PUBLIC HEALTH REFERENCE SHEET
Influenza-Associated Hospitalization

Name	COMMON NAME: Seasonal flu INCLUDES: People younger than 65 years of age who are admitted to the hospital because of influenza EXCLUDES: Non-hospitalized influenza cases and *Haemophilus influenza*
Reservoir & Transmission	Influenza A – humans and some animals (wild birds, poultry, pigs, horses, mink, and ferrets) Influenza B – humans, seals Routes of influenza virus transmission include inhalation of large droplets and close contact.
Incubation Period	Average 2 days (range 1–4 days)
Common Symptoms	Fever, chills, cough, sore throat, runny or stuffy nose, muscle or body aches, headache, and fatigue
Gold Standard Diagnostic Test	Rapid detection of influenza viruses is the reverse transcription polymerase chain reaction (RT-PCR) assay for the detection of virus-specific ribonucleic acid (RNA) sequences from throat, nasal, and nasopharyngeal secretions; tracheal aspirates; or bronchoalveolar lavage fluid. Culture
Risk Groups	All age groups are at risk during yearly seasonal influenza epidemics, but children younger than 2 years and adults older than 64 are at risk for complications.
Geographic Significance	Worldwide

What is influenza and influenza associated hospitalization?
Influenza, commonly known as seasonal flu, is an infectious viral illness caused by the influenza virus. Influenza is a single-stranded, helically shaped, RNA virus of the orthomyxovirus family. Three types of influenza virus are known to affect humans: A, B, and C. Influenza B more commonly affects children. Influenza C is rarely reported as a cause of human illness. As influenza C has not been associated with epidemic disease, this document will only address types A and B. Type A influenza has subtypes determined by the surface antigens hemagglutinin (HA) and neuraminidase (NA). There are 18 different H subtypes and 11 different N subtypes. Eight H subtypes (H1, H2, H3, H5, H6, H7, H9, H10) and six N subtypes (N1, N2, N6, N7, N8, and N9) have been detected in humans. Type B influenza is classified into two lineages: B/Yamagata and B/Victoria. Infection with influenza viruses can be asymptomatic or result in disease that ranges from mild to severe.

For purposes of Department of Defense (DoD) medical surveillance data collection, the guidelines in the Armed Forces Reportable Medical Events 2022 specific to reporting influenza associated hospitalization are as follows:

- Reportable cases include people younger than 65 years of age who are admitted to the hospital because of influenza.
- Reportable cases exclude all non-hospitalized influenza cases and *Haemophilus influenza.*
- A confirmed case of *Haemophilus influenza* is a case that meets the clinical description of acute viral disease of the respiratory tract characterized by fever, chills, cough, sore throat, runny or stuffy nose, muscle or body aches, headache, fatigue, and with ALL of the following:
    - Younger than 65 years of age, and

  - Any positive influenza laboratory test (example: culture, DFA, IFA, rapid, PCR), AND
  - Hospital admission date was ≤ 14 days after a positive influenza test, or
  - Hospital admission date was ≤ 3 days before a positive influenza test.
- Hospitalization is defined as an admission to an inpatient ward of a hospital, or a medical transfer or evacuation to a facility with a higher level of care. Patients admitted for observation and discharged the same day are considered hospitalized for this case definition. An overnight stay is not required. Emergency room or outpatient clinic visits that do not result in hospital admission are not considered hospitalizations.

What is the occurrence of influenza and influenza-associated hospitalizations?

- The first documented pandemic, or worldwide epidemic, that clearly fits the description of influenza was in 1580. The pandemic of "Spanish" influenza in 1918–1919 caused an estimated 21 million deaths worldwide. Influenza A and B viruses were first isolated in the 1930s and inactivated vaccines were first developed and used in the late 1930s and 1940s.
- In the Northern Hemisphere, influenza season can begin as early as October and last as late as April or May, while in the Southern Hemisphere, the season typically occurs during April–September. In the United States, flu season usually occurs in the fall and winter. While influenza viruses spread year-round, most flu activity peaks between December and February. Per CDC, 9.3 to 45 million people experience symptomatic illness annually, with an annual average of 37,463 influenza-associated deaths since 2010.
- The overall health impact (e.g., infections, hospitalizations, and deaths) of flu varies from season-to-season. CDC has estimated the burden of flu since 2010 using a mathematical model that is based on data collected through the Influenza Hospitalization Surveillance Network (FluSurv-NET), https://www.cdc.gov/flu/weekly/influenza-hospitalization-surveillance.htm, which is a network that covers approximately 9% of the U.S. population.
- CDC collects, compiles, and analyzes information on influenza activity year-round in the United States and produces FluView, a weekly surveillance report, and FluView Interactive, which allows for more in-depth exploration of influenza surveillance data. The Weekly U.S. Influenza Summary Update is updated weekly and year-round at https://www.cdc.gov/flu/fluvaxview/index.htm.

How is influenza transmitted?

- Influenza viruses spread from person-to-person, primarily through respiratory droplets (e.g., when an infected person coughs or sneezes near a susceptible person). Transmission generally occurs via large particle droplets that require close proximity (≤6 feet) between the source and the recipient, but airborne transmission via small particle aerosols can occur within confined air spaces. Indirect transmission occurs when a person touches their face after touching a virus-contaminated surface (fomite).
- Most adults ill with influenza shed the virus in the upper respiratory tract and are infectious from the day before symptom onset to approximately 5–7 days after symptom onset. Infectiousness is greatest within 3–4 days of illness onset and is correlated with fever. Children, immunocompromised people, and severely ill people might shed influenza virus for ≥10 days after symptom onset. Those who are asymptomatic can still shed the virus and infect others. Seasonal influenza viruses are rarely detected in blood or stool.

Who is at risk for influenza?

- Adults ≥65 years old
- Children <2 years old; although all children <5 years are considered at increased risk for serious influenza complications, the highest risk is for those <2

- Pregnant people and people ≤2 weeks post-partum
- People with certain medical conditions, including asthma, blood disorders, body mass index ≥40, chronic lung disease, endocrine disorders, heart disease, immunocompromise due to disease or medication, kidney disease, liver disorders, metabolic disorders, neurologic and neurodevelopment conditions, and history of stroke
- People who live in nursing homes and other long-term care facilities
- People from certain racial and ethnic minority groups are at increased risk for hospitalization with flu, including non-Hispanic Black persons, Hispanic or Latino persons, and American Indian or Alaska Native persons

What are the signs and symptoms of influenza?

- The incubation period for influenza is commonly 2 days but ranges from 1 to 4 days. Due to its short incubation period, influenza outbreaks may escalate very quickly, especially in highly susceptible populations. Influenza illness is characterized by the abrupt start of fever, sore throat, headache, myalgia, non-productive cough, and extreme fatigue, with major symptoms lasting an average of 2 to 3 days. Fever usually ranges between 100° and 104°F. Illness typically improves within a week, but cough and malaise may persist for 2 or more weeks.

What are the potential complications of influenza?

The most common complication of influenza is pneumonia but may include exacerbation of underlying chronic pulmonary and cardiopulmonary diseases, such as chronic obstructive pulmonary disease, asthma, and congestive heart failure and rarely, death.

How is influenza diagnosed?

- Influenza can be difficult to distinguish from respiratory illnesses caused by other pathogens based on signs and symptoms alone. The positive predictive value of clinical signs and symptoms for influenza-like illness (fever with either cough or sore throat) for laboratory-confirmed influenza virus infection is 30%–88%, depending on host factors (e.g., age, community influenza activity levels).
- Consider diagnostic testing for hospitalized patients with suspected influenza; patients for whom a diagnosis of influenza will inform clinical care decisions, including patients who do not improve on antiviral therapy and those with medical conditions that place them at increased risk for complications; and patients for whom results of influenza testing would affect infection control or management of close contacts, including other patients, such as in institutional outbreaks or other settings (e.g., cruise ships, tour groups).
- For clinicians seeking laboratory confirmation of influenza, the Infectious Diseases Society of America recommends the use of rapid molecular assays in outpatients and nucleic acid amplification tests (e.g., reverse transcription PCR [RT-PCR]), in hospitalized patients.
- Serology testing is no longer used for clinical diagnosis of influenza but is still used for research studies.
- Further details about diagnosis of influenza can be found on CDC's website, "Information for Clinicians on Influenza Virus Testing" at https://www.cdc.gov/flu/professionals/diagnosis/index.htm

How is influenza treated?

- Early antiviral treatment can shorten the duration of fever and other symptoms and reduce the risk for complications from 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 who is at increased risk for influenza-associated complications. Treatment is most effective if it can be initiated ≤48 hours of symptom onset. Click on the link below for current annual influenza season for clinical practice regarding the use of influenza antiviral medications https://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm.

- Influenza symptoms (e.g., pain and fever) can be controlled with medications such as aspirin, ibuprofen, or acetaminophen. Aspirin and salicylate-containing products should not be used for children or adolescents because it may increase the risk for developing Reye syndrome.

How can influenza be prevented?

- An annual seasonal flu vaccine is the best way to help reduce the risk of getting flu and any of its potentially serious complications. Vaccine composition is reviewed and updated each year since the influenza virus is constantly changing. Considerations include which influenza viruses are causing illness, the extent to which viruses are spreading, and how well the previous season's vaccine protects against those viruses. The annul recommendation can be found under the CDC website for Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP) https://www.cdc.gov/flu/professionals/acip/summary/summary-recommendations.htm.
- Educate healthcare personnel and the public in hand hygiene and other everyday preventive actions to stop the spread of respiratory viruses.

What are some Public Health considerations?

- When reporting varicella infections in the Disease Reporting System internet (DRSi)—
  - Specify the virus type (A or B) and subtype (example: H3N2, H1N1), if available.
  - Note the patient's influenza immunization history.
  - Report co-infections with other organisms, like SARS CoV-2, separately as individual RMEs.
- For the Army, Navy, and Air Force medical services to provide a medically ready force and ready medical force to Combatant Commands in both peacetime and wartime, the Defense Health Agency (DHA) has created a comprehensive annual Seasonal Influenza Resource Center for its military and Civilian healthcare personnel https://www.health.mil/Military-Health-Topics/Health-Readiness/Immunization-Healthcare/Vaccine-Preventable-Diseases/Influenza-Seasonal-Northern-Hemisphere/Influenza-Resource-Center.

References:

Defense Health Agency. 2022. *Armed Forces Reportable Medical Events: Guidelines and Case Definitions.* https://www.health.mil/Reference-Center/Publications/2022/11/01/Armed-Forces-Reportable-Medical-Events Guidelines

"Epidemiology and Prevention of Vaccine-Preventable Diseases - Influenza," Centers for Disease Control and Prevention (CDC), last reviewed August 18, 2021. https://www.cdc.gov/vaccines/pubs/pinkbook/flu.html#Clinical

Heymann, David L. ed. 2022. *Control of Communicable Diseases Manual*. 21st Edition. Washington, DC: APHA Press.

"Influenza (Flu)," Centers for Disease Control and Prevention, last reviewed November 21, 2023. https://www.cdc.gov/flu/index.htm