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# Influenza, Influenza-Associated Mortality, and Novel Influenza A

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## **Influenza, Influenza-Associated Mortality, and Novel Influenza A**

### **Overview**<sup>(1,2,3)</sup>


Influenza is a contagious respiratory illness caused by influenza viruses. Influenza typically begins with the sudden onset of fever, often accompanied by a cough or sore throat, chills or rigor, headache, malaise, and diffuse myalgia. As the disease progresses, respiratory tract signs, including sore throat, nasal congestion, rhinitis, and cough become more prominent. Less common symptoms such as conjunctival injection, abdominal pain, nausea, vomiting, and diarrhea are more likely to occur in children. Symptoms usually resolve in five to seven days.

Influenza is spread primarily person-to-person through droplets created when a person infected with the virus coughs, sneezes, or talks. Infection occurs when infected droplets land in the mouth or nose of people who are nearby or are inhaled into the lungs. Less often, infection can occur when a person touches a surface contaminated with an influenza virus and then touches their mouth or nose. The influenza virus can survive for hours on solid surfaces, particularly in lower temperatures and lower humidity. The incubation period is usually one to four days, with an average of two days. A healthy adult is infectious beginning one day before and up to five to seven days after symptom onset. Children may be contagious for a longer period of time.

Influenza is a single-stranded, helically shaped, RNA virus of the orthomyxovirus family. There are four types of influenza viruses: A, B, C, and D. Only influenza A and B viruses cause seasonal epidemics and both types are included in influenza vaccines. Influenza C viruses cause a mild respiratory illness and are not included in influenza vaccines. Influenza D viruses primarily affect cattle and are not known to infect or cause illness in people. Humans are the reservoir for influenza B and C viruses. Aquatic birds are the primary reservoir for influenza A viruses. Influenza A viruses can circulate in many different animals, including ducks, chickens, pigs, horses, seals, and others. Influenza A viruses are divided into subtypes based on two surface antigens: hemagglutinin (HA) and neuraminidase (NA). There are 18 different HA subtypes and 11 different NA subtypes. Current subtypes of influenza A viruses found in people are influenza A (H1N1) and influenza A (H3N2). Influenza B viruses are not divided into subtypes, but can be broken down into lineages and strains. Currently circulating influenza B viruses belong to either the B/Yamagata or B/Victoria lineage.

Influenza viruses are constantly evolving. Minor antigenic variation within the same influenza A subtype or influenza B type is called antigenic drift. Antigenic drift occurs continuously and results in new strains of influenza A and B viruses, leading to seasonal epidemics. Antigenic shift involves a major change in one or both of the influenza A surface antigens resulting in a new subtype. Antigenic shifts can lead to a pandemic if the new strain can infect humans and is easily spread from person to person between individuals with little or no preexisting immunity.

Seasonal influenza results in yearly epidemics of varying severity, with sporadic cases or outbreaks occurring outside of typical season patterns. In the northern hemisphere, cases of influenza occur in greater numbers during the winter months, usually peaking from December to March, with a 5% to 20% attack rate in the general population. Some people such as senior citizens, young children, children less than two years of age, and persons with certain health

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conditions are at high risk for serious complications from influenza. Bacterial pneumonia, ear infections, sinus infections, dehydration, and worsening of chronic medical conditions such as congestive heart failure, asthma, or diabetes may occur. Children may have severe neurologic complications that range from febrile seizures to severe encephalopathy and encephalitis. Reye syndrome has also been associated with influenza infection.

Humans can be infected by influenza viruses circulating in animals. Usually these human infections of zoonotic influenza are acquired through direct contact with infected animals or contaminated environments and do not spread very far among humans. Novel influenza is defined as a human case of infection with an influenza A virus subtype that is different from currently circulating human influenza H1 and H3 viruses. New subtypes of influenza A can emerge among humans through direct transmission of an animal influenza virus to humans, or through reassortment of genes derived from an animal influenza virus and a human influenza virus. Such genetic reassortment can create a new virus that combines human and animal influenza properties. Human infections with novel influenza A viruses that can be transmitted from person to person may signal the beginning of an influenza pandemic. The first laboratory suggestion of a novel influenza A infection from an animal source is the inability of available tests to subtype the detected virus.

Influenza pandemics can lead to substantially increased morbidity and mortality rates compared with seasonal influenza. During the 20<sup>th</sup> century, there were three influenza pandemics, in 1918 (H1N1), 1957 (H2N2), and 1968 (H3N2). The first pandemic of the 21<sup>st</sup> century occurred from April 2009 to August 2010. The influenza A (H1N1)pdm09 strain has replaced the previously circulating seasonal influenza A (H1N1) strain.

For a complete description of Influenza, refer to the following texts:

- Control of Communicable Diseases Manual (CCDM)
- Red Book, Report of the Committee on Infectious Diseases
- Epidemiology and Prevention of Vaccine-Preventable Diseases, Centers for Disease Control and Prevention

### **Case Definition - Influenza**


#### ***Clinical Description***

Influenza is an acute viral disease of the respiratory tract characterized by abrupt onset of fever, myalgia, headache, severe malaise, nonproductive cough, sore throat and rhinitis. Without laboratory confirmation, influenza is referred to as influenza-like illness (ILI).

#### ***Clinical Case Definition***

Without laboratory confirmation, the ILI case definition used by CDC for national surveillance is fever  $\geq 100^{\circ}$  Fahrenheit or  $37.8^{\circ}$  Celsius **and** cough and/or sore throat (in the absence of a known cause). Influenza is commonly recognized by epidemiologic characteristics. Influenza illness may be indistinguishable from other viral respiratory illnesses based on symptoms alone.

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### ***Laboratory Criteria for Diagnosis***

- Virus isolation by cell culture
- CLIA certified laboratory Immunofluorescence, Influenza Enzyme Immuno Assay (EIA), or reverse transcription-polymerase chain reaction (RT-PCR)
- CLIA waived Commercial rapid non-culture diagnostic tests for influenza virus
- \*Four-fold rise in antibody titer between the acute and convalescent serum specimens.

### ***Case Classification***

**Confirmed:** Laboratory confirmation by one of the test methods listed above.

\*Note: 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 acute serum samples are not interpretable and are not considered to be confirmatory.

## **Case Definition - Influenza-Associated Mortality**

### ***Clinical Description***

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.

A death should not be reported as influenza-associated if:


- There is no laboratory confirmation of influenza virus infection.
- The influenza illness is followed by full recovery to baseline health status prior to death.
- 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 specimens;
- 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 inhibition (HI) antibody titer in paired acute and convalescent sera\*.

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***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.

***Comments***

\*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.

**2014 Case Definition – Novel Influenza A Virus Infections**

***Clinical Description***

An illness compatible with influenza virus infection (fever >100 degrees Fahrenheit, with cough and/or sore throat).

***Laboratory Criteria for Diagnosis***

A human case of infection with an influenza A virus subtype that is different from currently circulating human influenza H1 and H3 viruses. Novel subtypes include, but are not limited to, H2, H5, H7, and H9 subtypes. Influenza H1 and H3 subtypes originating from a non-human species or from genetic reassortment between animal and human viruses are also novel subtypes. Novel subtypes will be detected with methods available for detection of currently circulating human influenza viruses at state public health laboratories (e.g., real-time reverse transcriptase polymerase chain reaction [RT-PCR]). Confirmation that an influenza A virus represents a novel virus will be performed by CDC’s influenza laboratory. Once a novel virus has been identified by CDC, confirmation may be made by public health laboratories following CDC-approved protocols for that specific virus, or by laboratories using an FDA-authorized test specific for detection of that novel influenza virus.


***Epidemiologic Linkage***

Criteria for epidemiologic linkage:

- a) The patient has had contact with one or more persons who either have or had the disease, **AND**
- b) Transmission of the agent by the usual modes of transmission is plausible

A case may be considered epidemiologically linked to a laboratory-confirmed case if at least one case in the chain of transmission is laboratory confirmed. Laboratory testing for the purposes of case classification should use methods mutually agreed upon by CDC and the Council of State and Territorial Epidemiologists (CSTE). Currently, only viral isolation, RT-PCR, gene sequencing, or a 4-fold rise in strain-specific serum antibody titers are considered confirmatory.

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### ***Case Classification***

#### **Confirmed**

- A case of human infection with a novel influenza A virus confirmed by CDC’s influenza laboratory or using methods agreed upon by CDC and CSTE as noted in Laboratory Criteria, above.

#### **Probable**

- A case meeting the clinical criteria and epidemiologically linked to a confirmed case, but for which no confirmatory laboratory testing for influenza virus infection has been performed or test results are inconclusive for a novel influenza A virus infection.

#### **Suspected**

- A case meeting the clinical criteria, pending laboratory confirmation. Any case of human infection with an influenza A virus that is different from currently circulating human influenza H1 and H3 viruses is classified as a suspected case until the confirmation process is complete.

#### ***Comments***

Once a novel virus is identified by CDC, it will be nationally notifiable until CSTE in consultation with CDC determines that it is no longer necessary to report each case.


On December 13, 2006, the United States formally accepted the revision of the International Health Regulations, referred to as IHR (2005)

(<http://archive.hhs.gov/news/press/2006pres/20061213.html>). The IHR (2005) are an international legal instrument that governs the roles of the World Health Organization (WHO) and its member countries in identifying and responding to and sharing information about public health emergencies of international concern

([http://whqlibdoc.who.int/publications/2008/9789241580410\\_eng.pdf](http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf)). The updated rules are designed to prevent and protect against the international spread of diseases, while minimizing interference with world travel and trade. The revised regulations add human infections with new influenza strains to the list of conditions that Member States must immediately report to WHO. An outbreak of infections with a new influenza A virus that demonstrates human-to-human transmission could signal the beginning of the next pandemic. Robust epidemiologic and laboratory surveillance systems are required for a coordinated public health response to infections with a novel influenza virus subtype. Early detection of an influenza virus with pandemic potential will permit identification of viral characteristics (e.g., genetic sequence, antiviral susceptibility, and virulence) that will affect clinical management and public health response measures. It should also facilitate development of a virus-specific vaccine and testing strategies.

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All state public health laboratories have the capacity to test respiratory specimens for influenza viruses with sensitive and specific assays that can detect human and non-human influenza A viruses. They also have the capacity to subtype currently circulating human influenza A H1, H3, and avian H5 (Asian lineage) viruses. The detection or confirmation by a state public health laboratory of an influenza A virus that is unsubtypeable with standard methods (e.g., real-time RT-PCR assays for human influenza A(H3) or (H1) viruses), or a non-human influenza virus (e.g., H5) from a human specimen, could be the initial identification of a virus with pandemic potential. Prompt notification of CDC by a state epidemiologist in conjunction with the public health laboratory will permit rapid confirmation of results and reporting to WHO. In addition, it will aid prompt viral characterization, and the development of virus-specific diagnostic tests.

### **Information Needed for Investigation**

Reported influenza cases do not typically require further investigation. However there are situations when an investigation is necessary including influenza-associated outbreaks and school closures, influenza-associated mortality, or identification of a novel influenza virus. Special circumstances may also arise with influenza surveillance that would necessitate further investigation. Additional investigation guidelines would be provided.


### **Notification**

- Immediately contact the [District Communicable Disease Coordinator](#), the [District Senior Epidemiology Specialist](#), or the Missouri Department of Health and Senior Services (DHSS) - Bureau of Communicable Disease Control and Prevention, phone (573) 751-6113, fax (573) 526-0235, or for afterhours notification contact the Emergency Response Center (ERC) at (800) 392-0272 (24/7) when an outbreak or novel influenza A virus infection is suspected.
- Contact the Bureau of Environmental Health Services (573-751-6095) and the Section for Child Care Regulation (573-751-2450) when cases are associated with a childcare center.
- Contact the Section for Long Term Care Regulation (573-526-8524) when cases are associated with a long-term care facility.
- Contact the Bureau of Health Facility Regulation (573-751-6303) when cases are associated with a hospital or hospital-based long-term care facility, or ambulatory surgical center.

### **Control Measures**

#### **Vaccination**

The best way to protect against influenza is to get vaccinated each year. There are three forms of the vaccine, inactivated influenza vaccine (IIV), administered intramuscularly or intradermally, live-attenuated influenza vaccine (LAIV), administered intranasally, and recombinant influenza vaccine (RIV), administered intramuscularly. Influenza vaccines are either trivalent or quadrivalent. Trivalent vaccines protect against three different influenza viruses, two influenza

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A viruses and one influenza B virus. Quadrivalent vaccines protect against four different influenza viruses, two influenza A viruses and two influenza B viruses.

The Advisory Committee on Immunization Practices (ACIP) recommends annual influenza vaccination for all persons aged 6 months and older. Persons at high risk of having serious flu-related complications or because they live with or care for high risk persons especially should receive yearly vaccinations. CDC has yearly recommendations for high risk groups. Refer to the Morbidity and Mortality Weekly Report (MMWR), Prevention and Control of Influenza: Recommendations of the Advisory committee on Immunization Practices (ACIP). (This is published annually in April at: <http://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/flu.html>). ACIP does not recommend one vaccine over the other as long as the vaccine is licensed for the appropriate age group. However, in light of low effectiveness against influenza A(H1N1)pdm09 in the United States during the 2013–14 and 2015–16 seasons, for the 2016–17 season, ACIP made the interim recommendation that LAIV4 should not be used. For the most up to date seasonal vaccine information, visit <https://www.cdc.gov/flu/protect/vaccine/index.htm>

### Education


Take every day preventative actions to stop the spread of influenza.

- Try to avoid contact with sick people.
- If you are sick with influenza-like illness, stay home for at least 24 hours after your fever is gone (without the use of fever-reducing medicine) except to get medical care or for other necessities.
- While sick, limit contact with others as much as possible to keep from infecting them.
- Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in the trash after you use it.
- Wash your hands often with soap and water. If soap and water are not available, use an alcohol-based hand rub.
- Avoid touching your eyes, nose, and mouth.
- Persons at high risk for influenza complications who become ill with influenza-like illness should call their health care provider as soon as possible to determine if they need antiviral treatment. Early treatment (within 48 hours of the onset of illness) with antiviral medications can decrease the risk of severe illness from influenza.

### Treatment/Chemoprophylaxis

Influenza antiviral prescription drugs can be used to treat influenza or to prevent illness. In the United States, five licensed antiviral medications are approved for treatment and chemoprophylaxis of influenza. Currently, neuraminidase inhibitors (oseltamivir, zanamivir, peramivir) are the only recommended influenza antiviral drugs because of widespread resistance to the adamantanes (amantadine, rimantadine) among influenza viruses. Antiviral resistance to oseltamivir, zanamivir, and peramivir among circulating influenza viruses is currently low, but this could change. The neuraminidase inhibitors are effective against influenza A and B viruses while the adamantanes are effective only against influenza A viruses.




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Treatment: Early antiviral treatment can shorten the duration of fever and illness symptoms, and may reduce the risk of complications from influenza. Clinical benefit is greatest when antiviral treatment is administered early, especially within 48 hours of influenza illness onset. Decisions about starting antiviral treatment should not wait for laboratory confirmation of influenza. Antiviral treatment is recommended as early as possible for any patient with confirmed or suspected influenza who is hospitalized, has severe, complicated, or progressive illness, or is at higher risk for influenza complications. Persons at higher risk for influenza complications recommended for antiviral treatment include:

- Children aged younger than 2 years
- Adults aged 65 years and older
- Persons with chronic pulmonary (including asthma), cardiovascular (except hypertension alone), renal, hepatic, hematological (including sickle cell disease), and metabolic disorders (including diabetes mellitus), or neurologic and neurodevelopment conditions (including disorders of the brain, spinal cord, peripheral nerve, and muscle, such as cerebral palsy, epilepsy [seizure disorders], stroke, intellectual disability [mental retardation], moderate to severe developmental delay, muscular dystrophy, or spinal cord injury)
- Persons with immunosuppression, including that caused by medications or by human immunodeficiency virus (HIV) infection
- Women who are pregnant or postpartum (within 2 weeks after delivery)
- Persons aged younger than 19 years who are receiving long-term aspirin therapy
- American Indians/Alaska Natives
- Persons who are morbidly obese (i.e., body mass index is equal to or greater than 40)
- Residents of nursing homes and other chronic care facilities

Chemoprophylaxis: Annual influenza vaccination is the best way to prevent influenza because vaccination can be given well before influenza virus exposures occur, and can provide safe and effective immunity throughout the influenza season. Antiviral medications are approximately 70-90 % effective in preventing influenza. Widespread or routine use of antiviral medications for chemoprophylaxis is not recommended so as to limit the possibilities that antiviral resistant viruses could emerge. Antiviral chemoprophylaxis generally is not recommended if more than 48 hours have elapsed since the first exposure to an infectious person. The following are examples of situations where antiviral medications can be considered for chemoprophylaxis to prevent influenza:

- Prevention of influenza in persons at high risk of influenza complications during the first two weeks following vaccination after exposure to an infectious person
- Prevention for people with severe immune deficiencies or others who might not respond to influenza vaccination, such as persons receiving immunosuppressive medications, after exposure to an infectious person
- Prevention for people at high risk for complications from influenza who cannot receive influenza vaccine due to a contraindication after exposure to an infectious person

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- Prevention of influenza among residents of institutions, such as long-term care facilities, during influenza outbreaks in the institution

For current recommendations about treatment and chemoprophylaxis, see <http://www.cdc.gov/flu/professionals/antivirals/index.htm>.

## **Laboratory Procedures**


- **Polymerase-chain Reaction (PCR):** PCR is the most sensitive method for the detection of influenza viruses and the gold standard for influenza diagnosis. PCR tests can detect influenza virus genomes even when they are present at very low levels and can provide rapid identification of viruses.
- **Viral Culture:** Viral isolation is essential for influenza surveillance. Viral culture testing may take up to 3 weeks for strain identification; therefore it is not suitable for diagnosis in determining treatment options. Virus isolation has the advantage of producing quantities of virus sufficient for full antigenic characterization, which is required for determining vaccine match, and conducting testing for antiviral resistance.
- **Rapid Influenza Diagnostic Test (RIDT):** RIDTs test for the presence of viral antigens but are less sensitive than PCR testing. RIDTs can produce quick results in less than 30 minutes and are simple to perform. The sensitivity and specificity of these rapid tests is usually dependent on the type of test, the quality of specimen collected, the time it was collected and on the amount of virus collected in the specimen. Currently available RIDTs fall into two groups that can either detect the presence of an influenza A or B virus but cannot differentiate between the two, or detect both influenza type A and B viruses and distinguish between the two. No RIDT can currently provide information on virus subtypes or strains.
- **Serology:** Serology may be used for laboratory confirmation of influenza, but is not the recommended procedure for routine diagnosis. If a unique or a new strain (subtype) of influenza virus is suspected, this method may prove valuable. The laboratory diagnosis will be based on a four-fold rise in antibody titer between the acute and convalescent specimens of serum.
- **Immunofluorescent Antibody Staining:** Cells from respiratory specimens can be stained using an immunofluorescent antibody that reveals the presence of viral antigen using a fluorescent microscope.
- **Immunohistochemical (IHC) Staining:** IHC staining for influenza viral antigens can be performed in respiratory tract tissue.

## **Missouri State Public Health Laboratory (MSPHL) Procedures**

Laboratory testing at the MSPHL is limited to sentinel sites and outbreak investigations. Routine laboratory testing is not provided.

If an outbreak is reported at a school, hospital, nursing home, or other group setting, contact the [District Communicable Disease Coordinator](#) or the [District Senior Epidemiology Specialist](#) to arrange for respiratory specimen collection kits to be sent to the facility from the MSPHL.

Instruct the facility to properly collect specimens from symptomatic patients, residents or staff, and send the specimens back to the MSPHL for testing. Specimen types acceptable for RT-PCR

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testing include nasopharyngeal swabs, nasal swabs, throat swabs, nasal aspirates, nasal washes, dual nasopharyngeal/throat swabs, bronchoalveolar lavage, bronchial wash, tracheal aspirate, sputum, lung tissue, and specimens from viral culture.

Specimens should be collected in the acute stage of the illness, kept in viral transport media only, and refrigerated immediately. Specimens should be stored at refrigerator temperature (2-8°C) pending shipment and should be shipped on refrigerant packs to the MSPHL as soon as possible. Whenever possible, specimens should be shipped so they will not arrive in the laboratory over the weekend or on a holiday. Specimens that are not received within three days of collection will not be tested unless stored at -70°C and shipped on dry ice. View the [“Collection and Submission of Seasonal Influenza Specimens”](#) for more information. Postage-paid mailers are provided to sentinel sites and facilities experiencing outbreaks, and the state laboratory courier service is provided free-of charge. Be sure to label the specimen with the date of collection and the patient’s name. Any specimens that are received by the laboratory without patient names will be discarded without testing.

All specimens are tested by both polymerase chain reaction (PCR) and viral culture. Regardless of the PCR result, viral isolation will still be performed on the specimen since an isolate is still needed to do further antigenic typing. Viral culture testing may take up to 3 weeks for strain identification; therefore it is not suitable for diagnosis in determining treatment options. PCR results will be reported within a week from when the specimen is received. PCR testing is used to quickly identify influenza outbreaks or novel strains of influenza that may be circulating.


Questions regarding [seasonal influenza testing](#) or [avian influenza testing](#) may be directed to the MSPHL at 573-751-3334.

### **Reporting Requirements**

Laboratory-positive influenza is a Category 4 reportable disease and shall be reported directly to DHSS weekly. Influenza-associated mortality, influenza-associated public and/or private school closures, novel influenza A virus infections, and influenza-associated outbreaks are Category 2 reportable diseases and shall be reported to the local health authority or to DHSS within one (1) calendar day of first knowledge or suspicion by telephone, facsimile or other rapid communication. Contact the [District Communicable Disease Coordinator](#), the [District Senior Epidemiology Specialist](#), or DHSS – BCDCP, phone (573) 751-6113, fax (573) 526-0235, or for afterhours notification contact the ERC at (800) 392-0272 (24/7).

As Nationally Notifiable Conditions, confirmed cases of influenza-associated pediatric mortality and probable and confirmed cases of novel influenza A virus infections are a **STANDARD** report to CDC. DHSS will submit these reports to CDC by electronic case notification (WebSurv) within the next reporting cycle.

1. **Laboratory-positive influenza** cases are reported in aggregate through WebSurv by local public health agencies (LPHAs). Results by laboratories other than the MSPHL are part of the aggregate report. All laboratory-positive influenza shall be reported on a weekly basis in aggregate form to the local health authority year round. Reporting forms can be found online


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at <http://health.mo.gov/emergencies/ert/med/seasonal.php>. *NOTE: Influenza A (H1N1)pdm09 virus is considered the circulating seasonal influenza A virus and should be entered in the Aggregate Reporting tab in WebSurv as Influenza A.* Confirmed influenza cases identified by the MSPHL will be entered into WebSurv by name with the influenza A virus subtype or influenza B virus lineage identified, if known. The cases will be entered with a “confirmed” status and a “closed” resolution. These cases are available for review through the notification function in WebSurv.

2. For all cases of **influenza-associated mortality**, complete a “[Disease Case Report](#)” (CD-1) and an “[Influenza-Associated Mortality Case Report](#)”. Isolates or specimens positive for influenza from these patients should be sent to the MSPHL for further testing. Entry of the completed Disease Case Report (CD-1) into WebSurv negates the need for the form to be forwarded to the District Health Office. Forward the supplemental form to the [District Communicable Disease Coordinator](#) or the [District Senior Epidemiology Specialist](#).
3. For all confirmed and probable cases of **novel influenza A virus infection**, complete a “[Disease Case Report](#)” (CD-1) and a “[Human Infection with Novel Influenza A Virus Case Report Form](#)”. Any suspect novel influenza respiratory specimens or any unsubtypeable influenza A viruses should be sent to the MSPHL for further testing. Consultation with MSPHL is required before sending these specimens. Entry of the completed Disease Case Report (CD-1) into WebSurv negates the need for the form to be forwarded to the District Health Office. Forward the supplemental form to the [District Communicable Disease Coordinator](#) or the [District Senior Epidemiology Specialist](#).
4. For all **outbreaks** or “suspected” outbreaks, complete the “[Missouri Outbreak Surveillance Form](#)” (CD-51). For school or child care outbreaks/closures, complete the “[Influenza Outbreak/School Closure Information Form](#)”. For outbreaks in health care facilities, nursing homes, residential care facilities or rehabilitation facilities, complete the “[Institutional Influenza Investigation Report](#)”. Forward the completed forms to the [District Communicable Disease Coordinator](#) or the [District Senior Epidemiology Specialist](#).
5. An **outbreak summary** should be submitted within 90 days from the conclusion of an outbreak to the District Communicable Disease Coordinator or the District Senior Epidemiology Specialist.

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6. Centers for Disease Control and Prevention. Manual for the surveillance of vaccine-preventable diseases. Centers for Disease Control and Prevention, Atlanta, GA, 2008. <http://www.cdc.gov/vaccines/pubs/surv-manual/chpt06-influenza.html>
7. Morbidity and Mortality Weekly Report (MMWR), “Prevention and Control of Influenza with Vaccines Recommendations of the Advisory Committee on Immunization Practices, United States, 2016-17 Influenza Season”. <http://www.cdc.gov/mmwr/volumes/65/rr/rr6505a1.htm>
8. Centers for Disease Control and Prevention, “Influenza (flu)”. <http://www.cdc.gov/flu/>

## **Resources**

National Flu Surveillance

<http://www.cdc.gov/flu/weekly/fluactivitysurv.htm>

Toolkit for Long-Term Care Employers

<http://www.cdc.gov/flu/toolkit/long-term-care/index.htm>

Interim Guidance for Influenza Outbreak Management in Long-Term Care Facilities

<http://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm>

Information for School and Childcare Providers

<https://www.cdc.gov/flu/school/index.htm>

Information for Businesses and Employers

<https://www.cdc.gov/flu/business/index.htm>

Avian Influenza

<http://www.cdc.gov/flu/avianflu/index.htm>


Swine/Variant Influenza

<http://www.cdc.gov/flu/swineflu/index.htm>

Pandemic Influenza

<http://www.cdc.gov/flu/pandemic-resources/index.htm>



	Division of Community and Public Health	
	<b>Section: 4.0 Diseases and Conditions</b>	Updated 6/17
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### Sample Letter to Parents

[Date]

Dear Parent/Guardian,

Your child may have been exposed to influenza (flu) at school. The flu is a contagious respiratory illness caused by influenza viruses. Flu viruses are spread from person-to-person through the air by coughing or sneezing. A person might also get flu by touching a surface or object that has flu virus on it and then touching their own nose or mouth. Flu symptoms can include fever, cough, sore throat, runny or stuffy nose, muscle or body aches, headache, chills, and fatigue. People with the flu may be able to infect others from 1 day before getting sick to 5 to 7 days after becoming sick. Children may pass the virus for longer than 7 days.

If your child develops flu-like symptoms, keep them home from school until at least 24 hours after they no longer have a fever without the use of fever-reducing medicine. Make sure your child gets plenty of rest and drinks enough fluids. Talk to your doctor if you are worried about your child's illness. Antiviral drugs are prescription medications that can be used to treat flu in persons who are at high risk for flu complications.

In addition, take the following everyday preventative actions to stop the spread of flu:

- **Stay home when you are sick.** If possible, stay home from work, school, and errands when you are sick. You will help prevent others from catching your illness.
- **Avoid close contact with people who are sick.**
- **Cover your nose and mouth** with a tissue when you cough or sneeze. Throw the tissue away after use and wash your hands. If a tissue is not available, cover your mouth and nose with your sleeve, not your hand.
- **Wash your hands often with soap and water**, especially after you cough or sneeze. If soap and water are not available, use an alcohol-based handrub.
- **Avoid touching your eyes, nose, or mouth.**
- **Clean and disinfect surfaces or objects.** Clean and disinfect frequently touched surfaces at home, work or school, especially when someone is ill.

Remember the best way to protect against the flu is to get vaccinated each flu season. Seasonal flu vaccination is recommended for everyone 6 months of age and older unless they have a specific contraindication to flu vaccine.

For more information, visit <http://www.cdc.gov/flu/index.htm> or call your local county health department at [insert contact information].