

Swine Origin Influenza A (H1N1) Virus Infection

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Objective

This document provides interim guidance for clinicians who might provide care for patients with confirmed novel influenza A (H1N1) or suspected novel influenza A (H1N1) virus infection (previously referred to as swine-origin influenza virus).

Transmission

Transmission of novel influenza A (H1N1) is being studied as part of the ongoing outbreak investigation, but limited data available indicate that this virus is transmitted in ways similar to other influenza viruses. Seasonal human influenza viruses are thought to spread from person to person primarily through large-particle respiratory droplet transmission (e.g., when an infected person coughs or sneezes near a susceptible person). Transmission via large-particle droplets requires close contact between source and recipient persons because droplets do not remain suspended in the air and generally travel only a short distance (< 6 feet). Contact with contaminated surfaces is another possible source of transmission and transmission via droplet nuclei (also called —airborne || transmission). Because data on the transmission of novel H1N1 viruses are limited, the potential for ocular, conjunctival, or gastrointestinal infection is unknown. Since this is a novel influenza A virus in humans, transmission from infected persons to close contacts might be common. All respiratory secretions and bodily fluids (diarrheal stool) of novel influenza A (H1N1) cases should be considered potentially infectious.

Incubation period

The estimated incubation period is unknown and could range from 1-7 days, and more likely 1-4 days.

Case Definitions for Infection with Novel Influenza A (H1N1) Virus

A confirmed case of novel influenza A (H1N1) virus infection is defined as a person with an influenza-like illness with laboratory confirmed novel influenza A (H1N1) virus infection by one or more of the following tests:

1. real-time RT-PCR

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2. viral culture

A probable case of novel influenza A (H1N1) virus infection is defined as a person with an influenza-like-illness who is

- positive for influenza A, but negative for human H1 and H3 by influenza RT_PCR

Optional

A suspected case of novel influenza A (H1N1) virus infection is defined as a person who does not meet the confirmed or probable case definition, and is not novel H1N1 test negative, and is/has:

- a previously healthy person < 65 years hospitalized for ILI

OR

- ILI and resides in a state without confirmed cases, but has traveled to a state or country where there are one or more confirmed or probable cases

OR

- ILI and has an epidemiologic link in the past 7 days to a confirmed case or probable case

Clinical findings

Patients with uncomplicated disease due to confirmed novel influenza A (H1N1) virus infection have experienced fever, chills, headache, upper respiratory tract symptoms (cough, sore throat, rhinorrhea, shortness of breath), myalgias, arthralgias, fatigue, vomiting, or diarrhea. In New York City, 95% of patients with novel influenza A (H1N1) met the case definition for influenza-like illness (subjective fever plus cough and/or sore throat)

Complications

There is insufficient information to date about clinical complications of this novel influenza A (H1N1) virus infection. Among persons infected with previous variants of swine influenza viruses, clinical syndromes have ranged from mild respiratory illness, to lower respiratory tract illness, dehydration, or pneumonia. Deaths caused by previous variants of swine influenza viruses have occasionally occurred. Although data on the spectrum of illness is not yet available for this novel influenza A (H1N1), clinicians should expect complications to be similar to seasonal influenza: exacerbation of underlying chronic medical conditions, upper respiratory tract disease (sinusitis, otitis media, croup) lower respiratory tract disease (pneumonia, bronchiolitis, status asthmaticus), cardiac (myocarditis,

pericarditis), musculoskeletal (myositis, rhabdomyolysis), neurologic (acute and post-infectious encephalopathy, encephalitis, febrile seizures, status epilepticus), toxic shock syndrome, and secondary bacterial pneumonia with or without sepsis.

Groups at high risk for complications

Currently, insufficient data are available to determine who is at higher risk for complications of novel influenza A (H1N1) virus infection. Thus, at this time, the same age and risk groups who are at higher risk for seasonal influenza complications should also be considered at higher risk for swine-origin influenza complications.

Groups at higher risk for seasonal influenza complications include:

- Children less than 5 years old;
- Persons aged 65 years or older;
- Children and adolescents (less than 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.

Medical care for patients with novel influenza A (H1N1) virus

Not all patients with suspected novel influenza (H1N1) infection need to be seen by a health care provider. Patients with severe illness and those at high risk for complications from influenza (see list above) should contact their medical provider or seek medical care.

Which patients should be tested for novel influenza A (H1N1) virus

Clinicians should test persons for the novel influenza (H1N1) virus if they have an acute febrile respiratory illness or sepsis-like syndrome. Certain groups may have atypical presentations including infants, elderly and persons with compromised immune systems. Priority for testing includes persons who 1) require hospitalization or 2) are at high-risk for severe disease (as listed above). To test for novel H1N1 influenza virus, upper respiratory specimens, such as a nasopharyngeal swab or aspirate, nasal swab plus a throat swab or nasal wash, or tracheal aspirate should be collected. Persons who perform nasal and tracheal aspirate collections on ill persons require appropriate personal protective equipment. Specimens should be sent to the state public health laboratory. Not all people with suspected novel influenza (H1N1) infection need to have the diagnosis confirmed, especially if the person resides in an affected area or if the illness is mild. Recommendations on who to test may differ by state or

community. Clinicians should be aware of local guidance on testing and should use their clinical judgment in addition to this guidance for deciding when to test for novel influenza A (H1N1).

Reporting suspect novel influenza A (H1N1) virus infection

Clinicians should contact their state public health department if they test a person for novel influenza A (H1N1) infection to obtain information on what clinical and epidemiological data to collect and specimen shipment protocols in their state.

Treatment of novel influenza A (H1N1)

The novel influenza (H1N1) virus is susceptible to both oseltamivir and zanamivir. It is resistant to amantadine and rimantadine.

Additional Therapy

Additional therapy such as antibacterial agents, should be used at the discretion of the clinicians given the patients clinical presentation. For antibacterial treatment of pneumonia, clinical guidance for community-acquired pneumonia should be followed and can be accessed [here](#).

For hospitalized patients with severe community-acquired pneumonia (CAP) requiring intensive care unit admission, methicillin-resistant *Staphylococcus aureus* (MRSA) infection should be suspected and treated empirically in addition to other causes of CAP if they have 1) necrotizing or cavitary infiltrates or 2) empyema.

Infectious period

The duration of shedding with novel influenza A (h1N1) virus is unknown. Therefore, until data are available, the estimated duration of viral shedding is based upon seasonal influenza virus infection.. Infected persons are assumed to be shedding virus from one day prior to illness onset until resolution of symptoms. In general, persons with novel influenza A (H1N1) virus infection should be considered potentially infectious from one day before to 7 days following illness onset. Children, especially younger children, might be infectious for up to 10 days.

Infection control measures

Background

To date, human cases of novel influenza A (H1N1) virus infection have been confirmed in residents of several U.S. states and Mexico (for the most up-to-date list please see the [H1N1 Flu website](#)). Investigations of these cases suggest that on-going human-to-human novel H1N1 virus is occurring. Illness signs and symptoms have consisted of fever and respiratory tract illness (cough, sore throat, runny nose), headache, muscle aches, Some cases have had vomiting

and diarrhea. Cases of severe respiratory disease, including fatal outcomes, have been reported.

The novel H1N1 virus that has infected humans in the U.S. and Mexico is a novel influenza A virus that has not previously been identified in North America. This virus is resistant to the antiviral medications amantadine and rimantadine but is sensitive to oseltamivir and zanamivir.

Implementation of Respiratory Hygiene/Cough Etiquette

To prevent the transmission of all respiratory infections in healthcare settings, including novel H1N1, respiratory hygiene/cough etiquette infection control measures (see [Respiratory Hygiene/Cough Etiquette in Healthcare Settings](#)) should be implemented at the first point of contact with a potentially infected person. They should be incorporated into infection control practices as one component of Standard Precautions.

Healthcare facilities should establish mechanisms to screen patients for signs and symptoms of febrile respiratory illness at any point of entry to the facility. Provisions should be made to allow for prompt isolation and assessment of symptomatic patients.

Implementation of Facility Contingency Plans

The current situation with novel H1N1 flu in the United States is evolving quickly. Staff in healthcare settings should monitor the [H1N1 Flu](#) website and state and local health department websites for the latest information. Healthcare facilities should be reviewing and making plans to implement their facility contingency response and/or pandemic response plans. This should include making plans for managing increasing patient volume and potential staffing limitations.

Interim Infection Control Recommendations

If the patient is presenting in a community where novel H1N1 transmission is occurring (based upon information provided by state and local health departments), these infection control recommendations should apply to all patients with febrile respiratory illness (defined as fever [greater than 37.8° C] plus one or more of the following: rhinorrhea or nasal congestion; sore throat, cough).

If the patient is presenting in a community without novel H1N1 transmission, these infection control recommendations should apply to those patients with febrile respiratory illness AND:

- close contact with a person who is a confirmed, probable, or suspected case of novel H1N1 virus infection, within the past 7 days OR
- travel to a community either within the United States or internationally where there are one or more confirmed novel H1N1 cases within 7 days

As the situation evolves, the ability to use epidemiologic links to identify potentially infectious patients may be lost and these recommendations may need to be applied to all patients with febrile respiratory illness. This situation will be monitored, and these guidelines will be updated as needed.

Infection Control of Ill Persons in a Healthcare Setting

Screening of patients presenting to medical facility should be done in a location with negative pressure air handling whenever feasible.

Patient placement and transport

Any patients who have a confirmed, probable, or suspected case of novel H1N1 and present for care at a healthcare facilities should be placed directly into individual rooms and the door should be kept closed. Healthcare personnel who interact with the patients should follow the infection control guidance in this document. For the purposes of this guidance, healthcare personnel are defined as persons, including employees, students, contractors, attending clinicians, and volunteers, whose activities involve contact with patients in a healthcare or laboratory setting.

For procedures that are likely to generate aerosols (e.g., bronchoscopy, elective intubation, suctioning, administering nebulized medications), an airborne infection isolation room (AIIR) with negative pressure air handling with 6 to 12 air changes per hour can be used. Air can be exhausted directly outside or be recirculated after filtration by a high efficiency particulate air (HEPA) filter. Facilities should monitor and document the proper negative-pressure function of AIIRs, including those in operating rooms, intensive care units, emergency departments, and procedure rooms.

Procedures for transport of patients in isolation precautions should be followed. Facilities should also ensure that plans are in place to communicate information about suspected cases that are transferred to other departments in the facility (e.g., radiology, laboratory) and other facilities. The ill person should wear a surgical mask to contain secretions when outside of the patient room and should be encouraged to perform hand hygiene frequently and follow respiratory hygiene/cough etiquette practices.

Limitation of healthcare personnel entering the isolation room

Healthcare personnel entering the room of a patient in isolation should be limited to those performing direct patient care.

Isolation precautions

All healthcare personnel who enter the patient's room should take standard and contact precautions plus eye protection should be used for all patient care activities for patients being evaluated or in isolation for novel H1N1 . Maintain adherence to hand hygiene by washing with soap and water or using alcohol-based hand sanitizer immediately after removing gloves and other equipment and after any contact with respiratory secretions. Nonsterile gloves and gowns

along with eye protection should be donned when entering a patient's room.
(See

Personal Protective Equipment (PPE) in Healthcare Settings)

Respiratory protection: All healthcare personnel who enter the rooms of patients in isolation with confirmed, suspected, or probable novel H1N1 influenza should wear a fit-tested disposable N95 respirator or better. Respiratory protection should be donned when entering a patient's room.

Note that this recommendation differs from current infection control guidance for seasonal influenza, which recommends that healthcare personnel wear surgical masks for patient care. The rationale for the use of respiratory protection is that a more conservative approach is needed until more is known about the specific transmission characteristics of this new virus. This recommendation is also

<http://www.pandemicflu.gov/plan/healthcare/maskguidancehc.html> outlined in the October 2006 — Interim Guidance on Planning for the Use of Surgical Masks and Respirators in Healthcare Settings during an Influenza Pandemic || .

Management of visitors

Limit visitors for patients in isolation for novel H1N1 infection to persons who are necessary for the patient's emotional well-being and care. Visitors who have been in contact with the patient before and during hospitalization are a possible source of novel H1N1. Therefore, schedule and control visits to allow for appropriate screening for acute respiratory illness before entering the hospital and appropriate instruction on use of personal protective equipment and other precautions (e.g., hand hygiene, limiting surfaces touched) while in the patient's room. Visitors should be instructed to limit their movement within the facility.

Visitors may be offered a gown, gloves, eye protection, and respiratory protection (i.e., N95 respirator) and should be instructed by healthcare personnel on their use before entering the patient's room.

Duration of precautions

Isolation precautions should be continued for 7 days from symptom onset or until the resolution of symptoms, whichever is longer.

Persons with novel H1N1 virus infection should be considered potentially contagious from one day before to 7 days following illness onset. Persons who continue to be ill longer than 7 days after illness onset should be considered potentially contagious until symptoms have resolved. Children, especially younger children, might be contagious for longer periods.

Surveillance of healthcare personnel

In communities where novel H1N1 virus transmission is occurring, healthcare personnel should be monitored daily for signs and symptoms of febrile respiratory illness. Healthcare personnel who develop these symptoms should be instructed not to report to work, or if at work, should cease patient care

activities and notify their supervisor and infection control personnel.

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In communities without novel H1N1 virus transmission, healthcare personnel working in areas of a facility where there are patients being assessed or isolated for novel H1N1 infection should be monitored daily for signs and symptoms of febrile respiratory infection. This would include healthcare personnel exposed to patients in an outpatient setting or the emergency department. Healthcare personnel who develop these symptoms should be instructed not to report to work, or if at work, should cease patient care activities and notify their supervisor and infection control personnel.

Healthcare personnel who do not have a febrile respiratory illness may continue to work. Asymptomatic healthcare personnel who have had an unprotected exposure to novel H1N1 also may continue to work if they are started on antiviral prophylaxis. (See Interim Guidance on Antiviral Recommendations for Patients with Novel Influenza A (H1N1) Virus Infection and Their Close Contacts).

Management of ill healthcare personnel

Healthcare personnel should not report to work if they have a febrile respiratory illness. In communities where novel H1N1 transmission is occurring, healthcare personnel who develop a febrile respiratory illness should be excluded from work for 7 days or until symptoms have resolved, whichever is longer.

In communities without novel H1N1 transmission, healthcare personnel who develop a febrile respiratory illness and have been working in areas of the hospital where swine influenza patients are present, should be excluded from work for 7 days or until symptoms have resolved, whichever is longer.

In communities where novel H1N1 transmission is not occurring, healthcare personnel who develop febrile respiratory illness and have not been in areas of the facility where swine influenza patients are present should follow facility guidelines on returning to work.

Stewardship of personal protective equipment and antivirals

Facilities should implement plans to ensure appropriate allocation of personal protective equipment, including N95 respirators, and antiviral medications.

Environmental infection control

Routine cleaning and disinfection strategies used during influenza seasons can be applied to the environmental management of swine influenza. Management of laundry, utensils and medical waste should also be performed in accordance with procedures followed for seasonal influenza. (See Guideline for Environmental Infection Control in Health-Care Facilities, 2003).

Facility access control

Facilities should have signage at entry points instructing patients and visitors about hospital policies, including the need to notify staff immediately if they have signs and symptoms of febrile respiratory illness. Facilities in communities where swine influenza transmission is occurring should limit points of entry to the facility.

Administration of the current 2008-09 seasonal influenza vaccine

It is not anticipated that the seasonal influenza vaccine will provide protection against the novel H1N1 viruses. However, in some parts of the country, seasonal influenza viruses are still circulating. Influenza vaccination is effective against these seasonal viruses and should continue to be given to unvaccinated patients in areas where seasonal influenza cases are still occurring.

*Respirator use should be in the context of a complete respiratory protection program in accordance with Occupational Safety and Health Administration (OSHA) regulations. Staff should be medically cleared, fit-tested, and trained for respirator use, including: proper fit-testing and use of respirators, safe removal and disposal, and medical contraindications to respirator use

View the guidance on [infection control](#) during care of patients with confirmed or suspected novel influenza A (H1N1) virus infection.

Objective: To provide updated interim guidance on the use of antiviral agents for treatment and chemoprophylaxis of novel influenza (H1N1) virus infection, and assist clinicians in prioritizing use of antivirals for treatment or chemoprophylaxis of patients at higher risk for influenza-related complications. Additional revisions to these recommendations for antiviral treatment should be expected as the epidemiology and clinical presentation of novel influenza A (H1N1) virus infection is better understood. This guidance can be adapted according to local epidemiologic data and antiviral supply considerations.

High-risk groups: A person who is at high-risk for complications of novel influenza (H1N1) virus infection is defined as the same for seasonal influenza at this time. As more epidemiologic and clinical data become available, these risk groups might be revised.

- Children younger than 5 years old. The risk for severe complications from seasonal influenza is highest among children younger than 2 years old.
- Adults 65 years of age and older.
- Persons with the following conditions:
 - Chronic pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, hematological (including sickle cell disease), neurologic, neuromuscular, or metabolic disorders (including diabetes mellitus);
 - Immunosuppression, including that caused by medications or by HIV;
 - Pregnant women;
 - Persons younger than 19 years of age who are receiving long-term aspirin therapy;
 - Residents of nursing homes and other chronic-care facilities.

Transmission: Transmission of novel influenza A (H1N1) is being studied as part of the ongoing outbreak investigation, but limited data available indicate that this virus is likely transmitted in ways similar to other influenza viruses. Seasonal

human influenza viruses are thought to be transmitted between persons primarily through large-particle respiratory droplet transmission (e.g., when an infected person coughs or sneezes near a susceptible person). Transmission via these large-particle droplets requires close contact between source and recipient persons because droplets do not remain suspended in the air and generally travel only a short distance (< 6 feet). Contact with contaminated surfaces is another possible source of transmission and transmission via small-droplet nuclei (also called —airborne || transmission) might also occur, but the contribution of these modes of transmission to influenza epidemiology is uncertain. Because data on the transmission of novel H1N1 viruses are limited, the potential for ocular, conjunctival, or gastrointestinal infection is unknown. Since this is a novel influenza A (H1N1) virus in humans, transmission from infected persons to close contacts might be common. All respiratory secretions and bodily fluids (diarrheal stool) of novel influenza A (H1N1) cases should be considered potentially infectious.

Close contact, for the purposes of this document, is defined as having cared for or lived with a person who is a confirmed, probable or suspected case of novel influenza A (H1N1), or having been in a setting where there was a high likelihood of contact with respiratory droplets and/or body fluids of such a person. Examples of close contact include kissing or embracing, sharing eating or drinking utensils, physical examination, or any other contact between persons likely to result in exposure to respiratory droplets. Close contact typically does not include activities such as walking by an infected person or sitting across from a symptomatic patient in a waiting room or office.

Special Considerations for Children

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

Children younger than 4 years of age should not be given over-the-counter cold medications without first speaking with a healthcare provider.

Antiviral Resistance

This novel (H1N1) influenza virus is sensitive (susceptible) to the neuraminidase inhibitor antiviral medications, zanamivir and oseltamivir. It is resistant to the adamantane antiviral medications, amantadine and rimantadine.

Antiviral Treatment for Novel (H1N1) Influenza

For antiviral treatment of novel influenza (H1N1) virus infection, either oseltamivir or zanamivir are recommended Table 1. Recommendations for use of antivirals may change as data on antiviral effectiveness, clinical spectrum of illness, adverse events from antiviral use, and antiviral susceptibility data become available.

Clinical judgment is an important factor in treatment decisions. Persons with suspected novel H1N1 influenza who present with an uncomplicated febrile illness typically do not require treatment unless they are at higher risk for influenza complications, and in areas with limited antiviral medication availability, local public health authorities might provide additional guidance about prioritizing treatment within groups at higher risk for infection.

Treatment is recommended for:

1. All hospitalized patients with confirmed, probable or suspected novel influenza (H1N1).
2. Patients who are at higher risk for seasonal influenza complications (see above).

If a patient is not in a high-risk group or is not hospitalized, healthcare providers should use clinical judgment to guide treatment decisions, and when evaluating children should be aware that the risk for severe complications from seasonal influenza among children younger than 5 years old is highest among children younger than 2 years old. Many patients who have had novel influenza (H1N1) virus infection, but who are not in a high-risk group have had a self-limited respiratory illness similar to typical seasonal influenza. For most of these patients, the benefits of using antivirals may be modest. Therefore, testing, treatment and chemoprophylaxis efforts should be directed primarily at persons who are hospitalized or at higher risk for influenza complications.

Once the decision to administer antiviral treatment is made, treatment with zanamivir or oseltamivir should be initiated as soon as possible after the onset of symptoms. Evidence for benefits from antiviral treatment in studies of seasonal influenza is strongest when treatment is started within 48 hours of illness onset. However, some studies of oseltamivir treatment of hospitalized patients with 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. Recommended duration of treatment is five days. Antiviral doses recommended for treatment of novel H1N1 influenza 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](#)) ([See Emergency Use Authorization of Tamiflu \(oseltamivir\)](#)).

Note: Areas that continue to have seasonal influenza activity, especially those with circulation of oseltamivir-resistant seasonal human influenza A (H1N1) viruses, might prefer to use either zanamivir or a combination of oseltamivir and rimantadine or amantadine to provide adequate empiric treatment or chemoprophylaxis for patients who might have seasonal human influenza A (H1N1) virus infection.

Antiviral Chemoprophylaxis for Novel (H1N1) Influenza

For antiviral chemoprophylaxis of novel (H1N1) influenza virus infection, either oseltamivir or zanamivir are recommended ([Table 1](#)). Duration of antiviral chemoprophylaxis post-exposure is 10 days after the last known exposure to novel (H1N1) influenza. The indication for post-exposure chemoprophylaxis is based upon close contact with a person who is a confirmed, probable or suspected case of novel influenza A (H1N1) virus infection during the infectious period of the case. The infectious period for persons infected with the novel influenza A (H1N1) virus is assumed to be similar to that observed in studies of seasonal influenza. With seasonal influenza, studies have shown that people may be able to transmit infection beginning one day before they develop symptoms to up to 7 days after they get sick. Children, especially younger children, might potentially be infectious for longer periods. However, for this guidance, the infectious period is defined as one day before until 7 days after the case's onset of illness. If the contact occurred with a case whose illness started more than 7 days before contact with the person under consideration for antivirals, then chemoprophylaxis is not necessary. For pre-exposure chemoprophylaxis, antiviral medications should be given during the potential exposure period and continued for 10 days after the last known exposure to a person with novel (H1N1) influenza virus infection during the cases infectious period. Oseltamivir can also be used for chemoprophylaxis under the EUA for children less than 1 year of age (see Children Under 1 Year of Age).

Post exposure antiviral chemoprophylaxis with either oseltamivir or zanamivir can be considered for the following:

1. Close contacts of cases (confirmed, probable, or suspected) who are at high-risk for complications of influenza
2. Health care personnel, public health workers, or first responders who have had a recognized, unprotected close contact exposure to a person with novel (H1N1) influenza virus infection (confirmed, probable, or suspected) during that person's infectious period. Information on appropriate personal protective equipment is available at: [Interim Guidance for Infection Control for Care of Patients with Confirmed or Suspected Swine Influenza A \(H1N1\) Virus Infection in a Healthcare Setting](#) and might be updated frequently as additional information on transmission becomes available.

Pre-exposure antiviral chemoprophylaxis should only be used in limited circumstances, and in consultation with local medical or public health authorities. Certain persons at ongoing occupational risk for exposure who are also at higher risk for complications of influenza (e.g., health care personnel, public health workers, or first responders who are working in communities with influenza A H1N1 outbreaks) should carefully follow guidelines for appropriate personal protective equipment or consider temporary reassignment.

Antiviral Use for Control of Novel H1N1 Influenza Outbreaks

Use of antiviral drugs for treatment and chemoprophylaxis of influenza has been a cornerstone for the control of seasonal influenza outbreaks in nursing homes

and other long term care facilities. (see MMWR: [Prevention and Control of Influenza: Recommendations of the Advisory Committee on Immunization Practices \(ACIP\), 2008](#)). At this time, no outbreaks of novel influenza A (H1N1) have been reported in such settings. However, if such outbreaks were to occur, it is recommended that ill patients be treated with oseltamivir or zanamivir and that chemoprophylaxis with either oseltamivir or zanamivir be started as early as possible to reduce the spread of the virus as is recommended for seasonal influenza outbreaks in such settings. Chemoprophylaxis should be administered to all non-ill residents and should continue for a minimum of 2 weeks. If surveillance indicates that new cases continue to occur, chemoprophylaxis should be continued until approximately 7 days after illness onset in the last patient. In addition to antiviral medications, other outbreak-control measures include appropriate infection control, establishing cohorts of patients with confirmed or suspected influenza, restricting staff movement between wards or buildings, and restricting contact between ill staff or visitors and patients, and active surveillance for new cases. Medical directors of long-term care facilities should review their plans for outbreak control of influenza. Additional guidance for infection control measures in long-term care facilities can be found at: [Using Antiviral Medications to Control Influenza Outbreaks in Institutions](#).

In addition to use in nursing homes, antiviral chemoprophylaxis also can be considered for controlling influenza outbreaks in other closed or semiclosed settings (e.g., correctional facilities, or other settings in which persons live in close proximity). For more information about influenza outbreaks in facilities see: [Prevention and Control of Influenza: Recommendations of the Advisory Committee on Immunization Practices \(ACIP\), 2008](#) or [Seasonal Influenza in Adults and Children—Diagnosis, Treatment, Chemoprophylaxis, and Institutional Outbreak Management: Clinical Practice Guidelines of the Infectious Diseases Society of America](#).

Table 1. Antiviral medication dosing recommendations for treatment or chemoprophylaxis of novel influenza A (H1N1) infection.
(Table extracted from [IDSA guidelines for seasonal influenza](#).)

| Agent, group | | Treatment | Chemoprophylaxis |
|-----------------------------|---------------|--|---|
| Oseltamivir | | | |
| Adults | | 75-mg capsule twice per day for 5 days | 75-mg capsule once per day |
| Children ≥ 12 months | 15 kg or less | 60 mg per day divided into 2 doses | 30 mg once per day |
| | 16-23 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 |
| Zanamivir | | | |
| Adults | | Two 5-mg inhalations (10 mg total) twice per day | Two 5-mg inhalations (10 mg total) once per day |
| Children | | Two 5-mg inhalations (10 mg total) twice per day (age, 7 years or older) | Two 5-mg inhalations (10 mg total) once per day (age, 5 years or older) |

Children Under 1 Year of Age

Children under one year of age are at high risk for complications from seasonal human influenza virus infection. The characteristics of human infection novel

(H1N1) influenza virus are still being studied, and it is not known whether infants are at higher risk for complications associated with novel (H1N1) influenza virus infection compared to older children and adults. Oseltamivir is not licensed for use in children less than 1 year of age. However, limited safety data on oseltamivir treatment for seasonal influenza in children less than one year of age suggest that severe adverse events are rare.

Because infants experience high rates of morbidity and mortality from influenza, infants with novel (H1N1) influenza virus infections may benefit from treatment using oseltamivir. (Tables 2 and 3, [Emergency Use Authorization of Tamiflu \(oseltamivir\)](#)).

Table 2. Dosing recommendations for antiviral treatment of children younger than 1 year using oseltamivir.

| Age | Recommended treatment dose for 5 days |
|-------------|---------------------------------------|
| <3 months | 12 mg twice daily |
| 3-5 months | 20 mg twice daily |
| 6-11 months | 25 mg twice daily |

Table 3. Dosing recommendations for antiviral chemoprophylaxis of children younger than 1 year using oseltamivir.

| Age | Recommended prophylaxis dose for 10 days |
|-------------|---|
| <3 months | Not recommended unless situation judged critical due to limited data on use in this age group |
| 3-5 months | 20 mg once daily |
| 6-11 months | 25 mg once daily |

Healthcare providers should be aware of the lack of data on safety and dosing when considering oseltamivir use in a seriously ill young infant with confirmed novel (H1N1) influenza virus infection or who has been exposed to a confirmed novel (H1N1) influenza case, and carefully monitor infants for adverse events when oseltamivir is used. Additional information on oseltamivir for this age group can be found at: [Swine Flu: Emergency Use Authorization \(EUA\) of Medical Products and Devices](#).

Pregnant Women

Pregnant women are known to be at higher risk for complications from infection with seasonal influenza viruses, and severe disease among pregnant women was reported during past pandemics. Cases of confirmed novel (H1N1) influenza virus infection in pregnant women resulting in severe disease have been reported, and a pregnant woman died in 1988 after being infected with another type of swine influenza virus. Oseltamivir and zanamivir are "Pregnancy Category " medications, indicating that no clinical studies have been conducted to assess the safety of these medications for pregnant women. Although a few adverse effects have been reported in pregnant women who took these medications, no relation between the use of these medications and those adverse events has been established. Pregnancy should not be considered a contraindication to oseltamivir or zanamivir use. Because of its systemic activity, oseltamivir is preferred for treatment of pregnant women. The drug of choice for chemoprophylaxis 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.

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