

# Epidemiology Newsletter

Editor: Lawrence K. Sands, DO, MPH



## January 2006 – Clark County Influenza Surveillance

Patricia Rowley, BS, CPH – Pat Armour, BS, MT(ASCP)

Clark County Health District (CCHD) annually prepares for the seasonal onset of influenza by initiating community surveillance strategies, education and vaccination programs. Accurate and timely influenza surveillance information coupled with appropriate diagnostic testing can aid clinical judgment and help guide treatment decisions as well as assist in identifying potential pandemic strains. This newsletter will provide an overview of influenza surveillance and the appropriate use of available influenza diagnostic tests to guide the medical management of patients with febrile respiratory illness.

### Influenza Surveillance in Clark County

The main objectives of influenza surveillance are to determine:

- when and where influenza viruses are circulating
- the intensity and impact of influenza activity (e.g., trends, morbidity, mortality, virulence)
- the types and strains circulating

CCHD has been participating in the CDC sentinel site influenza surveillance system since 1999. Volunteering healthcare providers provide weekly statistics on the proportion of patients seen in their practice with symptoms consistent with influenza. These providers periodically collect specimens from acutely ill patients and submit them to the Southern Nevada Public Health Laboratory (SNPHL) for testing and typing. Local commercial laboratories also submit all positive influenza cultures to SNPHL for confirmation and typing. Through this system CCHD staff is able to monitor influenza-like illness (ILI) trends and circulating subtypes, including the H5 (avian) subtype.

As an adjunct to sentinel site surveillance, in recent years, CCHD initiated syndromic surveillance for ILI. Participating medical

facilities electronically submit patient complaint data on a daily basis, which is monitored for general trends or unusual surges in the number of complaints consistent with ILI. The main advantage of this system over sentinel site surveillance is that the data collected is closer to real-time, which allows for earlier detection of surges in illness levels. During the flu season, the information collected and analyzed from these two systems forms the basis for reports that are distributed by fax and email to medical providers and other officials interested in receiving this information.

### Laboratory Testing for Influenza

When disease incidence is low, such as at the beginning and end of the influenza season, the accuracy of clinical diagnosis on the basis of symptoms alone is limited because symptoms from illness caused by other respiratory pathogens can overlap considerably with influenza. Therefore, laboratory confirmation of influenza early and late in the season is critical for ensuring accurate diagnosis. However, at any time during the influenza season, appropriate laboratory confirmation provides opportunities for:

- identifying circulating types, subtypes and strains (including pandemic strains)
- initiation of appropriate antiviral treatment (which may deter secondary complications)
- assuring judicious use of antibiotics and other diagnostic procedures
- initiation of antiviral prophylaxis for at-risk individuals

Several laboratory tests are available that can be used to detect influenza in human clinical specimens. These include culture, PCR, serology and rapid tests. The table below compares these methods. Each has limitations, so it is imperative that the limitations be considered before ordering the test.

Test Method	Reasons for testing; benefits and limitations	Time to Results
Virus isolation by culture	<ul style="list-style-type: none"> <li>• “Gold Standard” – confirms virus is infectious</li> <li>• Identify types and strains of circulating viruses</li> <li>• Detect unusual events (novel virus)</li> <li>• If avian flu is suspected, contact CCHD Epidemiology for testing instructions. Special laboratory precautions not available to commercial labs are required to isolate avian flu virus</li> </ul>	2-10 days Not Rapid test
Rapid Antigen testing	<ul style="list-style-type: none"> <li>• Perform when results will affect clinical decision</li> <li>• Used to identify acute infection</li> <li>• Use rapid antigen test with highest sensitivity and specificity</li> <li>• Collect samples early in illness (within 4-5 days of symptom onset)</li> <li>• False negative rapid tests more likely to occur when disease prevalence is high – negative test result might not rule out influenza and should not affect patient management or infection control decisions</li> <li>• None of FDA cleared rapid flu tests can differentiate flu A virus subtypes or discriminate between those subtypes that infect humans and those that infect birds</li> </ul>	30 minutes Rapid test
Molecular (Reverse Transcription Polymerase Chain Reaction (RT-PCR))	<ul style="list-style-type: none"> <li>• Faster than culture</li> <li>• SNPHL utilizes CDC approved method with ability to identify H1, H3, H5, H7 subtypes</li> <li>• Commercial labs may not have capability to perform subtyping</li> <li>• Sample not destroyed in testing – additional material available for culture</li> </ul>	8-10 hours Not Rapid Test
Serology (Antibody) test	<ul style="list-style-type: none"> <li>• Requires paired serum collection (acute and convalescent)</li> <li>• Order when direct identification of influenza virus is not possible due to: Clinical samples for isolation cannot be obtained Case identified after virus shedding has stopped Lack of access to laboratory that can perform Rapid Antigen, molecular or viral tests</li> </ul>	> 2 weeks Not Rapid test

Despite the availability of rapid diagnostic tests, viral culture still remains the gold standard among influenza diagnostic tests. Only culture isolates can provide specific information regarding circulating influenza subtypes and strains. This information is needed to compare current circulating influenza strains with vaccine strains, to guide decisions regarding influenza treatment and chemoprophylaxis, and to formulate vaccine for the coming year. Virus isolates also are needed to monitor the emergence of novel influenza A subtypes that might pose a pandemic threat.

If infection with novel influenza A subtypes such as avian influenza is suspected, cultures must be performed in laboratories that have special containment capabilities (Biological Safety Level 3 plus). Since commercial and hospital laboratories are not equipped to isolate avian flu, contact Clark County Health District Office of Epidemiology at 759-1300 for instructions regarding sample collection and isolation. Molecular testing (RT-PCR) performed at SNPHL provides influenza subtyping following CDC protocol. RT-PCR does not require *in vitro* growth or isolation of the virus. If private laboratories perform RT-PCR during the early phase of an influenza pandemic, the results

should be confirmed in consultation with SNPHL.

Rapid antigen tests should not be confused with serology antibody testing. Rapid antigen testing is performed on respiratory samples and will provide direct identification of infection with influenza virus. Antibody testing is performed on serum samples and can be used to retrospectively confirm infection with influenza. In general, rapid antigen tests have lower sensitivity (~70%) than other methods. This means that when utilizing rapid tests, the result will miss identifying true positive cases 30% of the time. Additionally, the level of influenza activity in the community at the time of specimen collection influences the positive predictive value of rapid tests. At the beginning and end of the flu season, when influenza activity is low, the positive predictive value of rapid tests will be lower as well. Therefore at these times, rapid test results will be even less reliable. A negative test result might not rule out influenza and should not affect patient management or infection control decisions.

Currently, despite the occurrence of avian influenza in Asia and Europe, there has been no H5N1 avian influenza activity detected in North

America. However, because there always remains a possibility of importing a human case of avian influenza, it is important for healthcare providers to remain vigilant, particularly in cities like Las Vegas that host a high volume of world travelers. There are no symptoms that distinguish avian influenza from other types of influenza. A recent travel history to a country where avian flu has been identified should immediately raise the index of suspicion that a patient with ILI symptoms may be infected with avian influenza. In absence of avian flu in North America, CDC has the following recommendations:

- i. Testing for influenza A(H5N1) is indicated for ***hospitalized*** patients with:
  - a. radiographically confirmed pneumonia, acute respiratory distress syndrome (ARDS), or other severe respiratory illness for which an alternate diagnosis has not been established, **AND**
  - b. history of travel within 10 days of symptom onset to a country with documented H5N1 avian influenza in poultry and/or humans (for a listing of H5N1-affected countries, see the OIE Website at [www.oie.int/eng/en\\_index.htm](http://www.oie.int/eng/en_index.htm) and the WHO Web site at [www.who.int/en](http://www.who.int/en)).
- ii. Testing for influenza A(H5N1) should be considered on a case-by-case basis in consultation with state and local health departments for **hospitalized or ambulatory** patients with:
  - a. documented temperature of  $>38^{\circ}\text{C}$  ( $>100.4^{\circ}\text{F}$ ), **AND**
  - b. one or more of the following: cough, sore throat, shortness of breath, **AND**
  - c. history of contact with domestic poultry (e.g., visited a poultry farm, household raising poultry, or bird market) or a known or suspected human case of influenza A(H5N1) in an H5N1-affected country within 10 days of symptom onset.

In Clark County there is nothing unusual about the current influenza season thus far, and the influenza strain (H3N2) currently circulating in

Clark County is covered by this year's vaccine. Of the 139 flu-positive specimens submitted this season to SNPHL for typing, 100% have been influenza A. Of those that were able to be subtyped by polymerase chain reaction (PCR), all were H3, which is a fairly typical human influenza strain. The trends in occurrence of ILI are similar to last year. Last year's influenza season was typical for Clark County, peaking in mid- to late-February, and returning to baseline in April.

Clark County Health District, in conjunction with SNPHL will continue influenza surveillance throughout the season. With the assistance of healthcare providers through collection of human clinical specimens for influenza culture, we will be able to continually monitor the circulating subtypes and provide reports on the findings. Should a pandemic strain arise, healthcare practitioners will be notified via the Clark County health alert network.

To report influenza or other communicable diseases, call (702) 759-1300. Epidemiology staff are ready to take your reports 24/7.