



# INFLUENZA (Individual Cases and Outbreaks)

## (also see Respiratory Disease Outbreaks)

1. **Agent:** Influenza viruses A, B, and C. Only influenza A and B are of public health concern since they are responsible for epidemics.
2. **Identification:**
  - a. **Symptoms:** Acute onset of fever >100°F (38°C), non-productive cough, sore throat, chills, headache, myalgia, and malaise. Can also cause gastrointestinal (GI) symptoms. Duration is 2-4 days in uncomplicated cases, with recovery usually in 5-7 days. Infection with non-human strains of influenza such as avian influenza viruses theoretically may cause other illness, such as conjunctivitis, gastroenteritis or hepatitis.
  - b. **Differential Diagnosis:** Other agents that cause febrile respiratory illnesses or community acquired pneumonia including but not limited to *Mycoplasma pneumoniae*, adenovirus, respiratory syncytial virus, rhinovirus, parainfluenza viruses, *Legionella* spp., and severe acute respiratory syndrome (SARS) coronavirus.
  - c. **Diagnosis:** Clinical syndrome associated with community outbreaks, confirmed by viral isolation, PCR, rapid antigen test, or a DFA/IFA test. See Table 1 for comparison of tests.
3. **Incubation:** 1-4 days; average 2 days.
4. **Reservoir:** Humans, possibly swine, and migratory birds.
5. **Source:** Largely droplet spread by nasal and pharyngeal secretions, fomites.
6. **Transmission:** Droplet spread by contact with aerosolized droplets or contaminated fomites from infective persons. Possible airborne spread.
7. **Communicability:** People infected with seasonal and novel H1N1 flu shed virus and may be able to infect others from 1 day before getting sick to 5 to 7 days after. This can be longer in some people, especially children and people with weakened immune systems and in

people infected with the new H1N1 virus. See <http://www.cdc.gov/h1n1flu/ga.htm>.

8. **Specific Treatment:** Supportive care, e.g., rest, antipyretics, fluids, etc. Antiviral medications may reduce the severity and duration of influenza illness if administered within 48 hours of onset. These same medications are especially useful if case was unvaccinated or if vaccine does not cover circulating strain.

Streptococcal and staphylococcal pneumonias are the most common secondary complications and should be treated with appropriate antibiotics.

9. **Immunity:** Permanent for a specific strain.

### REPORTING PROCEDURES

#### 1. Outbreaks reportable:

- a. Under Title 17, Section 2500, *California Code of Regulations* all outbreaks are reportable.

Influenza outbreaks are often reported as acute febrile respiratory infection (AFRI) clusters until laboratory testing confirms influenza as the etiology. AFRI is defined as any illness with a fever of at least 100°F accompanied by a cough or a sore throat in the absence of a known cause.

A cluster or outbreak in a congregate-living facility (e.g., jail, juvenile hall, camps, assisted living centers) is defined as three or more cases of AFRI occurring within 48 to 72 hours, in residents who are in close proximity to each other (i.e., in the same area of the facility).

A cluster or outbreak in schools and daycare centers (i.e., community-based) is defined as a sudden increase of AFRI cases over the normal background rate or 5 cases of AFRI in one week in an epidemiologically linked group (such as a sports team, single classroom, after school group).



***Special Situation:*** One case of confirmed influenza by any testing method in a long-term care facility resident is to be considered an outbreak by definition and should prompt enhanced surveillance for other cases.

- b. **Pediatric Deaths reportable.** Under Title 17, Section 2500, *California Code of Regulations*, pediatric influenza-associated deaths Case must be 0-17 years old, have died and have 1) confirmed influenza by laboratory testing; and 2) a clinical syndrome consistent with influenza or complications of influenza (pneumonia, ARDS, apnea, cardio-pulmonary arrest, myocarditis, Reye syndrome or acute CNS symptoms (e.g., seizures, encephalitis).
- c. All “**unusual**” **diseases** are reportable under Title 17, Section 2500, *California Code of Regulations*, which may include novel strains of influenza (example: pandemic [H1N1] 2009).
- d. **Human cases of avian influenza reportable.** Possible human cases of avian influenza are also reportable under Title 17, Section 2500 and 2500, *California Code of Regulations*. The case definition will vary depending on the extent of confirmed avian influenza in birds elsewhere in the world. Typical risks will include exposure to sick birds in those regions or a history of contact with a known or suspected human case of avian influenza within 10 days of symptom onset. Check the web sites of the World Health Organization [http://www.who.int/csr/disease/avian\\_influenza/en/](http://www.who.int/csr/disease/avian_influenza/en/) or Centers for Disease Control & Prevention <http://www.cdc.gov/flu/avian/gen-info/avian-flu-humans.htm> for current countries at risk.  
  
**Note:** Since the epidemiologic factors associated with human risk for avian influenza are constantly changing, any suspected case should be reported immediately to Acute Communicable Disease Control (213-240-7941).
- e. **Other cases reportable.** To address the evolving epidemiology of severe influenza, as of August 6, 2009, all cases of influenza in any age resulting in ICU admission or death, are reportable to LAC DPH.

Hospitals are also asked to report aggregate numbers of hospitalized patients with influenza (non-ICU/deaths). These reporting requirements may change as circumstances change. Staff are encouraged to check the ACDC Influenza website for updated information: <http://lapublichealth.org/acd/Flu.htm>.

## 2. Report Forms: SEE TABLE 3

- a. Use the following forms for outbreaks at various settings.

For initial and final reports of sub-acute healthcare facility influenza outbreaks:  
**CD OUTBREAK INVESTIGATION — SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, 5/08)**  
<http://publichealth.lacounty.gov/acd/EpiForms/CD%20Outbreak%20Investigation%20-%20Sub-Acute-%20H-1164-SubAcute.pdf>

ACDC reports these to the State by completing the CDPH Congregate-Living Setting Outbreak Form with attachment of H-1164 form.

For initial report of a non-healthcare facility (congregate-living or community-based) influenza outbreak:  
**INITIAL OUTBREAK FORM FOR SCHOOL/DAYCARE SETTINGS (acdcoobschdc 3/09)**  
<http://lapublichealth.org/acd/EpiForms/acd-obschdc.pdf> **and**  
**OUTBREAK WORKSHEET FOR SCHOOL/DAYCARE SETTINGS (7/08)**  
<http://lapublichealth.org/acd/EpiForms/acd-obworksheet.pdf>.

For final report of an influenza outbreak in congregate-living facility (jail, juvenile hall, camps, assisted living centers):  
**AFRI AND/OR ACUTE INFECTIOUS PNEUMONIA CONGRGATE-LIVING SETTINGS OUTBREAK REPORT FORM (CDPH 9001 10/08)**  
[http://lapublichealth.org/acd/EpiForms/Acute%20AFRI\\_Inf%20Pneumonia%20Congregate%20OB-CDPH%209001.pdf](http://lapublichealth.org/acd/EpiForms/Acute%20AFRI_Inf%20Pneumonia%20Congregate%20OB-CDPH%209001.pdf)

For final report of an influenza outbreak in a community-based setting (schools, daycares): **AFRI AND/OR ACUTE INFECTIOUS PNEUMONIA COMMUNITY-**



**BASED SETTINGS OUTBREAK REPORT  
(CDPH 9000 10/08)**  
[http://lapublichealth.org/acd/EpiForms/Acute%20FRI\\_Inf%20Pneumonia%20Community%20OB-CDPH%209000.pdf](http://lapublichealth.org/acd/EpiForms/Acute%20FRI_Inf%20Pneumonia%20Community%20OB-CDPH%209000.pdf)

- b. For single cases of fatal influenza pediatric case (less than 18 years old):  
**PEDIATRIC SEVERE INFLUENZA CASE REPORT FORM (acd-pedinflusec 10/08)**  
<http://lapublichealth.org/acd/EpiForms/Influenza-Pediatric%20Severe%20Case%20Report.pdf>

**PEDIATRIC INFLUENZA-ASSOCIATED DEATH SUPPLEMENTAL FORM (acd-pedinfludeath 10/08)**  
<http://lapublichealth.org/acd/EpiForms/Influenza-Pediatric%20Death%20Supplemental%20.pdf>

- c. For single cases of pandemic (H1N1) 2009 leading to ICU admission or death:  
**NOVEL INFLUENZA A (H1N1) CASE REPORT FORM (HOSPITALIZED AND FATAL CASES) (ACDCH1N1influ 7/09)**  
[http://lapublichealth.org/acd/EpiForms/acd-H1N1influ706\\_09.pdf](http://lapublichealth.org/acd/EpiForms/acd-H1N1influ706_09.pdf)
- d. For suspected or confirmed human cases of avian influenza:  
**AVIAN (H5N1) INFLUENZA SUSPECT CASE SCREENING FORM (acd-avianflu 06/06)**  
[http://publichealth.lacounty.gov/acd/EpiForms/Influenza,%20Avian%20\(H5N1\)%20Suspect%20Case%20Screening-acd-avianflu.pdf](http://publichealth.lacounty.gov/acd/EpiForms/Influenza,%20Avian%20(H5N1)%20Suspect%20Case%20Screening-acd-avianflu.pdf)

### 3. Epidemiologic Data for Outbreaks:

- a. Make a case definition: include pertinent clinical symptoms and laboratory data (if appropriate).
- b. Confirm etiology of outbreak using laboratory data (rapid test, culture, or PCR).
- c. Create line list including:
- names of patients with Influenza-Like Illness (ILI)
  - dates of onset of ILI
  - symptoms

- age
  - hospitalization status
  - results of laboratory tests
  - prior immunization history
  - travel history if relevant
  - epi links to other cases (room #s, grades in school, etc)
- d. Create epi-curve, by date on onset, of all cases of ILI during the outbreak. Only put those on the epi-curve that meet the case definition.
- e. Maintain surveillance for new cases until rate of AFRI is down to “normal” or no new cases for 1 week.
- f. (For avian influenza) exposure to domestic or wild birds or their products and/or exposure to a known or suspected human case of avian influenza within 10 days of symptom onset and/or travel history.

### CONTROL OF CASE, CONTACTS & CARRIERS

#### CASE:

**Precautions:** None. Advise patients to stay away from work, schools, camps, and mass gatherings for at least 24 hours after resolution of fever. Limit exposure to others, especially those at high risk for complications.

Advise patients with ILI who work in health care settings not to return to work until 7 days after symptom onset or 24 hours after resolution of symptoms, whichever is longer.

Four licensed influenza antiviral agents are available in the United States: amantadine, rimantadine, zanamivir, and oseltamivir (Table 2). Influenza A virus resistance to amantadine and rimantadine can emerge rapidly during treatment. On the basis of antiviral testing results conducted at CDC and in Canada indicating high levels of resistance, ACIP recommends that neither amantadine nor rimantadine be used for the treatment or chemoprophylaxis of influenza A in the United States until susceptibility to these antiviral medications has been re-established among circulating influenza A viruses. Oseltamivir or zanamivir can be prescribed if antiviral treatment of influenza is indicated. Oseltamivir is approved for treatment of persons aged  $\geq 1$  year, and zanamivir is approved for treatment of persons aged  $\geq 7$  years.



In April 2009, oseltamivir use for treatment of Novel H1N1 for children less than 1 year old was approved by the FDA under an Emergency Use Authorization (EUA)

<http://www.fda.gov/downloads/Drugs/DrugSafety/InformationbyDrugClass/UCM153546.pdf>

Oseltamivir and zanamivir can be used for chemoprophylaxis of influenza; oseltamivir is licensed for use in persons aged  $\geq 1$  year, and zanamivir is licensed for use in persons aged  $\geq 5$  years. Only zanamivir and oseltamivir have been shown to be effective for type B viruses, and the recommended age for treatment and prevention varies among the available drugs.

See CDC for additional information about the use of antivirals for treatment and prophylaxis:

- [www.cdc.gov/flu/protect/antiviral/](http://www.cdc.gov/flu/protect/antiviral/)
- [www.cdc.gov/mmwr/preview/mmwrhtml/rr5510a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5510a1.htm)

**CONTACTS:** No restrictions.

Prophylaxis with appropriate antiviral medication (Table 2) during outbreaks is advised for high-risk patients who have not been vaccinated or when the vaccine is of questionable efficacy.

**CARRIERS:** Not applicable.

#### GENERAL CONTROL RECOMMENDATIONS FOR OUTBREAKS

1. Reinforce good hand hygiene among all (including visitors, staff, and residents/students).
2. Emphasize respiratory etiquette (cover cough and sneezes, dispose of tissues properly).
3. Provide posters and health education about hand hygiene and respiratory etiquette.
4. Encourage reduction of sharing water bottles or water fountains.
5. Emphasize importance of early detection of cases and removing them from contact with others.
6. Encourage regular environmental cleaning with EPA registered disinfectant appropriate for influenza viruses.
7. Consider isolation and/or cohorting and/or quarantine for congregate-living facilities.
8. Consider canceling group activities.
9. Consider post-exposure prophylaxis with antiviral medications for high-risk contacts.

\*\*\*Note that decision on what antiviral to use needs to be made on a case by case basis, depending on the strain of influenza causing the outbreak.\*\*\*

10. Consider using influenza vaccine to control situation (consult with ACDC).

Consider the additional following recommendations for congregate-living facilities, especially with high risk patients:

1. Close facility or affected areas to new admissions until 1 week after last case.
2. Suspend group activities until 1 week after last case.
3. If possible, separate staff that cares for sick from staff that cares for well patients.
4. Institute droplet precautions.
5. Refer to California Department of Public Health. *Recommendations for the Prevention and Control of Influenza in California Long-Term Care Facilities, 2008-2009* at [http://www.cahfdownload.com/cahf/dpp/Attachment2008\\_InfluenzaGuidelines.pdf](http://www.cahfdownload.com/cahf/dpp/Attachment2008_InfluenzaGuidelines.pdf).
6. Strongly consider using antiviral post-exposure prophylaxis or vaccine to control outbreak (see end of this chapter for more information on use of post exposure prophylaxis in congregate-living facilities)

\*\*\*Note that decision on what antiviral to use needs to be made on a case by case basis, depending on the strain of influenza causing the outbreak.\*\*\*

#### DIAGNOSTIC PROCEDURES

Clinical and epidemiologic history required to aid in laboratory test selection.

1. **Culture or PCR:** Ideally collect no later than 2 days after onset. Collect at least 5 specimens for any outbreak and select those patients with the most recent onset for specimen collection.

NOTE: culture should not be attempted when avian influenza is suspected. Contact Public Health Laboratory (PHL) or ACDC for instructions.

**Container:** Viral Culturette. Do NOT use wooden swab.



**Laboratory Form: Test Requisition and Report Form H-3021** or online request if electronically linked to the PHL.

**Examination Requested:** Respiratory virus culture or PCR for influenza.

**Material:** Nasopharyngeal swab preferred; NP wash or aspirate.

**Storage:** Keep refrigerated and upright. Deliver to PHL as soon as possible.

## PREVENTION/EDUCATION

1. Immunize high-risk persons and their close contacts (e.g., family members, health-care staff) according to ACIP recommendations (see ACDC or IP website). For seasonal flu, vaccine should be given in the fall before influenza season (December-March) begins.
2. Practice good personal hygiene, avoid symptomatic persons during outbreaks, and do not work or go to school when ill with a respiratory disease.
3. Do not give aspirin to children with influenza and other viral illnesses.
4. Postpone elective hospital admissions during epidemic periods, as beds may be needed for the ill.
5. At all healthcare facilities, restrict the movement of staff and visitors with respiratory infections.

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Additional information on the control of influenza during outbreaks, especially in healthcare facilities:

CDC. *Infection Control Guidance for the Prevention and Control of Influenza in Acute Care Facilities*. Available at:  
<http://www.cdc.gov/flu/professionals/infectioncontrol/healthcarefacilities.htm>

CDC. *Infection Control Measures for Preventing and Controlling Influenza Transmission in Long-Term Care Facilities*. Available at:  
<http://www.cdc.gov/flu/professionals/infectioncontrol/longtermcare.htm>

California Department of Public Health. *Recommendations for the Prevention and Control of Influenza in California Long-Term Care Facilities, 2008-2009* at  
[http://www.cahfdownload.com/cahf/dpp/Attachment2008\\_InfluenzaGuidelines.pdf](http://www.cahfdownload.com/cahf/dpp/Attachment2008_InfluenzaGuidelines.pdf)

Hospital Association of Southern California. *Recommended Management Actions to Prepare Hospitals for Overflow Situations in the Winter Season - White Paper*. Available at:  
<http://www.hasc.org/download.cfm?ID=15148>

CDC. Seasonal Influenza Information for Health Professionals. Available at:  
<http://www.cdc.gov/flu/professionals/index.htm>

CDC. Seasonal Influenza Information for Specific Groups. Available at:  
<http://www.cdc.gov/flu/groups.htm>

LAC. Acute Communicable Disease Control Program.  
<http://www.lapublichealth.org/acd/flu.htm>

Seasonal Influenza in Adults and Children—Diagnosis, Treatment, Chemoprophylaxis, and Institutional Outbreak Management: Clinical Practice Guidelines of the Infectious Diseases Society of America. *Clinical Infectious Diseases* 2009; 48:1003–32. Available at:  
<http://www.journals.uchicago.edu/doi/pdf/10.1086/598513?cookieSet=1>

**Excerpt:** Antiviral chemoprophylaxis may be considered for unvaccinated adults, including health care workers, and for children aged  $\geq 1$  year who are in close contact with persons at high risk of developing influenza complications during periods of influenza activity...Antiviral chemoprophylaxis and other control measures should be initiated in institutions, such as hospitals and long-term care facilities (e.g., nursing homes), when an influenza outbreak is detected or when influenza is strongly suspected but the etiology of the outbreak has yet to be determined.

CDC. Prevention and Control of Influenza. August 8, 2008 / 57(RR07);1-60 Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2008. Available at:  
<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5707a1.htm>

**Excerpt:** To reduce the spread of virus to persons at high risk, chemoprophylaxis during peak influenza activity can be considered for



unvaccinated persons who have frequent contact with persons at high risk. Persons with frequent contact might include employees of hospitals, clinics, and chronic-care facilities, household members, visiting nurses, and volunteer workers. If an outbreak is caused by a strain of influenza that might not be covered by the vaccine, chemoprophylaxis can be considered for all such persons, regardless of their vaccination status.

### **Control of Influenza Outbreaks in Institutions**

Use of antiviral drugs for treatment and chemoprophylaxis of influenza is a key component of influenza outbreak control in institutions. In addition to antiviral medications, other outbreak-control measures include instituting droplet precautions and establishing cohorts of patients with confirmed or suspected influenza, re-offering influenza vaccinations to unvaccinated staff and patients, restricting staff movement between wards or buildings, and restricting contact between ill staff or visitors and patients. Both adamantanes and neuraminidase inhibitors have been successfully used to control outbreaks caused by antiviral susceptible strains when antivirals are combined with other infection control measures.

When confirmed or suspected outbreaks of influenza occur in institutions that house persons at high risk, chemoprophylaxis with a neuraminidase inhibitor medication should be started as early as possible to reduce the spread of the virus. In these situations, having pre-approved orders from physicians or plans to obtain orders for antiviral medications on short notice can substantially expedite administration of antiviral medications. Specimens should be collected from ill cases for viral culture to assess antiviral resistance and provide data on the outbreak viruses. Chemoprophylaxis should be administered to all eligible residents, regardless of whether they received influenza vaccinations during the previous fall, and should continue for a minimum of 2 weeks. If surveillance indicates that new cases continue to occur, chemoprophylaxis should be continued until approximately 7-10 days after illness onset in the last patient. Chemoprophylaxis also can be offered to unvaccinated staff members who provide care to persons at high risk. Chemoprophylaxis should be considered for all employees, regardless of their vaccination status, if indications exist that the outbreak is caused by a strain of influenza virus that is not well-matched by the vaccine.



**Table 1: Influenza Diagnostic Table\*<sup>1</sup>**

Procedure	Influenza Types Detected	Acceptable Specimens	Time for Results	Point-of-care market
Viral culture	A and B	NP swab <sup>2</sup> , throat swab, nasal wash, bronchial wash, nasal aspirate, sputum	5-10 days <sup>3</sup>	No
Immunofluorescence	A and B	NP swab <sup>2</sup> , nasal wash, bronchial wash, nasal aspirate, sputum	2-4 hours	No
Influenza Enzyme Immunoassay (EIA)	A and B	NP swab <sup>2</sup> , throat swab, nasal wash, nasal aspirate	2 hours	No
Directigen Flu A (Becton-Dickinson)	A	NP swab <sup>2</sup> , throat swab, nasal wash, nasal aspirate	<30 minutes	Yes
Directigen Flu A+B (Becton-Dickinson)	A and B	NP swab <sup>2</sup> , throat swab, nasal wash, nasal aspirate	<30 minutes	Yes
FLU OIA (Biostar)	A and B <sup>4</sup>	NP swab <sup>2</sup> , throat swab, nasal aspirate, sputum	<30 minutes	Yes
Quick Vue (Quidel)	A and B <sup>4</sup>	NP swab <sup>2</sup> , nasal wash, nasal aspirate	<30 minutes	Yes
Zstat Flu (ZymeTx)	A and B <sup>4</sup>	throat swab	<30 minutes	Yes
RT-PCR <sup>5</sup>	A and B	NP swab <sup>2</sup> , throat swab, nasal wash, bronchial wash, nasal aspirate, sputum	1-2 days	No
Serology	A and B	paired acute and convalescent serum samples <sup>6</sup>	>2 weeks	No

\* From [www.cdc.gov/flu/professionals/labdiagnosis.htm](http://www.cdc.gov/flu/professionals/labdiagnosis.htm)  
 1. List may not include all test kits approved by the U.S. Food and Drug Administration. Use of trade names or commercial sources is for identification only and does not imply endorsement by the Department of Health Services.  
 2. NP = nasopharyngeal  
 3. Shell vial culture, available in PHL, may reduce time for results to 2 days.  
 4. Does not distinguish between influenza A and B types.  
 5. RT-PCR = reverse transcriptase polymerase chain reaction  
 6. A fourfold or greater rise in antibody titer from the acute-phase (collected within the first week of illness) to the convalescent-phase sample (collected 2-4 weeks after the acute sample) is indicative of recent infection.

Also note: Evaluation of Rapid Influenza Diagnostic Tests for Detection of Novel Influenza A (H1N1) Virus --- United States, 2009. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5830a2.htm>

**Table 2: Comparison of Antiviral Drugs for Influenza\***

Drug	Trade Name	Influenza Viral Type	Treatment Age	Prevention Age
amantadine	Symmetrel®	A	≥ 1 year	≥ 1 year
rimantadine	Flumadine®	A	≥ 13 years	≥ 1 year
zanamivir	Relenza®	A and B	≥ 7 year	≥ 1 year
oseltamivir	Tamiflu®	A and B	≥ 1 year	≥ 1 year

\* Adapted from [www.cdc.gov/flu/professionals/antiviralback.htm#table1](http://www.cdc.gov/flu/professionals/antiviralback.htm#table1). For more information about antivirals, visit [www.cdc.gov/flu/protect/antiviral](http://www.cdc.gov/flu/protect/antiviral)



## AVIAN INFLUENZA

The natural hosts for influenza A principally are aquatic birds. Other birds, pigs, horses, and humans may become infected with avian strains. There are at least 16 distinct hemagglutinin antigens found in aquatic birds. Present concern is with the H5N1 influenza variant that first arose in Hong Kong in 1997, when it caused severe respiratory disease in 18 humans, 6 of whom died. The infection of humans coincided with an epidemic of highly pathogenic avian influenza caused by the same strain in Hong Kong's poultry population. Extensive investigation of that outbreak determined that close contact with live infected poultry was the source of human infection. Studies at the genetic level further determined that the virus had jumped directly from birds to humans. Limited transmission to health care workers occurred, but did not cause severe disease.

That event alarmed public health authorities, as it marked the first time that an avian influenza virus was transmitted directly to humans and caused

severe illness with high mortality. Alarm mounted again in February 2003, when an outbreak of H5N1 avian influenza in Hong Kong caused 2 cases and 1 death in members of a family who had recently traveled to southern China. Another child in the family died during that visit, but the cause of death is not known.

Two other avian influenza viruses have recently caused illness in humans. An outbreak of highly pathogenic H7N7 avian influenza, which began in the Netherlands in February 2003, caused the death of one veterinarian and mild illness in 83 other humans. Mild cases of avian influenza H9N2 in children occurred in Hong Kong in 1999 (two cases) and in mid-December 2003 (one case). H9N2 is not highly pathogenic in birds.

For more information about avian influenza, visit: [www.cdc.gov/flu/avian/gen-info/avian-flu-humans.htm](http://www.cdc.gov/flu/avian/gen-info/avian-flu-humans.htm)

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### Why H5N1 is of particular concern.

Of the 16 avian influenza virus hemagglutinin A subtypes, H5N1 is of particular concern for several reasons. H5N1 mutates rapidly and has a documented propensity to acquire genes from viruses infecting other animal species. Its ability to cause severe disease in humans has now been documented on two occasions. In addition, laboratory studies have demonstrated that isolates from this virus have a high pathogenicity and can cause severe disease in humans. Birds that survive infection excrete virus for at least 10 days, orally and in feces, thus facilitating further spread at live poultry markets and by migratory birds.

The epidemic of highly pathogenic avian influenza caused by H5N1, which began in mid-December 2003 in the Republic of Korea and is now being seen in other Asian countries, is therefore of particular public health concern. H5N1 variants demonstrated a capacity to directly infect humans in 1997, and have done so again in Viet Nam in January 2004. The spread of infection in birds increases the opportunities for direct infection of humans. If more humans become infected over time, the likelihood also increases that humans, if

concurrently infected with human and avian influenza strains, could serve as the "mixing vessel" for the emergence of a novel subtype with sufficient human genes to be easily transmitted from person to person. Such an event would mark the start of an influenza pandemic.

Several measures can help minimize the global public health risks that could arise from large outbreaks of highly pathogenic H5N1 avian influenza in birds. An immediate priority is to halt further spread of epidemics in poultry populations. This strategy works to reduce opportunities for human exposure to the virus. Vaccination of persons at high risk of exposure to infected poultry, using existing vaccines effective against currently circulating human influenza strains, can reduce the likelihood of co-infection of humans with avian and influenza strains, and thus reduce the risk that genes will be exchanged. Workers involved in the culling of poultry flocks must be protected, by proper clothing and equipment, against infection. These workers should also receive antiviral drugs as a prophylactic measure.



When cases of avian influenza in humans occur, information on the extent of influenza infection in animals as well as humans and on circulating influenza viruses is urgently needed to aid the assessment of risks to public health and to guide the best protective measures. Thorough investigation of each case is essential. The successful containment of public health risks also depends on the epidemiological and laboratory capacity of affected countries and the adequacy of surveillance systems already in place. While all

these activities can reduce the likelihood that a pandemic strain will emerge, the question of whether another influenza pandemic can be averted cannot be answered with certainty.



**TABLE 3. INFLUENZA REPORTING FORMS**

SUB-ACUTE HEALTHCARE FACILITY	INITIAL REPORT	FINAL REPORT
	CD OUTBREAK INVESTIGATION – SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, 5/08) <a href="http://publichealth.lacounty.gov/acd/EpiForms/CD%20Outbreak%20Investigation%20-%20Sub-Acute-%20H-1164-SubAcute.pdf">http://publichealth.lacounty.gov/acd/EpiForms/CD%20Outbreak%20Investigation%20-%20Sub-Acute-%20H-1164-SubAcute.pdf</a>  ACDC reports these to the State by completing the CDPH Congregate-Living Setting Outbreak Form with attachment of H-1164 form.	CD OUTBREAK INVESTIGATION – SUB-ACUTE HEALTH CARE FACILITY (H-1164-SubAcute, 5/08) <a href="http://publichealth.lacounty.gov/acd/EpiForms/CD%20Outbreak%20Investigation%20-%20Sub-Acute-%20H-1164-SubAcute.pdf">http://publichealth.lacounty.gov/acd/EpiForms/CD%20Outbreak%20Investigation%20-%20Sub-Acute-%20H-1164-SubAcute.pdf</a>
NON-HEALTHCARE FACILITY	INITIAL REPORT	FINAL REPORT
<ul style="list-style-type: none"> <li>○ Congregate-Living (e.g., jail, juvenile hall, camps, assisted living center)</li> </ul>	INITIAL OUTBREAK FORM FOR SCHOOL/DAYCARE SETTINGS (acdc obschdc 3/09) <a href="http://lapublichealth.org/acd/EpiForms/acd-obschdc.pdf">http://lapublichealth.org/acd/EpiForms/acd-obschdc.pdf</a>	AFRI AND/OR ACUTE INFECTIOUS PNEUMONIA <i>CONGREGATE-LIVING</i> SETTINGS OUTBREAK REPORT FORM (CDPH 9001 10/08) <a href="http://lapublichealth.org/acd/EpiForms/Acute%20FRI_Inf%20Pneumonia%20Congregate%20OB-CDPH%209001.pdf">http://lapublichealth.org/acd/EpiForms/Acute%20FRI_Inf%20Pneumonia%20Congregate%20OB-CDPH%209001.pdf</a>
	OUTBREAK WORKSHEET FOR SCHOOL/DAYCARE SETTINGS (7/08) <a href="http://lapublichealth.org/acd/EpiForms/acd-obworksheet.pdf">http://lapublichealth.org/acd/EpiForms/acd-obworksheet.pdf</a>	
<ul style="list-style-type: none"> <li>○ Community-Based (e.g., school, daycare center)</li> </ul>	INITIAL OUTBREAK FORM FOR SCHOOL/DAYCARE SETTINGS (acdc obschdc 3/09) <a href="http://lapublichealth.org/acd/EpiForms/acd-obschdc.pdf">http://lapublichealth.org/acd/EpiForms/acd-obschdc.pdf</a>	AFRI AND/OR ACUTE INFECTIOUS PNEUMONIA <i>COMMUNITY-BASED</i> SETTINGS OUTBREAK REPORT (CDPH 9000 10/08) <a href="http://lapublichealth.org/acd/EpiForms/Acute%20FRI_Inf%20Pneumonia%20Community%20OB-CDPH%209000.pdf">http://lapublichealth.org/acd/EpiForms/Acute%20FRI_Inf%20Pneumonia%20Community%20OB-CDPH%209000.pdf</a>
	OUTBREAK WORKSHEET FOR SCHOOL/DAYCARE SETTINGS (7/08) <a href="http://lapublichealth.org/acd/EpiForms/acd-obworksheet.pdf">http://lapublichealth.org/acd/EpiForms/acd-obworksheet.pdf</a>	
SINGLE CASES OF FATAL INFLUENZA PEDIATRIC CASE (LESS THAN 18 YEARS OLD)	PEDIATRIC SEVERE INFLUENZA CASE REPORT FORM (acd-pedinflusec 10/08) <a href="http://lapublichealth.org/acd/EpiForms/Influenza-Pediatric%20Severe%20Case%20Report.pdf">http://lapublichealth.org/acd/EpiForms/Influenza-Pediatric%20Severe%20Case%20Report.pdf</a>	
	PEDIATRIC INFLUENZA-ASSOCIATED DEATH SUPPLEMENTAL FORM (acd-pedinfludeath 10/08) <a href="http://lapublichealth.org/acd/EpiForms/Influenza-Pediatric%20Death%20Supplemental%20.pdf">http://lapublichealth.org/acd/EpiForms/Influenza-Pediatric%20Death%20Supplemental%20.pdf</a>	
SINGLE CASES OF PANDEMIC (H1N1) 2009 LEADING TO ICU ADMISSION OR DEATH	NOVEL INFLUENZA A (H1N1) CASE REPORT FORM (HOSPITALIZED AND FATAL CASES) (ACDCH1N1influ 7/09) <a href="http://lapublichealth.org/acd/EpiForms/acd-H1N1influ706_09.pdf">http://lapublichealth.org/acd/EpiForms/acd-H1N1influ706_09.pdf</a>	
SUSPECTED OR CONFIRMED HUMAN CASES OF AVIAN INFLUENZA	AVIAN (H5N1) INFLUENZA SUSPECT CASE SCREENING FORM (acd-avianflu 06/06) <a href="http://publichealth.lacounty.gov/acd/EpiForms/Influenza,%20Avian%20(H5N1)%20Suspect%20Case%20Screening-acd-avianflu.pdf">http://publichealth.lacounty.gov/acd/EpiForms/Influenza,%20Avian%20(H5N1)%20Suspect%20Case%20Screening-acd-avianflu.pdf</a>	