “to-do list” for local health, public health and emergency planners at Interpandemic Phase 0, Levels 1 and 2. Local responsibilities at Level 1 include updating emergency contact lists and educational materials and estimating the number of health care workers by type and work setting. Local responsibilities at Level 2 include reviewing results of any previously conducted simulation exercises, assessing supplies, equipment and locations for mass vaccine clinics, and identifying gaps in response capacity that will require additional resources.¹

Confirmed human-to-human transmission of avian influenza anywhere in the world would bring us to Interpandemic Phase 0, Level 3. The local responsibilities for this level include increasing surveillance activities, reviewing estimates of high priority populations for vaccine or anti-virals, mobilization of human and financial resources, and training staff for mass immunizations (that is, if vaccine is available). Table I identifies the local responsibilities for surveillance, vaccine programs and other public health measures at each of the three levels of the interpandemic phase.

The risk of pandemic

Are we really at risk for pandemic? Very much so. Avian influenza is well known for jumping the species barrier – both between fowl and human, and between fowl and pig and human, among others. So far, avian influenza has not been transmissible from human to

human. What could turn this into a pandemic is a unique feature of Influenza A – its capacity for antigenic shift. Antigenic shift arises from a reassortment of the surface glycoproteins of the virus. Influenza viruses are classified according to their two surface glycoproteins: hemagglutinin and neuraminidase. The hemagglutinin (H) is the surface glycoprotein that mediates the entry of the virus into host cells. The neuraminidase (N) is an enzyme that facilitates cell-to-cell spread. An antigenic shift occurs when there are two concurrent influenza A infections in a host that lead to reassortment of the H and N glycoproteins. A new hemagglutinin, such as H5 or H7 from the current avian influenza outbreaks, reassorted into a human influenza virus is the most likely source of a pandemic.^{4,5}

WHO has recently noted that the control of H5N1 avian influenza in Asia has proven difficult, and will likely not be eradicated in the short term.³ At the beginning of March, the Canadian Food Inspection Agency noted that in addition to a benign outbreak, there was a highly pathogenic H7N3 virus outbreak in a farm in British Columbia.⁶

There are a number of challenges in developing a vaccine for an H5 or H7 virus. First is the pathogenicity of these viruses – neither H5 nor H7 can be grown in the usual egg medium as they are both lethal to egg embryos. Plasmid-based reverse genetics technologies are being developed and represent a promising alternative. However, these involve the use of cell lines and present their own set of challenges: intellectual property issues, issues of availability and suitability, and an unknown safety profile.⁵

When it hits

A pandemic influenza could begin anywhere in the world, and would likely spread quickly. Based on a model developed by Melzer and colleagues,⁶ the Canadian plan estimates that between 4.5 to 10.6 million people in Canada could contract this disease, with 2-5 million people seeking outpatient care and 34-138,000 requiring hospitalization.¹ In Canada, 43 people died from severe acute respiratory syndrome (SARS) last year; pandemic influenza could kill 43,000. Pandemic influenza has the potential to be 1000 times worse than SARS.

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It is difficult to imagine how our local health, public health and emergency services could respond to such a situation, in light of our recent experience with SARS. SARS revealed a lack of surge capacity locally, provincially and nationally.⁷ It also revealed the need for health, public health and emergency services to work more closely together.⁸

The need for public health leadership

The Canadian Pandemic Influenza Plan points out that “local public health authorities are responsible for planning the local response to an influenza pandemic. This involves liaising with local partners (e.g., emergency responders, hospitals, mortuary services) in advance of a pandemic to facilitate a coordinated response.”

It is time for local public health departments to rise to this challenge. Some have begun by conducting simulation exercises with their local partners.⁹ Ottawa has recently launched an Ottawa Pandemic Coalition, with a focus on communication and capacity building. We are planning a prevention strategy for decreasing the spread of respiratory infections, which we plan to launch in schools, long-term care institutions and physicians’ offices later this year. Others have launched a website promoting business continuity planning.¹⁰

Challenges abound. For example, although the Canadian Pandemic Influenza Plan highlights numerous local responsibilities regarding a pandemic, it is silent on where the funding for the local planning, mitigation and response will come from. It is also silent on who is responsible for setting up and staffing alternative (or non-traditional) assessment and treatment sites to care for patients when the hospitals are overwhelmed.

CONCLUSION

Pandemics know no boundaries and disregard overstretched budgets, poor timing and jurisdictional challenges. Now more than ever, we need to reach beyond our silos to create an integrated, inter-agency, multidisciplinary response. Local public health professionals are well placed to lead this effort.

The World Health Organization and other international agencies have been active in monitoring, planning and coordi-

TABLE I

Local Responsibilities for Surveillance, Vaccine Programs and Other Public Health Measures in the Interpandemic Phase 01

Level 1 Novel virus identified

Surveillance

- Alert those currently involved in influenza surveillance.
- Review and confirm that all inter-pandemic surveillance activities (via FluWatch) are operating optimally.

Vaccine Programs

- Promote pneumococcal vaccination of NACI recommended “high-risk” groups (to reduce the incidence and severity of secondary bacterial pneumonia).

Public Health Measures

- Review existing public materials on influenza and influenza pandemics.
- Review/Update educational materials on all aspects of influenza (for health care professionals, other special audiences and the general public).

Level 2 Two or more human cases

Vaccine Programs

- Conduct initial availability assessment of supplies (e.g., syringes, adrenalin, sharps disposal units), equipment and locations potentially required for a vaccine-based response (i.e., mass clinics).
- Develop a list of currently qualified vaccinators and sources of potential vaccinators.
- Review educational materials re: administration of vaccines and adapt/update as needed.
- Ensure that any legal issues that may impede rollout of a mass immunization program are addressed.

Public Health Measures

- Review staffing requirements for implementation of a pandemic response, including mass immunization clinics, control measures, and public education.
- Consider delaying introduction of public health programs that may not be adequately resourced if situation evolves into a pandemic, or other alternatives such as contracting out.
- Prepare educational material for public inquiry phone-line staff.

Level 3 Human-to-human transmission confirmed

Surveillance

- Establish or increase current surveillance activities.
- Consider implementation of emergency room surveillance (especially in areas known to receive a lot of travelers from affected areas).
- Implement real-time influenza mortality surveillance.
- Determine what information needs to be collected on cases and screening measures and how this will be done (e.g., data collection forms, database issues, data flow).

Vaccine Programs

- Ensure staff are trained and infrastructure is in place to record immunizations, including requirements for a two-dose immunization program (i.e., re-call and record-keeping procedures).
- Review estimates of the number of people who fall within reach of the priority groups for vaccination (i.e., high-risk groups, health care workers, emergency service workers, specific age groups) and access strategies.

Public Health Measures

- Ensure adequate resources are available to implement recommended public health measures, including isolation of cases.
- Prepare/revise educational and guidance materials for public health partners (specifically local health departments who will be on the front lines with respect to prevention and control measures), the general public; documents for the public should emphasize infection control in homes, schools, places of work.
- Review estimates of the number of people who fall within reach of the priority groups for antivirals (i.e., high-risk groups, health care workers, emergency service workers, specific age groups) and access strategies.
- Ensure staff is trained and infrastructure is in place to track who is receiving the drugs for the purpose of treatment and prophylaxis.

nating efforts to contain avian influenza and prevent the antigenic shift that could transform it into a human pandemic. In concert with the work being done to act globally, it is time to “think locally” about being prepared for pandemic influenza.

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