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Commentary

Contemporary Trends in Influenza Detection and Diagnostic Practice

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DESCRIPTION

Seasonal influenza remains one of the most common viral respiratory infections worldwide, contributing significantly to annual morbidity, hospitalizations and healthcare burden. Early and accurate diagnosis is essential for effective clinical management, appropriate antiviral use and implementation of public health measures. Because influenza symptoms overlap with many other respiratory pathogens, laboratory confirmation has become increasingly important, especially during peak respiratory virus seasons. This article reviews current diagnostic approaches for influenza, their clinical utility and considerations for optimal use in various healthcare settings.

Influenza typically presents with sudden-onset fever, chills, cough, sore throat, myalgia and fatigue. However, symptoms can vary widely by age, immune status and circulating viral strains. Young children and older adults may exhibit atypical presentations, such as gastrointestinal symptoms or exacerbation of chronic illnesses. Clinical diagnosis based solely on symptoms often lacks precision, particularly during periods when multiple respiratory viruses cocirculate. Consequently, laboratory methods have become essential tools for distinguishing influenza from illnesses caused by respiratory syncytial virus, SARS-CoV-2, adenovirus and other pathogens.

Rapid Influenza Diagnostic Tests (RIDTs) are among the most commonly used tools in outpatient and emergency settings. These antigen-based assays deliver results within 10-15 minutes and are simple to perform. Although their rapid turnaround time makes them valuable for point-of-care decision-making, their sensitivity varies considerably, often ranging between 50% and 70%. Negative results therefore do not rule out influenza, particularly when community prevalence is high. Positive results, however, are generally reliable during peak flu season. Clinicians using RIDTs must interpret results in the context of local epidemiology and the patient's clinical presentation.

More accurate options include rapid molecular assays, which detect influenza viral RNA using nucleic acid amplification techniques. These tests provide results in under an hour and

demonstrate far greater sensitivity and specificity than antigen-based assays. Rapid molecular tests have become the preferred diagnostic method in many healthcare systems due to their improved performance and ability to test for multiple pathogens simultaneously. Multiplex respiratory panels can detect influenza A and B alongside other viruses, allowing clinicians to identify coinfections and refine treatment strategies.

Reverse Transcription Polymerase Chain Reaction (RT-PCR) remains the gold standard for influenza diagnosis. RT-PCR offers exceptional sensitivity and specificity and is widely used in hospitals and public health laboratories. Although results typically take several hours, the method is invaluable for confirming cases during outbreaks, monitoring circulating strains and guiding public health responses. RT-PCR also allows for subtype differentiation, an important feature for surveillance and vaccine strain selection.

Viral culture, while historically the cornerstone of influenza diagnostics, is now used primarily for research and surveillance rather than routine clinical care. Although culture provides detailed information on viral characteristics, it requires specialized laboratory facilities and several days to yield results. Nevertheless, it remains an important tool for identifying emerging strains and monitoring antiviral resistance.

Serologic testing plays only a limited role in influenza diagnosis because antibody responses take weeks to develop. It is generally reserved for epidemiologic studies rather than acute diagnostic purposes. Similarly, imaging studies such as chest radiographs do not diagnose influenza but may help identify complications such as viral pneumonia or secondary bacterial infection.

Several factors influence test performance, including specimen type and timing. Nasopharyngeal swabs generally yield the highest viral loads and therefore the most reliable results. Testing is most accurate when performed within the first three to four days of symptom onset, during peak viral shedding. For hospitalized or immunocompromised patients, testing beyond this window may still be useful, as viral shedding tends to be prolonged.

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The COVID-19 pandemic has reshaped respiratory virus diagnostics by accelerating adoption of rapid molecular technologies and multiplex testing. Many hospitals now rely on combined influenza-SARS-CoV2 assays, allowing clinicians to differentiate between these clinically similar infections quickly. This integrated approach improves patient management and reduces unnecessary isolation or antiviral use.

In conclusion, accurate influenza diagnosis relies on integrating clinical assessment with appropriate laboratory testing. Rapid

antigen tests remain useful in primary care settings, but rapid molecular assays and RT-PCR have become the preferred methods due to their reliability and broader diagnostic capabilities. Continued advancement in molecular diagnostics, along with improved access to testing, will further enhance clinicians' ability to diagnose influenza promptly and guide effective treatment.