INFLUENZA SURVEILLANCE AND RESPONSE PROTOCOL

Public Health Action

1. Educate providers to report aggregate totals of influenza-like illness weekly to the local health department. Transmit this information weekly to the West Virginia Infectious Disease Epidemiology Program (IDEP).

2. Educate laboratories to report aggregate totals of culture-confirmed influenza, by type and subtype (if available) to the local health department on a weekly basis. Transmit this information weekly to IDEP.

3. Recruit one sentinel provider or laboratory per county for influenza season; no later than November 1, annually. Report this information to the West Virginia Department of Health and Human Resources influenza surveillance coordinator to complete the enrollment process. Successful provider recruitment and retention requires:
   a. Think broadly about provider recruitment. Clinics, physician assistants, nurse practitioners, university health centers, family practice residency programs, and many others make good sentinel providers.
   b. Make a personal recruiting visit. (Suggestion: ask your regional epidemiologist to help).
   c. Explain influenza surveillance using a recruitment package, including:
      i. A letter from the local health department;
      ii. Information on the CDC influenza surveillance system;
      iii. WVDHHR information sheets;
      iv. Enrollment form; and
      v. Virology collection instructions.
   d. Identify and communicate with a point of contact (POC) in the sentinel provider office.
   e. Send the completed enrollment form to DHHR. You will receive the virology collection kit by return mail.
   f. Deliver the kit to the POC.
   g. Keep the lines of communication open.

4. For the 2003-2004 influenza season (optional for counties participating in the pilot test for syndromic surveillance) collaborate with IDEP to capture the following information on a weekly basis from participating emergency rooms:
   a. Emergency room visits with a diagnosis of influenza or pneumonia.
   b. Total number of emergency room visits per week.

      Procedure: Record total ER visits from Friday through Thursday on Friday morning. Record total ER visits with a diagnosis of influenza or pneumonia (ICD -10 = J10 - J18). Submit to IDEP on the Friday of each week with the ILI and chickenpox totals for the week.

5. Educate providers and the public about appropriate use of influenza vaccine to prevent influenza.

6. If vaccine-strain influenza is identified in the county or the state, issue an alert to providers in your county. Inform them about:
   a. The type and subtype of influenza virus identified in the county or state, and
   b. Preventive measures for unimmunized high-risk patients.

7. If non-vaccine strain influenza is isolated, contact IDEP immediately. Consult with IDEP for recommendations specific to the situation. If the situation is of concern (unexpected and/or virulent strain), you may be asked to:
   a. Initiate active surveillance for clusters/outbreaks of influenza-like-illness through emergency rooms, schools and nursing homes;
   b. Work with local providers to obtain additional cultures from patients who meet the case definition of influenza-like illness. The purpose of this is to confirm limited versus widespread circulation of non-vaccine-strain virus; and
   c. Issue an alert to providers in your county notifying them of the situation.

8. Rapidly triage reported outbreaks of "influenza-like illness" by obtaining the following information:
   a. Number of ill persons
   b. Setting (school, nursing home, community, etc.)
   c. Age distribution of ill persons
   d. Do ill individuals have underlying disease or are they previously healthy?
   e. Symptoms
   f. Date(s) of onset of illness
   g. Duration of illness – time to full recovery
   h. Any results of rapid testing or culture for influenza?
   i. Does anyone have pneumonia? How many?
   j. Results of sputum gram stain and blood cultures, and other studies, if applicable
   k. Are any patients sick enough to be in the hospital? How many?
   l. Are any patients moribund? How many?
   m. Has anyone died? How many?
   n. Name and phone number of person reporting illness

9. Notify IDEP immediately when an outbreak of influenza-like illness is reported. Remember that many other agents (including bioterrorism agents) can mimic influenza in the early stages. If there is reason to consider bioterrorism (sudden onset of illness in large numbers of people, unusual severity or rapid progression in previously healthy individuals, atypical epidemiological or clinical features, etc.), contact IDEP immediately. Especially in high-risk populations, anticipate that you may be asked to investigate influenza outbreaks as follows:
   a. Work with providers to obtain approximately eight to 10 culture samples for viral isolation at the West Virginia Office of Laboratory Services *prior to initiation of antiviral agents*.
   b. Obtain a description of symptoms among a sample of eight to 10 ill persons.
   c. For nursing home outbreaks, advise providers to initiate antiviral prophylaxis

according to current recommendations (MMWR, April 25, 2003 / 52(RR08).
   d. If a community outbreak is confirmed as influenza A through rapid testing, issue a medical alert to providers with recommendations as in item 6 above.
   e. Modify recommendations as necessary, as additional laboratory data becomes available.

Disease Prevention Objective

To reduce hospitalization and mortality from influenza by encouraging widespread use of the influenza vaccine among high-risk groups.

Disease Control Objectives

1. After influenza is identified in the community, reduce further hospitalization and death from influenza by educating providers to:
   a. Offer the influenza vaccine immediately to high-risk persons who have not yet received the vaccine AND cover those individuals with an appropriate antiviral agent until two weeks after immunization is complete; OR
   b. Providers may also cover selected high-risk individuals who cannot receive influenza vaccine with an appropriate antiviral agent for the duration of influenza season or during peak influenza season.

2. If an influenza outbreak is identified in a long term care facility, advise providers to reduce the risk of illness by assuring that antiviral prophylaxis is offered to residents and staff and appropriate isolation measures are instituted.

Disease Surveillance Objectives

1. To identify the earliest case of influenza A in the state (county) and report/feedback data in real time.

2. To estimate the duration of influenza season from start to finish and report/feedback data in real time.

3. To identify institutional and community-based outbreaks of influenza and report/feedback information on circulating strains in real time.

4. To determine if early season, outbreak, and late season strains are vaccine-strain or non-vaccine-strain and report/feedback information in real time.

5. To contribute to the global (WHO) effort to identify appropriate strains of influenza vaccine to formulate vaccine composition recommendations for the coming year.

Public Health Significance

Epidemics of influenza occur every winter and are responsible for an estimated 36,000 deaths per year in the United States. Most vulnerable to hospitalization or death from influenza are the very young, the very old, and persons with chronic conditions. In

elderly populations, influenza vaccine is NOT highly effective in preventing influenza-like illness; it IS effective in preventing hospitalization and death.

The nation continues to be on alert for another wave of terrorism in the wake of the September 11 terrorist attacks. Some researchers believe that a mutated flu virus could be used as a weapon for a bioterrorist attack. In addition, many bioterrorism agents may exhibit "flu-like" symptoms in the prodrome phase. Thus it is imperative to recognize that public health must closely track influenza-like illness in the community.

Influenza A and B are the two "types" of influenza that are capable of causing epidemic disease. Influenza A is further categorized into "subtypes" based on the two surface antigens: hemagglutinin (H) and neuraminidase (N). Due to "antigenic drift" (small mutations in the genes coding for the antigenic structure of the virus), the virus is continually able to evade the human immune response, and the composition of the vaccine must change every year to match circulating influenza virus strains and provide optimal protection. Antigenic shift is a far more drastic change in antigenic structure, and represents emergence of a completely new subtype, which is likely to result in pandemic influenza with large numbers of deaths.

Thus, virologic surveillance is a very important part of influenza surveillance, and is routinely used by the public health community to answer the following questions:

1. Are *early season isolates* vaccine strain? This is an important question to answer because it is the earliest indicator that the circulating strains are covered in the current vaccine.

2. Are *outbreak isolates* vaccine strain? Again, it is important to know if outbreak strains are covered by the vaccine because immunization is a critical part of outbreak control. In addition, outbreak strains are used to formulate recommendations for the composition of influenza vaccine during the coming year.

3. Are *late season isolates* similar in antigenic structure to last year? Late season isolates are considered in the design of the next season's influenza vaccine.

4. Are reports of influenza-like illness due to influenza? In West Virginia, influenza-like illness is reportable, and the data usually show a seasonal upsurge in the number of cases every year sometime between December and March. Laboratory confirmation of this phenomenon adds to the credibility of the ILI data.

In West Virginia, virologic surveillance is conducted through the sentinel physician system and through sentinel laboratories. These laboratories submit specimens to the West Virginia Office of Laboratory Services, which confirms isolation and subtypes isolates of influenza A.

Rapid turnaround of influenza data is important so that providers know when influenza season begins and when it is over. Certain high-risk patients may be offered prophylaxis for the duration of influenza season.

Pandemic influenza occurs due to antigenic shift. The first recorded influenza pandemic is thought to have occurred in 1580. Since then, 31 pandemics have been described, the worst having occurred in 1918-1919 when 21 million people died worldwide, with 549,000 of these in the U.S. Another pandemic is thought to be inevitable, though no one knows when it will occur. Good quality influenza response during a routine year is good practice and necessary for pandemic readiness.

Clinical Description

Influenza is an acute illness characterized by fever, chills, sweats, headache, arthralgia, myalgia, prostration, coryza, sore throat, and cough. Symptoms are generally self-limited within two to seven days, though cough may be prolonged.

Elderly patients are at highest risk for influenza-related complications. These include viral or bacterial pneumonia, exacerbation of chronic lung disease, myositis, Guillan-Barre syndrome, and Reye syndrome. Patients with cardiac disease are at significantly increased risk of death from influenza. Young children age 0-1 years are hospitalized at rates comparable to elderly (age $\geq$ 65) persons.

Etiologic Agent

There are three types of influenza viruses: types A, B, and C. Influenza A includes three subtypes (H1N1, H3N2, and H2N3) that have caused pandemic disease. Influenza B has caused local and regional outbreaks. Influenza C is a cause of smaller outbreaks and sporadic cases.

Influenza viruses are classified as follows:

Type**/**Geographic Site of Isolation**/**Culture Number**/**Year of Isolation**(**Subtype**)**

The following are classification examples:

A/Beijing/262/95(H1N1) A/Sydney/5/97(H3N2) B/Yamanashi/166/98

Reservoir

Humans. Birds and swine are thought to be a source of new human subtypes that arise through genetic reassortment. These new subtypes may then be responsible for pandemic disease.

Mode of Transmission

Airborne spread predominates in closed places. Transmission may also occur through direct contact as the virus survives for hours in the cold and at low humidity.

Incubation Period

The incubation period is one to three days.

Infectious Period

The infectious period is probably three to five days after clinical onset in adults, and up to seven days after onset in young children.

Outbreak Recognition

Outbreaks are commonly recognized based on clinical and epidemiological features. Laboratory confirmation/investigation of outbreaks is important in high-risk settings such as nursing homes or hospitals, or early or late in influenza season, or anytime that unusual clinical or epidemiological features are noted. With the availability of antiviral agents, outbreak recognition and control are increasingly important. Health departments should have the most recent MMWR recommendations readily available to share with providers during influenza season.

Case Definition for Influenza-like Illness

For surveillance purposes, ILI is defined as fever ≥ 100° F (36° C) *and* cough or sore throat without another identified cause.

Laboratory Diagnosis of Influenza

The Office of Laboratory Services offers rapid culture confirmation for influenza A and B on nasopharyngeal swab samples. Results are shared by fax or phone. Testing is limited to physicians and laboratories participating in sentinel surveillance, and health departments engaged in outbreak investigation. Consult the Infectious Disease Epidemiology Program at (304) 558-5358 if testing is needed in special situations.

Preventive Interventions

The inactivated influenza vaccine is the only vaccine currently licensed for prevention of influenza, and must be given annually during October through November. The vaccine is recommended for:

1. Persons at increased risk for complications, including:
    a. Persons aged ≥ 65 years;
    b. Residents of nursing homes and other chronic care facilities that house persons of any age who have chronic medical conditions;
    c. Adults and children who have chronic disorders of the pulmonary or cardiovascular systems, including asthma;
    d. Adults and children who have required regular medical follow-up or hospitalization during the preceding year because of chronic metabolic diseases (including diabetes mellitus), renal dysfunction, hemoglobinopathies, or immunosuppression (including immunosuppression caused by medications or by human immunodeficiency [HIV] virus);
    e. Children and teenagers (aged six months to 18 years) who are receiving long-term aspirin therapy and therefore might be at risk for developing Reye syndrome after influenza infection; and

f. Women who will be in the second or third trimester of pregnancy during the influenza season.

2. Persons aged 50-64 (because of the higher prevalence of chronic conditions in this age group).

3. Persons who can transmit influenza to those at high risk, including:
   a. Physicians, nurses, and other personnel in both hospital and outpatient-care settings, including emergency response workers;
   b. Employees of nursing homes and chronic-care facilities who have contact with patients or residents;
   c. Employees of assisted living and other residences for persons in groups at high risk;
   d. Persons who provide home care to persons in groups at high risk;
   e. Household members (including children) of persons in groups at high risk; and
   f. Household contacts and out-of-home caretakers of children 0-23 months of age.

4. Influenza vaccine is encouraged for the following groups, depending upon vaccine availability:

   a. All children six to 23 months of age.
   b. Persons who provide essential community services.
   c. Students and other persons in institutional settings (e.g. those who reside in dormitories).
   d. Certain travelers (e.g. travel to the tropics; travel with organized tourist groups at any time of year; or travel to the Southern Hemisphere during April-September).
   e. Anyone who wishes to reduce the likelihood of becoming ill with influenza.

   The live attenuated influenza vaccine (LAIV) is licensed for healthy children and adults aged 5-49 (MMWR September 26, 2003 / Vol. 52 / No. RR-13). Contraindications to the use of the LAIV include:

   - Persons aged < 5 years and those aged $\geq$ 50 years
   - Persons with asthma, reactive airways disease or other chronic disorders of the pulmonary or cardiovascular systems; persons with other underlying medical conditions, including such metabolic diseases as diabetes, renal dysfunction, and hemoglobinopathies; or persons with known or suspected immunodeficiency diseases or who are receiving immunosuppressive therapies;
   - Children or adolescents receiving aspirin or other salicylates (because of the association of Rye syndrome with wild-type influenza infection);
   - Persons with a history of Guillain-Barré syndrome;
   - Pregnant women;
   - Persons with a history of hypersensitivity in clinical anaphylaxis, to any of the components of LAIV or to eggs; or
   - Persons who are close contacts of persons at risk for complications from

influenza.

In addition to influenza vaccine, there are now three antiviral agents licensed to prevent influenza. Amantadine and rimantidine are licensed in individuals ≥ 1 year of age for prevention of influenza A. Oseltamivir is licensed in individuals age 13 and older for prevention of influenza A and B. These agents can be used for prophylaxis of high-risk individuals who receive the vaccine after the start of influenza season. Prophylaxis must be continued for two weeks after completion of immunization (two weeks after immunization in adults and for up to six weeks in children receiving the two-dose regimen, i.e. four weeks after the first dose followed by two weeks after the second dose). These agents can also be used alone for prophylaxis of those few high-risk individuals who cannot receive influenza vaccine. Package inserts should be consulted for additional information

Surveillance Indicators

1. Proportion of MMWR weeks for which reporting of total ILI is available (county level).

2. Proportion of counties in which virologic surveillance was conducted during the season (state level).