



## **Natural Course of Swine Flu**

Jacqueline Rhoads, PhD, ACNP-BC, ANP-C, PMHNP, CCRN, FAANP  
Professor, Graduate Program Director  
UTMB School of Nursing  
301 University Blvd.  
Galveston, Texas 77554  
409-772-4802

Faye A. Mitchell, PhD, RN  
Assistant Professor, Coordinator  
The University of Southern Mississippi  
School of Nursing  
Gulfport, Mississippi

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In the United States, annual epidemics of influenza occur typically during the late fall through early spring seasons. Influenza viruses can cause disease among persons in any age group, but rates of infection are highest among children.<sup>1,2</sup> Rates of serious illness and death are highest among persons aged  $\geq 65$  years, children aged  $< 2$  years, and persons of any age who have medical conditions that place them at increased risk for complications from influenza.<sup>1,3,4</sup> An annual average of approximately 9,000 deaths during 2009 and over 200,000 hospitalizations have been associated with the swine influenza.<sup>5,6</sup> (Table 1)

## **Swine Flu History and Overview**

Influenza viruses are small RNA viruses that infect many mammals, including humans, birds, and swine.<sup>1-5</sup> Until 2009, swine influenza predominately affected swine and was not transmitted often or easily to people. Even in the isolated instances in which swine influenza infected people, it had very limited ability to spread from person to person.<sup>1-5</sup> Most cases of swine influenza in people were directly linked to contact with swine through farming or at fairs.<sup>1,2</sup> Although it is usually a mild disease, there have been deaths reported from human infection with swine influenza.<sup>1-5</sup>

In 1918 a variant of the swine flu virus pandemic occurred which was not a variant of the Swine strain. In 1930, the swine influenza virus was isolated and identified after reported increased incidence of flu occurred.<sup>1</sup> In 1979, there was an unusual outbreak of swine influenza at Fort Dix, New Jersey. One recruit died, and approximately 12 were hospitalized with influenza. Further testing showed that more than 200 recruits had acquired the virus, although most had few or no symptoms.<sup>1</sup> The infecting strain was found to be a novel swine influenza virus, raising concerns that a new pandemic might occur. In response, public health officials began a massive public vaccination program.<sup>1</sup> The 1979 strain never spread, most likely due to the low potential of transmission of the virus from person to person.<sup>1</sup> For more than 50 years, the swine virus remained relatively stable and unchanged but in the 1990s, swine viruses became more diverse.<sup>1</sup>

In April 2009 infections with a swine-origin influenza A (H1N1) virus were identified with cases in the United States and Mexico.<sup>2</sup> Those at higher risk for complications of swine-origin influenza A (H1N1) virus infection are the elderly, immune suppressed individuals, alcoholics, children, those with liver and kidney disease.<sup>2</sup> Adults and adolescents with HIV infection, especially persons with low CD4 cell counts, are known to be at higher risk for viral and bacterial lower respiratory tract infections and for recurrent pneumonias.<sup>1,2</sup>

## **Etiology of Swine Flu**

Swine Influenza (swine flu) is a respiratory disease of pigs caused by type A influenza virus that regularly causes outbreaks of influenza in pigs.<sup>3-6</sup> Swine flu viruses do not normally infect humans. Sporadic human infections with swine flu have occurred in persons with direct exposure to pigs (e.g. children near pigs at a fair or workers in the swine industry).<sup>3-6</sup> In addition, there have been documented cases of transmission of swine flu from person to person. In 1988, one case in Wisconsin resulted in multiple swine flu infections.<sup>3-6</sup> There is also evidence of infections between patients and care givers.<sup>3-6</sup> The most likely reason for this transmission is due to the fact that those infected with the flu fail to cover their mouths when coughing or sneezing.

Over the years, different variations of swine flu viruses have emerged. At this time, there are four main influenza type A virus subtypes that have been isolated in pigs: H1N1, H1N2, H3N2, and H3N1. However, most of the recently isolated influenza viruses from pigs have been H1N1 viruses.<sup>3-6</sup> It is important to realize that the influenza virus changes constantly resulting in many variations of H1N1.<sup>3</sup>

## **Transmission**

Influenza viruses are spread from person to person primarily through respiratory droplet transmission or contact with respiratory-droplet contaminated surfaces.<sup>3,5</sup> The estimated incubation period for swine flu is 1-4 days with an

average of 2 days.<sup>5</sup> Adults shed influenza virus from the day before symptoms begin through 5-10 days after illness begins. The amount of virus shed, decreases rapidly by 3-5 days after onset.<sup>5</sup> Young children might shed virus several days before illness onset, and children can be infectious for  $\geq 10$  days after onset of symptoms.<sup>5</sup> Severely immunocompromised persons can shed virus for weeks or months.<sup>5</sup> Swine flu can infect people of any age, and is most concerning in the high risk groups such as the very young (< one year of age) and the older adult (>65 years of age).

## **Clinical Signs and Symptoms of Influenza**

Influenza illness is characterized by the abrupt onset of fever, myalgia, headache, malaise, nonproductive cough, sore throat, and rhinitis.<sup>6</sup> The flu typically resolves after 3-7 days for the majority of persons, although cough and malaise can persist for over 2 weeks.<sup>6</sup> Sometimes the flu can progress to more serious conditions such as influenza viral pneumonia.<sup>6</sup> People with underlying medical conditions such as pulmonary or cardiac disease can experience secondary bacterial pneumonia, sinusitis, or otitis media. Often they will present with symptoms of fever, lethargy, lack of appetite, sneezing and coughing along with complaints of a runny nose, sore throat, nausea, vomiting and diarrhea.<sup>6</sup> People who are acutely ill present with shortness of breath, chest pain, dizziness, confusion, and nausea/vomiting.<sup>6</sup> Children typically display fever, cough, sore throat, diarrhea, vomiting and possibly otitis media.<sup>6</sup> Accurate diagnosis and treatment are important, particularly in patients with existing chronic cardiac or pulmonary conditions, to control co morbid complications and subsequent infection transmission. Any patient presenting with influenza like illness (ILI) should be tested as per CDC recommendations found under "Screening and Specimen Collection" at <http://www.cdc.gov/h1n1flu/guidance/>.

## **DIAGNOSIS**

CDC<sup>13</sup> and WHO<sup>14</sup> define a confirmed case of H1N1 infection as a person with an acute febrile respiratory illness with laboratory confirmed infection at CDC by one or more of the following tests:

1. real-time RT-PCR (used for influenza virus detection since the early 2000s for routine surveillance)
2. viral culture

To diagnose swine influenza A infection, a respiratory specimen would generally need to be collected within the first 4 to 5 days of illness (when an infected person is most likely to be shedding virus).<sup>13-15</sup> Identification as a swine flu influenza A virus requires sending the specimen to CDC for laboratory testing.<sup>15</sup> The U.S. Food and Drug Administration, in response to requests from the U.S. Centers for Disease Control and Prevention, has issued Emergency Use Authorizations (EUAs) to make available to public health and medical personnel

important diagnostic and therapeutic tools to identify and respond to the swine flu virus under certain circumstances.<sup>8,10-13</sup> The rapid influenza antigen test, is one method for diagnosis. It is available at most primary care facilities. One major drawback to the test is its unknown sensitivity and specificity to detect human infection with H1N1 virus in clinical specimens. A negative rapid test could register a false negative and should not be used as a final diagnostic test for H1N1 infection.<sup>8,9</sup> Only RT-PCR (Reverse transcription polymerase chain reaction) or viral culture can confirm infection with H1N1 influenza A virus. Persons who might have H1N1 virus and who test positive for influenza A should have confirmatory RT-PCR or viral culture testing to confirm the presence of H1N1 virus.<sup>8,9</sup> A negative rapid antigen or immunofluorescence test cannot be used to rule out H1N1 virus infection.<sup>8,9</sup> A nasopharyngeal swab/aspirate or nasal wash/aspirate should be collected as soon as possible after illness onset. If these specimens cannot be collected, a combined nasal swab with an oropharyngeal swab is acceptable.<sup>8-10</sup> For patients who are intubated, an endotracheal aspirate should also be collected. Specimens should be placed into sterile viral transport media and immediately placed on ice or cold packs or at 4°C for transport to the laboratory.<sup>8-10</sup> Swab specimens should be collected using swabs with a synthetic tip (polyester or Dacron®) and an aluminum or plastic shaft.<sup>10</sup> Swabs with cotton tips and wooden shafts are not recommended.<sup>8-10</sup> The swab specimen collection vials should contain 1-3ml of viral transport medium.<sup>8-10</sup>

The diagnostic evaluation and diagnosis of H1N1 influenza is determined by the following CDC<sup>10</sup> recommended criteria:<sup>7-15</sup>

1. A suspected case of infection is defined as a person who presents with acute febrile respiratory illness (this is defined as a recent onset of rhinorrhea, nasal congestion, sore throat, cough with or without fever) with onset within 7 days of close contact (this is defined as being within 6 feet of an infected person) with another person who has tested positive for H1N1 virus, or within 7 days of travel to a community either within the United States or internationally where there are one or more confirmed cases of infection, or resides in a community where there are one or more confirmed cases of H1N1 infection.<sup>7-13</sup>
2. A *probable* case of H1N1 infection is defined as a person who presents with an acute febrile respiratory illness and is positive for influenza A, but negative for H1 and H3 by influenza RT-PCR.<sup>7-13</sup>
3. A *confirmed* case of H1N1 infection is defined as a person who presents with an acute febrile respiratory illness with laboratory confirmed H1N1 infection at CDC by real-time RT-PCR and/or viral culture.<sup>7-13</sup>

## Treatment

Antiviral treatment should be considered for confirmed, probable or suspected cases of swine-origin influenza A (H1N1) virus infection.<sup>8-15</sup> Beneficial evidence

from antiviral treatment in studies of seasonal influenza is strongest when treatment is started within 48 hours of illness onset.<sup>8-15</sup> Some studies of treatment of seasonal influenza have indicated benefit, including reductions in mortality or duration of hospitalization even for patients whose treatment was started more than 48 hours after illness onset.<sup>8-15</sup> Recommended duration of treatment is five days.<sup>8-15</sup> Recommendations for use of antivirals may change as data on antiviral susceptibilities and effectiveness become available. Providers are encouraged to periodically review the CDC web site for latest developments in treatment recommendations.<sup>8-15</sup> Antiviral doses recommended for treatment of swine-origin influenza A (H1N1) virus infection in adults or children 1 year of age or older are the same as those recommended for seasonal influenza (Table 1). Oseltamivir use for children < 1 year old was recently approved by the U.S. Food and Drug Administration (FDA) under an Emergency Use Authorization (EUA), and dosing for these children is age-based (Table 2).<sup>8-15</sup>

Treatment of swine flu includes the standard antiviral medications oseltamivir (Tamiflu) or zanamivir (Relenza), both neuramidase enzyme inhibitors affecting virus aggregation and particle release.<sup>16-20</sup> Swine flu is resistant to both antivirals amantadine and rimantadine, which is uncommon for past strains of influenza A.<sup>16-20</sup> Usual practice provides treatment only if within the first 2 days or symptoms, but hospitalized patients should receive the treatment regardless of the onset of symptoms.<sup>16-20</sup> After two confirmed cases influenza within 72 hours, a healthcare facility can be considered to have an outbreak of influenza.<sup>16-20</sup> At this point, all patients presenting with swine flu should be treated with these antivirals.<sup>16,17</sup> In longterm care facilities, all residents should be treated prophylactically regardless of immunization status.<sup>16,17</sup> Any employee that did not receive vaccination against the infecting strain of influenza should receive chemoprophylaxis using these antivirals during an institutional outbreak. Recommended treatment duration is five days; however, for those in healthcare facilities, chemoprophylaxis should be continued for 14 days or 7 days post onset of symptoms of the last infection.<sup>16</sup>

Allergic reactions to the antivirals can occur and all patients who are given the antivirals should be instructed about allergic reaction symptoms such as facial or oropharyngeal edema. These reactions can be life threatening. The most common side effects with the above listed antivirals ( Oseltamivir and Zanamivir) are diarrhea, nausea, sinusitis, nasal signs and symptoms, bronchitis, cough, headache, dizziness, and ear, nose, and throat infections. No known drug interactions have been reported with use of these medications.<sup>16,18</sup> It is recommended that all antivirals be taken with food to prevent stomach upset, nausea and vomiting.<sup>16,18</sup> Transient neuropsychiatric events such as suicide ideation or delirium have been reported among persons taking oseltamivir.<sup>16,18</sup> Close monitoring for changes in mental status is strongly suggested by the Food and Drug Administration.<sup>16,18</sup>

If a person is exposed to someone with swine flu, prophylaxis should be considered especially during the *infectious period* (one day before until seven days after the onset of illness).<sup>16,18</sup> For *pre-exposure* protection, chemoprophylaxis should be given during the potential exposure period and continued for 10 days after the last known exposure to an ill confirmed case of H1N1 virus infection.<sup>16,18</sup>

Antiviral chemoprophylaxis is *recommended* for:<sup>16,18</sup> (Table 2)

- Household close contacts who are at high-risk for complications of influenza (persons with chronic medical conditions, persons 65 or older, children younger than 5 years old, and pregnant women) of a confirmed or probable case.
- Health care workers or public health workers who were not using appropriate personal protective equipment during close contact with an ill confirmed, probable, or suspect case of H1N1 virus infection during the case's infectious period.
- Children attending school or daycare who are at high-risk for complications of influenza (children with certain chronic medical conditions) and who had close contact (face-to-face) with a confirmed, probable, or suspected case.
- Travelers to Mexico who are at high-risk for complications of influenza (persons with certain chronic medical conditions, persons 65 or older, children younger than 5 years old and pregnant women).

People with swine flu should stay home for 7 days after the start of illness and fever is gone. They should be encouraged to get plenty of rest, drink clear fluids (such as water, broth, sports drinks, electrolyte beverages for infants) to keep from being dehydrated, cover coughs and sneezes. Clean hands with soap and water or an alcohol-based hand rub often and especially after using tissues and after coughing or sneezing into hands.

## **HIGH RISK POPULATIONS**<sup>20-26</sup>

The population groups who are at higher risk for complications include:

- Children less than 5 years old;
- Persons aged 50 years or older;
- Children and adolescents (aged 6 months–18 years) who are receiving long-term aspirin therapy and who might be at risk for experiencing Reye syndrome after influenza virus infection;
- Pregnant women;
- Adults and children who have chronic pulmonary, cardiovascular, hepatic, hematological, neurologic, neuromuscular, or metabolic disorders;
- Adults and children who have immunosuppression (including immunosuppression caused by medications or by HIV);

- Residents of nursing homes and other chronic-care facilities.

Several other high risk populations deserve consideration when thinking of infection control procedures. Persons who are homeless, sufferers of alcoholism, cognitive impairment, and psychiatric/mental illnesses, or individuals in socioeconomically deprived areas cannot or are not inclined to address the simple recommended preventions; such as: good handwashing, surface cleaning, and immediate disposal of tissues, and other environmental issues( 19,20 ). Healthcare providers are in high risk situations by nature of their jobs. Shortages of healthcare providers and working in a strained economy often require the healthcare provider to work when experiencing signs and symptoms of illness. The healthcare provider has to provide a good example and abide by impeccable infection control procedures to protect themselves and others.

Other groups in high risk situations are persons who are living/working in close proximity of one another; as in, dormitories, universities, schools, hospitals and other institutions. An awareness of the threat is imperative in these areas but it is also important to remember that the highly contagious swine flu virus can be appropriately addressed by following the CDC guidelines.

Young children and infants are less likely to have typical influenza symptoms. They may present with fever and lethargy, and may not have cough or other respiratory symptoms or signs. Symptoms of severe disease may include apnea, tachypnea, dyspnea, cyanosis, dehydration, altered mental status, and extreme irritability. [22-24](#)

Children under one year of age are at high risk for complications from seasonal human influenza virus infections. The characteristics of human infections with swine-origin H1N1 viruses are still being studied, and it is not known whether infants are at higher risk for complications associated with swine-origin H1N1 infection compared to older children and adults. Limited safety data on the use of oseltamivir (or zanamivir) are available for children less than one year of age, and oseltamivir is not licensed for use in children less than 1 year of age. Data suggest that severe adverse events are rare. Because infants typically have high rates of morbidity and mortality from influenza, infants with swine-origin influenza A (H1N1) infections may benefit from treatment using oseltamivir. [22-24](#)

Aspirin or aspirin-containing products should not be administered to any confirmed or suspected ill case of H1N1 virus infection aged 18 years old and younger due to the risk of Reye syndrome. For relief of fever, other anti-pyretic medications are recommended such as acetaminophen or non-steroidal anti-inflammatory drugs.

Antiviral chemoprophylaxis with either oseltamivir or zanamivir is *recommended* for: [22-24](#)

A child less than five years of age who has had household close contact with a confirmed or suspected case.

1. School children or daycare attendees who are at high-risk for complications of influenza (children younger than 5 years old, and those with certain chronic medical conditions) who had close contact (face-to-face) with a confirmed, probable, or suspected case.
2. Children who traveled to Mexico who are at high-risk for complications of influenza (children younger than 5 years old, and those with certain chronic medical conditions).

Many pregnant women will experience a typical course of uncomplicated influenza with complaints of cough, sore throat, rhinorrhea and/or fever. However, for some pregnant women, illness might progress rapidly, and might be complicated by secondary bacterial infections including pneumonia. Fetal distress associated is a complication that can occur. Maternal hyperthermia is one of the more well-studied adverse effects of influenza that can occur during the first trimester. Oseltamivir and zanamivir are "Pregnancy Category C" medications, indicating that no clinical studies have been conducted to assess the safety of these medications for pregnant women. Because of the unknown effects of influenza antiviral drugs on pregnant women and their fetuses, oseltamivir or zanamivir should be used during pregnancy only if the potential benefit justifies the potential risk to the embryo or fetus. However, no adverse effects have been reported among women who received oseltamivir or zanamivir during pregnancy or among infants born to women who have received oseltamivir or zanamivir. Pregnancy should not be considered a contraindication to oseltamivir or zanamivir use. The preferred treatment for pregnant women is oseltamivir because of its systemic activity . The drug of choice for prophylaxis is less clear. Zanamivir may be preferable because of its limited systemic absorption; however, respiratory complications that may be associated with zanamivir because of its inhaled route of administration need to be considered, especially in women at risk for respiratory problems.

Patients who have chronic cardiovascular disease and/or cerebrovascular disease (CVD) are at increased risk of acute exacerbation of disease during an illness with influenza. Health care providers should be aware that influenza might produce increased numbers of cardiovascular events, leading to increased hospitalizations and use of resources to treat acute coronary events, heart failure, and stroke.

Adults and adolescents with HIV infection, especially persons with low CD4 cell counts, are known to be at higher risk for viral and bacterial infections. HIV-infected adults and adolescents who are close contacts of persons with probable or confirmed cases of H1N1 should receive antiviral chemoprophylaxis.

## **PREVENTION** [29-31](#)

Guidance on prevention of transmission of the swine-origin influenza A (H1N1) virus infection can be found at: [http://www.cdc.gov/h1n1flu/guidelines\\_infection\\_control.htm](http://www.cdc.gov/h1n1flu/guidelines_infection_control.htm). The most effective strategy for preventing influenza is annual vaccination. Strategies that focus on providing routine vaccination to persons at higher risk for influenza complications have long been recommended, although coverage among the majority of these groups remains low. Routine vaccination of certain persons (e.g., children, contacts of persons at risk for influenza complications, and HCP) who serve as a source of influenza virus transmission might provide additional protection to persons at risk for influenza complications and reduce the overall influenza burden, but coverage levels among these persons needs to be increased before effects on transmission can be reliably measured. Antiviral drugs used for chemoprophylaxis or treatment of influenza are adjuncts to vaccine but are not substitutes for annual vaccination. However, antiviral drugs might be underused among those hospitalized with influenza.<sup>29-31</sup> The CDC has issued and updated interim guidance in response to the current H1N1 pandemic to inform healthcare providers, public health officials, and the general public of interventions to limit the spread of the H1N1 pandemic and decrease morbidity/ mortality.

Social distancing recommendations are provided for both children and adults to include the closure of childcare programs, school dismissals, and reduction in out-of-school contacts. These recommendations are designed to decrease transmission among children in high child density classrooms and non-school settings.<sup>29-31</sup> A decrease in H1N1 infection among household members and the community at large will also result from adherence to these child social distancing recommendations. The guide acknowledges the difficulty of implementing and adhering to these recommendations among the older student population of colleges and universities.<sup>29-31</sup> Colleges and universities are also encouraged to follow social distancing recommendations and to be prepared to assist students with leaving and returning from home as well as those students unable to return home during the pandemic.<sup>29-31</sup> Adult social distancing recommendations include modification in the workplace; such as: telework and staggered shifts to reduce social contact thus H1N1 transmission in the workplace. Additional adult social distancing to reduce transmission among adults, their families, and the community- at- large include the avoidance, cancellation, or rescheduling of large social and public gatherings .

Health care providers have a unique opportunity to provide their clients and their families with information on how to prevent the flu. They can teach family members, who are caring for those who are sick, the importance of keeping the sick person away from other people as much as possible. They can teach ways to cover coughs, how to effectively clean hands with soap and water or an alcohol-based hand rub, especially after coughing and/or sneezing. It is especially important to determine if there is a need for prophylaxis especially for contacts who may have chronic health conditions.

As for the care of those who have the flu, family should be instructed to keep the sick person in a room separate from the common areas of the house. (For example, a spare bedroom with its own bathroom, if that is possible.) Keep the sickroom door closed. They should know that unless it is necessary to go to the clinic or ER, persons with the flu should not leave the home when they have a fever or during the time that they are most likely to spread their infection to others (7 days after onset of symptoms in adults. Children may pass the virus for longer than 7 days). If persons with the flu need to leave the home (for example, for medical care), they should cover their nose and mouth whenever they cough or sneeze and should always consider wearing a loose-fitting (surgical) mask. Family should be provided a mask or respirator and be instructed on how to use it. Have the sick person wear a surgical mask if they need to be in a common area of the house near other persons. If possible, sick persons should use a separate bathroom. This bathroom should be cleaned daily with household disinfectant.

Other persons in the home should be educated on how to avoid acquiring the flu as well. The Health Care Provider should instruct them to discourage visitors other than caregivers. A phone call is safer than a visit. If possible, have only one adult in the home take care of the sick person and at all cost avoid having pregnant women care for the sick person. (Pregnant women are at increased risk of influenza-related complications and immunity can be suppressed during pregnancy). All persons in the household should clean their hands with soap and water or an alcohol-based hand rub frequently, including after every contact with the sick person or the person's room or bathroom. Use paper towels for drying hands after hand washing or dedicate cloth towels to each person in the household. For example, have different colored towels for each person. If possible, consideration should be given to maintaining good ventilation in shared household areas (e.g., keeping windows open in restrooms, kitchen, bathroom, etc.). Antivirals can be used to prevent the flu, so healthcare providers should check to see if some persons in the home should use antiviral medications.

Instructions should be given to all caregivers, namely to avoid being face-to-face with the sick person and how to hold small children who are sick, (place their chin on shoulder so that they will not cough in the face of the caregiver). They must know to wash their hands with soap and water or use an alcohol-based hand rub after touching the sick person or handle used tissues, or laundry. There is a great possibility that caregivers could acquire the flu from the person they are caring for, and then spread the flu to others even before they show symptoms. Instruct them on using a mask when they leave their home to keep from spreading flu to others in case they are in the early stages of infection. Caregivers should consider taking antiviral medication to prevent them from getting the flu. They need to educate and be good role models to minimize anxiety provoking episodes that can lead to panic situations. Lastly, they should stay home if sick. It is recommended that other than vaccinations, staying home is encouraged.<sup>19</sup> Treatment recommended for lay persons should also apply for caregivers.

Frequent handwashing, covering coughs, and having ill persons stay home, except to seek medical care, and minimize contact with others in the household who may be ill with swine-origin influenza virus are measures that can prevent exposure to the flu. Additional measures that can limit transmission of a new influenza strain include voluntary home quarantine of members of households with confirmed or probable swine influenza cases, reduction of unnecessary social contacts, and avoidance whenever possible of crowded settings. If used correctly, facemasks and respirators may help reduce the risk of getting influenza, but they should be used along with other preventive measures, such as avoiding close contact and maintaining good hand hygiene. A respirator that fits snugly on the face can filter out small particles that can be inhaled around the edges of a facemask, but compared with a facemask it is harder to breathe through a respirator for long periods of time.

Patients should be reminded of the importance of maintaining their health as a means of reducing their risk of infection with influenza and improving their immune system's ability to fight an infection should it occur. In particular, patients who are currently taking antiretrovirals or antimicrobial prophylaxis against opportunistic infections should be reminded of the importance of adhering to their prescribed treatment.

## **Summary**

This is a fearsome flu that carries with it significant ramifications. Healthcare providers are urged to monitor the Centers for Disease Control and Prevention (CDC) web site for latest postings about the swine flu outbreak in the U.S. (CDC website at [www.cdc.gov/flu/swine](http://www.cdc.gov/flu/swine).)

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**Table 1: latest confirmed deaths due to H1N1( swine flu)**

AREA	CONFIRMED DEATHS
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<b>Worldwide (total)</b>	<b>12,121</b>
Europe and Central Asia	1,938
Mediterranean and Middle East	1174
Africa	112
North America	3215
Central America( include Caribbean)	222
South America	3148
Northeast Asia; Southeast Asia; South Asia	1,995
Australia and Pacific	217

**Table 2: Antiviral chemoprophylaxis**

- Household close contacts at high-risk for complications of influenza
- Health care workers or public health workers
- Children attending school or daycare who are at high-risk for complications of influenza
- Travelers to Mexico who are at high-risk for complications of influenza

**Table 3: Groups at higher risk for complications**

- Children less than 5 years old
- Persons aged 50 years or older
- Children and adolescents (aged 6 months–18 years) at risk for experiencing Reye syndrome
- Pregnant women
- Adults and children who have chronic pulmonary, cardiovascular, hepatic, hematological, neurologic, neuromuscular, or metabolic disorders;
- Adults and children who have immunosuppression
- Residents of nursing homes and other chronic-care facilities.

**Table 4: CDC recommended treatment of zanamivir and oseltamivir antiviral medications for the treatment and prevention of influenza in children 1-18 years-old<sup>2</sup>**

<u>Antiviral agent</u>	<u>Age group (yrs)</u>			
	<u>1-6</u>	<u>7-9</u>	<u>10-12</u>	<u>13-18</u>
<b>Zanamivir</b>	Treatment, influenza A and B	N/A	10 mg (2 inhalations) twice daily	10 mg (2 inhalations) twice daily
	Chemoprophylaxis, influenza A and B	Ages 1-4	Ages 5-9 10 mg (2 inhalations) once daily	10 mg (2 inhalations) once daily
	Treatment, influenza A and B	Dose varies by child's weight	Dose varies by child's weight	Dose varies by child's weight
	Chemoprophylaxis, influenza A and B	Dose varies by child's weight	Dose varies by child's weight	Dose varies by child's weight
<b>Oseltamivir</b>	Treatment	Recommended duration for antiviral treatment is 5 days.		
	Chemoprophylaxis	Recommended duration is 10 days after the last known exposure.		

**Table 5: CDC recommended doses of oseltamivir antiviral medication for the treatment of H1N1 influenza for children less than 1 year of age<sup>2</sup>**

<b>Age</b>	<b>Recommended treatment dose for 5 days</b>
<3 months	12 mg twice daily

3-5 months      20mg twice daily  
 6-11 months    25 mg twice daily

**Table 6. CDC recommended doses of oseltamivir antiviral medication for the prevention of H1N1 influenza for children less than 1 year of age<sup>2</sup>**

**Age**                      **Recommended prophylaxis dose for 10 days**  
 <3 months      Not recommended unless situation judged critical  
 3-5 months      20mg once daily  
 6-11 months    25 mg once daily

**Table 7. Swine-organ influenza antiviral medication dosing recommendations**  
 (Table extracted from [IDSA guidelines for seasonal influenza](#))

Agent, group		Treatment	Chemoprophylaxis
<b>Oseltamivir</b>			
<b>Adults</b>		75-mg capsule twice per day for 5 days	75-mg capsule once per day
<b>Children (age, 12 months or older), weight:</b>	15 kg or less	60 mg per day divided into 2 doses	30 mg once per day
	15–23 kg	90 mg per day divided into 2 doses	45 mg once per day
	24–40 kg	120 mg per day divided into 2 doses	60 mg once per day
	>40 kg	150 mg per day divided into 2 doses	75 mg once per day
<b>Zanamivir</b>			
<b>Adults</b>		Two 5-mg inhalations (10 mg total) twice per day	Two 5-mg inhalations (10 mg total) once per day
<b>Children</b>		Two 5-mg inhalations (10 mg total) twice per day (age, 7 years or	Two 5-mg inhalations (10 mg total) once per day (age, 5 years

	older)	or older)
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**Table 8: Using Facemasks or Respirators**

- Avoid close contact (less than about 6 feet away) with the sick person
  - Wear a facemask.
  - An N95 respirator should be used, this may be purchased at a pharmacy, building supply or hardware store.
  - Avoid re-using disposable facemasks and N95 respirators if possible.
  - If necessary to reuse it, it should be laundered with normal laundry detergent and tumble-dried in a hot dryer.
  - After taking off a facemask or N95 respirator, clean hands with soap and water or an alcohol-based hand sanitizer.
- \*\*\* More information on facemasks and respirators can be found at [www.cdc.gov/swineflu](http://www.cdc.gov/swineflu)**

**Table 9: Household Cleaning, Laundry, and Waste Disposal**

- Keep clean by wiping them down with a household disinfectant
- Linens, eating utensils, and dishes belonging to

those who are sick do not need to be cleaned separately

- These items should not be shared.
- Wash linens (such as bed sheets and towels) by using household laundry soap and tumble dry on a hot setting.
- When changing the bed linens avoid “hugging” laundry prior to washing it
- Clean hands with soap and water or alcohol-based hand rub right after handling dirty laundry.