

# Investigative Guideline: Influenza Hospitalizations and Deaths

(Current as of September 1, 2009)

This guideline is intended to be used for investigation of laboratory-confirmed influenza resulting in or associated with hospitalization or death, reportable in Oregon as of September 1, 2009.

## 1. DISEASE REPORTING

### 1.1. Purpose of Reporting and Surveillance

1. To measure incidence and follow trends of severe influenza;
2. To define populations at risk for severe influenza.

### 1.2. Laboratory and Physician Reporting Requirements

1. All Oregon physicians, other healthcare providers, and laboratorians are required by law to report any lab-confirmed influenza-related hospitalization or death within one working day to their local health department.

### 1.3. Local Health Department Reporting and Follow-up Responsibilities

1. Begin follow-up investigation of laboratory-confirmed influenza cases resulting in hospitalization or death within one working day. Document investigation using the *Influenza Hospitalization* or *Influenza Death* case reporting form.

### 1.4. State Public Health Division Reporting and Follow-up Responsibilities

1. Assist local health departments in completing *Influenza Death Case Reporting Forms* as needed.
2. Link hospitalized cases to death registry on a weekly basis to identify any missed influenza-related deaths that occur outside the hospital.
3. Report weekly aggregate numbers of influenza-related hospitalizations and deaths on the Oregon Public Health Division (OPHD) web site and to CDC.
4. Send de-identified case reports for pediatric influenza-related deaths to CDC.

## 2. THE DISEASE AND ITS EPIDEMIOLOGY

### 2.1. Etiologic agent

Influenza is a segmented single-stranded, enveloped, RNA virus of the family Orthomyxoviridae. Influenza types include A and B and C, of which types A and B are most commonly associated with human illness. Currently circulating subtypes include seasonal influenza A (H3), seasonal influenza A (H1), and pandemic influenza A (H1N1). Influenza B viruses are not divided into subtypes, but two distinct lineages of B viruses currently circulate: Yamagata and Victoria lineages.

### 2.2. Description of Illness

Influenza is an acute respiratory illness notable for significant malaise, myalgia and fever, and, in some cases, pneumonia. The initial presentation may be non-specific, and cases of pandemic influenza A (H1N1) without high fever have been reported. Some patients with pandemic

influenza A (H1N1), especially children or bone marrow transplant patients, may have gastrointestinal or central nervous system illness. GI manifestations have been reported in up to 25% of children in school-related outbreaks of seasonal influenza A (H1) and influenza B.

### **2.3. Mode of Transmission**

Influenza viruses are spread primarily through dispersion of large respiratory droplets that are generated by coughing or sneezing and that typically settle out of the air within 6 feet. Infection can also occur through contact with fomites contaminated with respiratory secretions. Risk of transmission through such contact is felt to be minimal 8 hours after initial deposition of the influenza virus, and can be eliminated much more quickly by simple cleaning of surfaces with a variety of disinfectants, bleach among the best. The potential for airborne spread of pandemic influenza A (H1N1), and other influenza viruses for that matter, is not well defined, but is thought to be low.

### **2.4. Period of Communicability**

Seasonal influenza is considered to be communicable from approximately 1 day before to 5 days after symptom onset; in young children it can be up to 7 days after symptom onset. Few data are available regarding the communicable period of pandemic influenza A (H1N1); interim CDC recommendations consider it to be 1 day before to 7 days after onset of illness.

### **2.5. Incubation Period**

Seasonal influenza has an incubation period of 1–3 (usually 2) days. The incubation period is unknown for pandemic influenza A (H1N1) but is likely similar.

### **2.6. Reservoir**

Humans are the primary reservoir for influenza. Birds and pigs are also reservoirs for pandemic strains of influenza that could affect humans.

### **2.7. Treatment**

Therapy for influenza could include supportive care, including mechanical ventilation as needed. Antiviral treatment with a neuraminidase inhibitor (oseltamivir or zanamivir), shortens the duration of seasonal influenza illness by an average of about 1 day. Data from clinical trials have not demonstrated any reduction in hospitalization or complications from seasonal influenza, although some observational studies have reported reduction in pneumonia, otitis media, and hospitalization in patients treated with neuraminidase inhibitors, compared to matched controls.

Pandemic influenza A (H1N1) has shown resistance to adamantanes, and there have been isolated cases of oseltamivir-resistant pandemic influenza A (H1N1) worldwide. During the 2008–09 influenza season, nearly all seasonal influenza A (H1) was resistant to oseltamivir. Seasonal influenza A (H3) has been resistant to adamantanes for some time. Adamantanes have no effect on influenza B viruses. See [www.flu.oregon.gov](http://www.flu.oregon.gov) for current antiviral recommendations based on Oregon surveillance data, or contact an ACDP epidemiologist at 971-673-1111.

## **3. CASE DEFINITIONS, DIAGNOSIS, AND LABORATORY SERVICES**

### **3.1. Case Definitions**

#### **1. Influenza-related hospitalization**

Only confirmed cases should be reported.

A confirmed influenza-related hospitalization is defined as a person who is:

- A resident of Oregon (though all out-of-state cases should be reported to ACDP to be forwarded to the patient's state of residency)

- With a positive test for influenza (e.g., viral culture, direct [DFA] or indirect [IFA] antibody test, polymerase chain reaction [PCR], fourfold rise in influenza antibody titer, commercially available rapid diagnostic test for influenza, or even an unspecified test type)
- During a stay on an inpatient hospital ward or within 14 days before admission
- As evidenced by a laboratory report in the hospital record, a written note in the admission H&P of a positive influenza test before admission, a laboratory report from another hospital, a report from an infection control practitioner, or a verbal report from a primary care provider's office).

Emergency room and outpatient visits are not hospitalizations.

## 2. Influenza-related death

Only confirmed cases should be reported.

A confirmed influenza-related death is defined as:

- A resident of Oregon (though all out-of-state deaths should be reported to ACDP to be forwarded to the deceased's state of residency).
- Who died with an illness clinically compatible with influenza
- With a positive test for influenza (e.g., viral culture, direct [DFA] or indirect [IFA] antibody test, polymerase chain reaction [PCR], fourfold rise in influenza antibody titer, a commercially available rapid diagnostic test for influenza, or immunohistochemical [IHC] staining for influenza viral antigens in respiratory tract tissue from autopsy specimens)

Cases will be excluded if:

1. The influenza illness is followed by full recovery to baseline health status prior to death; or
2. After review and consultation there is an alternative agreed-upon cause of death.

### 3.2. Services available at the Oregon State Public Health Laboratory (OSPHL)

Testing at Oregon State Public Health Laboratory for surveillance purposes for influenza virus infection is requested for all patients admitted for influenza-like illness (Fever > 37.8°C (100°F) and respiratory symptoms (e.g., cough, sore throat) and for fatal cases in which influenza infection is suspected. If OSPHL becomes overwhelmed with submissions for hospitalized cases, a sampling strategy for testing will be applied to the submitted specimens in order to mitigate the demand and at the same time maintain a representative sample of specimens for surveillance. Providers who are submitting specimens on hospitalized patients to OSPHL are encouraged to submit a second specimen to their local laboratory for (more timely) diagnostic purposes. See [www.flu.oregon.gov](http://www.flu.oregon.gov) for the most up-to-date guidance on submitting specimens to OSPHL for testing.

## 4. ROUTINE CASE INVESTIGATION

### 4.1. Hospitalized Case Investigation

Collect demographic (age or date of birth, sex, race, ethnicity), laboratory and hospitalization information.

Complete the Hospitalization Case Report Form.

Unless the case has died or proves to be part of an outbreak, further investigation is not indicated.

### 4.2. Death Case Investigation

Complete the Death Case Report Form.

Investigations of influenza-related deaths are more extensive and will require review of medical records from the hospital or the primary care provider. Information regarding the circumstances of the death, possible co-infections, underlying medical conditions, medications including antivirals,

vaccination status, etc., will be collected. ACDP influenza surveillance coordinators can assist with these investigations.

## **5. CONTROLLING FURTHER SPREAD**

### **5.5. Follow-up of Cases**

No follow-up with the cases themselves is required for influenza hospitalizations. It is expected that most of the information for the case report can be derived from the laboratory-report. Investigators may contact primary care providers or cases to ascertain any missing data; however, this is not mandatory.

Other follow-up, such as prophylaxis of contacts, is primarily a medical rather than a public health responsibility, except for some outbreak settings (see Influenza Outbreak Investigative Guidelines). Recommendations for use of antiviral medications are available for healthcare providers at: [www.cdc.gov/flu/professionals/antivirals/index.htm](http://www.cdc.gov/flu/professionals/antivirals/index.htm) for seasonal flu and [www.cdc.gov/h1n1flu/recommendations.htm](http://www.cdc.gov/h1n1flu/recommendations.htm) for pandemic influenza A (H1N1) flu.

## **6. MANAGING SPECIAL SITUATIONS – INVESTIGATING A POSSIBLE OUTBREAK**

Outbreaks of influenza (seasonal and pandemic) may be uncovered via case reports of hospitalized cases or deaths. Contact an ACDP epidemiologist to discuss possible outbreaks, and consult the Influenza Outbreak Investigative Guidelines.