Benefits of Rapid Influenza Testing in the Physician Office

Influenza is a highly contagious, acute, viral infection of the respiratory tract. It is a communicable disease easily transmitted through the coughing and sneezing of aerosolized droplets containing live virus. Influenza outbreaks occur each year during the fall and winter months. Each year in the United States, about 5% to 20% of residents get influenza, and more than 200,000 people have to be hospitalized as a result of influenza. Type A viruses are typically more prevalent than type B viruses and are associated with most serious influenza epidemics, while type B infections are usually more mild.

Respiratory tract infections are a common reason for prescribing antibiotics although many of these infections do not require such therapy. During the flu season, using a rapid test to quickly diagnose influenza can help to reduce antibiotic use, allow for infection control and reduce overall costs related to additional diagnostic investigations. Quickly identifying patients who are infectious with influenza will allow for appropriate treatment with antiviral medications such as Tamiflu or Relenza. These drugs are most effective when administered within 48 hours of the onset of symptoms. Rapid diagnosis of influenza at the point of care is critical to ensuring that patients are able to receive these antiviral medications as quickly as possible.

Physician knowledge of rapid diagnostic test results for influenza-positive pediatric patients resulted in significant alteration of physician decision-making and patient management:
- significant reductions in tests performed and their associated charges
- decreased antibiotic use
- increased antiviral use

References


About Influenza

Influenza (Flu) is a highly contagious virus that infects the respiratory tract and causes a cascade of symptoms known as "The Flu". In the United States, flu season typically runs from November through April, with the largest number of cases seen between late December and early March. According to the United States Centers for Disease Control and Prevention (CDC), influenza infections cause more than 200,000 hospitalizations and 36,000 deaths annually. In healthy adults, bronchitis and pneumonia (primary viral and secondary bacterial) are the most common complications of influenza. Together, influenza and pneumonia are the 6th leading cause of death in the United States. Influenza may be particularly fatal in the elderly and immunocompromised (cancer patients, those with HIV infection, individuals receiving steroids, chemotherapy, or radiation therapy). Influenza infection compromises the mucociliary lining of the respiratory tract and makes individuals susceptible to such bacterial agents as *Staphylococcus aureus*, *Streptococcus pneumonia*, and *Hemophilus influenza*. Other complications of influenza infection include encephalitis and meningitis. Otitis media, croup and primary viral pneumonia and secondary bacterial pneumonia are influenza complications found in children. Reye's Syndrome is another potential complication from influenza infection that is found in children between the ages of 6 and 11 on long-term aspirin therapy.

Influenza replication takes place within the host respiratory epithelial cells. The incubation period lasts 1-3 days during which time the virus spreads to nearby columnar cells of the respiratory epithelium. After 1-3 days there
is usually enough influenza virus present to cause the clinical symptoms associated with influenza infection. Adults will "shed" influenza virus for approximately 7 days following infection during which time they are considered contagious and capable of spreading the infection. Children and individuals with a compromised immune system may "shed" virus for up to 2 weeks during which time they remain contagious. Infected respiratory epithelium demonstrates significant necrosis which predisposes the infected individual to a secondary bacterial infection.

The onset of flu symptoms is abrupt and characterized by fever (up to 104° F), chills, myalgia, headache, lumbosacral backache, weakness, pharyngitis, and a dry cough. Fever usually lasts 2-4 days. The other symptoms, especially cough and malaise, may persist for up to 2 weeks. Unlike adults, children may present with vomiting and diarrhea. Physical examination may demonstrate evidence of conjunctivitis, nasal discharge, hyperemic pharyngeal mucosa without exudate, cervical adenopathy and rarely rales.

The influenza viruses are RNA viruses from the family Orthomyxoviridae and are identified as either type A or type B based upon the immunoreactivity of the viral nucleoprotein (NP). The nucleoprotein is associated with the 8 unique viral RNA segments. Together the NP and RNA form the viral ribonucleoprotein. A lipid envelope surrounds the internal ribonucleoprotein and contains the viral hemagglutinin protein (HA) and neuraminidase (NA) protein antigens that project outward from the lipid envelope. The human influenza type A strains are identified by the presence of the hemagglutinin protein (H1, H2, H3) and by the presence of the neuraminidase protein (N1, N2). The influenza virus A strain is thus identified, for example, as an H1N2 virus. The influenza virus strains are also identified by the location where they were isolated, the isolate number and the year of isolation. For example, an H1N3 influenza type A virus isolated from the eighth individual from whom a clinical sample was obtained in Puerto Rico in 1934 would be identified as A/PR/8/34 (H1N3).

Vaccination is the primary means to protect an individual from influenza and help prevent the spread of disease. The inactivated vaccine is highly purified and 70-90% effective in preventing influenza in healthy adults. In addition, vigilance in handwashing and avoiding close contact with known infected individuals are also important in preventing the spread of influenza. The Advisory Committee on Immunization Practices (ACIP) has identified specific "high risk" individuals who should receive the vaccine. These individuals have the greatest potential of developing severe disease or complications:

- Children aged 6-23 months
- People aged 50 years and older.
- People with chronic heart, lung, or kidney disease, diabetes, immunosuppression, or severe forms of anemia.
- Residents of nursing homes or other chronic care facilities.
- Women who will be over 3 months pregnant during the influenza season.
- Children and teens receiving long-term aspirin therapy. These individuals may be at risk for developing Reye's Syndrome following influenza infection.
- People who live or work with high-risk patients.

The following individuals should also receive the vaccine because they have the greatest potential to transmit influenza to "high risk" individuals:

- Healthcare workers
- Employees of nursing homes and other chronic care facilities

The vaccine is contraindicated in individuals with a prior allergic reaction to the vaccine and in individuals allergic to eggs. Individuals with an acute febrile illness should wait until their symptoms subside before receiving the vaccine.
There are four anti-viral drugs currently available which are potentially effective in decreasing the severity and duration of the flu symptoms. These drugs are most effective when administered within 48 hours of the onset of symptoms. Rapid and accurate diagnosis of influenza at the point of care is paramount in order to ensure that an individual is able to benefit from these anti-viral medications.

The QuickVue® Influenza test and QuickVue® Influenza A+B test are point-of-care, lateral flow, immunodiagnostic tests designed to detect the presence of the influenza A and B virus in patient nasal swab, nasopharyngeal swab and nasal wash/aspirate specimens within 10 minutes. A positive test result is visually detected as a red test line. The test has a built-in procedure control that will appear as a blue colored line.

The QuickVue® Influenza test technology utilizes the principle of antibody specificity for the influenza virus nucleoprotein (NP) to selectively interact with the influenza A and B viruses. The NP is evolutionarily highly conserved and not subject to the same year-to-year changes that make it necessary to be vaccinated each year to prevent influenza infection. For this reason the QuickVue® test is not adversely affected by the appearance of different influenza strains.