# INFLUENZA SURVEILLANCE AND RESPONSE PROTOCOL

*Note:* ***The situation surrounding pandemic and avian influenza is rapidly changing and this protocol will be revised as the situation evolves. <u>Please make certain you are operating from the most current guidelines</u>.*** *In addition, please use MMWR, 2007; 56(July 13, 2007) throughout the season for detailed recommendations on seasonal influenza.*

## <u>Provider Responsibilities</u>

1. Educate patients to practice cough etiquette (Source: CDC):
   a. Cover the nose and mouth when coughing or sneezing,
   b. Use tissues to contain respiratory secretions,
   c. Dispose of used tissues in the nearest waste receptacle, and
   d. Wash hands frequently (with soap and water or alcohol-based hand rub) and after coughing or sneezing or contact with used tissues or other contaminated items.
   e. Persons with febrile respiratory illness during influenza season should stay at home until fever is resolved and cough is resolving. If ill persons cannot stay at home, consider using a mask to avoid exposing other persons
   f. During periods of respiratory illness in the community, offer a mask to persons with febrile respiratory illness when they present for medical services.

2. Assure that health care personnel with direct patient contact have adequate employee health precautions in place:
   a. They should be offered influenza vaccine on an annual basis.
   b. They should use a surgical mask (standard and droplet precautions) when evaluating patients with febrile respiratory illness.

3. On a <u>weekly</u> basis, report total visits for influenza-like illness to your local health department in accordance with guidelines from your local health department. <u>Influenza-like illness</u> is defined as:
   i. Fever 100° F (36°C) *and*
   ii. Cough or sore throat without another identified cause.

4. <u>Hospitals only:</u> On a weekly basis, using the "Expanded Hospital Syndromic Surveillance Summary," report:
   a. Total admissions for influenza and pneumonia and total admissions to the hospital. Admission is defined as any hospital stay over 24 hours.
   b. Total discharges and deaths from influenza and pneumonia and total discharges and deaths from the hospital.
   c. Send a copy of the form to your local health department by Monday of each week.

5. <u>Immediately</u> report any of the following by phone to the local health department as a potential outbreak or unusual occurrence:

a. Pediatric death: A death from influenza in a person age 18 and under. Complete the provider (yellow) section of the WVEDSS Influenza-Associated Pediatric Deaths Case Report Form, and attach a copy of the laboratory slip confirming the diagnosis of influenza. Refer the completed report to the local health department.

b. Suspect influenza outbreaks: Influenza outbreaks may be defined as:
   i. Excessive school or workplace absenteeism due to influenza or influenza-like illness;
   ii. Three or more cases of influenza or influenza-like illness in a single nursing home unit within a 3-day period.
   iii. Increased incidence of influenza or influenza-like illness over the expected rate.

   Laboratory testing during influenza outbreaks is an extremely important part of influenza surveillance because it helps identify circulating strains of influenza. Laboratory testing can also guide control measures, e.g., treatment and prophylaxis decisions in a nursing home outbreak. Laboratory testing during outbreaks can be arranged free-of-charge by contacting the Infectious Disease Epidemiology Program (IDEP) (800-423-1271) or the local health department.

c. Suspect cases of avian influenza. Diagnosis of avian influenza should be considered in a patient with influenza-like illness or pneumonia and:
   i. Travel to a country with H5N1 outbreaks; and history of :
      1. direct contact with domestic poultry;
      2. consumption of uncooked poultry or poultry products;
      3. direct contact with poultry feces; OR
      4. close contact with a known or suspected human case of H5N1.
   ii. History of close contact with an ill patient who was confirmed or suspected to have H5N1; OR
   iii. Occupational exposure to live influenza H5N1 in a laboratory.

   Consult IDEP (800-423-1271) or the local health department to determine if testing should be performed. Testing decisions will be made on a case-by-case basis depending on the current case definition and the situation. Testing for avian influenza can be performed free-of charge.

6. If a suspect case of avian influenza is identified:
   a. Immediately isolate the patient using standard, airborne and contact precautions (Source: OSHA):
      i. For hospitalized patients, notify infection control at the earliest possible time, certainly before a suspect patient is admitted or transferred.
      ii. Use fit-tested N-95 masks, gloves and gowns for health care workers with direct patient contact;
      iii. Eye protection for health care workers within 3 feet of the patient;
      iv. Negative pressure isolation for the patient;

v. Pay close attention to hand hygiene after all interactions with the patient; and
vi. Minimize patient transport or movement within or between healthcare facilities. If the patient must be moved use the most practical measures to contain patient secretions (if possible, place a surgical mask on the patient).

b. Assist in confirmation of the diagnosis by supplying clinical information as requested and laboratory specimens to rule out or confirm the diagnosis.
c. If the patient is a strong suspect, initiate treatment with neuraminidase inhibitors, according to standard recommendations (New England Journal of Medicine, 2005; 353:1374-85.)
d. Assist state and local public health personnel in identifying close contacts (unprotected face-to-face contact within 3 feet) of the patient.

## Laboratory Responsibilities

1. Report the following information to IDEP (Fax: 1-304-558-8736) by close of business Monday for the previous week (Sunday to Saturday):
   a. Total specimens cultured for influenza A and B; AND
   b. Total specimens positive (by culture) for influenza A or B, by type and subtype as available.

   Contact IDEP for questions at (800)-423-1271 or (304)-558-5358.

2. Subtyping of selected seasonal influenza specimens is available through Office of Laboratory Services (OLS) free-of-charge. A sample of early, mid and late season isolates are welcome; as are isolates from influenza outbreaks. Contact the OLS Influenza Laboratory at 304-558-3530.

3. Urgently refer all requests for testing for avian influenza to the Infectious Disease Epidemiology Program at 304-558-5358 or 800-423-1271.

## Public Health Action

1. Take steps to protect employee health, as follows:
   a. For seasonal influenza:
      i. Vaccination is offered to employees on an annual basis; and
      ii. Surgical masks should be available to personnel for case and outbreak investigation. Gowns and gloves should be available, if contact with respiratory secretions is likely.
   b. For avian influenza:
      i. Above precautions, plus:
      ii. Fit-tested N-95 mask is available for personnel who will perform case investigations.
      iii. Goggles or eye protection are available for personnel who will be within 3 feet of the patient.

2. Transmit total ILI for the previous week for the county by fax (304-558-8736) no later than Monday every week (throughout the year) to the West Virginia Infectious Disease Epidemiology Program (IDEP).

3. Recruit one sentinel provider or laboratory per county for influenza season; no later than November 1, annually. Report this information to the West Virginia Department of Health and Human Resources influenza surveillance coordinator to complete the enrollment process. Successful provider recruitment and retention requires:
    a. Identifying providers who may be interested in participating. Think broadly. Clinics, physician assistants, nurse practitioners, university health centers, family practice residency programs, and many others make good sentinel providers.
    b. Make a personal recruiting visit. (Suggestion: ask your regional epidemiologist to help).
    c. Explain influenza surveillance using a recruitment package, including:
        i. A letter from the local health department;
        ii. Information on the CDC influenza surveillance system;
        iii. WVDHHR information sheets;
        iv. Enrollment form; and
        v. Virology collection instructions.
    d. Identify and communicate with a point of contact (POC) in the sentinel provider office.
    e. Send the completed enrollment form to DHHR. (Fax to the attention of the Influenza Surveillance Coordinator at 304-558-8736.) You will receive the virology collection kit by return mail.
    f. Deliver the kit to the POC in the sentinel provider office.
    g. Keep the lines of communication open.

4. Notify IDEP immediately when any of the following is reported:

    a. Pediatric Death: a death from laboratory-confirmed influenza in a person aged 18 or younger. Deaths should be investigated using the WVEDSS Pediatric Flu Death Investigation form.
    b. Outbreak:
        i. Rapidly triage reported outbreaks of “influenza-like illness” by obtaining the following information:
            1. Number of ill persons
            2. Setting (school, nursing home, community, etc.) and size of the population in that setting
            3. Age distribution of ill persons
            4. Do ill individuals have underlying disease or are they previously healthy?
            5. Symptoms
            6. Date(s) of onset of illness
            7. Duration of illness – time to full recovery
            8. Any results of rapid testing or culture for influenza?

9. Does anyone have pneumonia? How many? For patients with pneumonia, what are the results of sputum gram stain and blood cultures, and other studies?
10. Are any patients sick enough to be in the hospital? How many?
11. Are any patients moribund? How many?
12. Has anyone died? How many?
13. Name and phone number of person reporting illness

ii. Especially in high-risk populations, anticipate that you may be asked to investigate influenza outbreaks as follows:

1. Work with providers to obtain approximately 8 to 10 culture samples for rapid testing and viral isolation at the West Virginia Office of Laboratory Services *prior to initiation of antiviral agents*.
2. Obtain a description of symptoms among a sample of 8 to 10 ill persons.
3. For nursing home outbreaks, advise providers to initiate antiviral prophylaxis according to current recommendations
4. If a community outbreak is confirmed as influenza A through rapid testing, issue a medical alert to providers with recommendations as in item 6 above.
5. Modify recommendations as necessary, as additional laboratory data becomes available.

c. <u>Suspect case of highly pathogenic avian influenza</u> (See case definition). Take all of the following steps:

i. Assure the suspect case is appropriately isolated using airborne and contact precautions.

ii. Complete the 'Human A (H5) Domestic Case Screening Form.' Fax to IDEP at 304-558-8736.

iii. Begin a line listing of contacts using "Form 2B: Avian Influenza Primary Contact/Site Worksheet." Contacts are defined as persons who came within 3 feet of the patient from one day prior to onset of symptoms through 7 days after resolution of fever (or up to 21 days) in the index case. Using form 2B, prioritize the list of contacts, and identify which contacts are high priority (priority 1-3). Complete "Form 2D: Avian Influenza Contact Tracing Form" for each high-priority contact.

iv. Assist health care providers and IDEP in obtaining laboratory studies for confirmation.

v. If highly pathogenic avian influenza is confirmed:

1. Assure the patient remains in isolation through at least 7 days after resolution of fever, or up to 21 days.
2. Notify IDEP. Complete the screening form, and attach copies of all laboratory slips and a copy of the chest radiograph report. Refer the completed forms to IDEP at 304-558-8736.
3. Begin oseltamivir prophylaxis on close contacts (75 mg daily for 7 to 10 days).
4. Educate contacts about:

a. Transmission of avian influenza;
b. Cough etiquette;
c. Self-referral to medical care if symptoms develop. The patient should be educated to contact the health care facility by phone prior to traveling to a health care facility so that health care providers can take appropriate precautions.

5. Arrange to talk to contacts daily by phone for 7 days after last exposure, if resources allow. Passive surveillance of contacts is also acceptable. Document daily contact on "Form 2E: Avian Influenza Contact Surveillance Form."
6. If a contact becomes ill with fever, refer the contact for medical care immediately. Notify the health care facility so health care personnel can take precautions. Notify IDEP immediately so arrangements can be made for laboratory confirmation.

d. Suspect or confirmed human exposure to highly pathogenic avian influenza (H5N1) from an agricultural or environmental source.
   i. Suspect/confirmed exposure is defined as direct contact with sick or dead wild or domestic birds suspected or confirmed to have influenza H5N1. Ingestion of undercooked meat or blood from infected birds or direct contact with feces from infected birds is also an exposure.
   ii. Management of exposed persons:
      1. Begin oseltamivir prophylaxis (75 mg daily for 7 to 10 days).
      2. Ask exposed persons to remain under surveillance for 7 days after last exposure.
      3. Educate exposed persons about:
         a. Infection control procedures at home (hand washing, bag household trash and dispose in the usual way, clean the household in the usual way with ordinary household cleaners);
         b. Transmission of avian influenza;
         c. Cough etiquette;
         d. Self-referral to medical care if symptoms develop. The patient should be educated to contact the health care facility by phone prior to traveling to a health care facility so that health care providers can take appropriate precautions.
      4. If resources allow, arrange to talk to exposed persons daily by phone until seven days have passed after last exposure. Passive surveillance of exposed persons is also acceptable. Document daily contact on "Form 2E: Avian Influenza Contact Surveillance Form."
      5. If the exposed person becomes ill with fever, refer him/her for medical care immediately. Notify the health care facility so health

care personnel can take precautions. Notify IDEP immediately so arrangements can be made for laboratory confirmation.

5. When culture-confirmed seasonal influenza is identified in the county or the state, consider issuing an alert to providers in your county. Inform them about:
   a. The type and subtype of influenza virus identified in the county or state, and
   b. Preventive measures for unimmunized high-risk patients.
   c. If non-vaccine strain influenza is isolated, consult with IDEP for recommendations specific to the situation. If the situation is of concern (unexpected and/or virulent strain), you may be asked to:
      i. Initiate active surveillance for clusters/outbreaks of influenza-like-illness through emergency rooms, schools and nursing homes;
      ii. Work with local providers to obtain additional cultures from patients who meet the case definition of influenza-like illness. The purpose of this is to confirm limited versus widespread circulation of non-vaccine-strain virus; and
      iii. Issue an alert to providers in your county notifying them of the situation.

6. Conduct enhanced syndromic surveillance data for hospital admissions and deaths from influenza and pneumonia: Collect total hospital admissions, total hospital admissions from influenza and pneumonia and total deaths from influenza and pneumonia. Ask hospitals to record this information on the form entitled, “Expanded Hospital Syndromic Surveillance Summary,” and send it to you or IDEP at 304-558-8736 by Monday, close of business. Please forward a copy to IDEP immediately on receipt.

## Disease Prevention Objective

1. To reduce hospitalization and mortality from influenza by encouraging widespread use of the influenza vaccine among high-risk groups.

## Disease Control Objectives

1. Consistent with current MMWR guidelines, after influenza is identified in the community, reduce further hospitalization and death from influenza by educating providers to:
   a. Offer the influenza vaccine immediately to high-risk persons who have not yet received the vaccine AND cover those individuals with an appropriate antiviral agent until two weeks after immunization is complete (up to 6 weeks in children < 9 years of age receiving the vaccine for the first time); OR
   b. Providers may also cover selected high-risk individuals who cannot receive influenza vaccine with an appropriate antiviral agent for the duration of influenza season or during peak influenza season.

2. Consistent with current MMWR guidelines, after an influenza outbreak is identified in a nursing home, reduce further hospitalization and death from influenza by educating

providers to: offer antiviral prophylaxis to residents and staff and institute appropriate isolation measures.

3. If a case of avian influenza is identified, prevent person-to-person spread by:
    a. Isolation of the index case;
    b. Identification, surveillance and prophylaxis of contacts.

## Disease Surveillance Objectives

1. To identify the earliest case of influenza A in the state (county) and report/feedback data as available.

2. To estimate the duration of influenza season from start to finish and report/feedback data as available during the season.

3. To identify institutional and community-based outbreaks of influenza and report/feedback information on circulating strains as available during the season.

4. To determine if early season, outbreak, and late season strains are vaccine-strain or non-vaccine-strain and report/feedback information as available during the season.

5. To contribute to the global (WHO) effort to identify appropriate strains of influenza vaccine to formulate vaccine composition recommendations for the coming year.

6. To identify enhanced syndromic surveillance techniques to supplement and improve information on influenza in West Virginia.

7. To identify highly pathogenic avian influenza if it occurs in West Virginia.

## Public Health Significance

Epidemics of influenza occur every winter and are responsible for an estimated 36,000 deaths per year in the United States. This phenomenon, occurring every year in northern climates during the winter months is referred to as 'seasonal influenza.' Most vulnerable to hospitalization or death from seasonal influenza are the very young, the very old, and persons with chronic conditions. In elderly populations, influenza vaccine is effective in preventing hospitalization and death; however it may not prevent influenza-like illness.

Influenza A and B are the two "types" of influenza that are capable of causing epidemic disease. Influenza A is further categorized into "subtypes" based on the two surface antigens: hemagglutinin (H) and neuraminidase (N). Due to "antigenic drift" (small mutations in the genes coding for the antigenic structure of the virus), the virus is continually able to evade the human immune response, and the composition of the vaccine must change every year to match circulating influenza virus strains and provide optimal protection. Antigenic shift is a far more drastic change in antigenic structure, and represents emergence of a

completely new subtype, which is likely to result in pandemic influenza with large numbers of deaths. During a pandemic, it is estimated that the death rate increases by 10 to 50-fold.

Thus, virologic surveillance is a very important part of seasonal or pandemic influenza surveillance, and is routinely used by the public health community to answer the following questions:

1. Are *early season isolates* vaccine strain? This is an important question to answer because it is the earliest indicator that the circulating strains are covered in the current vaccine.

2. Are *outbreak isolates* vaccine strain? Again, it is important to know if outbreak strains are covered by the vaccine because immunization is a critical part of outbreak control. In addition, outbreak strains are used to formulate recommendations for the composition of influenza vaccine during the coming year.

3. Are *late season isolates* similar in antigenic structure to last year? Late season isolates are considered in the design of the next season's influenza vaccine.

4. Are reports of influenza-like illness (ILI) due to influenza? In West Virginia, influenza-like illness is reportable, and the data usually show a seasonal upsurge in the number of cases every year usually sometime between December and March. Laboratory confirmation of this phenomenon adds to the credibility of the ILI data.

5. Have unusual or novel influenza strains arrived in our state?

In West Virginia, virologic surveillance is conducted through the sentinel physician system and through sentinel laboratories. These laboratories submit specimens to the West Virginia Office of Laboratory Services, which confirms isolation and subtypes isolates of influenza A.

Rapid turnaround of influenza data is important so that providers know when influenza season begins and when it is over. Certain high-risk patients may be offered prophylaxis for the duration of influenza season.

Pandemic influenza occurs due to antigenic shift. The first recorded influenza pandemic is thought to have occurred in 1580. Since then, 31 pandemics have been described, the worst having occurred in 1918-1919 when 21 million people died worldwide, with 549,000 of these in the U.S. Another pandemic is thought to be inevitable, though no one knows when it will occur. Good quality influenza surveillance and response during a routine year is good practice and necessary for pandemic readiness.

In recent years, massive epidemics of 'bird flu' (avian influenza) have captured media attention and raised concerns about a worldwide pandemic of H5N1 influenza. Wild birds carry influenza in their intestines, but usually do not become ill. However, avian influenza is readily transmissible among poultry resulting in widespread illness and death. Human cases and deaths have occurred in association with exposure to birds. So far, spread from one

human to another has been very rare and has not continued beyond a single generation. If the virus were to mutate so that person-to-person spread occurred readily, a worldwide pandemic could occur. For current case counts and information on avian influenza, see: http://www.who.int/csr/disease/avian_influenza/en/index.html

As we enter the 2007-2008 influenza surveillance season, the world is in the pandemic alert phase number 3, with limited animal-to-human transmission of influenza and little or no human-to-human spread:

Pandemic Phases Labeled with Current Status

| | | |
|---|---|---|
| Inter-pandemic phase<br>New virus in animals, no human cases | Low risk of human cases | 1 |
| | Higher risk of human cases | 2 |
| Pandemic alert<br>New virus causes human cases | No or very limited human-to-human transmission | 3 |
| | Evidence of increased human-to-human transmission | 4 |
| | Evidence of significant human-to-human transmission | 5 |
| Pandemic | Efficient and sustained human-to-human transmission | 6 |

Source: WHO; current as of August, 2007.

## Clinical Description

Seasonal influenza is an acute illness characterized by fever, chills, sweats, headache, arthralgia, myalgia, prostration, coryza, sore throat, and cough. Symptoms are generally self-limited within two to seven days, though cough may be prolonged. Influenza occurs as widespread community outbreaks on an annual basis during the winter months. In addition to increased utilization of medical services, indirect costs of this annual epidemic include those related to increased absenteeism and lost of work productivity.

Elderly patients are at highest risk for influenza-related complications. These include viral or bacterial pneumonia or exacerbation of chronic underlying disease (e.g., bronchitis, emphysema, cardiac disease, etc.). Patients with cardiac disease are at significantly increased risk of death from influenza. Young children age 0-1 years are hospitalized at rates comparable to elderly (age $\geq$ 65) persons; however the elderly are most at-risk for death from influenza. Pregnant women are also at increased risk of death from influenza relative to non-pregnant women.

Symptoms in patients with avian influenza have included: high fever and influenza-like illness with lower respiratory tract symptoms. Other symptoms have included diarrhea, vomiting, abdominal pain, pleuritic pain, and bleeding from the nose and gums. Patients have also presented with encephalitis. Dyspnea may develop approximately 5 days into illness, followed by respiratory distress, tachypnea, and inspiratory crackles. Sputum production is variable and sometimes contains blood. Case fatality rate is about 60%. Mildly

symptomatic illness has not been documented by serosurveys of populations in close contact with sick and dying poultry.

Seasonal influenza can be treated with antiviral agents. Amantadine and rimantadine have been effective against influenza A; until the 2005-2006 season, when CDC reported widespread resistance to these drugs. Oseltamivir and zanamivir are effective against influenza A and B. When administered within 2 days of onset of illness, these agents reduce the duration of illness by approximately one day. No data is available on reduction in complications. Oseltamivir is 70-80% effective in preventing illness when administered appropriately as chemoprophylaxis.

Optimal treatments for avian influenza in humans remain to be discovered; however, most experts recommend early initiation of oseltamivir (within 48 hours of onset). Optimal dose and duration are unknown. See New England Journal of Medicine, 2005; 353:1374-85.

## Etiologic Agent

There are three types of influenza viruses: types A, B, and C. Influenza A includes three subtypes (H1N1, H3N2, and H2N3) that have caused pandemic disease. Influenza B has caused local and regional outbreaks. Influenza C is a cause of smaller outbreaks and sporadic cases.

Influenza viruses are classified as follows:

Type**/**Geographic Site of Isolation**/**Culture Number**/**Year of Isolation**(**Subtype**)**

The following are classification examples:

A/Beijing/262/95(H1N1)  A/Sydney/5/97(H3N2)  B/Yamanashi/166/98

## Reservoir

In nature, wild birds are the reservoir for influenza viruses. Humans are the primary reservoir for human infection. Birds and swine are thought to be a source of new human subtypes that arise through genetic reasortment. These new subtypes may then be responsible for pandemic disease.

## Mode of Transmission

Droplet spread, predominantly during coughing or sneezing by the infected person. Direct or indirect contact with nasopharyngeal secretions. To date, all human-to-human transmission of avian influenza has occurred through intimate contact without the use of precautions.

## Incubation Period

The incubation period for seasonal influenza is one to four days, with an average of two days.

For avian influenza, the incubation period has generally been in the range of 2-4 days, but the upper limit has been up to 8 days.

## Infectious Period

Persons are most infectious for 24 hours prior to onset of symptoms and during the most symptomatic period: three to five days after clinical onset in adults, and up to three weeks after onset in young children. Prolonged shedding can occur in immunocompromised persons.

## Outbreak Recognition

Outbreaks are commonly recognized based on clinical and epidemiological features. Community outbreaks are commonly first recognized as increased school absenteeism. Outbreaks in closed populations with naïve populations may have attack rates approaching 50%. Investigation of these outbreaks may give important clues about emerging strains of influenza.

The definition of a nursing home outbreak is controversial and all of the following definitions have been offered: 10% of residents with ILI; one resident with confirmed influenza A; and 3 or more cases of ILI on a single nursing unit within a 3-day period. Rapid testing for influenza can guide outbreak response in long-term-care facilities where timely provision of antiviral treatment can control disease. Laboratory confirmation/investigation of outbreaks is important in high-risk settings such as nursing homes or hospitals, or early or late in influenza season, or anytime that unusual clinical or epidemiological features are noted. Health departments should have the most recent MMWR recommendations readily available to share with providers during influenza season.

# CASE DEFINITIONS

## Case Definition for Influenza-like Illness (ILI)

For surveillance purposes, ILI is defined as fever ∃ 100E F (36E C) *and* cough or sore throat without another identified cause.

## Case Definition for Pediatric Death Due to Influenza (‘Influenza-Associated Pediatric Mortality’)

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 for diagnosis

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 specimen;
- Rapid influenza diagnostic testing of respiratory specimens;
- Immunohistochemical (IHC) staining for influenza viral antigens in respiratory tract tissue from autopsy specimens;
- Four-fold rise in influenza hemagglutination injhibition (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.

**Interim Case Definition for Suspected H5N1 Cases in the U.S.**

Testing for avian influenza A (H5N1) virus is recommended for a patient who:
- [ ] Has an illness that requires hospitalization or is fatal; AND

- ☐ Has or had a documented temperature of $\geq$ 38 °C ($\geq$ 100.4 °F); AND
- ☐ Has radiographically confirmed pneumonia, acute respiratory distress syndrome (ARDS), or other severe respiratory illness for which an alternate diagnosis has not been established; AND
- ☐ Has at least one of the following potential exposures within 10 days of symptom onset:
    a. History of travel to a country with influenza H5N1 documented in poultry, wild birds and/or humans AND had at least one of the following potential exposures during travel:
        - Direct contact with (e.g., touching) sick or dead domestic poultry;
        - Direct contact with surfaces contaminated with poultry feces;
        - Consumption of raw or incompletely cooked poultry or poultry products;
        - Direct contact with sick or dead wild birds suspected or confirmed to have influenza H5N1;
        - Close contact (approach within 1 meter [approx 3 feet]) of a person who was hospitalized or died due to a severe unexplained respiratory illness;

    b. Close contact (approach within 1 meter [approx 3 feet]) of an ill patient who was confirmed or suspected to have H5N1;
    c. Worked with live influenza H5N1 virus in a laboratory.

:
Persons with mild or atypical disease or persons with unknown or uncertain epidemiological information may be considered for testing on a case-by-case basis. Consult the Infectious Disease Epidemiology Program at 304-558-5358 or 800-423-1271

**Interim Case Definition for use in association with an H5N1 outbreak in poultry in the U.S.**

The case and contact classifications outlined below have been developed as preliminary guidance for use in the event of an avian influenza A (H5N1) outbreak in U.S. domestic poultry and should be adapted, as necessary, for the specific outbreak conditions. This guidance is based on the current state of knowledge regarding human infection with influenza A (H5N1) viruses; however, it may be modified for use during poultry outbreaks caused by other notifiable avian influenza viruses. As of this writing, influenza H5N1 has not been identified among animals or humans in the United States. In addition, no sustained human-to-human transmission of influenza H5N1 has been documented anywhere in the world, consistent with WHO Pandemic Phase 3 (Pandemic Alert Period)*. This guidance will be updated as our knowledge of the epidemiology of influenza H5N1 changes.

Cases are classified as follows:

**A suspect case** is a person who:

- Has had a documented temperature of ≥38°C (≥100.4°F) and at least one following symptoms - cough, sore throat, and/or respiratory distress.

***and***

- Has had one of the following exposures within 10 days of the first symptom:
    - direct contact with (e.g., touching) sick or dead domestic poultry
    - direct contact with surfaces contaminated with poultry feces
    - consumption of raw or incompletely cooked poultry or poultry products, including blood
    - close contact (within 3 feet) of an ill patient who was confirmed or suspected to have H5N1 influenza
    - works with live H5N1 influenza virus in a laboratory.

  ***and***

- Has a laboratory test for H5N1 that is pending, inadequate, or unavailable.
    - Examples might include persons who died prior to testing or for whom testing can not be done, and persons with a positive result for influenza A by rapid antigen testing alone;

A **confirmed case** is a person who:

- Meets the clinical and exposure criteria for a Suspect Case (see above)

***and***

- Has a positive test for H5N1 influenza by one or more of the following methods:
    - isolation of an H5N1 influenza virus by viral culture
    - positive reverse transcriptase–polymerase chain reaction (RT-PCR) for H5N1
    - positive immunofluorescence antibody test for H5 antigen, using H5N1 monoclonal antibodies
    - 4-fold rise in H5N1-specific antibody titer detected by microneutralization assay in paired serum samples

Note: If a person tests positive by any of the methods above, but does not meet the clinical and exposure criteria, they may still be counted a confirmed H5N1 infections and treated as a confirmed case for the purpose of the investigation and follow-up.

A **report under investigation** is a person who

- Does not fulfill the suspect case criteria, in terms of exposure or clinical characteristics because information is not yet available. Additional information is needed to classify into one of the other case classifications.

**Not a case**

- Negative for H5N1 influenza as determined by sensitive laboratory testing methods with adequate and appropriately timed specimens.

## Laboratory Diagnosis of Influenza

The Office of Laboratory Services offers rapid antigen testing and culture confirmation for seasonal influenza A and B on nasopharyngeal swab samples. PCR testing is available for both seasonal influenza and circulating avian strains. Results are shared by fax or phone. Testing is limited to physicians and laboratories participating in sentinel surveillance, and health departments engaged in outbreak investigation. Consult the Infectious Disease Epidemiology Program at (304) 558-5358 if testing is needed in special situations.

## Preventive Interventions

A live-attenuated vaccine and an inactivated vaccine are available to prevent influenza. Recommendations for use are found in MMWR, 2007; 56 (July 13, 2007), and are also detailed in the current provider information sheet.

In addition to influenza vaccine, neuraminidase inhibitors may be used to prevent influenza. Oseltamivir is licensed in individuals age 1 year and older for prevention of influenza A and B, and can be used for prophylaxis of high-risk individuals who receive the vaccine after the start of influenza season. Similarly, Zanamivir is licensed for chemoprophylaxis in persons aged 5 years and older. Prophylaxis must be continued for two weeks after completion of immunization (two weeks after immunization in adults and for up to six weeks in children receiving the two-dose regimen, i.e. four weeks after the first dose followed by two weeks after the second dose). Oseltamivir and Zanamivir can also be used alone for prophylaxis of those few high-risk individuals who cannot receive influenza vaccine.

## Surveillance Indicators

1. Proportion of MMWR weeks for which reporting of total ILI is available (county level).
2. Proportion of counties in which virologic surveillance was conducted (state level).
3. Proportion of BT regions in which enhanced syndromic surveillance (Hospital influenza and pneumonia admissions, discharges and deaths) was conducted (state level).
4. Number of outbreaks identified and proportion of outbreaks with culture confirmation (state level).
5. Time to reporting of a suspect avian influenza patient.
6. Time to reporting of influenza outbreaks.

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**Websites**

CDC:
http://www.cdc.gov/flu/avian/index.htm
http://www.cdc.gov/flu/
OSHA:
http://www.osha.gov/dsg/guidance/avian-flu.html
WHO:
http://www.who.int/csr/disease/avian_influenza/en/index.html