



INFLUENZA (Outbreaks; hospitalized or fatal pediatric cases)

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 to 101-102°F, non-productive cough, sore throat, chills, headache, myalgia, malaise, and photophobia. Duration is 2-4 days in uncomplicated cases, with recovery in 5-7 days. Infection with non-human strains of influenza such as avian influenza viruses theoretically may cause other illness, such as gastroenteritis or hepatitis.
 - b. **Differential Diagnosis:** Other agents that cause febrile respiratory illnesses 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, rapid antigen test, or demonstrated rise in antibodies from paired sera (Table 1).
3. **Incubation:** 1-4 days; average 2 days.
4. **Reservoir:** Humans, possibly swine, and migratory birds.
5. **Source:** Airborne, nasal and pharyngeal secretions, fomites.
6. **Transmission:** Airborne spread; direct contact with aerosolized droplets or contaminated fomites from infective persons.
7. **Communicability:** 2 days prior to and 3 days after the onset of clinical symptoms; up to 7 days in children.
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.

Pneumococcal 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

- 1a. **Outbreaks reportable.** (Title 17, Section 2500, *California Code of Regulations*). Outbreaks are commonly reported from institutional settings (e.g., nursing homes, hospitals, schools, day care centers, jails and juvenile correction facilities). Acute febrile respiratory infection (AFRI) is defined as any illness with a fever equal to or greater than 100°F accompanied by a cough or a sore throat in the absence of a known cause. A cluster is three or more cases of AFRI occurring within 48 to 72 hours, in residents who are in close proximity to each other (e.g., in the same area of the facility). An outbreak is a sudden increase of AFRI cases over the normal background rate or when any resident tests positive for influenza. One case of confirmed influenza by any testing method in a long-term care facility resident is an outbreak.
- 1b. **Pediatric Intensive Care and Deaths reportable.** Certain cases of pediatric influenza-associated deaths or patients admitted to an intensive care unit are reportable. Case must be 0-17 years old, either have died or is critically ill (hospitalized in the ICU), and have either 1) confirmed influenza by laboratory testing; or 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).
- 1c. **Human cases of avian influenza reportable.** Possible human cases of avian influenza are also reportable. 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 [www.who.int/csr/disease/avian_influenza/en] or Centers For Disease Control & Prevention [www.cdc.gov/flu/avian/gen-info/avian-flu-humans.htm] for current countries at risk.

Note: Since the epidemiologic factors associated with risk for human infections of avian influenza are constantly changing, any suspected case should be reported immediately to Acute Communicable Disease Control (213-240-7941).

2a. Report Form: OUTBREAK / UNUSUAL DISEASE REPORT (DHS 8554, 03/00 fillable) for outbreaks outside of healthcare facilities.

For healthcare facility outbreaks:
CD OUTBREAK NOTICE — HEALTH CARE FACILITY INVESTIGATION (H-1163, 1/78)

CD OUTBREAK INVESTIGATION — HEALTH CARE FACILITY INVESTIGATION (H-1164, 1/78)

2b. For single cases of severe or fatal pediatric disease (case less than 18 years old):

PEDIATRIC SEVERE INFLUENZA CASE HISTORY FORM (acd-pedinflusec 9/05)

PEDIATRIC INFLUENZA DEATH SUPPLEMENTAL FORM (acd-pedinfludeath 9/05)

2c. For suspected or confirmed human cases of avian influenza:

AVIAN INFLUENZA CASE SCREENING FORM (acd-avianflu 11/05)

3. Epidemiologic Data:

- a. Exposure to confirmed or suspected cases.
- b. Prior immunization status.

- c. Date of onset of the first case and, if the outbreak appears to be over, the date of onset of the last case.
- d. Number of persons with ILI, approximate age range of ill persons and extent of influenza activity in community, school, place of employment or other groups.
- e. Travel history.
- 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.

CONTROL OF CASE, CONTACTS & CARRIERS

CASE:

Precautions: None. Advise patients to stay away from work or school for 3 days following onset of illness. Limit exposure to others, especially those at high risk for complications.

Four licensed influenza antiviral agents are available in the United States: amantadine, rimantadine, zanamivir, and oseltamivir. 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 ≥ 1 year, and zanamivir is approved for treatment of persons aged ≥ 7 years. Oseltamivir and zanamivir can be used for chemoprophylaxis of influenza; oseltamivir is licensed for use in persons aged ≥ 1 year, and zanamivir is licensed for use in persons aged ≥ 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 (Table 2).

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



- General Information:
www.cdc.gov/flu/protect/antiviral/
- 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.

DIAGNOSTIC PROCEDURES:

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

1. **Culture:** Collect no later than 2 days after onset. NOTE: culture should not be attempted when avian influenza is suspected. Contact PHL or ACDC for instructions.

Container: Viral Culturette.

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

Examination Requested: Respiratory virus culture.

Material: Nasopharyngeal swab preferred; NP wash or aspirate.

Storage: Keep chilled and upright. Deliver to Public Health Laboratory as soon as possible.

2. **Serology:** Paired sera required. (Note: Consult Acute Communicable Disease Control first before conducting or ordering serologic tests.)

Container: VR, which contains a serum separator tube (SST). **Test Requisition and Report Form H-3021 or online request if electronically linked to the Public Health Laboratory.**

Examination Requested: Influenza Serology.

Material: Whole clotted blood.

Amount: 8-10 ml.

Storage: Refrigerate.

Remarks: Collect first (acute) blood as early as possible and second (convalescent) blood approximately 2 weeks after the first. Send specimens as they are collected.

PREVENTION-EDUCATION

1. Immunize high-risk persons and their close contacts (e.g., family members, health-care staff) with current seasonal influenza vaccine. To be effective, 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 health facilities, restrict the movement of staff and visitors with respiratory infections. (For more information, see *Infection Control Measures for Preventing and Controlling Influenza Transmission in Long-Term Care Facilities* at: www.cdc.gov/flu/professionals/infectioncontrol/healthcarefacilities.htm)

See also *Hospital Association of Southern California Recommended Management Actions to Prepare Hospitals for Overflow Situations: 2005-2006 Winter Season White Paper (Revised October 2005)* available at: www.lapublichealth.org/acd/flu.htm.
6. Consider the following recommendations during outbreaks in facilities with high-risk individuals (elderly and chronically ill):
 - a. Confirm strain of virus through rapid test, viral isolation, and/or serology.
 - b. Close facility or affected areas to new admissions until 1 week after last case.
 - c. Suspend group activities until 1 week after last case.



- d. Provide prophylaxis for residents and staff until outbreak terminated. Note that appropriate treatment varies according to the age of the patient and the type of virus that is circulating (Table 2).
- e. Reinforce good hand washing practices among staff, visitors, patients, and residents.
- f. If possible, separate staff that cares for sick from staff that cares for well patients.
- g. Maintain surveillance for new cases.



Table 1: Influenza Diagnostic Table*¹

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

* From www.cdc.gov/flu/professionals/labdiagnosis.htm

- 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.
- NP = nasopharyngeal
- Shell vial culture, available in PHL, may reduce time for results to 2 days.
- Does not distinguish between influenza A and B types.
- RT-PCR = reverse transcriptase polymerase chain reaction
- 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.

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. For more information about antivirals, visit www.cdc.gov/flu/protect/antiviral