

Preparing for a Pandemic

Lessons From



By Deborah R. Roy

In March 2009, Mexican authorities begin to notice an increase in “influenza-like-illness.” On April 12, a 39-year-old woman suffering from an acute respiratory illness dies after 5 days of hospital treatment. Another death occurs at the same hospital a few days later. On April 23, U.S. public health officials announce that seven people in California and Texas have been diagnosed with and are recovered from a flu virus known as H1N1. At this point, it is unclear whether the U.S. and Mexican cases are related.

On Sunday, April 26, the U.S. declares a health emergency after the confirmation of 20 cases, including eight students in New York who had traveled to Mexico. Alerts are sent by National Safety Council and CDC to the smart phones of any employer representative in their networks. The next day, World Health Organization (WHO) raises the pandemic alert level from 3 to 4 on a scale of 6 (Figure 1), meaning verified human-to-human spread of a virus that can cause “community-level outbreaks” (WHO, Chronology). Phase 4 signals a “significant increase in risk of a pandemic.”

Many U.S.-based corporations start reviewing their written business continuity plans. Most of these plans were written or revised a few years ago based on the threat of avian influenza in Asia or threat of a terrorism event such as anthrax after Sept. 11, not

Influenza A virus (then called swine flu). By April 29, the first confirmed H1N1 death in the U.S. is a 23-month-old Mexican toddler in Texas. The virus has spread to five continents in the world, including a case in Spain of a person who had not been to Mexico.

WHO declares Phase 5, which means that person-to-person spread is into at least two countries in one WHO region (WHO, Chronology). This is a signal that a pandemic is imminent and time to finalize plans is short. U.S.-based companies start to restrict travel to Mexico, and put other procedures in place to protect their employees.

On May 1, WHO announces it has “no doubt” that a successful vaccine against the swine flu virus could be developed within the next 6 months (WHO, Chronology). Most of the sustained spread of H1N1 is in North America at this point. Two days later, on May 3, WHO decides to deploy stockpiles of the antiviral drug Oseltamivir (Tamiflu) to 72 of the least developed countries. The

IN BRIEF

- The H1N1 outbreak in 2009 resulted in the first flu pandemic in more than 40 years.
- Although this outbreak resulted in fewer deaths than predicted, the declaration of a pandemic caused businesses to pause and consider their response plans.
- This article provides an overview of the course of the virus and practical lessons learned from the trenches.
- Details include a framework for updating business continuity plans to include a more realistic pandemic response, and strategies for minimizing the risk of pandemic in the workplace.

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virus, now known as novel H1N1, continues to spread throughout the world with more than 40 countries reporting cases and some deaths. On June 11, WHO declares Phase 6, “the start of the 2009 influenza pandemic” (WHO, Chronology).

A disease epidemic occurs when there are more cases of that disease than normal. A pandemic is a worldwide epidemic of a disease. This article provides an overview of the course of the virus and practical lessons learned from the trenches of the pandemic response team. Details include a framework for updating business continuity plans to include a more realistic pandemic response, and strategies for minimizing the risk of pandemic in the workplace. These strategies encompass the use of vaccines and antiviral medications; personal hygiene; and social distancing.

Course of the Virus

The U.S. Public Health Emergency for 2009 H1N1 influenza expired on June 23, 2010. On Aug. 10,

2010, WHO declared an end to the 2009 H1N1 pandemic globally (CDC, 2010). Deaths occurred, but fewer than the number expected based on the 1918-19 flu pandemic that caused an estimated 20 to 50 million deaths worldwide (CDC, 2011).

On Aug. 1, 2010, WHO reported that more than 214 countries and overseas territories or communities had reported laboratory-confirmed cases of pandemic influenza H1N1 2009, including more than 18,449 deaths (WHO, 2010). H1N1 led to nearly 260,000 hospitalizations and approximately 12,000 deaths in the U.S. (DHHS, 2010).

H1N1 is expected to continue to circulate in some form for many years to come. The illness was less severe than expected but it affected more children, young adults and pregnant women than a typical seasonal flu. The characteristic symptoms are fever, cough, sore throat, runny or stuffy nose, body aches, headaches and chills.

The normal course of the disease has been 3 to 7 days, with individuals who have underlying medical conditions such as asthma ill much longer. Eighty percent of adults and 60% of children who were hospitalized had one or more underlying conditions such as pregnancy, diabetes, heart disease, asthma and kidney disease (CDC, 2010c).

Most affected people recovered at home with the use of fever-reducing medication and rest. CDC recommends prompt treatment (within 48 hours) for persons with suspected or confirmed H1N1 influenza, if they meet the following criteria: 1) illness requiring hospitalization; 2) progressive, severe or complicated illness, regardless of previous health status; and/or 3) patients at risk for severe disease.

Oseltamivir (Tamiflu) and Zanamivir (Relenza) were shown to be effective in treating the 2009 H1N1 flu. In addition, Peramivir IV was authorized under an emergency use authorization in the U.S. to treat certain patients with suspected or confirmed 2009 H1N1 influenza virus infection.

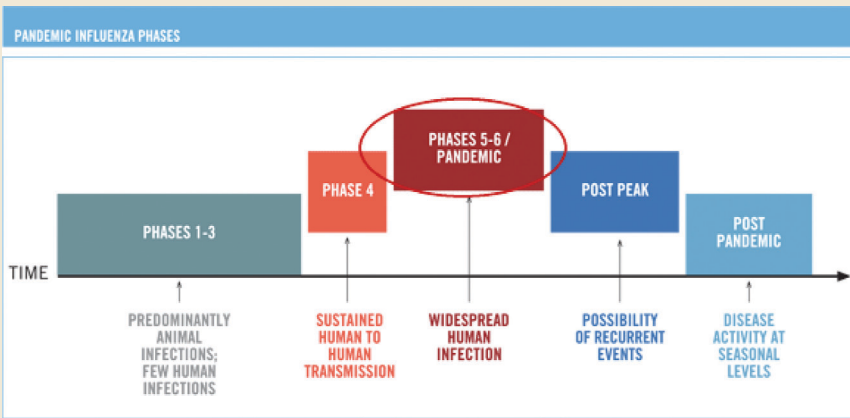
Although some small clusters of hospitalized patients were found to have the H1N1 virus that is resistant to Oseltamivir, CDC does not believe that a drug-resistant form of the flu is circulating in the population. This means that treatment with antivirals remains an effective way to limit the duration and severity of the illness. Antivirals should not routinely be used for prevention since the protection is only afforded while taking the medication (CDC, 2009b).

Vaccines are considered the best option for prevention but it takes time to produce and distribute them. Although distribution of vaccines in the U.S. started in October 2009 (within the WHO predicted timeframe), the quantity of vaccine doses was much lower than expected due to manufacturing and logistics challenges.

Doses for high-risk individuals were allocated and distributed to states on a population basis, not based on the number of high-risk population or the course of the virus's spread.

This was complicated by the need for children under age 10 to receive two doses, 1 month apart. Consequently, H1N1 flu activity was peaking in

WHO Pandemic Influenza Phases



In **Phase 1** no viruses circulating among animals have been reported to cause infections in humans.

In **Phase 2** an animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans and is, therefore, considered a potential pandemic threat.

In **Phase 3**, an animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people, but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks. Limited human-to-human transmission may occur under some circumstances, for example, when there is close contact between an infected person and an unprotected caregiver. However, limited transmission under such restricted circumstances does not indicate that the virus has gained the level of transmissibility among humans necessary to cause a pandemic.

Phase 4 is characterized by verified human-to-human transmission of an animal or human-animal influenza reassortant virus able to cause "community-level outbreaks." The ability to cause sustained disease outbreaks in a community marks a significant upward shift in the risk for a pandemic. Any country that suspects or has verified such an event should urgently consult with WHO so that the situation can be jointly assessed and a decision made by the affected country if implementation of a rapid pandemic containment operation is warranted. Phase 4 indicates a significant increase in risk of a pandemic but does not necessarily mean that a pandemic is a forgone conclusion.

Phase 5 is characterized by human-to-human spread of the

virus into at least two countries in one WHO region. While most countries will not be affected at this stage, the declaration of Phase 5 is a strong signal that a pandemic is imminent and that the time to finalize the organization, communication, and implementation of the planned mitigation measures is short.

Phase 6, the pandemic phase, is characterized by community-level outbreaks in at least one other country in a different WHO region in addition to the criteria defined in Phase 5. Designation of this phase will indicate that a global pandemic is underway.

During the **postpeak period**, pandemic disease levels in most countries with adequate surveillance will have dropped below peak observed levels. The postpeak period signifies that pandemic activity appears to be decreasing; however, it is uncertain whether additional waves will occur and countries will need to be prepared for a second wave.

Previous pandemics have been characterized by waves of activity spread over months. Once the level of disease activity drops, a critical communications task will be to balance this information with the possibility of another wave. Pandemic waves can be separated by months and an immediate at-ease signal may be premature.

In the **postpandemic period**, influenza disease activity will have returned to levels normally seen for seasonal influenza. It is expected that the pandemic virus will behave as a seasonal influenza A virus. At this stage, it is important to maintain surveillance and update pandemic preparedness and response plans accordingly. An intensive phase of recovery and evaluation may be required.

much of the U.S. in late October, just as the vaccine was becoming available for the high-risk population (CDC, 2010d).

Flu activity peaked later in November for many northern U.S. states and the vaccine was becoming more available to the high-risk population by then. The vaccine was not available to the general public in most states until December 2009. By that time, many people had either had the virus or chose not to be vaccinated.

CDC (2009c) conducted the National 2009 H1N1 Flu Survey Dec. 6-12, 2009. Results showed that an estimated 46 million people (15.3% of the population) had been vaccinated against 2009 H1N1 flu. This represents 28 million adults (13%) and 18 million children (24%). The amount of vaccine shipped to providers at the time the survey was conducted was enough to vaccinate about 21% of the U.S. population. Therefore, almost 3 of 4 shipped doses had been administered.

On Feb. 22, 2010, Food and Drug Administration announced that the 2009 H1N1 strain would be included in the seasonal flu vaccine for 2010-11. WHO made the same recommendation. So, seasonal flu vaccine for 2010 had two strains of Influenza A (H1N1 and H3N2) and one of Influenza B (Flu.gov, 2010).

On Feb. 24, 2010, CDC announced an expansion of the recommendation for annual influenza vaccination to include all people age 6 months and older. Historically, the uptake of seasonal influenza vaccine has been less than half of the number of persons with a specific recommendation to receive the vaccination.

It remains to be seen whether the broad recommendation of seasonal flu vaccine for all translated into higher uptake of vaccine during the 2010-11 flu season (CDC, 2010b). Current statistics can be found at www.cdc.gov/flu/professionals/vaccination.

Updating Business Continuity Plans

When reviewing their business continuity plans in spring 2009 (even if the plans did include pandemic response), many firms found they were facing a different scenario. In recent years, pandemic planning in the U.S. had focused on the threat of avian influenza (H5N1) arriving from Asia.

Planning and response strategies were elevated according to WHO's six pandemic phases. This meant that U.S.

Note. Reprinted from Pandemic Phases, by WHO.

companies without global operations typically focused on how to obtain product from regions of the world that were not affected by avian influenza; how to minimize or eliminate employee travel to impacted regions; and how to keep vendors from visiting U.S. operations. Those with global operations may also have stockpiled antiviral medications in likely threat areas and developed plans to divert production to different regions of the world.

These concepts remain sound, but some flaws began to be detected when businesses faced a different virus, with a lesser severity, that began in North America.

First, the WHO phases are intended to allow for preparedness and response to a potential pandemic (see sidebar on p. 46). Phases 1 through 3 involve capacity development and response planning activities. Phases 4 through 6 signal the need for response and mitigation efforts.

The original phase information from WHO and guidance from CDC always assumed a high level of severity and human-to-human transmission. So business response plans often assumed that a high degree of containment was needed, resulting in more extreme social distancing such as shutting down operations to keep sick people from transmitting the virus to critical staff, and minimizing all expenses to preserve cash in case of an interruption to the revenue stream.

Second, the H1N1 outbreak began in North America. By the time Phase 4 was announced by WHO on April 27, 2009, the U.S. already had at least 20 cases of so-called swine flu including vacationers to Mexico who had started to transmit the virus to other people in several states. On April 29, WHO declared Phase 5 and started to refer to the disease as new influenza A (H1N1). By this time, there were cases on all five continents.

Limiting employee travel may be appropriate early in an outbreak, but limiting business travel (e.g., to Mexico in the case of H1N1) was not effective after 1 week or so. Containment in Mexico itself was too late to protect the rest of the world, although the eventual shut down of schools, universities, theaters and museums in Mexico City reduced the transmission of the disease to some extent. It also created the awareness of the need to isolate those who were sick.

Finally, the 2009 H1N1 virus typically affected only about 10% of a given workplace over the course of the wave, in addition to children of employees and family members. Many of those affected were younger employees.

Most of those who died were age 18 to 64. CDC (2010c) estimates that only 12,000 deaths occurred out of 59 million H1N1 cases in the U.S. Quarantine of entire households turned out not to be necessary since parents of a sick child often did not become ill themselves.

Personal hygiene messages and sending employees home as soon as they became ill became the norm. Early on, it was unclear how long sick employees needed to stay home. CDC guidance was initially at least 7 days, which later changed

to 24 hours after being fever free without fever-reducing medication. Some workplaces did not have soap and water readily available to all employees, and alcohol-based hand sanitizer was difficult to purchase early on due to high demand. CDC provided regular information to employers via mass conference calls and on its website.

The purpose of a pandemic plan is to: a) reduce transmission among staff; b) protect people who are at higher risk for complications from getting infected with flu; c) maintain business operations; and d) minimize adverse effects on other entities in their supply chains. Those purposes have not changed.

What was learned during the H1N1 pandemic is that employers should expect to see a wide range of disease patterns across the country and around the world. Business strategies and response to flu outbreaks should be based on local information from local and state public health authorities. Key indicators to use when making decisions on appropriate responses include:

- disease severity (i.e., hospitalization and death rates) in the community where business is located;
- extent of disease (number of people who are sick) in the community;
- effect of disease on workforce populations that are vulnerable and at higher risk for flu complications (e.g., pregnant women, employees with chronic medical conditions that put them at increased risk for complications of flu);
- other factors that may affect employees' ability to get to work, such as school dismissals or early childhood program closures due to high levels of absenteeism or illness.

Employers with more than one location are encouraged to provide local managers with the authority to take appropriate actions outlined in their business pandemic plan based on the condition in each locality (CDC, 2010a). The sidebar on p. 48 highlights the important components of a flu pandemic plan.

Strategies for Minimizing the Risk of Pandemic in the Workplace *Enhanced Personal Hygiene*

The single most important strategy learned during the H1N1 pandemic was that enhanced personal hygiene makes a difference. Emphasis on respiratory etiquette and hand hygiene by those who are healthy and those who have flu symptoms will minimize spread of the virus. Hygiene communications can include posters, memos or intranet stories. Soap and water should be readily available; in areas without running water, companies should provide alcohol-based sanitizer. Tissues and no-touch trash receptacles should be available for use by employees and visitors as well.

Additional environmental cleaning of high-touch areas such as doorknobs, keyboards, desks and railings should occur. Establish a process to communicate information to employees and business partners on pandemic plans and latest health flu information. This may be accomplished through a widget or button on the company home page. An-

anticipate employee fear, anxiety, rumors and misinformation, and plan communications accordingly.

Social Distancing

Another lesson learned is that the key social distancing strategy is to keep sick people out of the workplace until they are well and less likely to spread the virus. To achieve this, employees need to know what symptoms constitute the flu and supervisors/managers need to send home people who come to work sick.

Employers need to allow sick employees to stay

home without fear of losing their jobs; develop other flexible leave policies to allow employees to stay home to care for sick family members or for children if schools dismiss students or early childhood programs close; and share the company's flu pandemic plan with employees and explain what human resources policies, workplace and leave flexibilities, and pay and benefits will be available to them. It will be important to know normal absentee rates so comparisons can be made to absenteeism rates due to pandemic flu. This may require a system that does not already exist at a company.

Social distancing, as defined in most pandemic plans, should be implemented only if flu severity increases, and local public health officials recommend that employers implement measures to increase the physical distance between people in the workplace to reduce the spread of flu. The goal in that case should be to provide at least 6 ft of distance between people at most times.

This is not a simple or easy strategy and would typically require considerable flexibility. These measures may include avoiding crowded work settings, canceling business-related face-to-face meetings, spacing employees farther apart, canceling nonessential travel, increasing use of teleworking, and using staggered shifts to allow fewer employees to be in the workplace at the same time.

If appropriate and feasible for a given type of business, review or develop policies for teleworking that include an assessment of the capabilities and gaps of current computer systems and availability of technical support. Take remedial steps if needed, and test systems in advance to verify that they can handle an increase in remote users.

Vaccines

The number-one employer strategy recommended by the CDC is to encourage vaccination against the flu. CDC's message is, "The single best way to prevent seasonal flu is to get a yearly flu vaccine" (DHHS, 2011).

To encourage vaccinations, employers can offer opportunities at a worksite for flu vac-

Important Components of a Flu Pandemic Plan

- Be prepared to implement multiple measures to protect employees and ensure business continuity. A layered approach will likely work better than using just one measure.
- Identify possible work-related exposure and health risks to your employees. OSHA has developed tools to determine whether employees are at risk of work-related exposures and, if so, how to respond (www.osha.gov/dsg/topics/pandemicflu/index.html).
- Review human resources policies to make sure policies and practices are consistent with public health recommendations and are consistent with existing state and federal workplace laws (for more information on employer responsibilities, visit the Department of Labor's and the Equal Employment Opportunity Commission's websites at www.dol.gov and www.eeoc.gov).
- Allow employees to stay home if they are sick, have to care for sick family members, or must watch their children if schools or early childhood programs close.
- Explore whether the company can establish policies and practices, such as flexible worksites (e.g., telecommuting) and flexible work hours (e.g., staggered shifts), to increase the physical distance among employees and between employees and others if local public health authorities recommend the use of social distancing strategies. Ensure that the company has the information technology and infrastructure needed to support multiple employees who may be able to work from home.
- Identify essential business functions, essential jobs or roles and critical elements within supply chains (e.g., raw materials, suppliers, subcontractor services/products, and logistics) required to maintain business operations. Plan for how the business will operate if absenteeism increases or these supply chains are interrupted.
- Set up authorities, triggers and procedures for activating and terminating the company's flu pandemic plan, altering business operations (e.g., possibly changing or closing operations in affected areas) and transferring business knowledge to key employees. Work closely with local health officials to identify these triggers.
- Plan to minimize exposure to fellow employees or the public if public health officials call for social distancing.
- Establish a process to communicate information to employees and business partners on pandemic plans and latest health information. Anticipate employee fear, anxiety, rumors and misinformation, and plan communications accordingly.

Over the past several years, many federal agencies have developed guidelines, including checklists, to help businesses, industries and other employers plan for a pandemic. Review these resources at <http://pandemicflu.gov/professional/business>.

Note. CDC, *Guidance for Businesses and Employers to Plan and Respond to the 2009-10 Influenza Season*.

cination. Employer-paid flu vaccine clinics at the worksite can result in higher levels of vaccination because it is more convenient (even if immunizations at a healthcare provider are covered at 100% by the health plan).

Sites with occupational health nurses often can provide vaccines in a cost-effective manner. Employers also can grant employees time off to get vaccinated if not offered at the worksite. In addition, employers should review health benefits and work with insurers to explore whether they can cover the costs of flu vaccination.

Antiviral Medications

The stockpiling of antiviral medications was considered a major pandemic strategy for many employers and public health agencies in response to avian influenza. Drug companies and others even offered to provide storage services for a fee.

Although this remains a CDC and WHO strategy, and it may be an appropriate prevention strategy for critical infrastructure employers, it was not of value to the average employer in the case of H1N1. Most people recovered from H1N1 in a week without antiviral treatment. Since household spread was not severe, most family members of those who were sick did not need to take antivirals as a preventive measure unless they were in a high-risk group.

Some community-based pharmacies ran out of antivirals early in the H1N1 outbreak, but hospitals typically had access to the CDC stockpile through a state or local public health agency. Antivirals are effective as treatment if received quickly after symptoms occur. This will remain a pandemic treatment strategy as long as a virus does not mutate and become resistant to the drugs.

Conclusion

The 2009 H1N1 pandemic allowed employers to exercise their pandemic plans. This exercise revealed some flaws in those plans since they were typically based on an outbreak of avian influenza that would originate in Asia and have a high fatality rate. Now is an opportune time to modify the plan to be more flexible and focused on the local public health situation, as opposed to a company-wide rigid approach.

A virus outbreak can spread quickly around the world and containment is not as likely as once thought. The good news is that communication is also rapid. WHO and CDC can provide accurate information to employers and provide updates whenever needed by using the Internet, e-mail alerts or social media. Employers can use the same technologies to keep employees informed throughout the world.

According to CDC, influenza is unpredictable, and the agency does not rule out the possibility of another pandemic in the future. Hopefully, when future pandemics are a threat, the speed of vaccine development will be faster as a result of better technology. In the event of any new virus outbreak in the short term, the strategies discussed are the

best course for an employer to follow until vaccine becomes available. **PS**

References

- CDC. (2009, Dec. 22). 2009 H1N1 influenza vaccination coverage. Washington, DC: U.S. Department of Health and Human Services (DHHS), Author. Retrieved Oct. 19, 2010, from www.cdc.gov/h1n1flu/in_the_news/influenza_vaccination.htm.
- CDC. (2010, Aug. 11). 2009 H1N1 flu situation update. Washington, DC: DHHS, Author. Retrieved April 29, 2011, from www.cdc.gov/h1n1flu.
- CDC. (2010, Feb. 24). Advisory Committee on Immunization Practices (ACIP) recommends universal annual influenza vaccination. Washington, DC: DHHS, Author. Retrieved Nov. 26, 2010, from www.cdc.gov/media/pressrel/2010/r100224.htm.
- CDC. (2009, Dec. 9). Antiviral drugs for treatment of influenza. Washington, DC: DHHS, Author. Retrieved Nov. 26, 2010, from www.cdc.gov/H1N1flu/recommendations.htm.
- CDC. (2010, May 14). CDC estimates of 2009 H1N1 cases and related hospitalizations and deaths from April 2009 to April 10, 2010, by age group. Washington, DC: DHHS, Author. Retrieved Nov. 26, 2010, from www.cdc.gov/h1n1flu/estimates_2009_h1n1.htm.
- CDC. (2011, Feb. 8). Reconstruction of the 1918 influenza pandemic virus. Washington, DC: DHHS, Author. Retrieved Oct. 19, 2010, from www.cdc.gov/flu/about/qa/1918flupandemic.htm.
- CDC. (2010, May 14). Flu estimates. Washington, DC: DHHS, Author. Retrieved Oct. 19, 2010, from www.cdc.gov/h1n1flu/estimates_2009_h1n1.htm.
- CDC. (2010, Feb. 22). Guidance for businesses and employers to plan and respond to the 2009-10 influenza season. Washington, DC: DHHS, Author. Retrieved Oct. 19, 2010, from www.cdc.gov/h1n1flu/business/guidance.
- CDC. (2009, Aug. 19). H1N1 flu resources for businesses and employers. Washington, DC: DHHS, Author. Retrieved Oct. 19, 2010, from www.cdc.gov/h1n1flu/business.
- CDC. (2010, Aug. 12). What sort of flu season is expected this year? Washington, DC: DHHS, Author. Retrieved Nov. 29, 2010, from www.cdc.gov/flu/about/qa/1011season.htm#expected.
- DHHS. Business planning. Washington, DC: Author. Retrieved Nov. 29, 2010, from <http://pandemicflu.gov/professional/business>.
- DHHS. (2011, March 14). Seasonal flu information for businesses and employees. Retrieved April 29, 2011, from www.flu.gov/professional/business/toolkit20102011.html.
- Flu.gov. (2010, Feb. 22). Protection against 2009 H1N1 to be included in 2010-2011 seasonal flu vaccine [Blog post]. Washington, DC: Author. Retrieved April 29, 2011, from www.flu.gov/news/blogs/blog20100222.html.
- World Health Organization (WHO). Chronology of influenza A (H1N1). New Delhi, India: WHO Regional Office for South-East Asia. Retrieved Nov. 29, 2010, from [www.searo.who.int/LinkFiles/Influenza_A\(H1N1\)_Chronology_of_Influenza_A\(H1N1\).pdf](http://www.searo.who.int/LinkFiles/Influenza_A(H1N1)_Chronology_of_Influenza_A(H1N1).pdf).
- WHO. Pandemic phases. Geneva, Switzerland: Author. Retrieved Oct. 19, 2010, from www.who.int/csr/disease/avian_influenza/phase/en.
- WHO. (2010, Aug. 6). Pandemic H1N1 2009: Update 112. Geneva, Switzerland: Author. Retrieved Nov. 26, 2010, from www.who.int/csr/don/2010_08_06/en/index.html.