

Respecting Influenza: An Evidence-based Overview for Primary Care Nurse Practitioners

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ABSTRACT

Influenza is a severe acute viral respiratory illness that affects the upper respiratory tract and lungs and is caused by seasonal, pandemic, or variant viral strains. Although seasonal influenza is usually self-limiting, it is a significant cause of mortality in the elderly, children under 2 years old, and at-risk populations. Pandemic and variant influenza strains also result in increased mortality. Primary care nurse practitioners have an important role in the prevention, recognition, and management of influenza. This article provides a current, evidence-based overview of influenza, including its pathophysiology, epidemiology, transmission, prevention, diagnosis, and treatment.

Keywords: influenza, influenza vaccination, neuraminidase inhibitors

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Influenza is a severe acute viral respiratory illness that significantly impacts the health and lives of many individuals, families, and communities. Nurse practitioners (NPs) have an important role in the prevention, recognition, and management of influenza. The purpose of this article is to provide an evidence-based overview of influenza including its pathophysiology, epidemiology, transmission, prevention, diagnosis, and management.

PATHOPHYSIOLOGY

Influenza viruses belong to the Orthomyxoviridae family and are enveloped, segmented, single-strand RNA viruses. Influenza viruses are divided into 3 types (A, B, and C) that vary by viral RNA segments. Types A and B are more common than C and are more likely to cause severe symptoms and epidemics. Influenza A viruses are divided into subtypes based on 2 surface proteins: hemagglutinin (H) and neuraminidase (N). There are 18 hemagglutinin (H1-H18) subtypes and 11 neuraminidase subtypes (N1-N11). Influenza B viruses are divided into lineages and strains, not subtypes.¹

Seasonal Influenza

Seasonal influenza results from circulating influenza A and B viruses, which evolve gradually through

mutation and antigenic changes. In the Northern Hemisphere, seasonal influenza primarily occurs from October through March. In the Southern Hemisphere, it primarily occurs from May through September. In countries closest to the equator, influenza virus circulates year-round with no defined peaks in activity.²

Pandemic Influenza

A pandemic influenza occurs when a novel influenza virus subtype emerges, causes serious illness, and spreads rapidly, causing significant morbidity and mortality. Several pandemic influenzas that have occurred over the past century include the Spanish Flu of 1918 (influenza A N151), the Hong Kong Flu of 1968 (influenza A H3N2), and the influenza pandemic of 2009 (influenza A N151). Pandemic influenzas often have a higher mortality rate in children and young adults because these individuals have not been exposed to or developed immunity to the affecting influenza subtype.³

Zoonotic or Variant Influenza

Humans can also be infected with variant influenza viruses that occur in animals, primarily avian and swine subtypes. Human infections with zoonotic influenza subtypes are usually acquired through direct

contact with an infected animal and are not easily transmissible to other humans. However, these viruses can acquire the capacity to spread quickly among humans.⁴

Human Infections

Influenza viruses enter human hosts through columnar epithelial cells of the trachea, bronchi, and bronchioles via influenza hemagglutinin (HA), a glycoprotein on the surface of the virus that binds to epithelial cells.¹ Viral replication continues in the airway epithelial cells; however, some novel influenza virus subtypes have an unusual hemagglutinin structure that allows them to cleave to other organs outside of the lungs.⁵

Influenza infection typically causes mucosal hyperemia and swelling along the respiratory tract, along with overproduction of mucous secretions. This, in turn, may obstruct the nares, sinus cavities, and/or eustachian tubes and can lead to secondary bacterial infections.⁵ Classic influenza symptoms begin suddenly with fever, headache, body aches, and fatigue accompanied by cough, sore throat, and nasal discharge, although symptoms can be mild and fever is not always present.⁶ Most individuals with uncomplicated influenza experience symptoms for 3–7 days and clear the virus 5–10 days after symptom onset with no treatment.⁷

The rate of complications associated with influenza is unknown. This is likely because of the fact that many cases of influenza go unreported. Additionally, confirmatory testing for influenza frequently does not occur. However, results from several large studies provide compelling evidence that complications from influenza are significant, particularly in young children,⁸ pregnant women,⁹ and older adults with underlying cardiopulmonary conditions.¹⁰ Additionally, after the pandemic influenza of 2009, 2 new high-risk groups were recognized from epidemiologic data: American Indians/Alaska Natives and those with morbid obesity (body mass index ≥ 40).¹¹ Table 1 provides a complete list of individuals at high risk for complications.

Pneumonia is the most common complication from influenza, including primary influenza pneumonia, secondary bacterial pneumonia, and mixed viral and bacterial pneumonia. Additionally, influenza

Table 1. Individuals at Higher Risk for Complications from Influenza³⁰

- Children ≤ 2 years
- Adults ≥ 65 years
- Persons with chronic pulmonary (including asthma), cardiovascular (except hypertension alone), renal, hepatic, hematologic (including sickle cell disease), metabolic disorders (including diabetes mellitus), or neurologic and neurodevelopment conditions (including disorders of the brain, spinal cord, peripheral nerve, and muscle such as cerebral palsy, epilepsy [seizure disorders], stroke, intellectual disability, moderate to severe developmental delay, muscular dystrophy, or spinal cord injury)
- Persons with immunosuppression including that caused by medications or human immunodeficiency virus infection
- Women who are pregnant or postpartum (within 2 weeks after delivery)
- Persons < 19 years who are receiving long-term aspirin therapy
- American Indians/Alaska Natives
- Persons who are morbidly obese (ie, body mass index ≥ 40)
- Residents of nursing homes and other chronic care facilities

can exacerbate asthma and chronic obstructive pulmonary disease. Rare complications associated with influenza include myositis and rhabdomyolysis, central nervous system diseases (eg, Reyes syndrome and Guillain-Barre syndrome), cardiac complications (eg, myocarditis and pericarditis), and toxic shock syndrome.¹²

EPIDEMIOLOGY

It is difficult to estimate how many people contract influenza. Barriers to attaining estimates include differences in annual infection rates and the fact that many people with influenza do not seek health care. In addition, many cases of influenza are made without laboratory confirmation and thus could actually represent other influenza-like illnesses (ILIs), including infections caused by rhinovirus, parainfluenza virus, and so on. Despite these barriers, the World Health Organization (WHO) estimates that 5%–10% of adults and 20%–30% of children contract seasonal influenza each year.¹³ A 2007 study of seasonal influenza disease burden in the United States calculated the influenza rates to be

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