

2009 Pandemic A Influenza (H1N1) Clinician Guidance

(available at www.health.utah.gov/h1n1flu)

12/29/2009

Contact the Bureau of Epidemiology 24/7 at 1-888-epi-utah



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Transmission

Studies are ongoing, but limited data indicate that transmission occurs in ways similar to other influenza viruses:

- Large-particle respiratory droplet transmission (e.g., when an infected person coughs or sneezes near a susceptible person), typically to people within 6 feet is the primary method of transmission.
- Transmission may also occur via contact with contaminated surfaces. Less frequently, airborne transmission may occur.
- The potential for ocular, conjunctival, or gastrointestinal transmission is unknown. All respiratory secretions and bodily fluids (diarrheal stool) of 2009 Pandemic A Influenza (H1N1) cases should be considered potentially infectious.

Incubation Period

The incubation period (or time between exposure and onset of symptoms) is usually 1-4 days with a range of 1-7 days.

Infectious Period

The infectious period (or the time when the patient can transmit the disease to others) is unknown. Based on seasonal influenza, most transmission probably occurs in the first 24-48 hours of illness. The theoretical infectious period is thought to be from the day before symptom onset until 7 days after illness onset or until 24 hours after symptoms have resolved, whichever is longer. The amount of virus shed is greatest in the first 2-3 days of illness and appears to correlate with fever, with higher amounts of virus shed when temperatures are highest. Young children and patients who are immunocompromised may be infectious for a longer period of time.

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Infection Control

Quarantine vs. Isolation

- Quarantine applies to exposed persons who are not ill and is intended to separate persons who may become infectious from those who are healthy.
- We do not currently recommend home quarantine of an asymptomatic patient that has been exposed to the 2009 Pandemic Influenza A (H1N1) virus.
- Isolation for non-hospitalized patients applies to ill persons who do not require hospitalization and is intended to limit the transmission of influenza from infectious persons to healthy persons. Isolation requires the individual to stay home and avoid contact with others persons during their infectious period.
 - If a patient is symptomatic, the patient should be instructed to stay home until 24 hours after fever is gone, without using fever-reducing medicines like acetaminophen or ibuprofen. This recommendation does not apply to health care settings (see below).
- Isolation for hospitalized patients is longer than that recommended for other populations because the duration of viral shedding is likely to be longer than for outpatients with milder illness. Isolation precautions for hospitalized patients who have influenza symptoms should be continued for 7 days after illness onset or until 24 hours after the resolution of fever and respiratory symptoms, whichever is longer.

Hierarchy of Controls to Prevent Influenza Transmission in Healthcare Settings (in order of preference)

1. Elimination of potential exposures – interventions include:
 - Minimizing outpatient visits for patients with mild ILI who do not have risk factors for complications.
 - Postponing elective visits by patients with suspected or confirmed influenza.
 - Denying entry to visitors who are sick.
 - Limiting visitors for patients in isolation.
 - Providing appropriate PPE and hand hygiene for visitors.
 - Screening - 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.
2. Engineering controls – interventions include:

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- Installing partitions in triage areas and other public spaces.
- Ensure proper ventilation with isolation rooms with negative pressure air handling with 6-12 air changes per hour especially for aerosol generating procedures.
- Using closed suctioning systems for airways suction in intubated patients.
- Thorough environmental hygiene practice with hands free soap and water dispensers and garbage receptacles.
- Using high efficiency particulate filters in mechanical ventilators.

3. Administrative controls – interventions include:

- Promoting and providing vaccination for all healthcare workers.
- Ensuring compliance with hand hygiene, respiratory hygiene and cough etiquette
- Providing hand sanitization, facemasks and tissues in all areas.
- Setting up triage stations and separate areas for patients who visit emergency departments with ILI, managing patient flow, and assigning dedicated staff to minimize the number of healthcare personnel exposed to those with suspected or confirmed influenza.
- Promptly triaging and identifying influenza patients.
- Promptly isolating suspected or confirmed influenza patients in airborne infection isolation room (AIIR).
- Using AIIR with negative pressure air handling with 6-12 air changes per hour and proper PPE for aerosol generating procedures (e.g., bronchoscopy, elective intubation, suctioning and administering nebulized medications.)
- Using standard droplet plus contact precautions when entering a room and examining patients with respiratory infections.
- Limiting entry to isolation rooms to only healthcare workers performing direct patient care and visitors providing emotional well being and care.
- Communication between personnel and departments about pts with suspected or confirmed influenza before transfers and limiting patient transport.
- Minimizing waiting time and delays associated with transport and procedures conducted outside the patient's room.
- Providing influenza patients with facemasks to wear and tissues to contain secretions when outside of their room.

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- Healthcare workers who develop a fever and respiratory symptoms should not report to work, or if at work, should promptly notify their supervisor and infection control personnel.
 - Healthcare workers who have fever and respiratory symptoms should be excluded from work for at least 24 hours after they no longer have a fever, with the use of fever-reducing medicines.
 - Healthcare workers, if returning to work in areas where severely immunocompromised patients are provided care, should be considered for temporary reassignment or exclusion from work for 7 days from symptom onset or until the resolution of symptoms, whichever is longer. Healthcare personnel recovering from a respiratory illness may return to work with immunocompromised patients sooner if absence of 2009 H1N1 viral RNA in respiratory secretions is documented by real-time reverse transcriptase-polymerase chain reaction (rRT-PCR).
 - Healthcare workers who develop acute respiratory symptoms without fever should be allowed to continue or return to work unless working in areas severely immunocompromised patients are provided care. In such cases, workers should be considered for temporary reassignment or exclusion from work for 7 days from symptom onset or until resolution of symptoms, whichever is longer.
 - Clinical judgment should be used for personnel with only cough as a symptom, since cough after influenza infection may be prolonged and may not be an indicator of viral shedding.
 - Asymptomatic healthcare personnel who have had an unprotected exposure to H1N1 may continue to work if they are started on antiviral prophylaxis.
4. Personal protective equipment (PPE) – PPE is a last line defense for individuals against hazards that cannot otherwise be eliminated or controlled.

CDC and OSHA continue to recommend the use of respiratory protection that is at least as protective as a fit-tested disposable N95 respirator for healthcare personnel who are in close contact with patients with suspected or confirmed 2009 H1N1 influenza. This recommendation does, however, recognize supply and other logistical concerns, and proposes strategies for prioritized use of N95 mask when they are in short supply. UDOH is working with healthcare organizations in the state to evaluate the current supply

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situation in Utah. Please check back soon for updated information. Information on the current CDC recommendation can be found [here](#).

For more hierarchy of control interventions click [here](#):
(www.cdc.gov/h1n1flu/guidance/ill-hcp.htm#table1)

For additional infection control recommendations, go [here](#)
(http://www.cdc.gov/h1n1flu/guidelines_infection_control.htm).

Identification

Influenza-associated hospitalizations and influenza-associated pediatric mortality are reportable disease conditions in Utah and nationally.

Case Definitions

Influenza-associated hospitalization:

Case Classification:

Confirmed:

- 1) A person who is hospitalized (>24 hours)*
- 2) **AND** case has confirmed influenza A (H1, H3 or novel) or B with one of the following laboratory tests:
 - a. RT-PCR
 - b. DFA
 - c. Culture

Probable:

- 1) A person who is hospitalized (>24 hours)*
- 2) **AND** has a rapid influenza test that is positive for type A, type B, or undifferentiated influenza.

Suspect: A person who is hospitalized (>24 hours)* with a clinically compatible illness**, with no confirmatory† laboratory testing (no test done or negative rapid test with no other test indicated).

Not a case:

Hospitalized person who has had confirmatory† laboratory testing with negative results.

2009 Pandemic Influenza A (H1N1) virus associated DEATHS.

Confirmed:

- 1) A person who has died
- 2) **AND** had a clinically compatible illness** with no period of complete recovery between the illness and death

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- 3) **AND** tested positive for 2009 Pandemic Influenza A (H1N1) virus
- 4) **AND** there is no other alternative agreed upon **cause** of death

(*Hospitalized is defined as having a 24 hour or longer stay. This can include people who either initiated their illness outside of the hospital and were subsequently hospitalized OR people who were hospitalized for an unrelated event and became ill with influenza-like illness during their hospitalization stay.)

(**Clinically compatible illness is influenza like illness (ILI). Characteristics include those of acute respiratory febrile illness: fever, chills, muscle aches, headache, stuffy or runny nose, cough, and/or sore throat.)

(† Confirmatory laboratory tests include: PCR, DFA and Culture)

Influenza-associated pediatric mortality (2004):

Case Definition -

An influenza-associated death is defined for surveillance purposes as a death resulting from a clinically compatible illness that was confirmed to be influenza by an appropriate laboratory or rapid diagnostic test. There should be no period of complete recovery between the illness and death. Influenza-associated deaths in all persons aged <18 years should be reported.

A death should not be reported if:

1. There is no laboratory confirmation of influenza virus infection.
2. The influenza illness is followed by full recovery to baseline health status prior to death.
3. The death occurs in a person 18 years or older.
4. After review and consultation there is an alternative agreed upon cause of death.

Laboratory Criteria

Laboratory testing for influenza virus infection may be done on pre- or post-mortem clinical specimens, and include identification of influenza A or B virus infections by a positive result by at least one of the following:

- Influenza virus isolation in tissue cell culture from respiratory specimens;
- Reverse-transcriptase polymerase chain reaction (RT-PCR) testing of respiratory specimens;
- Immunofluorescent antibody staining (direct or indirect) of respiratory specimens;
- Rapid influenza diagnostic testing of respiratory specimens;

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- Immunohistochemical (IHC) staining for influenza viral antigens in respiratory tract tissue from autopsy specimens;
- Four-fold rise in influenza hemagglutination inhibition (HI) antibody titer in paired acute and convalescent sera.

Case Classification

Confirmed: A death meeting the clinical case definition that is laboratory confirmed.

Laboratory or rapid diagnostic test confirmation is required as part of the case definition; therefore, all reported deaths will be classified as confirmed.

Comment

Serologic testing for influenza is available in a limited number of laboratories, and should only be considered as evidence of recent infection if a four-fold rise in influenza (HI) antibody titer is demonstrated in paired sera. Single serum samples are not interpretable.

Testing

Confirmatory Testing for 2009 Pandemic Influenza A (H1N1)

The Utah Public Health Laboratory (UPHL) and select commercial laboratories in Utah are able to perform confirmatory testing for 2009 Pandemic Influenza A (H1N1) via real-time reverse transcriptase polymerase chain reaction (rt-RT-PCR).

Utah Public Health would like confirmatory influenza laboratory testing (at either a commercial laboratory or UPHL) to be performed on:

1. Hospitalized patients, and
2. Other select cases that have been screened and authorized for outbreak characterization testing by the Utah Department of Health's Bureau of Epidemiology.

At this time surveillance data indicates that the vast majority of influenza activity in Utah is due to 2009 Pandemic Influenza A (H1N1). Confirmatory testing is not necessary in most situations.

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Our priority is to identify severe illness and monitor for potential changes in severity of illness. It is necessary to conserve laboratory resources to ensure this is possible for the duration of the outbreak.

Other Influenza Tests:

Rapid Influenza Antigen Test

Some commercially available rapid test can distinguish between influenza A and B viruses. Rapid test have a low to moderate sensitivity compared to viral culture or RT-PCR. The sensitivities of rapid tests to detect influenza B viruses are lower than for detection of influenza A viruses. The sensitivities of rapid tests appear to be higher for specimens collected from children than specimens collected from adults.

Recent studies have shown that compared to RT-PCR, the sensitivity of rapid tests for detecting 2009 Pandemic A (H1N1) virus infections ranged from 10-70%. Several factors that might contribute to a lower sensitivity for influenza laboratory tests to detect 2009 Pandemic A (H1N1) virus infection include the type of respiratory specimen (i.e., nasal vs. nasopharyngeal swab), quality of the specimen, time from illness onset to specimen collection, the age of the patient, time from specimen collection to testing, and the storage and processing of the specimen prior to testing. Therefore, a negative rapid test result does not rule out 2009 Pandemic A (H1N1) virus infection and should not be assumed to be a final diagnostic test.

Rapid test can provide useful information for patient care. When influenza viruses are circulating in a community, a positive test result indicates that influenza virus infections are likely present in the specimen. Knowledge of the presence of influenza A or B virus infection can help to inform influenza treatment decisions. However, a negative rapid test result does not rule out influenza virus infection. If clinical suspicion of influenza is high in a patient, clinicians should use their clinical judgment for treatment and infection control measures.

The CDC has developed an algorithm to assist in the interpretation of rapid test results during periods when influenza viruses are circulating in the community, it is available at: http://www.cdc.gov/h1n1flu/guidance/rapid_testing.htm#ftn4

The Utah Public Health Laboratories cannot test from a swab that has been extracted and used for rapid testing. Collect a fresh NP or nasal swab in viral transport media OR nasal aspirate in a sterile tube to submit for testing.

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Immunofluorescence (DFA or IFA)

Are widely available and have variable sensitivity (47% - 93%) for 2009 Pandemic A (H1N1). These tests can distinguish between influenza A and B viruses. DFA results are now considered confirmatory.

Viral Culture

Isolation of 2009 Pandemic Influenza A (H1N1) virus is diagnostic of infection, but may not yield timely results for clinical management. A negative viral culture does not necessarily exclude infection with 2009 Pandemic Influenza A (H1N1) virus, but a positive viral culture is considered a confirmatory test result for surveillance purposes.

Specimen Collection/Transport

- Nasopharyngeal swabs, nasal swabs, throat swabs, combined nasal-throat swabs, nasal aspirates and/or viral culture isolates from patients with signs and symptoms of respiratory infection are acceptable specimens. Nasal washes and deep respiratory specimens (tracheal aspirates and bronchoalveolar lavage) are not acceptable specimens because FDA has not validated them yet for use with their PCR Influenza test kit.
- Collect an endotracheal aspirate from intubated patients. For the procedure to collect nasopharyngeal swabs look [here](http://health.utah.gov/epi/fact_sheets/nasopharyngeal_swab_collect.pdf) (http://health.utah.gov/epi/fact_sheets/nasopharyngeal_swab_collect.pdf).
- Only use swabs with a synthetic tip (e.g. polyester or Dacron) and an aluminum or plastic shaft. (Other types of swabs interfere with the test process and may return false results.)
- Place swabs into 1-3 ml of viral transport media such as M4. (Note: Culturettes and similar collection devices are for bacteria and cannot be used.)
- Collect two swab specimens if you are planning to do an in-house rapid influenza test. (Once a swab has been used for a rapid test, it cannot be used by UPHL for test confirmation – they need a fresh swab.)
- Download a copy of the test request form [here](http://health.utah.gov/epi/h1n1flu/Lab/LabForm.html) (<http://health.utah.gov/epi/h1n1flu/Lab/LabForm.html>).
 - Fill out the test request form completely;
 - Indicate the patient criteria for testing;
 - Clearly label the specimen; and
 - Package the specimen with the test request form.
- If you do not know or don't have a provider code, call UPHL at 801-584-8400 and one will be assigned to you.

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- Keep specimens at 4°C until shipped to the lab. Send specimens within 72 hours of collection.
- Ship specimens refrigerated (on wet ice) as a category B infectious substance. Assure that specimen will be received at UPHL within 72 hours of collection.
- Either:
 - Use your regular courier service to coordinate sample delivery;
 - Contact your local health department or hospital laboratory to see if they can assist with sample delivery; or
 - Ship the specimen via overnight mail
 - UPHL address/contact information is:
46 North Medical Drive
Salt Lake City, UT 84113-1105
Phone: (801) 584-8400
Fax: (801) 584-8486
- Results will be available:
 - If received at the UPHL:
 - **Before 10:00 am-** your results will be available the same day
 - **After 10:00 am-** your results will be available the following day

Reporting

Report all laboratory confirmed influenza hospitalized cases and pediatric death cases immediately to your Local Health Department or to the Utah Department of Health. Also, all deaths with confirmed 2009 Pandemic A (H1N1) test need to be reported to public health.

To report, contact your local public health department or the Utah Department of Health. Contact information for your local public health department can be found here: [http://health.utah.gov/epi/LHDContaktInformation_24_7\(weblist\).pdf](http://health.utah.gov/epi/LHDContaktInformation_24_7(weblist).pdf)

Contact the Utah Department of Health at 1-888-EPI-UTAH (374-8824) - Public Health can be reached 24/7/365 using this number.

Treatment

- Most healthy persons who develop illness consistent with uncomplicated influenza do not need to be treated with antiviral medications and will recover without complications. However, clinical judgment should be the ultimate guide in making antiviral treatment decisions for ill persons not at higher risk for

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complications from influenza. For maximum benefit, treatment should be initiated early, before confirmatory laboratory results are available. In addition, because of known poor sensitivity, rapid influenza test results should not be used to guide treatment decisions.

- Early empiric influenza antiviral treatment is recommended for persons with suspected or confirmed influenza and:
 - Illness requiring hospitalization .
 - Progressive, severe, or complicated illness, regardless of previous health status.
 - The recommended duration of treatment is 5 days. Hospitalized patients with severe infections might require longer treatment courses.
 - Patients who are at higher risk for influenza complications (including people 65 years and older, children younger than two years old, pregnant women, women up to 2 weeks postpartum (including following pregnancy loss), people of any age with chronic medical conditions), regardless of whether they require hospitalization, people with disorders that can compromise respiratory function (e.g. cognitive dysfunction, spinal cord injury, seizure disorders, or other neuromuscular disorders), people with immunosuppression (including immunosuppression caused by medications), and people younger than 19 years of age who are receiving long-term aspirin therapy.
- Prompt empiric outpatient antiviral therapy is also recommended for persons with suspected influenza who have symptoms of lower respiratory tract illness or clinical deterioration regardless of previous health or age.
- When treatment of influenza is indicated in a patient with suspected influenza, health care providers should initiate empiric antiviral treatment as soon as possible. Waiting for lab confirmation of influenza to begin treatment with antiviral drugs is not necessary. Patients with a negative rapid influenza diagnostic test should be considered for treatment if clinically indicated because negative rapid influenza test result does not rule out influenza virus infection.
- For maximum benefit, antiviral medicines should be initiated as soon as possible.
- Patients who have mild, uncomplicated illness are not likely to benefit from treatment if initiated more than 48 hours after illness onset. Clinical judgment is always an essential part of treatment decisions (click [here](#) to see Clinical algorithm for antiviral treatment of persons with mild or uncomplicated influenza-illness).
- People who are already recovering from influenza do not need antiviral medications for treatment.

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- Hospitalized patients with 2009 Pandemic Influenza A (H1N1) infection should be monitored carefully and treated with antiviral therapy, including patients who seek care more than 48 hours after illness onset.
- If bacterial co-infection is suspected, antibacterials should be directed at likely pathogens consistent with existing guidelines for the management of community-acquired pneumonia.
- Antibacterial therapy also should be initiated after appropriate diagnostic specimens are obtained, including blood, respiratory secretions (especially for intubated patients), and pleural fluid for culture and urine for pneumococcal antigen testing (in adults).
- The 2009 Pandemic Influenza A (H1N1) virus to date has been found to be susceptible to both oseltamivir and zanamivir. It is resistant to amantadine and rimantadine.
- Experience with the avian influenza A (H5N1) virus in Southeast Asia has suggested that higher doses of antiviral medications may be necessary for severely ill patients. Clinicians treating severely ill patients with 2009 Pandemic Influenza A (H1N1) may want to seek infectious disease or other consultation regarding such treatment.
- For information on the availability of antiviral agents or items from the public health stockpile, please contact your local health department.
- Dosing recommendations for treatment and chemoprophylaxis can be found here (<http://www.cdc.gov/h1n1flu/recommendations.htm#table1>). Dosing recommendations for treatment and chemoprophylaxis of children under the age of 1 year can be found here (<http://www.cdc.gov/h1n1flu/recommendations.htm#table1>).
- Women may continue breastfeeding while on antivirals.
- Pregnancy should not be considered a contraindication to use of antiviral medications for treatment or prophylaxis.
- Seasonal strains of influenza A H1N1 during the past season were nearly always resistant to oseltamivir. Recommendations for treatment of patients with serious illness potentially due to influenza in communities where both seasonal strains of influenza A and 2009 Pandemic Influenza A (H1N1) are circulating are found [here](http://www.cdc.gov/h1n1flu/recommendations.htm) (<http://www.cdc.gov/h1n1flu/recommendations.htm>).
- Antiviral treatment recommendations for individuals vaccinated for influenza should parallel those recommendations for unvaccinated persons.

Peramivir IV – Peramivir EUA, Fact Sheet for Healthcare Providers is available at: <http://www.cdc.gov/h1n1flu/eua/peramivir.htm>

Treatment:

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- Peramivir IV is available through the CDC upon request of a licensed physician (<http://www.cdc.gov/h1n1/eua/peramivir.htm>).
- Under the EUA (emergency use authorization), treatment of adult patients with Peramivir IV is approved only if the following apply:
 1. The patient has not responded to either oral or inhaled antiviral therapy
 2. Drug delivery by a route other than IV is not expected to be dependable or is not feasible
 3. The clinician judges IV therapy is appropriate due to other circumstances.
- Treatment of pediatric patients is approved if either of the first two criteria apply

Renal dosing for Peramivir:

- For more information regarding see the "Questions and Answers for Health Care Providers: Renal Dosing and Administration Recommendations for Preamivir IV."
 - <http://www.fda.gov/downloads/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/UCM190601.pdf>

Chemoprophylaxis

Post-exposure prophylaxis:

Who should receive PEP:

- Post-exposure antiviral chemoprophylaxis is only recommended in limited circumstances. In most instances prompt empiric treatment is preferred. Post-exposure prophylaxis may be considered for: Persons at higher risk for complications of influenza who have had close contact with a person with confirmed, probable, or suspected 2009 Pandemic A (H1N1) or seasonal influenza during that person's infectious period.
- Healthcare personnel, public health workers, or first responders who have had a recognized, unprotected close contact exposure to a person with confirmed, probable, or suspect influenza during that person's infectious period.

Treatment should not wait for laboratory confirmation of influenza because laboratory testing can delay treatment and because a negative rapid test for influenza does not rule out influenza. The sensitivity of rapid tests can range from 10% to 70%.

Who doesn't need PEP:

- Antiviral agents should not be used for post-exposure chemoprophylaxis in healthy children or adults based on potential exposures.

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- Chemoprophylaxis generally is not recommended if more than 48 hours have elapsed since the last contact with an infectious person
- Chemoprophylaxis is not indicated when contact occurred before or after, but not during, the ill person's infectious period as defined above.

Post-exposure prophylaxis guidelines are found [here](http://www.cdc.gov/h1n1flu/recommendations.htm#table1) (<http://www.cdc.gov/h1n1flu/recommendations.htm#table1>).

Pre-exposure prophylaxis:

Pre-exposure prophylaxis should only be given in limited circumstances in consultation with public health.

Antiviral Resistance Testing

Antiviral resistance testing for clinical care is available on a limited case-by-case basis. To request antiviral testing, contact the CDC Emergency Operations Laboratory desk at eoclaboratory@cdc.gov.

Algorithm for requests for antiviral resistance testing by CDC for clinical care is available at: http://www.magnetmail.net/images/clients/APHL/attach/AR_Algo.pdf

Coordinate shipments for antiviral testing with the Utah Public Health Laboratory (UPHL) – Bureau of Microbiology (801-584-8400). Please also notify the Utah Department of Health – Bureau of Epidemiology (801-538-6191) when antiviral resistance testing is requested.

More information regarding antiviral resistance testing is available at: http://www.magnetmail.net/images/clients/APHL/attach/AR_Testing.pdf

Management of High Risk Patients

1. Severely Immunosuppressed Patients
2. Patients with Cardiovascular Disease
3. HIV Infected Patients
4. Pregnant Women
5. Patients with Asthma
6. Infants and Children

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1. Severely Immunosuppressed Patients

Some common conditions and treatments associated with severe immunosuppression are:

- Hematopoietic stem cell transplant recipient receiving anti-rejection medication.
- Solid organ transplant recipient receiving anti-rejection medication.
- Congenital immunodeficiency disorder.
- Chemotherapy for cancer.
- Autoimmune conditions and treatments.
- Chronic corticosteroid use.

Clinical Issues:

- While some severely immunosuppressed patients may develop typical signs and symptoms of influenza, fever may not always be present. Therefore, clinicians should suspect influenza in any severely immunosuppressed patient with acute respiratory symptoms, with or without fever, and initiate empiric antiviral treatment, and send respiratory specimens for lab testing.
- Appropriate infection control (including isolation) should be implemented for any suspected patient, even before testing results are available.

Vaccine and Prevention:

- The influenza vaccination may be poorly immunogenic in severely immunosuppressed patients. Therefore, antiviral chemoprophylaxis of influenza can be considered for severely immunosuppressed patients.
- Immunosuppressed persons aged 6 months and older are recommended to receive both inactivated seasonal influenza vaccine and inactivated 2009 H1N1 monovalent influenza vaccine. In addition, persons aged 6 months and older who are household contacts of severely immunosuppressed persons are recommended for annual inactivated seasonal influenza vaccination.

Influenza Diagnostic Testing:

- Any severely immunosuppressed patient who is ill with suspected influenza should start empiric antiviral treatment.
- Confirmatory influenza diagnostic testing for 2009 H1N1 influenza should be considered for severely immunosuppressed patients with suspected influenza because results will inform decisions regarding clinical care and infection control.

Antiviral Treatment:

- Antiviral treatment with oseltamivir or zanamvir should be initiated empirically as early as possible for severely immunosuppressed patients with suspected influenza.
- Initiation of antivirals beyond 48 hours after symptom onset should be considered.

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- Severely immunosuppressed patients with influenza may experience prolonged influenza viral shedding. It is recommended that clinicians consider a longer duration of neuraminidase inhibitor treatment (e.g. 10 days versus the standard 5 days).
- If oral oseltamivir or orally inhaled zanamivir are contraindicated or not tolerated, clinicians should be aware that intravenous antiviral medications are available: IV peramivir through an Emergency Use Authorization, and IV zanamivir through an Emergency Investigational New Drug Application.
- Severely immunosuppressed patients with suspected or confirmed oseltamivir-resistant 2009 H1N1 influenza virus who require antiviral treatment should receive zanamivir.
- Patients with suspected or documented oseltamivir resistance should not be treated with peramivir.
- Clinicians managing 2009 H1N1 influenza hospitalized patients who have not improved clinically and who have persistent laboratory-confirmed viral shedding may wish to consult infectious disease specialists, the Utah Department of Health, or the CDC for questions about antiviral resistance, additional testing, and antiviral treatment.

More information on severely immunosuppressed patients can be found [here](http://www.cdc.gov/h1n1flu/immunosuppression/index.htm) (<http://www.cdc.gov/h1n1flu/immunosuppression/index.htm>).

2. Patients with Cardiovascular Disease

- Patients with chronic cardiovascular disease and cerebrovascular disease (CVD) are at increased risk of experiencing an acute exacerbation of disease during influenza epidemics.
- Patients with CVD risk factors such as hypertension, smoking, obesity, and family history of premature heart disease might be considered for priority care over healthy individuals, but not before health care providers, the very young, elderly people, and the ill.
- 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.
- Consideration should be given for having adequate supplies of commonly used cardiovascular medications for prevention and treatment of cardiovascular events.

More information on patients with cardiovascular disease is found [here](http://www.cdc.gov/h1n1flu/heart.htm) (<http://www.cdc.gov/h1n1flu/heart.htm>).

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3. HIV-infected Patients

- Immune compromised persons, including HIV-infected adults and adolescents and especially persons with low CD4 cell counts or AIDS can experience more severe complications of seasonal influenza and it is possible that HIV-infected adults and adolescents are also at higher risk for 2009 Pandemic Influenza A (H1N1) complications.
- HIV-infected adults and adolescents positive for 2009 Pandemic Influenza A (H1N1) should receive empiric antiviral treatment.
- HIV-infected adults and adolescents who are close contacts of persons with probable or confirmed cases of 2009 Pandemic Influenza A (H1N1) should receive antiviral chemoprophylaxis.
- No adverse effects have been reported among HIV-infected adults and adolescents who received oseltamivir or zanamivir. There are no known absolute contraindications for co-administration of oseltamivir or zanamivir with currently available antiretroviral medications.

More information on HIV-infected patients is found [here](http://www.cdc.gov/h1n1flu/guidance_HIV.htm) (http://www.cdc.gov/h1n1flu/guidance_HIV.htm).

4. Pregnant Women

- Adverse pregnancy outcomes have been reported following previous influenza pandemics, with increased rates of spontaneous abortion and preterm birth reported, especially among women with pneumonia.
- Case reports and several epidemiologic studies conducted during interpandemic periods also indicate that pregnancy increases the risk for influenza complications for the mother and might increase the risk for adverse perinatal outcomes or delivery complications.
- Pregnant women who have a suspected influenza virus infection can be tested using a reliable test (RT-PCR).
- Pregnant women that test positive for influenza or who have suspected influenza (based on signs and symptoms) should receive empiric antiviral treatment.
- Pregnant women who are close contacts of persons with probable or confirmed cases of 2009 Pandemic Influenza A (H1N1) should receive antiviral chemoprophylaxis.
- Fever in pregnant women should be treated because of the risk that hyperthermia appears to pose to the fetus. Acetaminophen is the best option for treatment of fever during pregnancy.
- Pregnancy should not be considered a contraindication to oseltamivir or zanamivir use. Pregnant women might be at higher risk for severe complications from 2009 Pandemic Influenza A (H1N1), and the benefits of treatment or

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chemoprophylaxis with zanamivir or oseltamivir likely outweigh the theoretical risks of antiviral use.

More information on pregnant women is found [here](http://www.cdc.gov/h1n1flu/clinician_pregnant.htm) (http://www.cdc.gov/h1n1flu/clinician_pregnant.htm).

5. Patients with Asthma

- Persons with asthma are at higher risk for influenza-related complications, such as pneumonia.
- All persons with asthma should have and use an updated, written [Asthma Action Plan](#), developed with their healthcare professional, for daily treatment and for control of worsening asthma symptoms. The Asthma Action Plan should include what they should do for the earliest onset of symptoms of [influenza-like illness](#). Children with asthma should have an **Asthma Action Plan** on file at their school or daycare center, and the plan and medication(s) should be readily accessible.
- **Asthma Action Plan** available at: <http://www.cdc.gov/asthma/actionplan.html>
- Anyone with asthma at least 6 months of age and older should be vaccinated against seasonal influenza with the injectable trivalent inactivated influenza vaccine (TIV). Children aged 6 months through 8 years who never have had a seasonal flu shot will need two doses the first time. Persons with asthma should not use the inhaled "FluMist®" vaccine due to an increased risk of wheezing post-vaccination.
- 2009 H1N1 MONOVALENT FLU VACCINE: Persons with asthma aged 6 months through 64 years are listed in the priority groups to receive initial doses of the injectable, inactivated, 2009 H1N1 influenza A monovalent vaccine when it becomes available in their community. At this time, FDA has approved two doses for children 6 months through 9 years of age. Persons with asthma should not use a nasal spray vaccine.
- Zanamivir (trade name, "Relenza") is not recommended for treatment in patients with underlying airways disease (including asthma), because of the risk for adverse events, such as bronchospasm.

6. Infants and Children

- Children, especially those younger than 5 years of age and those who have high risk medical conditions, are at increased risk of influenza-related complications. Among children less than 5 years, the risk for severe complications from seasonal influenza is highest among children less than 2 years old.
- Illnesses caused by influenza virus infection are difficult to distinguish from illnesses caused by other respiratory pathogens based on symptoms alone.

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Young children are less likely to have typical influenza symptoms (e.g., fever and cough) and infants may present to medical care with fever and lethargy, and may not have cough or other respiratory symptoms or signs.

- Certain children are at higher risk for complications from influenza infection, including: infants < 6 months, and children with immune suppression, chronic kidney disease, heart disease, HIV/AIDS, diabetes, asthma or other problems of the lungs, sickle cell disease, those on long-term aspirin therapy for chronic disorders, children with conditions that affect respiratory function including neurological conditions such as intellectual and developmental disability, cerebral palsy, spinal cord injuries, seizure disorders, metabolic conditions or other neuromuscular disorders, children with poor nutritional and fluid intake because of prolonged vomiting and diarrhea, and children with an underlying metabolic disorder such as medium-chain acyl-CoA dehydrogenase (MCAD) deficiency.
- Aspirin or aspirin-containing products (e.g. bismuth subsalicylate – Pepto Bismol) should not be administered to children with influenza due to the risk of Reye syndrome. 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.
- Oseltamivir has previously been approved for treatment of children one year of age and older. Oseltamivir treatment of children under one year of age with 2009 Pandemic Influenza A (H1N1) infection was recently approved under an Emergency Use Authorization (EUA). Oseltamivir dosage is weight-dependent for children one year of age and older, and age-based for children under one year of age. Zanamivir is approved for treatment of children 7 years of age or older.
- Oseltamivir is approved for chemoprophylaxis in children 12 months or older. However, oseltamivir can be used for chemoprophylaxis under the EUA for children less than 1 year-old to prevent 2009 Pandemic Influenza A (H1N1) infection. Under the EUA, chemoprophylaxis is not recommended for infants less than 3 months old unless the situation is judged to be critical. For children 12 months or older, the dosage is weight-dependent; for children less than 12 months of age, dosage is age-dependent. Zanamivir is approved for chemoprophylaxis in children 5 years or older.

More information for infants and young children can be found [here](http://www.cdc.gov/h1n1flu/childrentreatment.htm) (<http://www.cdc.gov/h1n1flu/childrentreatment.htm>).

Additional Information:

See www.cdc.gov/h1n1flu/guidance for additional information in each of the above areas.