



INFLUENZA

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Epidemiology

Influenza is a disease of the respiratory tract caused by the influenza virus.

Influenza can cause a large percentage of a population to become ill in an epidemic fashion. Widespread morbidity and serious complications, notably viral and bacterial pneumonia, make influenza a potentially dreadful illness. Outbreaks of influenza generally last one to two months in a city, parish, or region. In a usual year, approximately 10% of the population is infected which would represent 450,000 people in Louisiana. During an outbreak, anywhere from 15% to 40% of the population may become ill. An average of about 600 people per year in the state dies from influenza and 2,000 per year have to be admitted to the hospital as a result of the flu. In Louisiana, influenza outbreaks do not usually occur until late December or early January.

Influenza is spread by droplets and contact

The flu is spread, or transmitted when a person who has the flu coughs, sneezes, or speaks and sends the flu virus into the air and other people inhale the virus. The virus enters the nose, throat, or lungs of a person and begins to multiply, causing symptoms of influenza. Influenza may, less often, be spread when a person touches a surface that has flu viruses on it - a door handle, for instance - and then touches his or her nose or mouth.

The incubation period for influenza is 1 to 4 days, with an average of 2 days.

Infectivity period: Adults typically are infectious from the day before symptoms begin through approximately 5 days after illness onset. Children can be infectious for ≥ 10 days and young children can shed virus for ≤ 6 days before their illness onset. Severely immune-compromised persons can shed virus for weeks or months.

Clinical Description

The illness affects the respiratory tract in humans (nose, throat and lungs). The flu is different from a cold. Influenza usually comes on suddenly and may include these symptoms:

- Fever
- Headache
- Tiredness (can be extreme)
- Dry cough
- Sore throat
- Nasal congestion
- Body aches

These symptoms are usually referred to as "flu-like symptoms."

The Myth of the "Stomach Flu": Many people use the term "stomach flu" to describe illnesses with nausea, vomiting, or diarrhea. These symptoms can be caused by many different viruses, bacteria, or even parasites. While vomiting, diarrhea and being nauseous or "sick to your stomach" can sometimes be related to the flu, particularly in children - these problems are rarely the main symptoms of influenza. The flu is a respiratory disease and not a stomach or intestinal disease.

Complications: People age 65 years and older, people of any age with chronic medical conditions and very young children are more likely to get complications from influenza. Pneumonia, bronchitis and sinus and ear infections are three examples of complications from the flu. The flu can make chronic health problems worse. For example, people with asthma may experience asthma attacks while they have the flu and people with chronic congestive heart failure may have worsening of this condition that is triggered by the flu.

Other viruses can cause similar symptoms. Individuals with these symptoms are seen year round. A physician cannot determine without appropriate laboratory testing whether a person has influenza or not. Gastrointestinal symptoms are rarely caused by influenza.

Influenza surveillance information as well as diagnostic testing can aid clinical judgment and help guide treatment decisions. The accuracy of clinical diagnosis of influenza on the basis of symptoms alone is limited because symptoms from illness caused by other pathogens can overlap considerably with influenza. Influenza surveillance by state and local health departments and the Centers for Disease Control and Prevention (CDC) can provide information regarding the presence of influenza viruses in the community. Surveillance can also identify the predominant circulating types, subtypes and strains of influenza.

Surveillance

Influenza is NOT a reportable condition. Most of cases of influenza do not get laboratory confirmation. Influenza and Influenza Like Illness (ILI) are so common that passive reporting would completely overwhelm the medical system. **Influenza cases should not be entered in RDD.**

Report and Confirm Early Cases

It is not necessary to investigate individual cases of influenza unless the case(s) is (are) the first one(s) to be reported in a given year for a specific parish or region. If you need guidance as to whether confirmation is useful call IDES.

If it is decided to confirm a case, then:

Upon receipt of a report of influenza, contact the physician to confirm the diagnosis. If the diagnosis is based on clinical symptoms only, encourage the physician to obtain throat swabs. Explain the importance of collecting samples early in the season. Make arrangements to pick up the specimens or have the physician send the specimen to the Office of Public Health (OPH) laboratory. It is recommended that several (4 or 5) throat swabs be obtained during the initial outbreak in a given area. Supplies needed for throat swabs may be obtained from the state laboratory.

Testing for antibodies is not recommended because:

- 1- It takes two specimens collected at 2-week intervals (an acute and a convalescent serum) to confirm the diagnosis, a very impractical process and
- 2- It is better to obtain throat swabs to have the ability to isolate the virus if necessary.

Sentinel Surveillance System

Influenza is an illness for which OPH relies on a **sentinel surveillance system** to monitor the occurrence of illness.

The Immunizations Program, Infectious Disease Epidemiology Section (IDES), and the Virology Laboratory collaborate on the Enhanced Influenza Surveillance Project. Under the supervision of the Immunizations Program Manager, the Influenza Surveillance Coordinator is responsible for management of the surveillance component of the project (including data collection and contact with sentinel sites). Infectious Disease Epidemiology provides assistance and program support, including management of the influenza database.

Each site provides both the weekly numbers of Influenza Like Illness (ILI) cases (numerators) by four age groups and weekly denominator data. The same age groups are collected for all site types. These age

groups are 0-4 years (preschoolers), 5-24 years (school age children/adolescents), 25-64 years (adults), and 65+ (older adults). Denominator data are distinct for each site; physicians provide number of patients seen for any reason, hospitals do not provide denominator data, schools provide student enrollment and nursing homes provide number of residents. Reports produced describe the following:

- proportion of sentinel physician visits for ILI
- proportion of sentinel school absences for ILI
- number of sentinel hospital visits of ILI
- number of sentinel nursing home occurrences of ILI

The sentinel surveillance data is used by OPH and CDC to determine the Influenza Activity Level which allows comparison with other states

| Activity Level | ILI Activity | Laboratory Data |
|----------------|--|---|
| No activity | Low | and No lab-confirmed cases |
| Sporadic | Not increased | and Isolated lab-confirmed |
| | or | |
| Local | Not increased | and Lab-confirmed in one institution |
| | ILI activity not increased in others | and Recent (within past 3 weeks) lab confirmation in region with increase |
| | or | |
| Regional | 2 or more institutional outbreaks (ILI or lab confirmed) in one region | and Recent (within past 3 weeks) lab confirmation in region with increase |
| | ILI activity not increased in others | and Activity \leq sporadic in others |
| | or | |
| Regional | ILI activity increased in ≥ 2 regions but $<$ half of regions | and Recent (within past 3 weeks) lab confirmation in affected regions |
| | or | |
| Regional | Institutional outbreaks (ILI or lab confirmed) in ≥ 2 regions but $<$ half of regions | and Recent (within past 3 weeks) lab confirmation in affected regions |
| | or | |
| Widespread | Increased ILI and/or regional outbreaks (ILI or lab confirmed) but $>$ half of regions | and Recent (within past 3 weeks) lab confirmation in the state |

- The baseline reporting of ILI is the mean percentage of visits for ILI during plus two standard deviations. Wide variability in regional data precludes calculating region specific baselines and makes it inappropriate to apply the national baseline to regional data. Common baselines observed are in the range of 2% to 3%.
- The epidemic threshold is 1.645 standard deviations above the seasonal baseline percentage.

Case Definition

A case of influenza is defined as an acute illness with characteristic symptoms and is either laboratory confirmed, or epidemiologically linked to a confirmed case, or linked to a community where laboratory confirmed cases have already been documented.

Laboratory Tests

A case of influenza is confirmed by:

1. Isolation of the virus from a nasopharyngeal swab or throat washing. Only culture isolates can provide specific information regarding circulating influenza subtypes and strains. This information is needed to compare current circulating influenza strains with vaccine strains, to guide decisions regarding influenza treatment and chemoprophylaxis and to formulate vaccine for the coming year. Virus isolates also are needed to monitor the emergence of antiviral resistance and the emergence of novel influenza A subtypes that might pose a pandemic threat.
2. Commercial rapid diagnostic tests are available that can be used by laboratories in outpatient settings to detect influenza viruses within thirty minutes. These rapid tests differ in the types of influenza viruses they can detect and whether they can distinguish between influenza types. Different tests can detect
 - a.) only influenza A viruses
 - b.) both influenza A and B viruses, but not distinguish between the two types or
 - c.) both influenza A and B and distinguish between the two

The types of specimens acceptable for use (i.e., throat swab, nasal wash, or nasal swab) also vary by test. The specificity and, in particular, the sensitivity of rapid tests are lower than for viral culture and vary by test. Because of the lower sensitivity of the rapid tests, physicians should consider confirming negative tests with viral culture or other means. Further, when interpreting results of a rapid influenza test, physicians should consider the positive and negative predictive values of the test in the context of the level of influenza activity in their community. Package inserts and the laboratory performing the test should be consulted for more details regarding use of rapid diagnostic tests.

3. A four-fold rise in antibody titer between acute and convalescent sera. These tests are a cumbersome process because of the requirement for two blood samples collected at two-week intervals and is no longer recommended.

Throat specimens should be collected within 48 hours after onset of symptoms. Although viruses may often be isolated after longer time periods, the likelihood of recovering respiratory disease virus is greatly diminished. When collecting a throat specimen, use a sterile cotton-tipped applicator and obtain a specimen from the back of the throat. Place swab in test tube with the prepared culture medium. Break off the top of the swab and place the lid on the container. A throat swab transported in the proper culture medium (tryptose-phosphate broth) should be refrigerated after collection and during transport to the laboratory.

Forms: If submitting a throat swab, complete an Immunology Lab Slip also, but be sure to circle OTHER (#98) and write in the words throat swab.

Outbreak investigation

Outbreaks of influenza or ILI which should be reported to the IDES are:

- 1- Those that occur early in the season
- 2- Large outbreaks which cause massive disruption of activities such as school closings, outbreaks in nursing homes, child care centers, institutionalized children
- 3- Outbreaks with a large proportion of severe cases (hospitalizations and deaths)
- 4- Outbreaks which cause serious concerns for the population and the media

The following information needs to be collected:

Date of onset of first cases, length of outbreaks, number of cases per week, number or proportion of hospitalizations, number or proportion of deaths, setting (educational, health care, business, social group).

Outbreak Management in a Health Care Facility

Examples of such settings include nursing homes, long-term care facilities, residential communities of high-risk persons, hospitals.

1. Droplet and contact isolation are recommended for the duration of illness. Isolation generally has a limited effect under most circumstances because of the delay in diagnosis.

2. In epidemics, due to increased patient load, it may be necessary to cohort cases.

3. The use of antiviral drugs for treatment and prophylaxis is a key component of influenza outbreak control in institutions. The majority of published reports concerning use of antiviral agents to control influenza outbreaks in institutions are based on studies of influenza A outbreaks among nursing home populations where amantadine or rimantadine were used. Less information is available concerning use of neuraminidase inhibitors in influenza A or B institutional outbreaks.

- Treatment of all persons who have been ill with influenza for less than 48 hours. Treatment should last for a period of 5 days.

- When confirmed or suspected outbreaks of influenza occur in institutions that house persons at high risk, chemoprophylaxis should be started as early as possible to reduce the spread of the virus. In these situations, having preapproved orders from physicians or plans to obtain orders for antiviral medications on short notice can substantially expedite administration of antiviral medications.

- When outbreaks occur in institutions, chemoprophylaxis should be administered to all residents, regardless of whether they received influenza vaccinations during the previous fall and should continue for a minimum of two weeks. If surveillance indicates that new cases continue to occur,

chemoprophylaxis should be continued until approximately one week after the end of the outbreak. The dosage for each resident should be determined individually.

- Chemoprophylaxis also can be offered to unvaccinated staff that provides care to persons at high risk. Prophylaxis should be considered for all employees, regardless of their vaccination status, if the outbreak is caused by a variant strain of influenza that is not well-matched by the vaccine.

- To limit the potential transmission of drug-resistant virus during outbreaks in institutions, whether in chronic or acute-care settings or other closed settings, measures should be taken to reduce contact as much as possible between persons taking antiviral drugs for treatment and other persons, including those taking chemoprophylaxis

4. Offering influenza vaccinations to unvaccinated staff and patients

5. Restrict staff movement between wards or buildings, and restrict contact between ill staff or visitors and patients

Outbreak Management in Other Institutions

1. Institute a respiratory hygiene program

2. Exclusion of symptomatic cases is not mandatory but symptomatic cases should be encouraged to stay home until resolution of acute symptoms.

3. The closing of schools has not proven to be an effective control measure but may be recommended based on academic considerations such as high absenteeism of students or staff.

4. Chemoprophylaxis also can be considered for controlling influenza outbreaks in other closed or semi-closed settings (e.g., dormitories or other settings where persons live in close proximity and cruise ships carrying elderly high-risk persons).

Immunization (see CDC Recommendations)

Prevention of transmission

Good respiratory hygiene should be encouraged, including cleaning of hands and staying at home when symptomatic with fever and respiratory illness.

Recommendation for Acute Care Facilities

Acute care hospitals should consider measures that can lessen the impact of a local influenza outbreak on the facility. Some suggestions:

1. Institute a respiratory hygiene program (see below), most importantly asking that all patients with respiratory symptoms wear surgical masks and physically segregating them from other patients to the extent possible.

2. Urge that all healthcare workers receive influenza vaccination.

3. Order more influenza vaccine if necessary and urge physicians to vaccinate high risk patients (e.g., a hospital-based program for inpatients).

4. Establish walk-in influenza clinics to triage and treat patients.

5. Consider visitor restrictions as respiratory illnesses increase in the community.

6. Review vacation requests for the winter holidays to ensure adequate staffing in the event of an outbreak occurring over this period and consider methods to identify and mobilize additional staff.

7. Review inventories of supplies and equipment, such as ventilators, which might be in short supply during an outbreak.

8. Consider postponing elective surgery if hospital capacity is exceeded.

As diversion occurs due to increased census, emergency departments should work closely in coordination with their local emergency medical services agency.

Respiratory Hygiene Program

Components of such a program include:

1. Placing a box of surgical masks as close to the entry to the emergency department waiting rooms as possible.

2. Providing masks to all patients with symptoms of a respiratory illness with instructions on their proper use and disposal.

3. For patients who cannot wear a surgical mask, providing tissues with instructions to cover the nose and mouth when coughing or sneezing.
4. Providing, if possible, a small paper or plastic bag for mask and tissue disposal.
5. Providing a readily accessible waterless hand hygiene product and instructing patients to decontaminate their hands after dealing with respiratory secretions and before their contact with a healthcare worker.
6. Separating patients with respiratory illness from other patients by either placing them into a cubicle, examination room or some physical separation by at least 3 feet.

Case Management - Treatment

1. Influenza is usually treated symptomatically. It is important to make parents aware that antibiotics are not useful for the treatment of influenza illness per se. Because of the possible association with Reye syndrome, salicylates should not be given as a symptomatic treatment to anyone under 17 years of age.

2. Antiviral medications with specific activity against influenza A viruses should be considered either for treatment or chemoprophylaxis for influenza A, especially in persons at high risk for complications from influenza.

The decision of whether and how to use these antiviral drugs must be made on an individual basis since many considerations may be involved. Some general considerations include the following:

The influenza antiviral drugs differ in terms of routes of administration, approved uses, approved ages, dosing adjustments based on age and renal function, side effects and costs. These differences are summarized in the package inserts.

Influenza diagnostic testing of each individual patient is not a prerequisite for administration of antiviral drugs. In the event of confirmed influenza activity in a community, a clinical diagnosis without laboratory testing for influenza often accurately predicts infection in patients presenting with influenza-like illness.

Situations in Which Influenza Antiviral Drugs SHOULD BE USED

Outbreaks in Institutions Housing High-Risk Persons

Situations in Which Influenza Antiviral Drugs SHOULD BE CONSIDERED

1. Treatment of high-risk persons older than one year of age with influenza infection. Treatment should be started within 48 hours of illness onset and continue for 5 days.

2. Chemoprophylaxis of unvaccinated high-risk persons older than one year of age in a variety of settings, including during community influenza outbreaks and influenza outbreaks in other settings (such as hospitals, cruise ships, camps, college dormitories). Ideally, high-risk persons in these situations should be vaccinated and chemoprophylaxis administered for two weeks after vaccination if inactivated vaccine is administered. If live, attenuated vaccine is used, antiviral drugs should not be administered since they will decrease the effectiveness of the vaccine. If vaccination is not possible, or if vaccination is unlikely to provide adequate protection because the patient cannot mount an adequate antibody response to the vaccine, then chemoprophylaxis for the duration of influenza activity in the community should be considered, though data and experience are limited on prolonged use (i.e., several weeks) of antivirals for chemoprophylaxis.

3. Chemoprophylaxis of unvaccinated health care workers who have close contact with influenza-infected patients. Ideally, unvaccinated health care workers should be vaccinated and chemoprophylaxis administered for a period of two weeks following vaccination. If vaccination is not possible, then chemoprophylaxis of these health care workers for the duration of influenza activity at the community level should be considered, though data are limited on prolonged use of antivirals for chemoprophylaxis.

4. Treatment of seriously ill influenza-infected patients admitted to the hospital, though data are limited on use of influenza antiviral drugs in such persons.

5. Chemoprophylaxis of family members of high-risk individuals during local community influenza activity.

6. Treatment of persons without high-risk factors who are infected with influenza can be considered if supplies of antiviral drugs are adequate.

Antiviral drugs

1. Neuraminidase Inhibitors (Zanamivir, Oseltamivir)

The neuraminidase inhibitors, zanamivir and oseltamivir, are chemically related drugs that have activity against both influenza A and B viruses.

Zanamivir is an orally inhaled powdered drug that is approved for treatment of influenza in persons aged 7 years and older. Zanamivir is not approved for chemoprophylaxis of influenza.

Oseltamivir is an orally administered capsule or oral suspension that is approved for treatment of influenza in persons equal to or older than one year of age. Oseltamivir is also approved for chemoprophylaxis of influenza in persons aged 13 years and older.

When used within 48 hours of illness onset, both drugs decrease shedding and reduce the duration of influenza symptoms by approximately 1 day compared with placebo, showing a significant reduction in influenza-related lower respiratory tract complications (pneumonia and bronchitis), and a significant reduction in hospitalizations.

2. Adamantane Derivatives (Amantadine, Rimantadine)

The adamantane derivatives, amantadine and rimantadine, are chemically related, orally administered drugs that are approved for treatment and chemoprophylaxis of influenza A. Amantadine and rimantadine specifically inhibit replication of influenza A viruses, but not influenza B viruses.

- Amantadine is approved for the treatment of influenza A in children aged 1 year and older and in adults.
- Rimantadine is approved for treatment of influenza A in adults.
- Both drugs are approved for chemoprophylaxis to prevent influenza A in people aged 1 year and older.
- When administered within 48 hours of illness onset, controlled studies have found that both drugs decrease viral shedding and reduce influenza A illness by approximately 1 day compared with placebo. The usual recommended duration of treatment is 5 days.

Canine Influenza

Canine influenza is a type A orthomyxovirus.

Canine influenza is contagious by aerosolized droplets and contaminated fomites (inanimate objects) that the dog can contact. People can transmit the disease to their pets. Canine influenza is not contagious to people, cats, or other species, although people can carry the virus in their nasal passages and transmit it to dogs at home.

Signs and symptoms are difficulty breathing, dry coughing, nasal discharge, high fever, severe lethargy or lack of appetite. It mimics "kennel cough" or Bordetella bronchiseptica/parainfluenza virus complex, which sounds like a hacking cough that does not seem to stop. The cough with canine influenza can be either moist or dry; about 20 per cent of infected dogs may show little or no clinical signs but still can be shedding virus.

Canine influenza should be considered a serious disease; infected animals have a 100% mortality rate. However, with a rapid and accurate diagnosis, proper treatment can reduce this statistic to a 1% to 5% mortality rate.

If any of these signs are displayed, isolate the dog from other animals and seek medical treatment immediately. Treatment is non-specific but generally supportive.