Avian Influenza: A Potential Pandemic

Occupational and Environmental Health Nurse’s Role in Pandemic Preparedness Planning

by

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Approved by:

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Susan A. Randolph
ABSTRACT

Influenza viruses periodically cause worldwide epidemics, or pandemics, with high rates of illness and death. Unlike other public safety emergencies, an influenza pandemic will simultaneously affect multiple populations around the world. Advance planning for a large-scale, widespread health crisis such as a pandemic is required to optimize health care delivery. Prevention and preparedness, the primary focus of public health initiatives, will facilitate the response and recovery before, during, and after an influenza pandemic.

An influenza pandemic has the potential to disrupt business operations and drain productivity due to ill and absent employees. The expertise, knowledge, and skills of the occupational and environmental health nurse (OEHN) at the workplace are valuable in helping businesses brace against these losses. Through pre-pandemic preparedness, the OEHN can ensure that practical, preventive measures and emergency response protocols are incorporated into existing business continuity and disaster plans.

Such measures will be necessary in the event of a pandemic caused by the avian influenza virus (H5N1). Community and public health resources alone may not be sufficient to adequately protect the population. Employers and company based employee health organizations can help defray the anticipated strain on community resources by developing and implementing preparedness plans in the workplace that are realistic and grounded in the preventive health principles of primary, secondary, and tertiary prevention.
This paper provides information that will assist the OEHN in understanding the potential risk of avian influenza, dealing with the potential threat of a pandemic, and developing a strategy to reduce the impact of ill health on the worker and the business.
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CHAPTER I

INTRODUCTION

Influenza, a major cause of sickness and death around the world, is one of the most important infectious diseases confronting the world today. Influenza is a respiratory infection characterized by headache, fever, and a short dry cough that lasts up to a week. According to the National Center for Health Statistics (NCHS), influenza was the seventh leading cause of death in the United States in 2003 with over 66,000 deaths (2003). Influenza is associated with an annual mortality rate of over 36,000 (Thompson, Shay, & Weintraub, 2003). The social costs of influenza include 200 million days of restricted activity, 75 million days of absenteeism, 22 million health care visits, and more than 110,000 hospitalizations (Seiguer, 2005).

Most influenza viruses occur in birds, particularly the aquatic waterfowl. Only a few types of influenza virus circulate widely in humans. “Bird flu” or “Avian flu” refers to influenza in birds and to instances where these avian viruses jump the species barrier to cause human disease (Bartlett & Hayden, 2005). Recently a new strain of influenza in poultry has emerged in Southeast Asia and health experts within the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) are concerned that this strain of avian flu virus called H5N1 could mutate into the next pandemic (WHO, 2005a). Most human avian influenza cases from this new strain that have been reported thus far have resulted from persons having contact with contaminated birds or bird by-products. To date, no human-to-human sustainable transmission of this virus has
been reported (Ungchusak, et al., 2005), but health experts are concerned that this mode of transmission is possible should the virus mutate. According to the WHO (2006a), the death rate from avian influenza (H5N1) has been high; since 1993 there have been more than 250 cases reported with a mortality rate greater than 50% (Table 1.1).

The migratory flight of birds (Figure 1.1), the global exportation of poultry, and global travel present a possible increased risk for spreading the virus from continent to continent, thus increasing the likelihood of a pandemic (WHO, 2006b). Scientists believe birds from Southeast Asia, specifically China, migrating to Siberia and Russia may have carried the virus with them, mixing with birds that then traveled to Europe. In the spring, birds from East Asia migrate to the Pacific Islands and to Alaska and northern Siberia, where they share breeding grounds with North American birds; in the fall some of these birds migrate into the continental United States (US) thus increasing the risk of the virus spreading into North America (Food and Agriculture Organization, n.d.). Scientists are working to develop a vaccine for this strain of virus but most experts predict that it would take up to six months to develop and produce an effective vaccine after the emergence of the pandemic (WHO, 2004). Currently all influenza vaccine development is done in chicken egg, a slow process that can take a year to complete (Figure 1.2). A new and faster technology of developing vaccines in human cells needs to be advanced and funding for such research should be a priority. In November 2005, US President George W. Bush proposed spending $7.1 billion over three years to prepare for the threat of a pandemic
**TABLE 1.1**

**CUMULATIVE NUMBER OF CONFIRMED HUMAN CASES OF AVIAN INFLUENZA A/(H5N1) REPORTED TO WHO**

11 October 2006

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Total number of cases includes number of deaths.
WHO reports only laboratory-confirmed cases.

FIGURE 1.1

BIRD FLU MIGRATORY ROUTES

FIGURE 1.2

INFLUENZA VACCINE HOW IT’S MADE

INFLUENZA STRAINS CHANGE ANNUALLY so a new influenza vaccine must be produced every year. Most influenza strains originate in Asia and travel around the world as the seasons progress. The Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO) monitor and identify the strains predicted to be the most prevalent in the upcoming season. The Food and Drug Administration (FDA) analyzes the CDC data and recommends strains for inclusion in the new vaccine.

Annual influenza vaccine production is a complex process, taking up to 16 months to manufacture, purify, test, and package influenza vaccine. Manufacturers begin production of each year’s influenza vaccine in January. The manufacturing process is designed to ensure vaccine reaches consumers before the influenza season begins. Any delay in the process can affect the timing of influenza vaccine for the coming year.

Timeline for Production of Influenza Vaccine

JANUARY-MAY: CDC provides influenza seed viruses to the FDA, which distributes it to the manufacturers. Each seed virus is injected into fertilized chicken eggs, which are incubated for several days to allow the virus to multiply.

Influenza vaccine contains three strains of the virus; each strain is produced separately.

After incubation the eggshell is opened and the allantoic fluid (egg whites) is removed to harvest the virus. The material undergoes multiple purification steps. A special chemical treatment is applied to ensure the virus is inactivated, making it impossible to contract influenza from the vaccine.

JUNE-JULY: FDA begins to test each of the company’s concentrated strains to determine the yield of the virus; to ensure it is pure and the potency is adequate for immunization. The three separate strains are blended into one vaccine and filled into vials and syringes.

AUGUST: The vaccine is packaged for distribution and is kept in cold storage to ensure potency.

SEPTEMBER: Shipping begins.

Product Release

OCTOBER/NOVEMBER: Patients begin to get vaccinated against influenza. It takes about 2 weeks from the time of vaccination for immunity to develop.

Source: How Do They Make Influenza Vaccine? (n.d.), p. 3.
influenza. Nearly $5 billion of the $7.1 billion was allocated for increasing domestic vaccine production and stockpiles, and $2.8 billion was dedicated to new cell based technology (Lueck & Mathews, 2005).

Influenza scientists have been predicting another pandemic caused by avian influenza for years. The most recent pandemic involving influenza A strains with gene combinations from human and avian influenza strains was in 1968 (Bartlett & Hayden, 2005). Historically pandemics have occurred every 11 to 40 years. It is believed not to be a question of whether a pandemic will occur but when, and H5N1 has made these predictions more worrisome because the protein structure on the surface of the H5N1 virus has some of the same characteristics of the virus that caused the Spanish Flu pandemic in 1918 (Harvey, Martin, Zambon, & Barclay, 2004).
CHAPTER II
LITERATURE REVIEW

Scope of the Problem

A pandemic is an epidemic occurring over a wide area, crossing international boundaries, and usually affecting a large number of people. Influenza pandemics occur when a new strain of virus appears or emerges in the human population, causes serious illness, and then spreads easily from person to person, continent to continent (DHHS, 2005a). A normal flu season in the United States results in approximately 200,000 hospitalizations and 36,000 deaths (CDC, 2006a). The next influenza pandemic in the US is estimated to affect over 200 million people with up to 734,000 hospitalizations and could result in 207,000 to 2 million deaths (Meltzer, Cox, & Fukuda, 1999). The Congressional Budget Office (CBO) has estimated that the financial impact of a mild to severe epidemic would be $60 billion to $600 billion respectively (2005). In the event of a mild pandemic, 25% of the workforce is likely to be absent an average of four workdays during the peak of illness. In the event of a severe pandemic it is estimated that 30% of workers would lose as many as 15 work days due to personal illness or because they feared the risk of infection at work, or because they needed to care for family or friends (CBO, 2005). Additional socioeconomic impacts will be experienced with disruption in essential services such as health care and transportation. The closure of schools, daycare, banks, restaurants, government offices, and shopping centers will cause significant hardship and limit access to these services. Food and water supplies may be interrupted and
temporary shortages could occur, fuel shortages will impact transportation and limit public transportation opportunities. Local governments may institute community wide quarantines, and widespread illness in the community will increase the likelihood that the medical infrastructure capacity will be compromised. The sudden demand for increased services and the shortages of personnel who provide essential health services will result in fewer people being able to receive the treatment they need which could lead to greater numbers of people with increased health complications and more serious illnesses (WHO, 2005b). To address some of these issues, the Department of Health and Human Services has published a planning guide designed to help individuals and families understand the threat of a pandemic influenza outbreak and commonsense actions that can be taken in preparing for a pandemic (Appendix A).

Types of Influenza Virus

There are three different types of influenza: 1) seasonal flu - a respiratory illness that is transmitted from person to person, 2) avian flu - caused by an influenza virus that occurs naturally in wild birds, and 3) pandemic flu - a virulent flu that causes a global outbreak with little to no natural immunity. All three types of influenza are primarily the result of influenza A, B, or C viruses (CDC, 2005).

Influenza A, B, and C

Three influenza viruses (influenza A, B, and C) cause respiratory illness and are easily transmitted from person to person. Most reported influenza illnesses are the result of the A and B viruses. Illnesses from type C virus are
usually milder and cause only minor outbreaks. Influenza type A viruses can infect people, birds, pigs, horses, and other animals, but wild birds are the natural hosts for these viruses (CDC, 2004a). Influenza A causes the most severe disease in humans and is the most likely to trigger a pandemic (Global Homeland Security, 2005). During the 2005-06 influenza season, influenza A H1N1 and H3N2 and influenza B co-circulated worldwide. In the United States, Influenza A H3N2 viruses predominated overall (92%) but influenza B viruses were isolated more frequently than influenza A viruses later in the season (MMWR, 2006a).

Influenza pandemics occur when there is a noticeable change or shift in the genetic structure of a circulating strain of influenza (Bartlett & Hayden, 2005). Because of this genetic shift, the human population is exposed to a new virus strain for which there is no previous immunity. This lack of immunity makes the population susceptible and vulnerable to infection from the newly developed pandemic strain.

Influenza A virus is divided into subtypes based on two proteins on the surface of the virus. These two major surface glycoproteins are hemagglutinin (HA) and neuraminidase (NA) proteins (CDC, 2004a). The HA subtypes are epidemiologically most important because they govern the ability of the virus to bind and to enter cells where multiplication of the virus occurs. The NA subtypes govern the release of newly formed virus from the cells. Influenza A viruses are further subdivided into subtypes dependent on differences in the surface glycoproteins. Only two influenza A subtypes currently co-circulate globally in humans - H1N1 and H3N2 (CDC, n.d.) but there are 16 distinct antigenic
subtypes of HA (H1 to H16) and nine NAs (N1 to N9) that have been identified in wild aquatic birds (Nicholson, Wood, & Zambon, 2003). Only influenza A viruses infect birds, and all known subtypes of influenza A viruses can infect birds. However, there are substantial genetic differences between the influenza A subtypes that typically infect birds and those that infect both people and birds. Three prominent subtypes of the avian influenza A viruses that are known to infect both birds and people are H5, H7, and H9 (CDC, 2005).

A minor antigenic change or drift in the influenza A virus is the likely cause of annual epidemics of influenza around the world. In the northern hemisphere, the epidemics occur between October and March and impact the elderly and the medically high-risk groups (Table 2.1). A major antigenic change or shift, may result in a worldwide pandemic if the virus is efficiently transmitted from human to human (Nicholson, et al., 2003). Influenza pandemics occur when an entirely new subtype of influenza A virus emerges through recombination or reassortment of human and animal antigens. The reassortment occurs when the host (e.g., pigs, birds, or humans) becomes simultaneously infected by two different viruses, either swine viruses, avian viruses, or human flu viruses (Figure 2.1). The surface glycoproteins of these two viruses permit binding of the cells - thereby the host becomes a virtual “mixing bowl” for a new virus to mutate (Myers, et al., 2006). This is a particular public health concern in areas where pigs, chickens, and people coexist and the viruses are epidemic, thus setting the
### TABLE 2.1

**PEOPLE AT HIGH RISK FOR COMPLICATIONS FROM THE FLU**

- People 65 years and older;

- People who live in nursing homes and other long-term care facilities that house those with long-term illnesses;

- Adults and children 6 months and older with chronic heart or lung conditions, including asthma;

- Adults and children 6 months and older who needed regular medical care or were in a hospital during the previous year because of a metabolic disease (like diabetes), chronic kidney disease, or weakened immune system (including immune system problems caused by medicines or by infection with human immunodeficiency virus [HIV/AIDS]);

- Children 6 months to 18 years of age who are on long-term aspirin therapy. (Children given aspirin while they have influenza are at risk of Reye syndrome.);

- Women who will be pregnant during the influenza season;

- All children 6 to 23 months of age; and

- People with any condition that can compromise respiratory function or the handling of respiratory secretions (that is, a condition that makes it hard to breathe or swallow, such as brain injury or disease, spinal cord injuries, seizure disorders, or other nerve or muscle disorders).

FIGURE 2.1

VIRUS REASSORTMENT OF HUMAN AND ANIMAL ANTIGENS

Source: CDC (2004b), Slide 10.
stage for an influenza pandemic to take place. Influenza pandemics occur infrequently but they cause substantially higher illness and death rates in the generally healthy groups who are not usually affected by annual epidemics.

**Avian Influenza**

Avian influenza, H5N1, is a highly contagious infectious disease in birds caused by a strain of the type A influenza virus. The disease is found worldwide and all birds are thought to be susceptible to the disease. Migratory waterfowl, ducks, and geese are a natural reservoir for avian influenza virus, and can carry the viruses without becoming ill. Of the sixteen subtypes of influenza virus known to infect birds, to date all outbreaks have been caused by subtypes H5 and H7 (WHO, 2006c). Avian influenza viruses do not normally infect species other than pigs or birds, but in 1997 the H5N1 strain infected 18 humans in Hong Kong, of whom six died from the illness (WHO, 2006d). This outbreak was unique and alarming because it was the first recognized direct transmission of influenza from birds to people (Bartlett & Hayden, 2005).

According to reports from the WHO and CDC, an influenza pandemic threat from the H5N1 virus is real and imminent (Gerberding, personal communication, December 1, 2005), and the risk to public health will be great. A number of factors influence the threat of a pandemic: 1) the avian flu is a new sub-type of the influenza A virus to which there is no human immunity; 2) reported cases have experienced severe illness with high mortality rates; and 3) cases show that both adults and children are susceptible to the infection (WHO, 2006d). Other factors that have heightened concerns among public health
officials include laboratory evidence that the virus has become more robust than the initial 1997 strain and it is able to survive longer under a broad range of environmental conditions. The virus has become increasingly pathogenic in poultry and has increased the range of species it can infect, now including ferrets and domestic cats, and the virus appears to have become resistant to one of the two classes of antiviral flu drugs (CBO, 2005).

Avian flu outbreaks continue to spread in Asia, Africa, and Europe. Although there had not been a new human case or single outbreak in poultry reported in Vietnam or Thailand as of May 14, 2006, the likelihood of eliminating avian flu in this region is doubtful (McNeil, 2006). As long as avian flu outbreaks among poultry continue, human infections will occur and it is only a matter of time before a person infected with seasonal influenza A becomes infected with H5N1, thus establishing the possible opportunity for the virus to mutate and acquire the ability to spread from person to person.

Past History of Pandemics

An influenza pandemic is a rare but recurrent event that sweeps quickly through populations and causes considerable death in its wake. Intervals between previous pandemics have varied from 11 to 42 years with no recognizable pattern (Bartlett & Hayden, 2005). Three influenza pandemics occurred in the previous century: Spanish influenza in 1918, Asian influenza in 1957, and Hong Kong influenza in 1968. The 1918 pandemic killed an estimated 40 to 50 million people worldwide, and is considered to be one of the deadliest disease events in
human history. Subsequent pandemics were much milder, with an estimated 2 million deaths in 1957 and 1 million deaths in 1968 (WHO, 2005a).

**1918 Spanish Flu**

The Spanish influenza pandemic is the largest and most rapidly fatal pandemic in history; it is the event against which all modern pandemics are measured. The H1N1 virus spread across the world in less than one year, causing at least 40 million deaths (Bartlett & Hayden, 2005). The spread of this influenza began in the United States in mid-September and in less than a month it had spread across the entire country. The highest mortality rate of the 1918 pandemic was in young, previously healthy adults 30 to 40 years old. The average time of death after the onset of illness was about seven to nine days. It is estimated that approximately 20% to 40% of the worldwide population became ill during the three waves of this pandemic (Mills, Robins, & Lipsitch, 2004). The severity of the Spanish Flu virus has not been seen again in humans, but the fear is that the severity potential is there with the avian influenza - the next potential pandemic.

**1957 Asian Flu**

In February 1957, the Asian influenza pandemic involving influenza A H2N2 was first identified in China (National Institute of Allergy and Infectious Disease, 2006). Immunity to this strain was rare in people less than 65 years of age and a pandemic was predicted. In preparation, vaccine production began in late May 1957, and health officials increased surveillance for flu outbreaks (DHHS, 2005b).
Unlike the virus that caused the 1918 pandemic, the 1957 pandemic virus was quickly identified due to advances in scientific technology. In the fall as children went back to school, they spread the disease in classrooms and brought it home to their families. Infection rates were highest among school children, young adults, and pregnant women in October 1957 (DHHS, 2005b). In 1957, the global death toll was estimated to be around 2 million and in the US, it resulted in about 70,000 deaths (NIAID, 2006).

1968 Hong Kong Flu

The most recent influenza pandemic occurred in 1968 with the Hong Kong Flu H3N2 outbreak, which resulted in nearly 1 million deaths worldwide and around 34,000 deaths in the United States (NIAID, 2006) over a two year period. Those over the age of 65 were most likely to die. The same virus returned in 1970 and 1972. There are a number of reasons that are thought to have contributed to this virus resulting in a milder pandemic than the two previous pandemics: 1) the virus subtype H3N2 was similar to the subtype of the Asian flu H2N2 of 1957, so some level of immunity could have existed, 2) the peak of the virus occurred during late December when school children were home for the holidays, and 3) improved medical care and antibiotics that are more effective for secondary bacterial infections were available for those who became ill (DHHS, 2005b).

1976 Swine Flu

In January 1976, an outbreak of respiratory disease was identified at Ft. Dix, New Jersey. The CDC influenza laboratory identified a swine influenza
virus strain, H1N1, from patients who possessed hemagglutinin and neuraminidase subtypes that had not circulated for more than 50 years (Sencer & Millar, 2006). It was concluded that this new strain could inevitably result in a pandemic and within three months of this virus identification there was a recommendation to begin mass immunization within the United States. In just under three months more than 40 million people were vaccinated. However, the mass immunization program was stopped after the first three months due to several reports of Guillain-Barré syndrome thought to be caused by the vaccine (Laitin & Pelletier, 1997).

**Current Outbreak**

Although avian influenza A viruses usually do not infect humans, more than 250 confirmed cases of human infection with avian influenza viruses have been reported since 1997 (CDC, 2006c). Avian influenza, specifically the H5N1 subtype, is the organism that health experts have targeted as a potential source for a pandemic in the near future. Outbreaks of avian influenza H5N1 occurred among poultry in eight countries in Asia including Cambodia, China, Indonesia, Japan, Laos, South Korea, Thailand, and Vietnam during late 2003 and early 2004. In an attempt to control the outbreaks, millions of birds were killed and it was thought that this action had been effective in stopping the spread of the virus (Aetna Inte!Health, 2005). By late June 2004, outbreaks were again reported in Cambodia, China, Tibet, Indonesia, Kazakhstan, Malaysia, Mongolia, Russia, Siberia, Thailand, and Vietnam. Influenza H5N1 infection also has been reported among poultry in Turkey, Romania, and Ukraine. Additionally, outbreaks of
influenza H5N1 have been reported among wild migratory birds in many countries throughout Asia, the Middle-East, Europe, and Africa (Figure 2.2).

Currently the virus is confined to birds but cats and pigs are also susceptible. Most of the humans infected with H5N1 had contact with infected birds during processing, cooking, eating, or providing care. According to a report on the analysis of 205 human cases of H5N1 since 2003, the overall mortality rate of this virus is 56% with the highest mortality of 73% in persons between 10 to 19 years of age (Table 2.2). The average number of days from onset of symptoms to death is 8 to 9 days (Table 2.3), the median age of those infected is 20 years with 90% of the cases less than 40 years of age (Table 2.4). Data provided in Table 2.5 show there are equal numbers of females and males affected (Weekly Epidemiological Record, 2006).

Causative Agent

Of the 16H and 9N subtypes of the influenza A virus, only the virus of the H5 and H7 subtypes are thought to cause the avian flu (WHO, 2006d). The virus enters the poultry population in a "low pathogenic" form, but within just a few months it mutates into a "high pathogenic" form that spreads rapidly in the poultry population causing multiple organ system failures. The mortality rate from the high pathogenic form of the virus is nearly 100% and occurs within 48 hours of contact (CDC, 2006d).

Mode of Transmission

Most human influenza infections are spread by virus-laden respiratory droplets that are expelled during coughing and sneezing. Influenza viruses range
FIGURE 2.2

AFFECTED AREAS WITH H5N1 IN POULTRY AND WILD BIRDS

Areas reporting confirmed occurrence of H5N1 avian influenza in poultry and wild birds since 2003

Source: WHO (2006e), Slide 3.
Table 2.2

CASE FATALITY RATE OF H5N1 BY AGE

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<tr>
<td>Total</td>
<td>100 (4/4)</td>
</tr>
</tbody>
</table>

Case fatality rates are given as percentages (numbers of deaths/number of cases)
Data as of April 30, 2006

TABLE 2.3

NUMBER OF DAYS BETWEEN ONSET OF SYMPTOMS AND DEATH

<table>
<thead>
<tr>
<th>Number of days between onset of symptoms and death</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3</td>
<td>5</td>
</tr>
<tr>
<td>4-5</td>
<td>7</td>
</tr>
<tr>
<td>6-7</td>
<td>8</td>
</tr>
<tr>
<td>8-9</td>
<td>25</td>
</tr>
<tr>
<td>10-11</td>
<td>10</td>
</tr>
<tr>
<td>12-13</td>
<td>9</td>
</tr>
<tr>
<td>14-15</td>
<td>6</td>
</tr>
<tr>
<td>16-17</td>
<td>3</td>
</tr>
<tr>
<td>18-19</td>
<td>2</td>
</tr>
<tr>
<td>&gt;20</td>
<td>2</td>
</tr>
</tbody>
</table>

TABLE 2.4

DISTRIBUTION OF H5N1 CASES BY AGE GROUP

TABLE 2.5

HUMAN H5N1 CASES BY SEX AND BY AGE GROUP

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Male</th>
<th>Female</th>
<th>Sex Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>13</td>
<td>8</td>
<td>1.6</td>
</tr>
<tr>
<td>5-9</td>
<td>19</td>
<td>13</td>
<td>1.5</td>
</tr>
<tr>
<td>10-19</td>
<td>18</td>
<td>31</td>
<td>0.6</td>
</tr>
<tr>
<td>20-29</td>
<td>18</td>
<td>27</td>
<td>0.7</td>
</tr>
<tr>
<td>30-39</td>
<td>17</td>
<td>16</td>
<td>1.1</td>
</tr>
<tr>
<td>40-49</td>
<td>5</td>
<td>6</td>
<td>0.8</td>
</tr>
<tr>
<td>&gt;50</td>
<td>6</td>
<td>5</td>
<td>1.2</td>
</tr>
<tr>
<td>Total</td>
<td>96</td>
<td>106</td>
<td>0.9</td>
</tr>
</tbody>
</table>

(N = 202)

in size from 0.08 to 0.12 micrometers that are carried in respiratory secretions as small-particle aerosols that are less than 10 micrometers in diameter (Mandell, Bennett, & Dolin, 1995).

The H5N1 influenza virus is spread primarily through the saliva, nasal secretions, and feces of infected birds. Healthy birds can become infected when they come in contact with contaminated excretions or with surfaces that are contaminated with excretions or secretions. In addition to being highly contagious among poultry, avian influenza viruses are easily transmitted from one location to another by the movement of live birds, rodents, animals, and people - especially when shoes and other clothing are contaminated as well as vehicles, equipment, feed, and cages. The highly pathogenic form of the virus can survive at cool temperatures in bird feces for at least three months. In water, the virus can survive for up to four days at 72° Fahrenheit and more than 30 days at 32° Fahrenheit. Studies have shown that a single gram of contaminated manure can contain enough virus to infect 1 million birds (Wikipedia, 2006). Some domestic ducks are known to be resistant to the virus and can be asymptomatic carriers of the virus, thus acting as a “silent reservoir” that perpetuates transmission. Most cases of avian influenza infection in humans have resulted from direct or close contact with infected poultry (e.g., domesticated chickens, ducks, and turkeys) or surfaces contaminated with secretions and excretions from infected birds. The majority of the cases have occurred in rural areas where households keep small flocks of chickens that roam freely in the yards and houses and share outdoor play areas with the children. In many areas in Asia, raising poultry is a source of
income and food for the family and when a chicken in the flock becomes ill, it is slaughtered and eaten by the family to prevent the spread of illness within the flock.

The spread of H5N1 viruses from person-to-person has been reported very rarely, and transmission has not been sustainable beyond one person. As of October 11, 2006, a total of 253 human cases of influenza A, H5N1 infections have been reported in 10 countries. The highest number of cases reported in 2006 is 50 cases in Indonesia (WHO, 2006a) where the first case of laboratory-confirmed human-to-human transmission was reported by the WHO on June 23, 2006. The report of the person-to-person transmission was the result of an investigation from a large human cluster in Sumatra, Indonesia where the virus killed seven members of a single family. According to a spokeswoman for the United Nations WHO, “the virus showed signs of mutation but it did not mutate into a form that is more transmissible because it did not seem to go beyond the cluster” (Microsoft National Broadcast Company, 2006b, paragraph 3).

**Signs and Symptoms**

In poultry, the virus causes two distinctly different forms of disease - one common and mild, the other rare and highly lethal. In the mild form, signs of illness may be expressed only as ruffled feathers, reduced egg production, or mild effects on the respiratory system. Outbreaks can be so mild they escape detection unless regular testing for viruses is in place. The second and far less common highly pathogenic form is characterized by sudden onset of severe disease that spreads and not only affects the respiratory tract, as in the mild form, but also
invades multiple organs and tissues resulting in massive internal hemorrhaging (WHO, 2006c).

In humans, bird flu has caused a range of symptoms. The influenza virus usually enters the body through the respiratory tract but can also gain access through the intestinal tract. Unlike seasonal influenza in which infections cause only mild upper respiratory symptoms in most people, H5N1 infection may follow an aggressive clinical course with rapid deterioration and high fatality (Table 2.6).

Initial symptoms of H5N1 in humans include a high fever, usually with a temperature higher than 100.4 degrees Fahrenheit and influenza-like symptoms with respiratory infections involving the lower lobes of the lungs. Diarrhea, vomiting, abdominal pain, chest pain, and bleeding from the nose and gums have also been reported as early symptoms in some patients (WHO, 2006d). Primary viral pneumonia and multi-organ failure have been common among people who have become ill with H5N1 influenza.

**Workers Affected**

There are significant variances in the estimated impact that an influenza pandemic would have on the different sectors of the US society. Reports of estimated illnesses from a "medium-level" pandemic in the US could be as high as 35% of the US population and the economic impact could reach $166.5 billion (CBO, 2005).

Workers at greater risk for contracting avian influenza as a work-related exposure are those employed in health care, airline travel, food handling, wildlife,
### TABLE 2.6

**COMPARISON OF BIRD FLU TO SEASONAL FLU**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Bird Flu</th>
<th>Seasonal Flu</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SYMPTOMS</strong></td>
<td>Persistent fever, cough, sore throat, muscle aches, shortness of breath and acute respiratory distress. Patients can develop viral pneumonia, multiple organ failure, especially in lungs and kidneys, and other severe and life-threatening complications in a matter of days. So far the virus is transmitted through direct contact with infected birds.</td>
<td>Fever, cough, runny nose, muscle pain.</td>
</tr>
<tr>
<td><strong>MORTALITY RATE</strong></td>
<td>Up to 50%. Over 253 people have become infected with H5N1 with the highest mortality in persons between 10-19 years old.</td>
<td>Kills up to 2% of people it infects, with elderly, young children, and people in developing countries more at risk. Mortality rates in developed countries are much lower but in an average year, influenza still kills between 500,000 and a million people globally.</td>
</tr>
<tr>
<td><strong>TREATMENT</strong></td>
<td>Prescription antivirals oseltamivir (Tamiflu) and to a lesser extent zanamivir (Relenza) are the only medications that are effective against avian flu. The drugs can prevent infection up to 80% and can treat patients who have had symptoms for 2 days or less. However, flu viruses can become resistant to these drugs, so these medications may not always work.</td>
<td>Some vaccines are available to prevent infection. Prescription antivirals, oseltamivir (Tamiflu) and zanamivir (Relenza), are approved to treat type A and B influenza, the two types most responsible for flu epidemics. To lessen severity of the infection, patients need to start treatment within two days of onset of symptoms.</td>
</tr>
</tbody>
</table>

and poultry industries - where there is opportunity for direct exposure to the virus. In the health care industry, at risk workers include, but are not limited to, doctors, nurses, medical aides, veterinarians, X-ray technicians, housekeeping, and laboratory and laundry staff. Airline travel workers such as flight crews - pilots and flight attendants, as well as the business travelers are at risk when exposed to ill passengers who might be traveling in an airplane from areas where avian influenza is endemic. Workers in the agricultural industry, especially poultry growers and processing plant operators, have a greater risk of contracting avian influenza through contact with contaminated poultry and poultry by-products. These include animal husbandry/veterinary staff and individuals involved in virus outbreak control and eradication activities (e.g., culling euthanasia, carcass disposal, cleaning, and disinfection of areas affected by avian influenza) on poultry farms or live bird markets. Their exposure risk is increased because of prolonged and direct contact with infected birds and/or contaminated surfaces.

**Employment Law Issues**

There are a number of potential employment labor laws and policy issues that employers may need to address in the face of a pandemic. Potential issues include maintaining a safe and healthy workplace in accordance with Occupational Safety and Health Administration’s General Duty Clause, Americans with Disabilities Act, Family Medical Leave Act, Workers’ Compensation, Health Insurance Portability and Accountability Act, company attendance and absence policies, and compensation during absence due to
company shut down (Table 2.7). Some, but not all, of these issues may be addressed in guidance from governmental agencies like the Homeland Security Council, but others may need to be addressed on a state, local, or business level. Employers should consider inclusion of these potential issues in a company specific Pandemic Preparedness Plan and in their Business Continuity Plan and Crisis Management Plans.
### TABLE 2.7

**POTENTIAL LABOR LAW AND POLICY ISSUES**

<table>
<thead>
<tr>
<th>Laws/Regulations</th>
<th>Policy Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA General Duty Clause</td>
<td>• Employer obligation to provide and maintain a health and safe workplace may be difficult in a pandemic.</td>
</tr>
<tr>
<td></td>
<td>• If an infected employee spreads avian flu at work, will the employer face OSHA fines and employee lawsuits?</td>
</tr>
<tr>
<td></td>
<td>• Employers may be required to keep infected employees away from the workplace against the will of the employee in an attempt to keep the workplace safe.</td>
</tr>
<tr>
<td></td>
<td>• Telecommuting - how to ensure home is a safe and healthy work environment?</td>
</tr>
<tr>
<td>Americans with Disability Act (ADA)</td>
<td>• Reasonable accommodations for those with the flu may not be possible.</td>
</tr>
<tr>
<td></td>
<td>• Employees forced to stay home may claim violation of ADA.</td>
</tr>
<tr>
<td>Family and Medical Leave Act (FMLA)</td>
<td>• Can forced leave be covered under FMLA?</td>
</tr>
<tr>
<td>Workers’ Compensation</td>
<td>• May be an increase in claims that infection occurred at work.</td>
</tr>
<tr>
<td>Health Insurance Portability and Accountability Act (HIPAA)</td>
<td>• Privacy rules may hinder employer knowing health status of critical essential employees.</td>
</tr>
<tr>
<td></td>
<td>• Difficulty for employer to communicate information to employees.</td>
</tr>
</tbody>
</table>

CHAPTER III

EXPOSURE MANAGEMENT OF PUBLIC HEALTH RISK

In the previous pandemics of the 20th Century, the world had little time to prepare for the event or for the devastating effects that they caused. But in the present situation the world has had the benefit of advanced warning, thus affording the opportunity to prepare for a potential pandemic and to develop ways to mitigate its impact.

Pandemic Preparedness Planning

In 1999, the World Health Organization issued the first influenza pandemic preparedness plan to guide public health officials in the event of the emergence of a novel influenza virus (Weir, Wong & Gemmill, 2004). The plan, updated in 2005, outlines a phased approach for response based on the pandemic threat level. Each phase or period includes steps to be taken following the appearance of a new influenza strain in a single human case (Table 3.1).

Interpandemic Period

In the interpandemic period (phases 1 and 2), a new influenza subtype may be present in animals and cause a human infection - but no new influenza virus subtypes have been detected in humans. The risk of human infection is considered to be low in phase 1, but in phase 2 the circulating animal influenza virus subtype poses a substantial risk of human disease.

Pandemic Alert Period

In the pandemic alert period (phases 3, 4, and 5), human infections have occurred. Within phase 3 (the current state of alert) there has been rare or
### TABLE 3.1

**WHO PHASES OF PANDEMIC ALERT**

<table>
<thead>
<tr>
<th>Pandemic Period</th>
<th>Alert Description</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpandemic</td>
<td>Low risk cases in humans</td>
<td>1</td>
</tr>
<tr>
<td>(New virus in animals without cases in humans)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pandemic alert</td>
<td>Greater risk of cases in humans</td>
<td>2</td>
</tr>
<tr>
<td>(New viruses cause cases in humans)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very limited or no human-to-human transmission</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Evidence of increased human-to-human transmission</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Evidence of significant human-to-human transmission</td>
<td>5</td>
</tr>
<tr>
<td>Pandemic</td>
<td>Efficient and sustainable human-to-human transmission</td>
<td>6</td>
</tr>
</tbody>
</table>

no human-to-human spread; phase 4 there are small highly localized clusters of
human-to-human spread of virus. At phase 5 larger clusters of human-to-human
spread has occurred, illness is still localized geographically, but increased risk of
larger spread of the disease is possible.

**Pandemic Period**

At pandemic period (phase 6), there is significant increased and sustained
transmission of the virus in the general population. The development of the WHO
pandemic preparedness plan requires planning and collaboration among multiple
partners and disciplines outside of the health sector. These partners include other
government departments (e.g., agriculture, transportation, trade, labor, defense,
education, and justice) at multiple levels within the government, as well as
partners in the private sector, including industry and nongovernmental
organizations. Additional global planning activities include developing a
pandemic vaccine and securing adequate supplies of antiviral medications used to
prevent and treat the influenza virus.

**Interdisciplinary Planning**

An employer based pandemic preparedness plan similar to the WHO plan
requires collaboration among multiple interdisciplinary teams and business
partners within and outside of the company. These partners could include
executive leadership, corporate crisis management, corporate communications,
security, safety, industrial hygiene, human resources, benefits, maintenance,
housekeeping, and critical external vendors and stakeholders such as insurance
plan providers and local health care facilities. The plan should support the health
and well being of employees, and maintain or resume critical operations during or after an influenza pandemic. The pandemic preparedness plan should work with existing plans for risk prevention, infection control, emergency response, technology and data recovery, business continuity, and crisis management. An example of a Corporate Employee Health Pandemic Preparedness Plan can be found in Appendix B. The OEHN who has a strong knowledge in health and business is in a unique position to support the development, testing, and implementation of an employer based pandemic plan. The OEHN is also a vital link in maintaining the health of the employees and impacting the effects that health and productivity have on the business. This vital health advocacy role will become even more critical in the face of a pandemic when the illness rates are projected to be very high.

**Risk Communication**

A critical element of pandemic planning is ensuring that an effective communication plan is in place. Employees are likely to be anxious about a pandemic and want to know how the company will respond if it occurs. To help alleviate employee anxiety and to facilitate effective plan initiation, frequent, honest, and accurate information must be communicated. A solid communication plan should include information on the company’s preparedness plan and where it can be accessed. It should provide clear, timely, and pro-active communications regarding policies related to attendance, site access, and employee’s responsibility to protect the health and safety of fellow workers during a pandemic.
CHAPTER IV

ROLE OF THE OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSE AND INTERDISCIPLINARY TEAM

One of the most influential and cost-effective actions that can be taken by the OEHN to reduce or avoid significant business impact caused by a potential pandemic is to educate employees about basic influenza prevention and infection control. Educational sessions on exposure routes, preparedness and prevention measures, signs and symptoms, recommended actions regarding personal and family illness, and at-home care can be delivered in a variety of formats within the workplace. The OEHN can deliver key health information to large groups of employees at one time through health fairs, lunch and learns, and web cast seminars. Other effective educational venues are health poster displays, pamphlet distribution, table tents, and email and voice mail messaging. In addition, the OEHN can provide one-on-one health coaching when the employee presents to the Employee Health Clinic for other health related services.

Workplace health education and health promotion programs along with preparedness planning are key factors that can help defray the effects that an influenza pandemic could have on a business. The role of the OEHN will be critical in the development of these programs that are based on the preventative health principles of primary, secondary, and tertiary prevention.

Primary Prevention: Avoiding Employee Infection

The OEHN proactively encourages employees to observe and practice flu prevention activities and behaviors as the first priority for guarding against the
potential devastating effects of a pandemic. An influenza prevention awareness campaign should include: education on the signs and symptoms of seasonal flu and pandemic flu, administration of flu shots in the workplace, distribution of antibacterial hand wipes and other personal protective equipment (i.e., face mask respirators), and education on proper hygiene and nutrition. Employees should be repeatedly informed about the need for frequent hand washing with soap and water, and when and how frequently they should use sanitizing hand lotions. Information on respiratory hygiene such as covering the mouth and nose when coughing and sneezing, and the proper disposal of used tissues should be provided.

Although wearing a face mask by the general population has not demonstrated an appreciable impact on respiratory infection transmission, permitting employees to wear a face mask may reduce fear and anxiety during a pandemic. Pre-ordering supplies of respirators, surgical masks, gloves, disinfectants, hand sanitizers, and over-the-counter cold and flu medication should also be done in the pre-pandemic period. A three month inventory level is recommended as these supplies may be difficult to obtain if a pandemic emerges. Employers should plan to provide their essential personnel with enough personal protective equipment to last at least six weeks. A reasonable approach for advance purchase of respirators is to obtain recommended models (i.e., N95 mask) in quantities sufficient to provide all high risk essential personnel with one clean respirator daily for two to six work week periods during a pandemic, or 60 disposable respirators per person. Multiple sizes of the same model should be
purchased where available. As with all respirators, the user will require medical clearance and proper fit testing to ensure maximum effectiveness and adequate protection.

A recommended approach for advance purchase of surgical masks for non-essential personnel is to buy enough to provide one surgical mask for 50% of the total worker population. Although the projected cumulative attack rate of influenza during multiple waves of a flu pandemic is not expected to exceed 30% (CBO, 2005), an excess in the number of masks available will provide sufficient coverage for situations where flu infection rates are higher or where the projected attack rate is uncertain. There is no fit testing or medical clearance requirement for surgical masks as they can be used by anyone. Education on proper use of a surgical mask and its effectiveness is necessary to ensure that the user understands that the surgical mask does not provide adequate protection from inhalation of airborne virus droplets. A toolkit for employer pandemic planning for respiratory protection, selection, and care is provided in Appendix C.

**Influenza Vaccine**

While the first line of defense for this public health risk is influenza vaccine, it is difficult to achieve since the current H5N1 virus circulating in Europe, Africa, and parts of Asia has drifted from the virus originally isolated from a patient in Vietnam (DHHS, 2006). Vaccines are an important and effective medical intervention against influenza and will be critical in the prevention and reduction of health consequences during a pandemic. Influenza vaccine is produced and administered annually to provide protection against the
influenza strains expected to be prevalent that year. The determination of which viral strains to include in the annual influenza vaccine is dependant on data collected from domestic and international surveillance systems. The Food and Drug Administration (FDA) decides which strains to include and also licenses and regulates companies that manufacture the vaccine. The 2006-07 trivalent vaccine virus strains are A/New Caledonia/20/1999 (H1N1)-like, A/Wisconsin/67/2005 (H3N2)-like, and B/Malaysia/2506/2004-like antigens (MMWR 2006b). Different influenza vaccine preparations have different indications as licensed by the FDA. Table 4.1 lists the different formulations and the companies that will manufacture vaccine for 2006-2007 influenza season.

Although vaccines are universally regarded as the most important medical intervention for preventing influenza and reducing its health consequences during a pandemic, they have never been available early enough and in sufficient quantities in the past to have an impact on morbidity and mortality. Efforts are under way to develop a vaccine that will prevent a pandemic influenza associated with the current avian flu. A number of pharmaceutical companies have been given government contracts for the research and development of cell-based vaccine production. Solvay Pharmaceuticals, GlaxoSmithKline, Novartis Vaccines & Diagnostics, MedImmune, and DynPort Vaccine (Center for Infectious Disease Research & Policy, 2006) are in a race against time and a changing virus to develop a cell mediated avian influenza vaccine. According to a report released by the Department of Health and Human Services (2006), the DHHS has stockpiled 8 million doses - enough for 4 million people based on a
<table>
<thead>
<tr>
<th>Manufacture</th>
<th>Vaccine</th>
<th>Formulation</th>
<th>Thimerosal Preservative</th>
<th>Age Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saofi Pasteur, Inc.</td>
<td>• Fluzone® Inactivated TIV</td>
<td>Multi-dose vial</td>
<td>Yes</td>
<td>≥ 6 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Single dose pre-filled 0.5 mL syringe or vial</td>
<td>None</td>
<td>≥ 36 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Single-dose pre-filled 0.25mL syringe</td>
<td>None</td>
<td>6-35 months</td>
</tr>
<tr>
<td>MedImmune, Inc.</td>
<td>• FluMist™ LAIV</td>
<td>Single-dose sprayer</td>
<td>None</td>
<td>Healthy persons 5-49 years</td>
</tr>
<tr>
<td>Novartis (formerly Chiron Corporation)</td>
<td>• Fluvirin™ Inactivated TIV</td>
<td>Multi-dose vial</td>
<td>Yes</td>
<td>≥ 4 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Single-dose 0.5 mL syringe</td>
<td>&lt; 1ug Hg/0.5 mL dose, preservative free</td>
<td>≥ 4 years</td>
</tr>
<tr>
<td>GSK</td>
<td>• Fluarix™ Inactivated TIV</td>
<td>Single-dose pre-filled syringe 0.5 mL</td>
<td>&lt; 1.25ug Hg/0.5 mL dose, preservative free</td>
<td>≥ 18 years</td>
</tr>
<tr>
<td></td>
<td>• FLULAVAL™</td>
<td>Multi-dose vial</td>
<td>25 ug Hg/0.5 mL dose</td>
<td>≥ 18 years</td>
</tr>
</tbody>
</table>

Source: CDC (2006e, July), p. 3.
two dose vaccine, of a H5N1 pre-vaccine that is based on a virus isolated in 2004 from a Vietnamese patient. A second H5N1 pre-vaccine that is under development is based on an H5N1 strain that was collected in Indonesia in 2005 and has circulated in Europe, Africa, and parts of Asia. The efficacy of these pre-pandemic vaccines cannot be predicted, but there is reason to believe they may provide some level of protection for priority personnel and those at greatest risk while a fully effective vaccine can be developed once the virus strain has evolved and been identified.

Secondary Prevention: Minimizing Transmission

Once the primary prevention goals have been implemented, secondary prevention efforts should be deployed to minimize transmission. These activities focus on increasing social distancing from infectious employees. Social distancing involves measures such as closing schools and workplaces, as well as avoiding mass gatherings. These measures will have limited effectiveness in stopping human infections once the pandemic begins but may be useful slowing the pandemic's spread. Because social distancing may be instituted or recommended by the public health authorities, advanced planning for such measures is encouraged and will minimize the impact on the health of employees and business continuity. In the work setting the OEHN can provide guidance to management and take a key role in modifying policy guidelines for travel, sick leave, remote and flexible working, and attendance management. The OEHN can use the toolkit on social distancing (Addendix D) to implement this type of policy in the workplace.
The OEHN, working in collaboration with management and the company travel agency, can ensure that travel to affected/restricted areas is prohibited or limited to business critical needs. For those employees required to travel, the OEHN should provide instruction on strict personal hygiene, eating practices, and the use of antiviral medications to reduce risk of infection. Employees traveling to affected areas should monitor their health for 10 days and report ‘flu-like’ symptoms or likely exposure to pandemic influenza prior to returning to work.

During the influenza pandemic, effective management of illness will be essential in reducing the spread of infection and complications associated with influenza. A rapid diagnostic test is available for detection and diagnosis of influenza and can aid in the assessment of employees at work who have early symptoms of illness; however, employees who are ill should be encouraged to remain at home to reduce the spread of the virus. The OEHN should work with human resources and the benefits departments to establish procedures for the management of persons who have been exposed to pandemic flu, those suspected to be ill due to pandemic flu, those who become ill while at the worksite, and for those returning to work following a pandemic illness. A management guidance tool for potential illness scenarios during a pandemic is provided in Appendix E. The use of an absence tracking system to record and track the absences of employees throughout each wave of influenza pandemic can help in the management, identification, and availability of essential personnel as employees who become ill during the first wave of the pandemic will likely be immune in subsequent waves and available for work.
Tertiary Prevention: Implementing Medication and Treatment Interventions

Businesses that have on-site employee health clinics may call on the OEHN to operate the clinic as a primary care treatment facility in the event of a pandemic. One of the primary medical treatment interventions recommended during an influenza pandemic is the use of antiviral medications. Currently there are only two antiviral medications that have been shown to be effective against the H5N1 virus. Oseltamivir (Tamiflu) and zanamivir (Relenza), if given within 48 hours of the onset of symptoms, have proven to reduce the illness severity and duration (WHO, 2005c). Relenza has also been approved by the FDA as a prophylactic treatment for influenza.

WHO has recommended that countries consider stockpiling antivirals and since the supplies are anticipated to be limited, plans should be developed for targeting priority groups such as front-line health care workers, emergency response personnel, and other essential life-sustaining workers. Many business have already started stockpiling antiviral medications as part of their business continuity plan to prepare for a pandemic (Schmidt, 2005). Pre-screenings and health assessments of employees and their dependants for the provision of the appropriate type and quantity of antiviral medications should be done during the pre-pandemic period. The utilization of a health questionnaire (Appendix F) and a decision flowchart (Appendix G) can aid in the evaluation of which antiviral to prescribe and ensure that any contraindications to the medications are identified.

The OEHN can play a key role in this health assessment process as well as determining which antiviral is to be distributed, provided she/he is practicing in
accordance with approved protocols and standing orders that are compliant with
the state nurse practice act where the nurse is licensed. Collaboration with local
pharmacies and established distribution warehouses in developing a tracking
system for prescriptions written and dispensed will help ensure adequate supply
of medications, safe and ethical distribution, and provide for recall and adverse
event tracking capability if needed. In the event of a public health crisis like
pandemic flu, the OEHN may be required to provide on-site distribution of
prescription antiviral medications. This practice will also require that appropriate
protocols be in place and may need to be approved and cleared by local regulatory
authorities such as the state Pharmacy Distribution Association.
CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Most company emergency and crisis management plans outline action steps required as a result of natural disaster occurrences related to weather or to events such as fire, explosions, and chemical spills. These types of events, though devastating, are usually of short duration and recovery begins immediately after the occurrence. In contrast, pandemic planning requires companies to focus on the prolonged business sustainability due to employee illness and high absenteeism that could continue for as long as two to three years after the pandemic begins.

Practice and Policy Implications

A pandemic preparedness plan needs to be comprehensive, adaptable, and continually reviewed and updated as situations change in this evolving health crisis. Advancements in vaccine development, genetic research, and drug discovery will have an impact on the recommendations and treatment guidelines provided by the WHO and CDC. The OEHN should closely monitor these changes and update the preparedness plan accordingly. To ensure the plan can be effectively implemented and test the organization’s preparedness, companies should practice the plan by engaging in periodic exercises that involve all key stakeholders who would be impacted by a pandemic.

The OEHN may be required to take a leading role in plan development, testing, and implementation, and can be a valuable asset to the company by ensuring that employees understand the potential health risks involved and are
knowledgeable about ways to help mitigate this risk. The scope of practice for health care professionals such as nurses and pharmacists may also need to temporarily expand during a pandemic to include the responsibility of diagnosing and treating patients with flu-like symptoms to help manage the overwhelming health needs of the public.

Multiple employment policies and regulations at the local, state, and national level will need review and possible revisions to include exceptions during a pandemic. Once a pandemic vaccine is developed, policy makers will need to determine to whom and when the vaccine will be administered as the initial supply of vaccine is expected to be limited. The pre-pandemic vaccine that has been developed based on the current strains of H5N1 virus require two injections to build adequate immunity. Should an avian influenza pandemic emerge in the near future, policy makers would need to decide if the limited supply of vaccine should be administered as recommended to develop adequate immunity (two doses), or if the vaccine should be given as one dose which would result in a lower immunity response but could be provided to twice the number of people. Decisions like these will be difficult but necessary to address the needs of the population during a major health crisis.

Further Research

The challenge of this deadly virus has researchers constantly looking for new ways of detecting virus mutation, discovery and development of medications to treat the virus, and other opportunities to mitigate the risk of a world wide spread of this health crisis. Until this research provides new and innovative ways
to address the health crisis, the OEHN must be diligent in efforts towards preparedness through prevention and public health initiatives that are realistic and grounded in the principles of primary, secondary, and tertiary prevention.
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APPENDIX A

PANDEMIC FLU PLANNING CHECKLIST FOR INDIVIDUALS & FAMILIES

Pandemic Flu Planning Checklist for Individuals & Families

You can prepare for an influenza pandemic now. You should know both the magnitude of what can happen during a pandemic outbreak and what actions you can take to help lessen the impact of an influenza pandemic on you and your family. This checklist will help you gather the information and resources you may need in case of a flu pandemic.

1. To plan for a pandemic:

- Store a two week supply of water and food. During a pandemic, if you cannot get to a store, or if stores are out of supplies, it will be important for you to have extra supplies on hand. This can be useful in other types of emergencies, such as power outages and disasters.
- Ask your doctor and insurance company if you can get an extra supply of your regular prescription drugs.
- Have nonprescription drugs and other health supplies on hand, including pain relievers, stomach remedies, cough and cold medicines, fluids with electrolytes, and vitamins.
- Talk with family members and loved ones about how they would be cared for if they got sick, or what will be needed to care for them in your home.
- Volunteer with local groups to prepare and assist with emergency response.
- Get involved in your community as it works to prepare for an influenza pandemic.

2. To limit the spread of germs and prevent infection:

- Teach your children to wash hands frequently with soap and water, and model the current behavior.
- Teach your children to cover coughs and sneezes with tissues, and be sure to model that behavior.
- Teach your children to stay away from others as much as possible if they are sick. Stay home from work and school if sick.
3. Items to have on hand for an extended stay at home:

<table>
<thead>
<tr>
<th>Examples of food and non-perishables</th>
<th>Examples of medical, health, and emergency supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ready-to-eat canned meats, fish, fruits, vegetables, beans, and soups</td>
<td>Prescribed medical supplies such as glucose and blood-pressure monitoring equipment</td>
</tr>
<tr>
<td>Protein or fruit bars</td>
<td>Soap and water, or alcohol-based (60-95%) hand wash</td>
</tr>
<tr>
<td>Dry cereal or granola</td>
<td>Medicines for fever, such as acetaminophen or ibuprofen</td>
</tr>
<tr>
<td>Peanut butter or nuts</td>
<td>Thermometer</td>
</tr>
<tr>
<td>Dried fruit</td>
<td>Anti-diarrheal medication</td>
</tr>
<tr>
<td>Crackers</td>
<td>Vitamins</td>
</tr>
<tr>
<td>Canned juices</td>
<td>Fluids with electrolytes</td>
</tr>
<tr>
<td>Bottled water</td>
<td>Cleansing agents/soap</td>
</tr>
<tr>
<td>Canned or jarred baby food and formula</td>
<td>Flashlight</td>
</tr>
<tr>
<td>Pet food</td>
<td>Batteries</td>
</tr>
<tr>
<td>Other nonperishable foods</td>
<td>Portable radio</td>
</tr>
<tr>
<td></td>
<td>Manual can opener</td>
</tr>
<tr>
<td></td>
<td>Garbage bags</td>
</tr>
<tr>
<td></td>
<td>Tissues, toilet paper, disposable diapers</td>
</tr>
</tbody>
</table>

Source: CDC (2006f, October).
Sample Employee Health Pandemic Preparedness Plan:
(Insert Country Name)

(Insert Plan Point of Contact)
(Insert Country Sponsor)
(Insert Date)
(Insert Review Date: plan date + 1 year)

Country Plan Reviewed by:
### TABLE OF CONTENTS OF COUNTRY PROGRAMME ELEMENTS

1. Executive Summary
2. Objective and Scope
3. Roles and Responsibilities
4. Employee Health Pandemic Planning Team (PPT) and Plan
5. Seasonal Flu and Travel Health
6. Antiviral Ordering, Storage, Prescribing, and Distribution
7. Pandemic Vaccine Storage, Prescribing, Distribution, and Administration
8. Staff, Operations, and Communications Plans
9. Requested Plan Exceptions
10. Solutions to be Shared
11. Certification Statement

**ATTACHMENT 1: Country X Timeline of Key Actions**
1 EXECUTIVE SUMMARY
This section provides an overview of the specific elements of the (Company X) Employee Health Pandemic Preparedness Plan:

- Plan owner
- Link to COMPANY X Corporate Crisis Management Team, country business continuity and crisis management plans and teams with team chairpersons
- Key plan elements (number of covered persons and essential daily jobs, employee locations/sites, seasonal flu vaccine, antiviral storage locations, plans for prescribing and distributing antivirals and vaccine, site closure decisions)
- Communication plan to ensure that messages are consistent in and outside COMPANY X and respond to media, product and employee health related questions.
- Timeline for key triggers and actions corresponding to WHO alert levels

2 OBJECTIVE AND SCOPE
This document describes the (Company X) Plan, key requirements, and other considerations needed to protect the workforce in an influenza pandemic. In addition, it describes requested exceptions to the plan and includes a certification statement from, (insert senior manager), indicating that a country plan meeting all core (Company X) requirements is in place.

This will be used by (Company X) General Managers, Site Directors, Pandemic Planning Team, and Crisis Management Teams to establish, review and execute (Country X’s) procedures to manage the workforce impact of a flu pandemic. It describes actions, triggers, and communications within and between (Country X) in WHO Phases 3, 4, 5 and 6 of a pandemic (Appendix 1). It has built in the following (Country X’s) global principles:

- comply with all relevant laws on prescribing and distribution (e.g., registration, etc.), and collaborate with local public health authorities during a pandemic;
- assume no significant support will be available from the public health system in a pandemic;
- maximize the use of established business processes wherever possible;
- cover current employees and their families as well as locally identified groups of contingent workers essential to (Country X’s) business continuity; and
- incorporate anti-viral access (AV’s) and other recommended public health measures.
3 ROLES & RESPONSIBILITIES
COUNTRY

During Phase 3 and 4 of a pandemic:

The (Country X’s) General Manager (or other senior country business manager) is accountable for developing and implementing all aspects of (Country X’s) Employee Health Pandemic Plan.

(Insert other key local groups as appropriate who will deliver important portions of the plan such as warehousing/logistics, evaluation and prescribing of antivirals/vaccine, IT, HR, and Finance).

During Phases 5 & 6 of a pandemic:

- Local Crisis Management Team will implement detailed action plans, deal with day-to-day questions and implement local measures in synchronization with Corporate Crisis Management Team (CCMT) and local governments.

- Communications will be responsible for providing clear and consistent messages to every business inside each country.

(Insert other key local groups as appropriate who will deliver various portions of the plan such as evaluation and prescribing of antivirals/vaccine, delivery of vaccine, communications, workforce redeployment, management of site sickness absence and other policies).

KEY GLOBAL RESPONSIBILITIES

During Phase 3 and 4 of a pandemic:

- Employee Health Management will develop and implement the Global Employee Health Pandemic Plan and tools.

- GMS will deliver AV (antivirals) supply and manage the above country logistics of both the regional “urgent use” AV stockpiles and shipment of antivirals to create in-country AV stockpiles.

- Corporate Communications will provide clear and consistent messages.

- Global Internal Audit, Employee Health Management/Corporate Environment Health & Safety will audit local employee health pandemic plans.

During Phases 5 & 6 of a pandemic:

- Employee Health Management will advise CCMT on appropriate actions and develop employee communications in conjunction with Corporate Communications.

- CCMT/Corp Communications will update (Country X) countries on corporate activities and provide templates for local communications.
4 Employee Health Pandemic Planning Team (PPT) and Plan
The planning team represented all in-country (Country X) business units, Human Resources, Employee Health, Communications, and other relevant group. It considered all core (Country X) plan requirements, local regulation, and relevant government plans to ensure alignment where applicable.

(Insert team charter or describe the country planning team scope and membership).

The overall plan is linked to the existing Country Crisis Management Team (CMT) and Site CMT, which will deliver the Country’s Employee Health Pandemic Preparedness Plan if needed. The Country CMT will be headed by (insert senior business leader) during the pandemic in order to make rapid decisions that cross multiple business areas. The Country CMT will include an Employee Health Medical representative (insert position) to advise during a pandemic. Site crisis and recovery plans will be managed by site crisis management teams. The GM has designated (insert name) as the country owner of the Employee Health Pandemic Plan. (insert name) will be responsible for annual review and update of the plan as circumstances change.

5 Seasonal Flu and Travel Health Programmes
The Country plan also does/does not provide access to annual seasonal flu vaccine programmes for all employees and key contractors

(Insert completed flu vaccine programme template or equivalent if applicable).

Seasonal flu vaccination is provided to all (Country X) international travellers. A travel health programme, linked to the business travel process, is in place. This programme provides travel health assessments, access to First Assist, travel advice, and access to antiviral medications (e.g., Relenza/Tamiflu) where an assessment has indicated a significant risk. It also includes local procedures for management of employees who may be travelling or returning from travel to affected areas at the start of a pandemic and prohibits international travel to affected areas when recommended by CCMT.

(Insert completed travel health programme template or equivalent if applicable).

6 Antiviral Ordering, Storage, Prescribing and Distribution

A. Registrations and Shipment
The team has reviewed current antiviral registration status for Relenza & Tamiflu and (check all that apply).

- Relenza is licensed and approved for treatment use
- Relenza filing is in progress and approval is expected in: ________
- Relenza is not approved will need alternate method for distribution
The plan has identified employees, key complimentary workers, and "daily essential" employees required to maintain business operations by location and function during a pandemic. Family members have also been identified as defined by the plan. The plan makes one treatment pack available to every current (Country X) employee, key contractor, and employees' family member as specified in the country's plan.

(Insert a workforce deployment plan if applicable).

Total # of Current Employees

Total # of family members

Total # of key contractors

Other covered persons (please explain)

TOTAL PERSONS COVERED BY PLAN

COUNTRY ANTIVIRAL ALLOCATION BY CORPORATE

Note: Totals which are more than 5% different from initial targets will need to be explained in the Plan Exceptions section (9).

B. Storage
A central location meeting GMP requirements for initial receipt and storage of antivirals has been identified and will be used until Phase 4 of a pandemic. During Phase 4, shipment to additional local locations to support prescribing and distribution will begin. Large or small (less than 50 packs) country stockpiles will be stored as required by the (Country X) plan.

C. Prescribing and Distribution
The prescribing and dispensing processes used are in compliance with applicable local laws and includes all covered groups (e.g., family and employees). The Country plan calls for AV distribution from country stockpiles to covered persons to be initiated in Phase 5 of a pandemic. AV use for treatment or prevention will be initiated only after CCMT, in consultation with EHM and local Crisis Management Team, has approved use in our country. The proposed prescribing process, inclusive of record keeping and informed consent is described in:

(Insert the prescribing and dispensing plan).
7  Pandemic Vaccine Storage, Prescribing, Distribution, and Administration

While the current plan does not include specific references to pandemic priming or pandemic vaccine, every effort will be made to provide access to them if and when a safe and effective vaccine is developed. Vaccine will require different storage and distribution (e.g. standard 2-8 C cold chain) and administration approach (administered by a health professional and not taken as an oral medication) than antivirals. Thus, it is prudent to develop, in advance, a plan for storage, prescribing, and distribution, and administration of vaccine. Insert an overview of the country plan here.

8  Staff, Operations, and Communication Plans

Staff and operational plans which address the key requirements are in place and includes:

• identification of those sites/operations which will likely close when a pandemic is locally active and those sites/operations which will remain open during the entire pandemic.
• decision points for when to reopen sites which are temporarily closed.
• the plan to provide appropriate infection control supplies (e.g., hand cleaning products, tissues, respirators for select groups, etc.
• appropriate access restriction and “social distancing” measures.
• measures to manage people who have been exposed to pandemic flu, those who become ill while at the worksite, and to how to ensure safe return to work of staff following pandemic illness.
• a remote working contingency plan.
• the phase in and phase out of any changes in relevant HR processes (e.g., payroll) and policies on flexible working, bereavement, compensation, sickness absence, etc.
• a communications plan with pandemic-related activation/termination links to the CCMT and local BCP, key contacts (with backups), chain of communications, multiple local communication channels (e.g., hotline, web site), local sources for timely and reliable pandemic and public health information, and key messages by pandemic stage.
• triggers for deactivating the overall country plan.

(Insert applicable staff, operations and communication plans if applicable).

9  Plan Exceptions

No exceptions to the core requirements of the plan are requested.

Or, the following plan exceptions are requested (these are examples—please explain any requests):

□ Total antiviral allocation more than 5% greater than initial Corporate allocation
□ Multiple initial warehouse locations required for country stockpile
□ Earlier distribution (before phase 5) of antivirals to selected groups of employees/family. Please describe
□ Seasonal flu vaccine programme will not be implemented.

Please explain any required exceptions:

__________________________________________________________________________________________________________

10 Solutions to be Shared within Country X

Please insert any tools or solutions that your team has developed in their work which may benefit other (Country X) countries preparing for a pandemic.
(Not Applicable or Insert Tools Here).

11 Certification Statement

I have reviewed and supported the planning process and I certify that all of the key requirements of the (Country X) global employee health pandemic preparedness plan are in place. This plan will be reviewed annually; we will contact the EHM account manager and GMS for any 5% increase or more in covered persons.

__________________________________________________________________________________________________________

Name ___________________________ Date __________

I request that the following amount of antivirals:

_______ Packs Relenza and Product Information
_______ Packs Tamiflu Capsules and Product Information
_______ Packs Tamiflu Suspension and Product Information

be shipped to the attention of the individual named below at the following (Country X) defined location as soon as sufficient quantities are available:

Name: ___________________________
Address: _______________________

Source: GlaxoSmithKline Employee Health Management (2006a).
ATTACHMENT 1

COUNTRY X TIMELINE OF KEY ACTIONS

Sample actions are listed below; please outline key actions and persons responsible under the country plan.

**WHO Phase 3: No or very limited evidence of human-to-human transmission**

Pandemic alert Phase 3 is our principle planning and preparation time and the following actions are critical. Modify actions and responsibilities as required.

<table>
<thead>
<tr>
<th>Action</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form pandemic team, assess preparedness, infrastructure needs, identify essential daily employees, families, relevant laws, AV registration status, etc.</td>
<td>Pharma GM &amp; Country Employee Health Pandemic Team</td>
</tr>
<tr>
<td>Finalise local plan based on key (Country X) requirements and submit to Corp EHM and GMS for approval</td>
<td>GM &amp; Country Employee Health Pandemic Team</td>
</tr>
<tr>
<td>Central storage of country allocation of antivirals.</td>
<td>Insert</td>
</tr>
<tr>
<td>Partial activation of (Country X) web site, communications cascade to employees about core plan elements</td>
<td>EHM, Corp Comms, Country Management &amp; Communications</td>
</tr>
<tr>
<td>HR system in place to fully define employment/family status</td>
<td>Insert</td>
</tr>
<tr>
<td>Progress seasonal flu vaccine campaigns and routine travel health programmes</td>
<td>Insert</td>
</tr>
<tr>
<td>Insert Other Key Actions</td>
<td>Insert</td>
</tr>
</tbody>
</table>

**Phase 4: Evidence of increased human-to-human transmission**

When WHO raises the pandemic alert to Phase 4 through government or public communication, the following actions will be taken. Modify actions and responsibilities as required.

<table>
<thead>
<tr>
<th>Action</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review country plan, assess readiness, and close gaps. Tabletop exercise of plan</td>
<td>Insert</td>
</tr>
<tr>
<td>Gather needed resources (EH, supplies) and test systems for local AV distribution.</td>
<td>Insert</td>
</tr>
<tr>
<td>Distribute central country stockpiles to other sites (if needed) (to “hub” or other local distribution sites)</td>
<td>Insert</td>
</tr>
</tbody>
</table>
- “Remote” groups (e.g., field sales in US): activate evaluation, prescription network and dispense AV’s to “remote” groups if approved. No AV use at this time unless pandemic flu is locally active.

- Regular communication updates and training as needed

- Progress seasonal flu vaccine campaigns, routine travel health programmes, pneumococcal vaccine for high risk persons

- Physically separate company stockpile from commercially available material

- Assess the overall local preparedness and consider request to CCMT for AV distribution from regional “urgent use” stockpiles

- Insert Other Key Actions

<p>| Phase 5: Evidence of significant human-to-human transmission (in a single village, location, or country) |
| When WHO raises the pandemic alert to Phase 5 through government or public communication, the CCMT together with EHM and Corporate Communications will inform all (Country X) countries, GMs, and Site Managers and the following actions are critical: |</p>
<table>
<thead>
<tr>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Review (or fully implement) country plan.</td>
<td>Insert</td>
</tr>
<tr>
<td>- Activate evaluation, prescribing, and distribution networks. Distribute AV’s to ALL remaining employees and families. AV use OK’d in affected areas. Country registry established. No AV use in non-affected countries</td>
<td>EHM/Corp Comms Country CMT and Site Teams</td>
</tr>
<tr>
<td>- Review (or implement) site emergency and closure plans, HR policies, IT, etc.</td>
<td>Insert</td>
</tr>
<tr>
<td>- Implement (Country X) travel restrictions to affected countries</td>
<td>Global travel/EHM</td>
</tr>
<tr>
<td>- Communication to employees with full activation of web site/cascades, including:</td>
<td>Corporate Communications</td>
</tr>
<tr>
<td>o last phase of pandemic alert</td>
<td>- to local communications</td>
</tr>
<tr>
<td>o synchronization of (Country X) and govt information to employees</td>
<td>- to GMs</td>
</tr>
<tr>
<td>o initiate measures as detailed in their pandemic plans</td>
<td>- to local Relenza and vaccine teams</td>
</tr>
<tr>
<td>o weekly updates (e-mails / website)</td>
<td></td>
</tr>
</tbody>
</table>
- Local communication to employees per intranet, e-mail and on message boards and other local channels
- Review of the situation by CCMT and periodic updates/information to country CMT.
- Assess the overall local preparedness and consider:
  - request to CCMT for AV distribution from regional “urgent use” stockpiles
  - providing daily prophylaxis for persons in “essential daily” jobs.
- Insert Other Key Actions

### 5.4 Phase 6: Pandemic—Efficient and sustained human-to-human transmission

This is the stage to fully activate local plans when pandemic flu is locally active.

<table>
<thead>
<tr>
<th>Description</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement site emergency (or closure) plans when flu locally active.</td>
<td>Insert</td>
</tr>
<tr>
<td>Check status of other preventive measures (vaccine, etc.)</td>
<td>Insert</td>
</tr>
<tr>
<td>Communication to countries on the following items:</td>
<td>Corporate Communications to:</td>
</tr>
<tr>
<td>- updates from WHO</td>
<td>- local communications</td>
</tr>
<tr>
<td>- need to liaise with local governments</td>
<td>- GMs</td>
</tr>
<tr>
<td>- countries to initiate their pandemic plans</td>
<td>- local Relenza and vaccine teams</td>
</tr>
<tr>
<td>- information to employees (time/content)</td>
<td></td>
</tr>
<tr>
<td>In Country communication to employees via intranet site, e-mail, message board, call centre:</td>
<td>Local Communications based on templates provided by Corporate Communications/EHM</td>
</tr>
<tr>
<td>- information on next steps:</td>
<td></td>
</tr>
<tr>
<td>- personal measures to reduce infection/transmission</td>
<td></td>
</tr>
<tr>
<td>- who/what jobs are critical and responsibilities</td>
<td></td>
</tr>
<tr>
<td>- who should stay at home</td>
<td></td>
</tr>
<tr>
<td>- when to initiate treatment</td>
<td></td>
</tr>
<tr>
<td>- prophylaxis for “essential daily” workers to be considered</td>
<td></td>
</tr>
<tr>
<td>- point to website to support information</td>
<td></td>
</tr>
<tr>
<td>Issue regular press updates on supply, production, emerging resistance, to external stakeholders, etc</td>
<td>Corporate Communications/Relenza Coordination team</td>
</tr>
<tr>
<td>Assess the overall local preparedness and consider request to CCMT for AV distribution from regional “urgent use” stockpiles.</td>
<td>Insert</td>
</tr>
<tr>
<td>Notify CCMT of country business status, use of</td>
<td>Insert</td>
</tr>
</tbody>
</table>
stockpile, sickness absence/death rates, additional need for antivirals, etc

- Insert Other Key Actions

Key for abbreviations used: CCMT=Corporate Crisis Management Team, EHM=Employee Health Management, GMS=Global Manufacturing and Supply, GM=General Manager, Country CMT=Country Crisis Management Team
APPENDIX C

PANDEMIC PREPAREDNESS PLANNING

RESPIRATORY PROTECTION TOOLKIT

PURPOSE

To provide guidance and tools to meet the respirator requirements of a Global Employee Health Pandemic Preparedness Plan and to assist in the effective selection and use of respirators during a flu pandemic.

SCOPE

The plan requirements and guidance apply to all operations. The respirator program elements should be applied to all locations. Some measures can also be used at home to reduce the risk of disease transmission.

EMPLOYEE HEALTH PANDEMIC PREPAREDNESS PLAN

REQUIREMENTS

- The routine use of surgical masks by asymptomatic persons is not recommended because they have not been demonstrated to reduce the risk of infection. It is recommended that symptomatic persons suspected to have pandemic flu use surgical masks until they can be escorted from the work site or while in transit/at their home.

- Respirators are to be used only for those persons who may be asked to medically evaluate or transport individuals infected with known or suspected pandemic flu. This will typically include: first aiders and medical staffs. Country plans should consider purchase and storage of respirators in advance as supplies are likely to be limited in a pandemic. Generally, FFP2 type (or
US N95) respirators are adequate, but the final choice of respirators will vary depending on the degree of protection required.

- Country plans must provide appropriate respirators (N95 or FFP2) and other protective equipment to persons involved in jobs with high exposure risk (e.g., unavoidable travel to health care facilities, procurement of eggs for flu vaccine manufacture if relevant, etc.).

**INTRODUCTION**

During an influenza pandemic, coughing and sneezing will be the main source of spread from person to person. Coughing and sneezing by infected persons can create aerosol droplets of respiratory secretions containing flu virus which remain airborne for an extended time. Respirators are designed to reduce, but will not entirely eliminate, the risk of exposure to these airborne viruses. The use of surgical masks (which are NOT respirators) by persons suspected to be infected with pandemic flu until they can be escorted from the site is also an important control.

To assist in implementing these programmes, this tool has been developed and is divided into the following sections:

- Identification of groups of persons at high risk of aerosol exposures
- Respirator selection/recommended models
- Advance purchase of RPE or surgical masks and storage
- Use and cleaning
- Surgical masks in the workplace
- Use of surgical masks and respirators in transit and at home
Timeline

IDENTIFICATION OF GROUPS OF PERSONS AT HIGH RISK FOR AEROSOL EXPOSURES

A first step should be to identify the following groups and estimate the overall number of employees in each group:

- Security personnel who may interact with members of the public or staff who are known or suspected to have pandemic flu;
- Cleaning personnel who may handle potentially contaminated equipment or clean infected areas where there is potential for aerosol generation;
- All supporting staff, including security, first aiders, or others who may be asked to escort persons who are known or suspected to have pandemic flu off the work site;
- Healthcare personnel or first aiders who are providing direct patient healthcare services to persons known or suspected to have pandemic flu;
- Employees with unavoidable work-related travel to health care facilities which provide care to persons infected with pandemic flu;
- Other jobs which have been determined to have significant aerosol exposure risk.

This information will guide the advance purchase of respirators and surgical masks and ensure that appropriate respirators and supporting programmes are in place during high risk activities.
RESPIRATOR SELECTION/RECOMMENDED MODELS

At a minimum, the World Health Organisation recommends one of the following types of respirators for persons at high risk of exposure to pandemic (or other) flu virus:

- European CE certified EN143 P2/ EN 149 FFP2;
- US NIOSH certified N-95; or
- Comparable national/regional particulate respirators WITHOUT exhalation valves. (Specific examples and pictures of these respirators are provided in Attachment 1).

The 3M Company is a global provider of respirators and usually offers competitive pricing. More protective particulate respirators (e.g., N-99 or FFP 3) may also be used, but can be considerably more expensive and complex to use. Regardless of model, multiple sizes of the same respirator model should be purchased (if available) to ensure a good fit across a wide range of face shapes and sizes. Respirators with exhalation valves should NEVER be used because they promote the spread virus from infected persons who may wear them but have not yet developed symptoms.

Many FFP2 and 3 respirators do not effectively protect persons with facial hair because a proper seal can not be achieved. Consideration should be given to obtaining powered air purifying respirators for these persons if removing facial hair is not an option.
ADVANCE PURCHASE AND STORAGE OF RPE AND/OR SURGICAL MASKS

After the number of persons and scope of the RPE program has been determined, advance purchase and storage of a sufficient supply of recommended respirators and surgical masks are recommended.

A reasonable approach to advance purchase of respirators is to obtain recommended models in quantities sufficient to provide all high risk persons with one clean respirator daily for two - six work week periods during a pandemic - or 60 disposable respirators per covered person. Multiple sizes of the same model should be purchased where available. The final number of respirators purchased is at the discretion of the country pandemic planning team and will depend on the number of high exposure risk jobs, an assessment of the likely limitations of local supply in the event of a pandemic, cost, and other factors. A respirator will require medical clearance, proper selection, and fit to be maximally effective; these steps are detailed below. Respirators purchased in advance should be stored on the sites where they will be used. It is recommended that they be stored in a secure and locked area with limited access to prevent theft.

A reasonable approach to advance purchase of surgical masks is to buy enough to provide one surgical mask for 50% of the local population; the cumulative attack rate during multiple waves of a flu pandemic is not expected to exceed 30% and the excess will provide sufficient coverage for situations where flu infection status is unclear. The final number of surgical masks purchased is at the discretion of the country pandemic planning team and will depend on the
number of persons and visitors in a country, an assessment of the likely
limitations of local supply in the event of a pandemic, cost, and other factors.

There are no fit testing or medical clearance requirements for surgical
masks; they can be used by anyone. Surgical masks purchased in advance should
be stored on the sites where they will be used. It is recommended that they be
stored in a secure and locked area with limited access to prevent theft.

USE, CLEANING, AND DISPOSAL

Respirator fit is very important. If a respirator does not seal properly to
the face, airborne flu virus will enter under or around the face piece seal and into
the nose and lungs. A good fit can only be obtained if the following conditions
are met:

- The face is clean shaven where the respirator seal meets the face;
  beards, moustaches or stubble can interfere with a good seal and cause
  leakage.
- A minimum of 2-3 sizes and types are made available to provide an
effective fit for faces of different shapes.
- The individual must be fitted and tested using the actual respirator
  model that they will wear. This must involve an individual qualitative
  or quantitative fit test by an experienced professional.
- Individuals with a compromised respiratory system, such as asthma or
  emphysema, or people with a history of heart disease should consult
  EH or a physician before selecting/wearing a respirator.
- The user carefully follows recommended donning and removal instructions.
- The user performs a seal check or fit check each time the respirator is put on and prior to use in a high risk environment.
- The respirator is worn the entire time in the high risk environment.
- Disposable respirators should never be shared. Disposable respirators should never be cleaned and reused. Once worn, the respirator should be considered contaminated. It should be disposed of: 1) at the end of the shift; 2) at the end of the work day; or 3) if it becomes visibly contaminated at any time during the day.
- Reusable respirators (e.g., those with cartridges and 1/2 face rubber seals for example) may be disinfected using a 1% solution of sodium hypochlorite (made with a 1:5 solution of hospital grade bleach and water respectively). Appropriate hand washing should be performed immediately after the removal of all PPE because this is a common source of contamination and infection.

SURGICAL MASKS IN THE WORKPLACE

Surgical masks are not respirators and do not reduce the risk of INHALING virus particles. Surgical masks are specifically designed to help prevent aerosols or biological particles from being EXHALED into the environment. They do not seal tightly to the face and therefore air leakages around the edges are certain.
Surgical masks are useful in preventing an infected person from creating a cloud of aerosol droplets during coughing or sneezing. Persons suspected of having pandemic influenza should be separated from others and asked to wear a surgical mask for the entire time they remain at the work site. If a surgical mask is not available, tissues should be provided and these persons should be advised to cover their mouth and nose when coughing.

USE OF SURGICAL MASKS AT HOME OR IN TRANSIT

Employees should generally be discouraged from taking mass transit during a pandemic. They are encouraged to commute alone in personal automobiles or use other means (e.g., motorbikes, bicycles) to get to work. If the use of mass transit is unavoidable, individuals should follow social distancing guidelines and any recommendation of local public health authorities. Generally, surgical masks offer no or at best, unproven protection against the risk of getting seasonal or pandemic flu.
### TIMELINE SUMMARY OF RECOMMENDATIONS FOR RESPIRATORY PROTECTION BY PANDEMIC PHASE

<table>
<thead>
<tr>
<th>WHO Phase 3</th>
<th>WHO Phase 4</th>
<th>WHO Phase 5</th>
<th>WHO Phase 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Select desired respirators and surgical masks based on minimum requirements, local availability, and price.</td>
<td>1. Review guidelines with EH and local Public Health authorities as required.</td>
<td>1. Review guidelines with EH and local Public Health authorities as required.</td>
<td>1. Review guidelines with EH and local Public Health authorities as required.</td>
</tr>
<tr>
<td>2. Identify high exposure risk persons and estimate numbers of respirators and surgical masks required.</td>
<td>2. Conduct training, medical clearance, and fit testing for likely RPE users.</td>
<td>2. Complete training, medical clearance, and fit testing for likely RPE users.</td>
<td>2. At sites which remain open, utilize respirators and surgical masks as recommended by country PPT and local Public Health authorities.</td>
</tr>
<tr>
<td>3. Procure needed respirators and surgical masks.</td>
<td>3. Review adequacy of stocks and make additional purchases if needed.</td>
<td>3. Review adequacy of stocks and release stocks as needed.</td>
<td>3. Authorize home use.</td>
</tr>
<tr>
<td>4. Select secure storage area near points of use.</td>
<td>4. If pandemic flu is locally active, implement respirator and surgical mask plans for employees and dependents (if applicable).</td>
<td>4. If pandemic flu is locally active, implement respirator and surgical mask plans for employees (e.g., security, cleaning, EH, etc.) and dependents (if applicable).</td>
<td>4. If pandemic flu is locally active, implement respirator and surgical mask plans for employees (e.g., security, cleaning, EH, etc.) and dependents (if applicable).</td>
</tr>
<tr>
<td>5. Consider advance training, medical clearance, and fit testing of likely RPE users.</td>
<td>5. Communicate to employees and dependents (if applicable).</td>
<td>5. Communicate to employees and dependents.</td>
<td>5. Communicate to employees and dependents.</td>
</tr>
</tbody>
</table>

Source: GlaxoSmithKline Employee Health Management (2006b).
ATTACHMENT 1

SPECIFIC EXAMPLES OF RESPIRATORS

(*Types of N95/ FFP2 respirators without exhalation valves*)

3M Model 1860S       3M Model 9210

3M Model 8810       Moldex Model 2490
APPENDIX D

PANDEMIC PREPAREDNESS PLANNING

SOCIAL DISTANCING TOOLKIT

PURPOSE

To provide guidance and tools to implement site access control and social distancing interventions which work with sickness absence programs, antivirals and vaccine to minimize the risk of transmission of pandemic influenza. Country pandemic planning teams should use this information to develop appropriate local site operation and meeting policies.

SCOPE

This guidance applies to all company operations. The social distancing measures described should be applied to all employees, families, contract workers, and visitors. Some measures can also be used at home to reduce the risk of disease transmission.

EMPLOYEE HEALTH PANDEMIC PLAN REQUIREMENTS

• Country plans must identify those sites/operations which must remain open during a pandemic (unless superseded by local authorities). At these sites, additional actions will be needed to reduce the risk of infected persons entering the site, such as: posting prominent notices at entry points, advising staff not to enter if they have symptoms of flu, etc.

• Sites which remain open in a pandemic must implement a system of specific social distancing measures. These measures must be implemented during
phase 5 (if pandemic is locally active) or at all sites which remain open during Phase 6.

INTRODUCTION

During an influenza pandemic, measures to increase social distance may be instituted or recommended by the public health authorities. These measures, which include closure of schools and restricting mass gatherings such as concerts, are intended to prevent transmission of influenza between people. In the work setting, social distancing and other policies will reduce the risk of ill persons entering a company site or reduce contact between potentially ill staff and visitors. This tool is divided into the following sections:

- Restricting Access to Company Sites.
- Implementing Appropriate Policies
- Personal Hygiene Policies
- Appendices with Tools

RESTRICTING ACCESS TO COMPANY SITES

1) Each site which will remain open when a pandemic is locally active should appoint security, employee health, reception, and other appropriate staff (including adequate back-up to allow for absence) to implement access restrictions at the site. This group should have ongoing communication with the site crisis management team (CMT).

2) Appointed persons should manage, in consultation with the site CMT, all access-related issues upon activation of the site emergency response plan.
3) Upon activation of the site emergency plan, appointed staff should take the following actions:

- Re-evaluate (and implement if appropriate) temperature, thermographic imaging, or other forms of screening based on the most recent local public health guidance and known information about the pandemic flu virus.
- Reduce the number of staff and visitor entrances and access points to the minimum number possible while still meeting operational, security, and EHS needs.
- Prominently post notices at all entry points to facility, advising staff and visitors not to enter if they have symptoms of influenza (Attachment 1).
- Train security/reception personnel on site access restrictions, how to identify persons potentially ill with pandemic flu, and the steps for managing interactions with potentially ill persons.
- Equip staff at entrances with adequate supplies of tissues, medical and hand hygiene products, N95 or equivalent respirators, and cleaning supplies required for their interactions with potentially infectious visitors or employees.
- Provide appropriate supplies of tissues, hygiene products, and surgical masks for use by potentially infectious visitors or employees.

4) Upon activation of the site emergency plan, appointed persons should advise employees not to come to work if they are feeling unwell, particularly if they are experiencing influenza symptoms. It would be useful
to advise staff of the difference in symptoms between influenza and the common cold. Staff who are ill should stay at home until symptoms resolve.

5) Use normal communication methods to ensure that all staff receives notices.

6) The appointed persons should determine, in consultation with local public health and site CMTs, when to reduce or eliminate site access restrictions as a pandemic wanes.

IMPLEMENTING APPROPRIATE SITE MEETING, SOCIAL DISTANCING, AND PERSONAL HYGIENE MEASURES

1) Comply with all advice and restrictions implemented by local public health authorities in your country regarding social distancing measures in the community.

2) Review all workplace activities that involve employees (and complementary workers) working in communal areas. Discontinue all non-essential activities in these areas and exclude employees from working in these areas. These areas may include:

- Open plan offices
- Laboratories
- Warehouses
- Catering areas
- Meeting rooms
- Production areas
- Workshops

3) Cease all face to face meetings and maximize the use of technology to conduct business such as teleconferencing / videoconferencing / sametime meetings – even when participants are in the same building.
• If a face-to-face meeting with people is unavoidable, minimize the meeting time, choose a large meeting room and sit at least one meter away from each other if possible. Consider holding meetings in the open air.

4) Review occupational travel activities including employee travel from home to work.

• Cease all travel on public and company owned mass transport systems including aircraft, trains and busses.

• Advise employees to use single person transportation means to travel to and from work.

5) Review work patterns:

• If possible, arrange for employees to work from home or work variable hours to avoid crowding at the workplace.

• Practice “ghost” shift changes wherever possible, with the shift going off duty leaving the workplace before the new shift enters. If possible, leave an interval before re-occupation of the workplace. If possible, thoroughly ventilate the workplace between shifts by opening doors and windows or turning up the fan speed/increasing air exchanges on the ventilation system.

• Set up systems where clients / customers can pre-order / request information via phone / email / fax and have order / information ready for fast pick-up or delivery; and
6) Educate staff regarding the transmission of influenza virus and the need to reduce risk by adopting infection control measures such as:

- Reduce person-to-person contact via personal greetings e.g., handshaking, kissing.
- Maintain a distance of at least one meter should be maintained between persons when practical. Larger distances are more effective.
- Avoid visiting or having other contact with unwell people.
- Cover the nose / mouth when coughing or sneezing.
- Use tissues to contain respiratory secretions.
- Dispose of tissues or other contaminated materials in appropriate receptacles.
- Perform hand hygiene after contact with respiratory secretions and contaminated objects or materials.
- Minimize hand contact with potentially contaminated surfaces such as handrails, door handles, etc.
- Bring lunch and eat at desk or away from others (avoid the cafeteria and crowded restaurants). Introduce staggered lunchtimes so numbers of people in the lunch room are reduced.
- Do not congregate in tearooms or other areas where people socialize. Do what needs to be done and then leave the area.
- Encourage staff to avoid recreational or other leisure classes / meetings etc. where they might come into contact with infectious people.
SCALING BACK SOCIAL DISTANCING MEASURES

At some point the decision to discontinue social distancing measures will need to be taken. This decision (in consultation with local public health authorities) should be based on evidence of improving local / regional control, such as:

- Consistent decrease in the number of new cases.
- Reduction in the number of probable and known cases.
- Effective protective countermeasures are in place (e.g., high coverage with a pandemic flu vaccine).

REINFORCING PERSONAL HYGIENE MEASURES

Basic personal hygiene measures should also be communicated to staff and they should be encouraged to practice them in the workplace to minimize potential influenza transmission. These measures should include:

- cover nose and mouth when sneezing and coughing (preferably with a disposable single use tissue).
- immediately dispose of used tissues.
- adopt good handwashing / hand hygiene practices, particularly after coughing, sneezing, or using tissues.
- keep hands away from the mucous membranes of the eyes, mouth, and nose.

1) Nominated staff should ensure that adequate supplies of hand hygiene products are available in restrooms, health centers, change rooms, and other
appropriate locations. This is a high planning priority as there may be interruption to the supply or shortages of soap and hand towels.

2) Hand and personal hygiene information should be communicated to staff and visitors:

- Post hygiene notices (Attachment 2) in all workplace entrances, washrooms, hand washing stations and public areas; and
- Consider brochures, newsletters, global emails, employee notice boards, and information included with pay slips, to inform staff of the importance of hand hygiene and environmental cleaning during a pandemic.

Source: GlaxoSmithKline Employee Health Management (2006c).
ATTACHMENT 1
SAMPLE SITE ACCESS SIGN

SITE ACCESS RESTRICTED:
INFLUENZA

Pandemic influenza is a contagious disease. In order to reduce the spread of Influenza at this site the following is required of ALL employees and visitors.

Do not enter this site if you have:
chills, shivering and a fever (temperature > 38°C)
sore throat
dry or significant cough
difficulty breathing
sneezing
runny nose

If some of the above apply to you, please go home and wait until you have recovered before returning to work.

If you begin to feel ill at work or have recently arrived from business travel overseas, please call:

_________________________ Phone: ___________________________
## ATTACHMENT 2

### SAMPLE SIGNS ON BASIC HYGIENE PRACTICES

### PROTECTING YOURSELF AND OTHERS AGAINST RESPIRATORY ILLNESS

- **Handwashing** is the most important thing you can do to protect yourself.
- Cover your nose and mouth when coughing or sneezing.
  - Use a tissue and dispose of this once used in the waste.
  - Always wash hands after coughing and sneezing or disposing of tissues.
- Keep your hands away from your mouth, nose and eyes.
- Avoid contact with individuals at risk (e.g. small children or those with underlying or chronic illnesses such as immune suppression or lung disease) until influenza-like symptoms have resolved.
- Avoid contact with people who have influenza-like symptoms.
- Ask people to use a tissue and cover their nose and mouth when coughing or sneezing and to wash their hands afterwards.

### Hand Hygiene with Soap and Water

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Remove jewelry. Wet hands with warm water.</td>
</tr>
<tr>
<td>2.</td>
<td>Add soap to palms. Rub hands together to create a lather.</td>
</tr>
<tr>
<td>3.</td>
<td>Cover all surfaces of the hands and fingers.</td>
</tr>
<tr>
<td>4.</td>
<td>Clean knuckles, back of hands and fingers.</td>
</tr>
<tr>
<td>5.</td>
<td>Clean the space between the thumb and index finger.</td>
</tr>
<tr>
<td>6.</td>
<td>Work the finger tips into the palms to clean under the nails.</td>
</tr>
<tr>
<td>7.</td>
<td>Rinse well under warm running water.</td>
</tr>
<tr>
<td>8.</td>
<td>Dry with a single-use towel and then use towel to turn off the tap.</td>
</tr>
</tbody>
</table>

Minimum wash time 10-20 seconds.
### Hand Hygiene with Alcohol-based Hand Sanitizer

1. **Remove jewelry.**
   - Apply enough product to open palms.**

2. Rub hands together
   - palms to palms

3. Rub in between and around fingers

4. Cover all surfaces of the hands and fingers

5. Rub backs of hands and fingers. Rub each thumb.

6. Rub fingertips of each hand in opposite palm

7. Keep rubbing until hands are dry.

   **The volume required to be effective varies from product to product. Enough product to keep hands moist for 15 seconds should be applied. Do not use these products with water. Do not use paper towels to dry hands.**

   **Note:** Wash hands with soap and water if hands are visibly dirty or contaminated with blood or other body fluids. Certain manufacturers recommend washing hands with soap and water after 5-10 applications of gel.

---

**HAND HYGIENE**

The most important thing you can do to keep from getting sick is to wash your hands!

Handwashing is the single most important measure to reduce the risks of transmitting infection from one person to another.

Hand washing with soap and water, alcohol-based hand rub, or antiseptic handwash should be performed regularly throughout the day. Hands should be thoroughly dried, preferably using disposable tissues or towels. Use the disposable towel to open the door.

Hand washing and drying should always be done after coughing, sneezing or handling used tissues or after touching objects, materials or hard surfaces that may have been contaminated by someone else.

Hand-to-face contact such as can occur during eating, normal grooming, or smoking presents significant risks because of the potential for transmission of influenza from surfaces contaminated with wet respiratory droplets. Handwashing should always be done before and after eating, grooming, smoking or any other activity that involves hand-to-face contact.
APPENDIX E
MANAGEMENT GUIDANCE FOR POTENTIAL PANDEMIC ILLNESS SCENARIOS

This document contains management guidance which could be applicable during any of the phases of the pandemic and is meant to be a general guide of employee, manager, and local pandemic planning team actions.

• Scenario 1: No reported illness or exposure to pandemic flu
• Scenario 2: Employee has had close contact with a confirmed Pandemic Flu patient
• Scenario 3: Employee is confirmed to have Pandemic Flu
• Scenario 4: Employee and/or Manager needs employee to travel to an infected area
• Scenario 5: Employee comes to work ill or becomes ill at work

**Scenario 1**
No reported illness or exposure to pandemic flu

**Employee Action Items**
1. Read and understand Pandemic Flu Information (policy and plan) posted on company website
2. Remain informed on status of pandemic flu in local area

**Manager Action Items**
1. Communicate up front company guiding principles - on pandemic flu.
2. Encourage employee participation in Seasonal Influenza Program

**Employee Health**
1. Serve as medical advisor on pandemic planning.
2. Assist country GMs in development of Country specific Pandemic Plans
3. Identify key EH professional (and back-up individual) to lead business decisions regarding pandemic response.
4. Plan and implement Seasonal Influenza Program
Employee exposed to pandemic flu outside workplace (traveling from pandemic area or exposed at home)

**Employee Action Items**

1. **Do not come in to work.**
2. Seek medical assistance by consulting your physician or a medical facility or phone Company EH.
3. Make individual decision of use of Antivirals (AV).
4. Use sick leave from the moment employee suspects illness or arrange with your manager to work from home.
5. Inform local EH or your manager and HR immediately if you are confirmed as Pandemic Flu patient.

**Manager Action Items**

1. Contact employee to gather urgent/important deliverables to ensure a smooth work transition.
2. If applicable, keep remaining team members informed of the situation. **Keep identity of employee confidential to the extent feasible.**
3. Inform HR.
4. Allow other employees within the impacted workgroup to work from home for period of up to 10 days if requested.
5. Track employee absences related to flu pandemic add to immune status list.
**Employee Health**

1. Provide telephonic consultative service (as needed) to employees on
determination of cold vs. flu.

2. Clear employee to RTW if no symptoms develop within 5 days post exposure.

3. Think about use of local EAP provider should their participation be helpful.

---

**SCENARIO 3**

Employee is confirmed to have Pandemic Flu

**Employee Action Items**

1. **DO NOT COME TO WORK** or send family members to collect work for you.

2. Assess risk and determine if further medical care should be sought.

3. Take AV as prescribed.

4. Inform local EH or your manager and HR immediately if you are confirmed as Pandemic Flu patient.

5. Follow all guidelines established by the Local Department of Public Health.

**Manager Action Items**

1. Contact employee to gather urgent/ important deliverables to ensure a smooth work transition.

2. If applicable, keep remaining team members informed of the situation. Keep employee identity confidential to the extent feasible.

3. Inform HR.
4. Allow other employees within the impacted workgroup to work from home for a period of up to 10 days if requested.

5. Track employee absences related to flu pandemic and add employees name to immune status list.

**Employee Health**

1. Clear employee to RTW if they are asymptomatic for >5 days post pandemic flu illness.

2. Think about use of local EAP provider should their participation be helpful.

---

**SCENARIO 4**

Employee and/or Manager needs employee to travel to an infected area.

**Employee Action Items**

1. Confirm that there is a “business essential” reason to travel to infected area.

2. Check local guidance which may prohibit travel into area where infections are occurring.

3. Check that immunizations and vaccinations are up to date.

4. Provide updated emergency contact information to manager.

5. Plan to work from home for a period of 7-10 days when returning from infected area.

**Manager Action Items**

1. Consider sending an employee who may have immunity due to previous pandemic illness.
2. Ensure that employee is supportive of traveling to the infected area or consider postponing business travel.

3. Verify that the business trip is essential and critical for business. Consider if work can be done by VTC, Live Meeting and/or teleconference.

4. Request that the employee work from home for 7-10 days when returning from infected area.

Employee Health

1. Provide travel consultation advise and needed medications and immunizations.

2. Clear employee to RTW if asymptomatic after 7-10 days post travel.

**SCENARIO 5**

Employee comes to work ill or becomes ill at work

Employee Action Items

1. Notify EH (if on-site), manager or HR by telephone if person feels ill and has symptoms of influenza.

2. Cover mouth and nose with Kleenex (use surgical mask if available).

3. Leave work immediately.

4. Avoid use of public transportation.

5. Assess risk and determine if further medical care should be sought.

6. Take AV as prescribed.

7. Inform local EH or your manager and HR immediately if you are confirmed as Pandemic Flu patient.
8. Follow all guidelines established by the Local Department of Public Health.

**Manager Action Items**

1. Ask the person if they have any of the following symptoms:

<table>
<thead>
<tr>
<th>Sore throat</th>
<th>Fatigue and weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough</td>
<td>Muscle aches and pains</td>
</tr>
<tr>
<td>Chest discomfort</td>
<td>High fever (or feel feverish and hot)</td>
</tr>
<tr>
<td>Difficulty in breathing</td>
<td>Been overseas recently</td>
</tr>
<tr>
<td>Headache</td>
<td>Been in contact with someone diagnosed with influenza</td>
</tr>
</tbody>
</table>

If response is “yes” to two or more of the symptoms above, employee should be considered as possible case of influenza.

2. **Advise employee to leave work immediately.**

3. **Arrange to have work area of ill employee cleaned.**

4. If applicable, keep remaining team members informed of the situation. **Keep employee identity confidential to the extent feasible.**

5. Advise team members that they have been in contact with suspect case.

6. Inform HR.

7. Allow other employees within the impacted workgroup to work from home for a period of up to 10 days if they request this.
8. Track employee absences related to flu pandemic and add employees name to immune status list.

9. Contact employee to gather urgent/ important deliverables to ensure a smooth work transition.

**Employee Health**

1. If contacted by employee, provide telephonic screening for symptoms and advise ill employee on appropriate actions to follow based on illness symptoms.

2. **If symptoms are consistent with influenza- treat as “suspect case”.**

3. Advise employee to cover mouth and nose and leave work immediately.

4. Clear employee to RTW if they are asymptomatic for >5 days post pandemic flu illness.

5. Think about use of local EAP provider should their participation be helpful.

Source: GlaxoSmithKline Employee Health Management (2006d).
APPENDIX F

ANTIVIRAL HEALTH HISTORY QUESTIONNAIRE

Please return to:

Purpose Statement
The purpose of collecting this personal health information is to assist Employee Health or other health professionals in determining which antiviral would be most appropriate for you or for your dependents to use as part of the Employee Health Pandemic Preparedness Plan. This questionnaire is not intended to be a comprehensive health questionnaire, but rather focuses on information which will affect the selection of an antiviral for use as directed during an influenza pandemic. This information will remain confidential. Providing this information and using anti-viral medication as part of the Employee Health Pandemic Preparedness Plan is optional, and is not required.

PERSONAL INFORMATION

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date of birth:</th>
<th>Today's Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- □ Employee
- □ Dependent of employee
- □ Complementary Worker

Contact address:

Contact telephone number:

PERSONAL MEDICAL HISTORY

<table>
<thead>
<tr>
<th>If YES please give details</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ No □ Yes Do you take any medicines? If yes, please list.</td>
</tr>
<tr>
<td>□ No □ Yes Are you allergic to any medicines or foods? If yes, please list.</td>
</tr>
<tr>
<td>□ No □ Yes Any tooth, mouth or facial problems which might prevent you from using a disc inhaler effectively. (Use of a diskhaler requires closing your lips firmly around a mouthpiece).</td>
</tr>
<tr>
<td>□ No □ Yes Chronic Lung disease (e.g. asthma, chronic bronchitis or emphysema)</td>
</tr>
<tr>
<td>□ No □ Yes Other chronic diseases. If yes, please list</td>
</tr>
<tr>
<td>□ No □ Yes Currently pregnant or breastfeeding</td>
</tr>
</tbody>
</table>

OTHER HEALTH CONCERNS

Do you have any questions regarding a personal medical condition which you feel may become an issue while taking anti-viral medication (Relenza or Tamiflu)?

□ No □ Yes (If yes, please describe):

I believe the above information to be true to the best of my knowledge:

Signature ____________________________

Date ________________________________

Source: GlaxoSmithKline Employee Health Management (2006e).
APPENDIX G

RELENZA or TAMIFLU DECISION TREE

Does the person have asthma or COPD?

Consider alternative protection/treatment

Yes

No

At least 1 year old?

Yes

No

Consider TAMIFLU

For children up to 13 yrs and adults who cannot swallow capsules, consider suspension

Renal impairment, chronic heart/lung disease or high-risk medical condition?

Yes

No

Do not use-consult with OHP or medical provider

At least 5 yrs old (prophylaxis) & 7 yrs old (treatment)?

Yes

No

Consider RELENZA

Use with caution with asthma/COPD & other uncontrolled chronic illness -avoid in severe asthma

Consult with OHP or medical provider

Pregnancy & lactation: do not use unless benefit outweighs risk

Refer to OHP or medical provider

Source: GlaxoSmithKline Employee Health Management (2006f).