Influenza

Summary

Influenza is an acute viral disease of the respiratory tract characterized by the sudden onset, fever often accompanied by sore throat, chills, headache, myalgias, rhinitis, nasal congestion and/or a dry cough. Conjunctival infection, abdominal pain, nausea, vomiting, and diarrhea are less commonly associated with influenza illness.,. In some children, influenza can have an atypical presentation of upper respiratory tract infection or as fever with few other respiratory tract symptoms. In infants, influenza can sometimes produce a sepsis-like picture and can cause other infections like pneumonia. Infections are acquired primarily by droplet spread from other infected persons after coughing or sneezing or by direct contact with contaminated surfaces leading to autoinoculation. Laboratory diagnosis is made by viral culture, antigen testing and/or polymerase chain reaction (PCR) of nasal, nasopharyngeal or throat swabs, or nasal washings. Serology should only be used retrospectively as it requires acute and convalescent specimens collected 14-days apart. Antiviral treatment is most commonly prescribed for high-risk patients, hospitalized patients with influenza, and any person presenting with severe, progressive illness. Antivirals, as prophylaxis, should be considered for non-immunized persons in special situations or groups at high risk of complications from influenza. Antiviral administration should not depend solely on lab confirmation and should be initiated as soon as possible after illness onset since the clinical benefit is greatest when administered early. However, antiviral treatment may still be beneficial in patients with severe, complicated, or progressive illness, in hospitalized patients, and in high-risk outpatients when started after 48 hours of illness onset, as indicated by clinical and observational studies. Antivirals do decrease shedding time and should be considered in all persons with influenza-like illness. Annual influenza vaccination is considered to be the most effective way to prevent disease, serious illness or complications in many patients.

Agent

Four types of influenza virus are currently recognized: A, B, C, and D. Influenza A, B, and C are the only types known to infect humans and cause illness. Influenza A and B are the only types that are tied to seasonal epidemics and outbreaks. Influenza A is the only type currently capable of causing pandemics.

Influenza A viruses are subclassified by two surface antigens: hemagglutinin (H, H1-H18) and neuraminidase (N, N1-N11). Minor antigenic variations within the circulating strains occur continuously and cause seasonal epidemics, this is a process referred to as antigenic “drift”. Antigenic “shift” is a major change in the circulating influenza virus that results in a new subtype and can lead to a pandemic if there is sustained human to human transmission. The implications of these genetic mutations are explained in more detail below.

Transmission

Reservoir**:**

> Humans are the primary reservoir for human influenza A viruses. Other reservoirs have been identified such as swine and birds and may be potential sources of new influenza A subtypes which can be pathogenic to humans and emerge through genetic re-assortment.

Mode of transmission:

Influenza viruses are primarily spread via droplets from infected persons who are coughing and/or sneezing, talking or by direct contact with virus-contaminated surfaces.

Period of communicability:

Adults can be infectious generally from one day prior to onset of symptoms and up to seven days after onset.

Clinical Disease

Incubation period:

Usually 1-4 days (with a mean of two days).

Illness:

The illness is characterized by the sudden onset of fever, with any or all of the following: sore throat, headache, myalgias, coryza (inflammation of the mucus membrane in the nose), and non-productive cough. Influenza may be indistinguishable from many other upper respiratory viral illnesses and should be confirmed with laboratory tests. The clinical picture may range from the common cold, croup, bronchiolitis, or viral pneumonia, to undifferentiated acute respiratory disease. Gastrointestinal manifestations (nausea, vomiting, or diarrhea) are uncommon, but may accompany the respiratory phase, particularly in children.

Laboratory Diagnosis

The diagnosis of influenza is often made on clinical grounds especially during influenza season which runs approximately from October through May. If done, testing ideally should be performed within the initial 72-hours of symptom onset.

Diagnosis can be confirmed by:

- Reverse transcriptase-polymerase chain reaction (RT-PCR) testing of nasal or throat swabs available at NMDOH Scientific Laboratory Division (SLD) and commercial labs. RT-PCR testing offers improved sensitivity and specificity and test results are available to the submitter usually within 2 to 3 business days.
- Viral culture of nasopharyngeal swab, nasal or throat washings is considered the “gold standard” testing method but turnaround time for results is usually 2-6 days.
- Immunofluorescence or direct fluorescent antibody (DFA) staining results are available within 2-4 hours and done in a lab setting. This testing method has acceptable sensitivity and specificity standards but requires specifically trained laboratory staff for interpretation.
- Rapid Influenza Diagnostic Test (RIDTs) provides more immediate results and can be done at the point of care. The sensitivity (45-90%) and specificity (60-90%) of these tests varies depending on the prevalence of influenza in the community and the specific tests used.
- Serological testing is rarely useful for patient management as two titers collected 10-14 days apart are required.

Treatment

Individual’s sick with influenza should be advised to stay home and avoid contact with other people. Influenza is typically treated with rest, liquids, and antipyretic medications. Salicylates (i.e., aspirin) should be avoided because of the risk of Reye’s syndrome.

Antiviral medications are usually reserved for treatment of high-risk patients (e.g., individuals with chronic cardiac, pulmonary, renal, or endocrine disorders; patients on immunosuppression; children under two years; adults ≥65 years old; pregnant women; persons <19 years old on chronic aspirin therapy; American Indians; persons with morbid obesity; and, residents of nursing homes and other chronic care facilities). Other situations (e.g., non-immunized exposed persons or groups at high-risk for complications) may also warrant antiviral medical use for prophylaxis.

- The neuraminidase inhibitors (zanamivir and oseltamivir) have been shown to be effective for treatment of both influenza A and B. The other class of antiviral medication for influenza is the adamantanes (amantidine and rimantidine). Current circulating influenza A and influenza B viruses are resistant to adamantanes.
- Oseltamivir is FDA-approved for treatment in persons aged two weeks of age and older.
- Zanamivir is approved for treatment in persons 7 years and older.
- Treatment started within 48 hours of onset of illness and given for 5 days reduces symptoms by one day and may reduce viral shedding.

Secondary complications such as bronchitis and pneumonia or more invasive secondary bacterial infections with respiratory tract pathogens may complicate influenza illness leading to severe disease or death, especially in high-risk populations. These secondary complications require specific antibiotic therapy as directed by the patient's health care provider.

Surveillance

Case Definition:

A formal case definition has not been established for influenza. However, for surveillance purposes influenza-like illness (ILI) is defined as fever (temperature of 100°F or more [37.8°C] or more), and a cough, and/or a sore throat in the absence of a diagnosis other than influenza.

Reporting:

Report all 1) laboratory confirmed cases of influenza, 2) human infection with novel influenza strains confirmed by laboratory testing, and 3) pediatric influenza-related deaths 4) ILI involving large number of people in the same geographic area (outbreaks) to the Epidemiology and Response Division (ERD) at 505-827-0006.

Control Measures

1. Case management
    a. Isolation: Patients with influenza should be cared for at home when possible unless hospitalization is warranted. In addition to standard precautions, droplet precautions are required for persons hospitalized with influenza or an influenza-like illness for the duration of illness.
2. Contact management
    a. Isolation: None required.
    b. Prophylaxis:

i. Antiviral medications are useful adjuncts to influenza vaccine for the prevention of influenza A or B in high-risk patients, non-immunized persons, or groups at high risk for complications, such as residents of institutions, nursing homes, or correctional facilities. The antiviral medication needs to be continued until full immunologic response to the vaccine has been achieved (i.e., two weeks), or throughout the epidemic for unimmunized or immunodeficient persons.

c. Oseltamavir and zanamivir can be used for prophylaxis against both influenza type A and B. Oseltamavir is approved for prophylactic use in persons ≥1 year; zanamivir for use in persons aged ≥5 years.

Guidelines on the indications for, and the dosing of, antiviral therapy for treatment and chemoprophylaxis are updated periodically. Current guidelines are available at:

http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm

3. Prevention

1.1. Immunization: Routine annual administration of influenza vaccine is a universal recommendation for all persons six months of age and older. High-risk persons as well as health care personnel are especially targeted groups. Vaccination is the most beneficial means of reducing influenza burden in those who are at the greatest risk of serious complications from influenza. The vaccine is available in both inactivated trivalent and quadrivalent injection(s). Recommendations for the administration of live attenuated nasal spray vaccinations should be checked annually as 2016-2017 recommendations did not support the administration of this vaccination method due to low effectiveness. This information can be accessed here: https://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm. Currently, there is no evidence to support the administration of a second dose of influenza vaccine to adults who have already received their annual seasonal vaccination.

1.2. Influenza vaccination and special populations: Fluzone High-Dose Seasonal Influenza vaccine is licensed specifically for persons ≥65 years of age; contains 4 times the amount of antigen as the regular flu shot. It is intended to give older people a better immune response following vaccination. Children 6 months through 8 years: Some children 6 months through 8 years require two doses of influenza vaccine. The first should be given as soon as the vaccine becomes available and the second at least 28 days later. Management of Influenza in Child Care Centers

1. All children six months of age and older and especially children who are at high risk for serious disease from influenza should be vaccinated.

2. If a child or staff person develops fever and chills, sore throat, headache, or muscle aches suggestive of influenza, s/he should be sent home until 24 hours after cessation of fever without use of antipyretics.

Management of Influenza in Long-term Care Facilities or other Institutional Settings

Please consult with the New Mexico Department of Health epidemiologist on call (505-827-0006) to report any cases of influenza-like illness at semi-enclosed institutional settings such as nursing homes, rehabilitation centers, or correctional institutions for assistance with

testing to confirm influenza and recommendations for prevention and control of further illness.

Annually updated guidelines for the management of influenza in child care, schools, outpatient, acute care and long-term care settings can be accessed at the New Mexico Department of Health Influenza Website: https://nmhealth.org/about/erd/ideb/isp/

Pandemic Control Measures

Influenza viruses mutate on a regular basis. Slight mutations within the same influenza B or influenza A subtypes occur almost every year resulting in “antigenic drift”. These small antigenic changes are the reason the influenza vaccine needs to be reformulated and administered every year.

Periodically, major antigenic changes occur in influenza A subtypes that are referred to as “antigenic shift”. The resulting new influenza A subtypes carry the potential to cause a pandemic when they demonstrate the ability to cause human illness and show efficient human-to-human transmission, in the background of little or no pre-existing immunity among the general population. These novel influenza viruses can result in global pandemics with morbidity and mortality exceeding baseline seasonal influenza levels. The most recent example was the 2009 Influenza A H1N1 pandemic that first appeared in April 2009 and caused increased morbidity and mortality worldwide throughout the 2009-2010 influenza season.

References

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Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices — United States, 2016–17 Influenza Season. MMWR 2016. August 26, 2016 / 65(5);1–54 Centers for Disease Control and Prevention. Influenza Antiviral Medications: Summary for Clinicians. Updated 27 December 2018. https://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm Accessed 28 December 2018.

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See Influenza Fact Sheets (English) (Spanish).