Influenza
Surveillance Protocol

WEST VIRGINIA Department of Health & Human Resources
BUREAU FOR PUBLIC HEALTH

Provider Responsibilities

1. Occupational Health
   a. Vaccinate staff to protect patients
      Get vaccinated annually and encourage staff to be 100% vaccinated

   b. Cough etiquette
      Cover your nose and mouth with tissue when coughing or sneezing. Discard the tissue in waste receptacle. For more information please see:
      http://www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm

2. Who should be tested?
   a. Symptomatic individuals presenting for diagnosis and treatment:
      If the result of influenza testing will influence clinical management (decisions on initiation of antiviral treatment, impact on other diagnostic testing, antibiotic treatment decisions, and infection control practices), high risk and other persons with influenza-like illness should be tested for influenza. See testing guidelines from the Infectious Disease Society of America (IDSA):

      i. http://www.dhhr.wv.gov/oeps/disease/flu/Documents/IDSA%20Seasonal%20Influenza%20Guidelines.pdf

      ii. Summarized as: http://www.dhhr.wv.gov/oeps/disease/flu/Documents/Provider_Who%20should%20be%20tested%20for%20influenza.pdf

      iii. http://www.cdc.gov/flu/professionals/diagnosis/testing_algorithm.htm

   b. Outbreaks in institutional or other closed settings
      i. Three or more cases of influenza-like illness occurring within 72 hours should prompt testing for influenza. When influenza viruses are circulating, even one positive laboratory test for influenza in conjunction with other compatible illnesses on the unit indicates that an outbreak is

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occurring. See IDSA guidelines at: http://www.dhhr.wv.gov/oeps/disease/flu/Documents/IDSA%20Seasonal%20Influenza%20Guidelines.pdf

ii. In an outbreak setting, because of the low sensitivity of rapid influenza tests, use of the tests on specimens from more than one ill person is recommended. The presence of any influenza positives among persons with clinically compatible illnesses is supportive of influenza as the probable cause of the outbreak. Confirmation of positive rapid tests by more specific influenza testing is indicated. By reporting outbreaks to your local health department (as required by law), you can access testing services at the Office of Laboratory Services free of charge.

iii. See CDC algorithm for testing at: http://www.cdc.gov/flu/pdf/professionals/diagnosis/testing_algorithm.pdf

c. Surveillance:
The West Virginia Office of Laboratory Services will accept 2 surveillance specimens per week from sentinel providers.

d. Do not test the worried well or mildly ill persons who are previously healthy.
Laboratory resources are limited and diagnosis is unlikely to change clinical management. Do NOT prescribe antiviral treatment to mildly ill persons who are otherwise healthy or the worried well. Overuse of antiviral agents will lead to unnecessary resistance and side effects.

3. What tests should be used?
   a. Tests that yield results in a timely manner are necessary for clinical management. PCR, immunofluorescent antibody tests and rapid tests are useful for clinical management. PCR is the most sensitive and specific; however, this test method is not widely available in West Virginia.

b. For a summary of available test methods, see http://www.dhhr.wv.gov/oeps/disease/flu/Documents/Provider_how%20do%20I%20test%20for%20influenza.pdf

c. If rapid tests are used, be cautious in interpretation of results. See: http://www.dhhr.wv.gov/oeps/disease/flu/Documents/Provider_how%20do%20I%20interpret%20rapid%20results_revised%20Oct2010.pdf

4. Antiviral Treatment

a. Healthy Populations

i. Patients, who are severely ill, hospitalized or at high risk for complications of influenza, should be offered antiviral medication.

ii. Close contacts of patients with seasonal influenza can be considered for antiviral prophylaxis if they are at high risk for complications. Guidelines for the 2011-2012 influenza season can be found on the CDC website at:

- http://www.cdc.gov/flu/professionals/antivirals/index.htm
- Summarized: http://www.cdc.gov/flu/pdf/professionals/antivirals/clinician-antivirals-2011.pdf ; AND
- Centers for Disease Control and Prevention MMWR Recommendations and Reports Vol. 60, No. 1. http://www.cdc.gov/mmwr/pdf/rr/rr6001.pdf

b. Residents of long term care facilities

i. Begin antiviral prophylaxis for all residents. Antiviral therapy should be continued for 14 days or for 7 days after the onset of symptoms in the last person infected, whichever is longer. Standing orders for antivirals should be in place before influenza season starts.

ii. Unvaccinated staff should receive antiviral prophylaxis. If inactivated vaccine is administered to staff, antiviral chemoprophylaxis can generally be stopped 2 weeks after vaccination.

iii. For details see: http://www.dhhr.wv.gov/oeps/disease/flu/Documents/IDSA%20Seasonal%20Influenza%20Guidelines.pdf

5. Isolation of symptomatic individuals in health care facilities
   a. Use standard and droplet precautions with careful attention to respiratory etiquette and hand hygiene.

   b. Place ill patients in private rooms or in the same room or wing as other ill patients.

   c. Ill staff should stay off work until they are recovered. To the extent possible, keep staff from "floating" between floors/units.

   d. Consider:
      i. Limiting new admissions
      ii. Limiting or stopping visitation to the facility until there has been no new cases for 48 hours or more.
      iii. Stopping or limiting group activities (dining hall, activity rooms, etc.)
      iv. Serve meals in residents' rooms.

6. Reporting requirements
   a. Aggregate

   Continue to report aggregate cases of influenza-like illness (ILI) to the local health department in accordance with guidelines from your local health department. Influenza-like illness is defined as:

   Fever ≥100°F (38°C) and
   Cough and/or sore throat without another identified cause.

   b. Special cases
      i. Report outbreaks immediately to the local health department
      ii. Report cases of novel influenza to your local health department immediately

iii. Report pediatric (age< 18 years) deaths from influenza to your local health department within one week

Laboratory Responsibilities

1. Laboratories should evaluate the influenza testing methods they make available to providers in light of Infectious Disease Society of America (IDSA) guidelines. IDSA guidelines are summarized at:

   a. http://www.dhhr.wv.gov/oeps/disease/flu/Documents/Provider_how%20do%20I%20test%20for%20influenza.pdf

   b. CDC guidelines for seasonal influenza testing: http://www.cdc.gov/flu/pdf/professionals/diagnosis/clinician_guidance_ridt.pdf

2. Many laboratories in West Virginia rely heavily on rapid tests. Rapid tests must be interpreted within the context of current influenza activity. For information on influenza activity in West Virginia, see:

   a. http://www.dhhr.wv.gov/oeps/disease/flu/Pages/fluSurveillance.aspx

   b. For CDC guidelines on rapid tests for laboratory directors please see: http://www.cdc.gov/flu/pdf/professionals/diagnosis/clinician_guidance_ridt.pdf

3. Confirmation and subtyping
   a. Please refer early season isolates to the Office of Laboratory Services for confirmation and sub typing. It is important to know – early in the season – what viruses are circulating in the state.

   b. When influenza viruses are known to be circulating in the community, a subset of influenza specimens or isolates from West Virginia laboratories should be confirmed and subtyped at the Office of Laboratory Services (OLS). OLS will accept specimens from:
      - *Reported outbreaks* (8-10 specimens per outbreak for characterization of the outbreak strain)

- Sentinel hospital laboratories (5 influenza A isolates per sentinel hospital laboratory per week) call the Office of Laboratory Service if interested in becoming a sentinel hospital laboratory; and
- Sentinel providers (2 specimens per sentinel provider per week).
- Contact OLS for shipping containers and other supplies. Instructions for specimen collection and submission are found at:

  The West Virginia Office of Laboratory Services
  167 Eleventh Ave, South Charleston, WV 25303,
  Ph. 304-558-3530, Fax. 304-558-2006
  http://www.wvdhhr.org/labservices/labs/virology/influenzaSurveillance.cfm

4. Reporting responsibilities
   All laboratory results positive for influenza by RT-PCR, immunofluorescence (IFA or DFA) or culture must be reported weekly in aggregate for the week ending on Saturday (MMWR week) by close of business on Monday of each week. **Report to DIDE by e-mail, phone or fax at: Phone 304.558.5358; Fax: 304.558.8736; or to** Susan.L.Stowers@wv.gov
   - Total tests done; and
   - Total positive for influenza A (by subtype, if available); and
   - Total positive for influenza B.
   - Novel influenza
   - Outbreaks

Local Health Responsibilities

1. Occupational Health
   a. Vaccinate staff
      Make sure staff who might interview patients with influenza are vaccinated annually

   b. Cough etiquette
      Use tissues or sleeve when coughing or sneezing and disposing of used tissues in waste receptacle. For more information please see:
      http://www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm

c. Masks
Have masks available for when seeing suspected ILI cases in the clinic or investigating outbreaks

2. Maintain routine surveillance for influenza, including
   a. Weekly aggregate reporting of influenza-like illness (ILI) from providers. ILI is defined as fever > 100° F and cough and/or sore throat without another identified cause. Fax ILI totals to Infectious Disease Epidemiology (DIDE) at (304)-558-8736 by Monday at close of business for the previous week ending on Saturday.

   b. Maintain one actively reporting sentinel provider per county. Check with the point-of-contact in the provider's office periodically to assure that the provider is reporting regularly and according to CDC guidelines. Sentinel providers should be encouraged to obtain two nasopharyngeal specimens every week from patients with symptoms of influenza-like illness. Local health departments should assure that sentinel providers who want influenza test kits have them available.

   c. Encourage hospital laboratories to work directly with the Office of Laboratory Services to confirm and subtype 5 influenza A specimens per week.

   d. Educate providers about recognition and reporting of influenza. Provider education materials are available at the DIDE website at: http://www.dhhr.wv.gov/oeps/disease/flu/Pages/default.aspx

   e. Investigate unusual cases of influenza:
      i. Pediatric deaths should be investigated using the WVEDSS form.
      ii. Novel influenza should be investigated immediately, in collaboration with DIDE.

2. <u>Immediately report outbreaks, clusters, and unusual cases of influenza to Infectious Disease Epidemiology (800)-423-1271</u>

3. Investigation of clusters and small outbreaks in healthy populations:
   a. Line list a subset of individuals to establish that reported cases meet the ILI case definition. Note: in large outbreaks such as school outbreaks it is usually not feasible to line list all ill persons. School or workplace absentee rates are the effective way to follow the course of an outbreak in a large institution.

   b. IF individuals meet the ILI case definition, it is very important to collect nasopharyngeal specimens from a sample of about 8-10 recently ill patients.

   c. Transmit recommendations to providers, schools and other local stakeholders as information becomes available. Excellent guidance for various groups is found at:
      i. Schools and daycares: http://www.cdc.gov/flu/school
      ii. Workplaces: http://www.cdc.gov/flu/workplace
      iii. General: http://www.cdc.gov/flu

   d. At the close of the outbreak, summarize the number of cases (or peak absentee rate) and communicate that information to DIDE.

   e. For complex outbreaks or those with unusual epidemiological characteristics, consult an experienced epidemiologist.

4. Investigation of clusters and small outbreaks in nursing homes or populations with chronic underlying disease:
   a. Line list all ill individuals to establish that reported cases meet the ILI case definition. Follow the outbreak until no new cases have been reported for 1 week.

   b. IF individuals meet the ILI case definition, it is very important to collect nasopharyngeal specimens from a sample of 8-10 recently ill (within 72 hours of illness onset).

   c. Rapid laboratory screening is important because these patients should be started on antiviral prophylaxis as soon as possible.

d. Use standard and droplet precautions. See additional recommendations in the outbreak toolkit posted at:

   http://www.dhhr.wv.gov/oeps/disease/flu/Pages/default.aspx

e. At the close of the outbreak, summarize the number of cases (or peak absentee rate) and communicate that information to Infectious Disease Epidemiology.

Disease Control Objectives

To reduce further hospitalization and death from influenza by educating providers to:

1. 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
2. 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.
3. Offer antiviral prophylaxis to residents and staff of long term care facilities and institute appropriate isolation measures.

Disease Prevention Objectives

To reduce hospitalization and mortality from influenza by encouraging widespread use of the influenza vaccine

Disease Surveillance Objectives

1. To identify the earliest case of influenza A in the state (county) and report/feedback data as available.
2. To characterize the level of influenza activity throughout influenza season from start to finish and report/feedback data as available during the season.
3. To identify institutional and community-based outbreaks of influenza and report/feedback information on circulating strains as available during the season.
4. To determine if early season, outbreak, and late season strains are vaccine-strain or non-vaccine-strain and report/feedback information as available during the season.

5. To contribute to the global (WHO) effort to identify appropriate strains of influenza vaccine to formulate vaccine composition recommendations for the coming year.
6. To identify enhanced surveillance techniques to supplement and improve information on influenza in West Virginia.

Public Health Significance

Influenza is a vaccine preventable disease that occurs seasonally each year. There are three strains that circulate: influenza AH1, influenza AH3 and an influenza B strain. Depending on how well the vaccine matches the circulating strains the season may be mild or severe. The severity of influenza seasons can differ from year to year from a low of about 3,000 deaths to a high of 49,000 deaths associated with influenza. When a totally different strain emerges, one that the population hasn't seen before or developed immunity to, it can result in an epidemic or even pandemic with increased morbidity and mortality. An epidemic affects many persons at the same time in a locality where the disease is not permanently prevalent, whereas a pandemic refers to an incident on a worldwide scale crossing international borders. Pandemic influenza is also associated with a) shift in mortality to younger age groups, b) successive pandemic waves, c) and higher transmissibility than seasonal influenza.

There have been four influenza pandemics in the last century. The most recent was the pandemic in 2009. In April 2009, an unusually high number of cases of influenza-like illness were noted in Mexico. Over 800 cases of pneumonia and almost 60 deaths were reported. Near the end of April, in the United States, seven cases of influenza-like illness were found to be infected with the same novel influenza strain; two in Texas and five in California. The causative agent was determined to be influenza A/H1N1/2009.

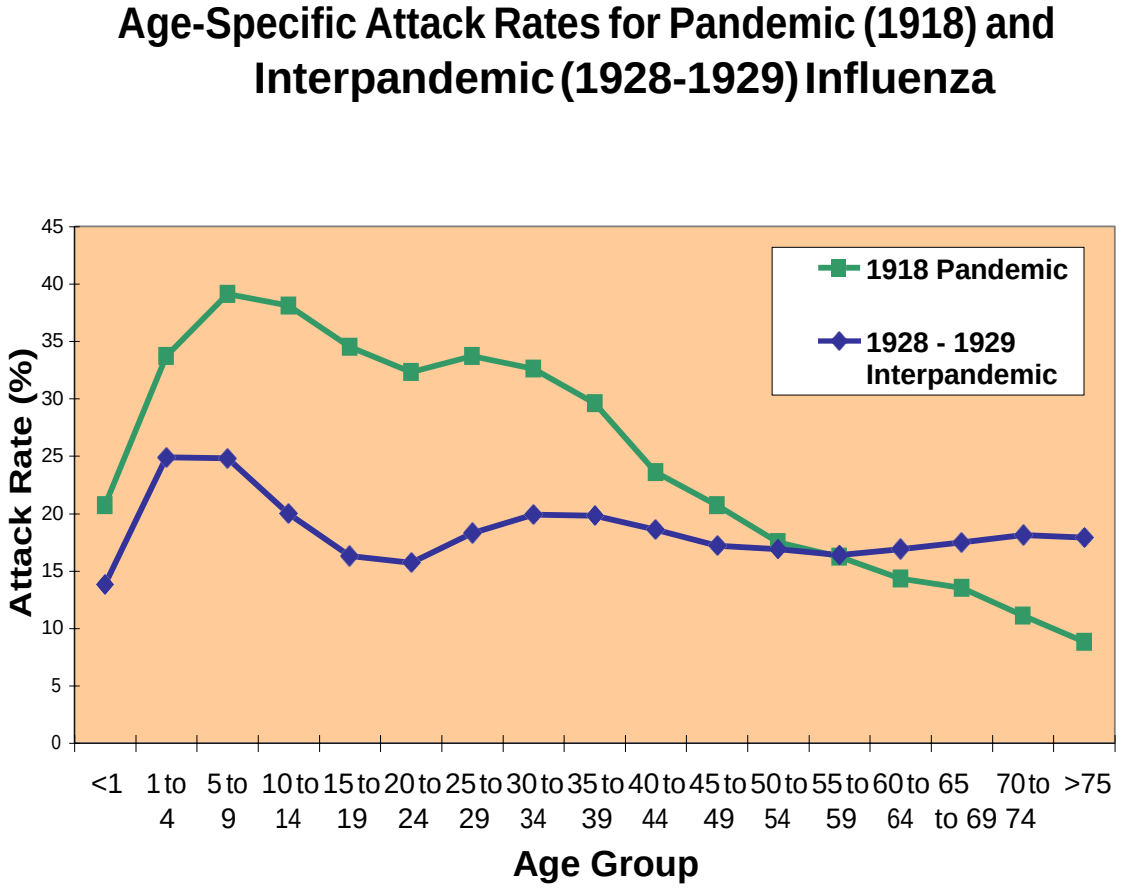
On June 11, 2009, the pandemic level was raised by World Health Organization to the highest level, level 6, because of the identification of novel influenza A (H1N1) in multiple countries and cases occurring without identified chains of transmission. By October of 2009, 191 countries and territories had reported more than 375,000 laboratory-confirmed cases of pandemic (H1N1) 2009 with more than 4,500 deaths

world-wide. The cumulative number of deaths from pandemic H1N1 influenza reported to the World Health Organization (WHO) as of July 2010 was at least 18,366.

During April through July of 2009, there were over 40,000 laboratory confirmed cases of influenza A pandemic (H1N1) 2009 reported. This only represented a fraction of total cases since not all persons with influenza sought testing or treatment. It is estimated that 1.8 to 5.7 million symptomatic cases of pandemic H1N1 2009 occurred, with 9,000 to 21,000 hospitalizations. Adults ages 20 to 59 were hit hardest by the pandemic, followed by young people 5 to 19 years old. In August of 2010, the WHO announced that a post-pandemic period had begun in anticipation that the influenza A H1N1 2009 virus will continue to circulate as a seasonal virus for several years. One hallmark of a pandemic is that the new virus replaces previously circulating viruses. In the Southern Hemisphere, the WHO reported that from August 2009 to October 2009, the proportion of viruses typed as pandemic H1N1 ranged from 92% - 96%.

While mortality from influenza is highest at extremes of age, attack rates are highest in young children. Children are the first to become ill in families and school settings. They predominate amongst those presenting initially for medical care. During both 1918 and 1957, pandemic virus seeded the population in the spring; however pandemic illness did not become apparent until October, after school had been in session for 6-8 weeks. For all these reasons, children are thought to be critical for the spread of influenza during pandemic and interpandemic years. The figure below shows age-specific attack rates for pandemic (1918) and interpandemic (1928 – 1929). Similar data are available for the 1957 and more recent time periods.

Figure 1: Age- Specific Attack Rates for Pandemic (1918) and Interpandemic (1928-1929) Influenza[1]



Comparatively, mortality during the 1918-1919 pandemic was notable for peak mortality rates in young adults as well as the very young and the very old. The mortality among young adults in the 1918-1919 pandemic is apparent by the mean age of death of 27.2 years of age. The 2009 pandemic struck the 20-59 age group the hardest and this is reflected in the mean age of death being 37.4 years of age (see Table 1).

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Table 1: Estimates of number of deaths, mean age of deaths, and years of life lost attributable to the 2009 pandemic in US, estimates of historical pandemics and typical A/H3N2 seasons[2]

	Numbers of deaths (adjusted to 2000 population)	Mean age of deaths (yrs)	Years of life lost (adjusted to 2000 population)
2009 pandemic	7,500-44,100 *	37.4	334,000-1,973,000
	12,000 (8,500-17,600) **		463,300 (328,900-680,300)
1968 Pandemic	86,000***	62.2	1,693,000
1957 Pandemic	150,600***	64.6	2,698,000
1918 Pandemic	1,272,300***	27.2	63,718,000
Average A/H3N2 season, 1979-2001	47,800***	75.7	594,000

* Range is based on estimates of excess P&I deaths (lower) and all-cause deaths (upper), based on projections from the 122 cities mortality surveillance
** Estimates based on CDC's probabilistic estimates, using 2009 pandemic survey data [8] (different from CDC's excess mortality method for measuring seasonal influenza burden)
*** Estimates based on excess mortality approach applied to final national vital statistics and adjusted to the 2000 population age structure

Years of Life Lost (YLL) is an estimate of the average years a person would have lived if he or she had not died prematurely, giving more weight to deaths that occur among younger people. YLL assists in quantifying the burden of disease better than the numbers of deaths[2]. Another way to compare the impact of pandemics is to use excess mortality. Excess mortality is death above what would be expected based on the non-crisis mortality rate in the population of interest. Excess mortality is mortality that is attributable to the crisis conditions, above and beyond death that occurs normally. It can be expressed as a rate (the difference between observed and non-crisis mortality rates)[3]. Table 2 illustrates the differences among pandemics and interpandemic periods and the impact influenza has on the population.

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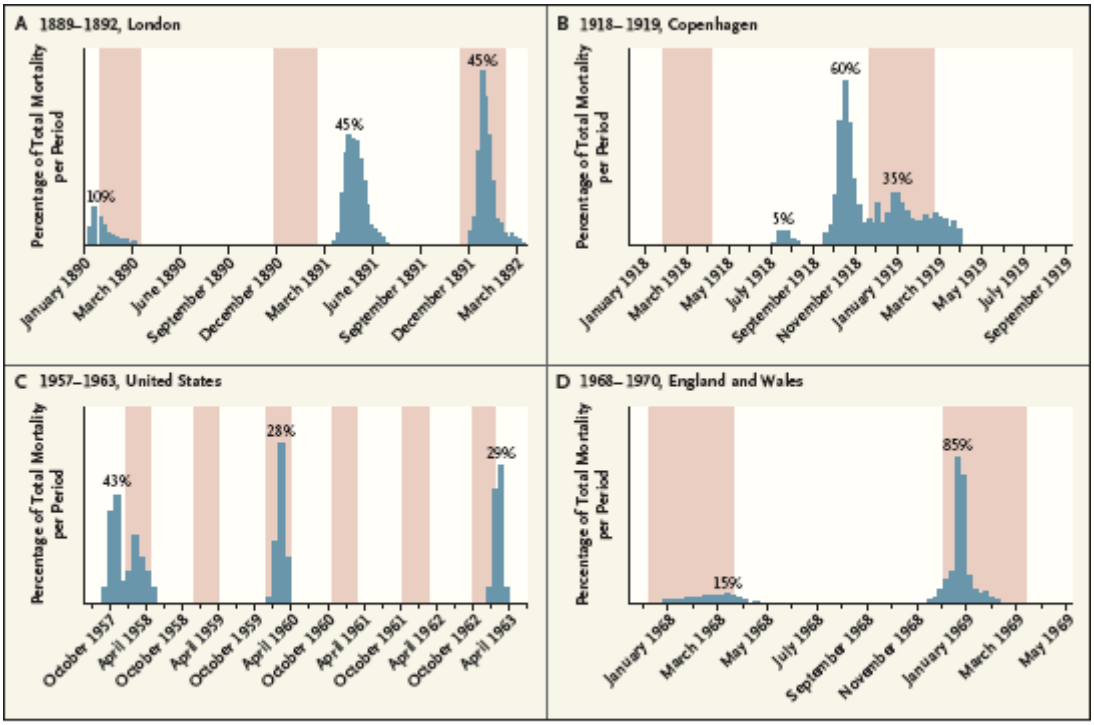
Table 2: Comparison of excess mortality and annual average mortality from influenza during selected pandemic and interpandemic periods, United States, 1918 to 1991[1]

Period	Circulating virus	Years	No. of excess deaths	Annual average deaths	Crude annual average death rate per 100,000 persons, based on mid-interval population
Pandemic	A (H1N1) "Spanish"	1918 - 1920	675,000	225,000	218.4
Interpandemic	A (H1N1)	1920 - 1933	368,400	28,338	23.0
Interpandemic	A (H1N1)	1933 – 1957	242,600	10,108	7.5
Pandemic	A (H2N2) "Asian"	1957 – 1960	115,700	38,567	22.0
Interpandemic	A (H2N2)	1960 - 1968	114,900	14,363	7.5
Pandemic	A (H3N2) "Hong Kong"	1968 – 1972	111,927	27,982	13.9
Interpandemic	A (H3N2)	1972 – 1981	198,800	22,089	10.3
Interpandemic	A (H3N2)	1981 - 1991	200,000	20,000	10.0

A second feature of pandemics is a pattern of multiple waves of disease. The origin of the pandemic of 1918 is unknown, but scattered outbreaks occurred throughout the United States during the spring and early summer of 1918. The virus apparently lay dormant during the summer months and picked up rapidly in the fall with a crescendo by the end of October 1918. This was followed by a decline and recrudescence in midwinter 1919. The same biphasic pattern was seen in 1957. In the United States, the 2009 virus was detected in late April and spread widely. Spread slowed during the

midsummer months, but increased again as children started school in the late summer months. The third wave in the winter months did not appear. This may be explained by the shrinking number of susceptible people due to the immunity in older people and the number of people immunized through the newly developed vaccine. Mortality distributions from several pandemics are documented in Figure 2.

Figure 2: Mortality Distributions and Timing of Waves of Previous Influenza Pandemics[3]



Mortality Distributions and Timing of Waves of Previous Influenza Pandemics.
Proportion of the total influenza-associated mortality burden in each wave for each of four previous pandemics is shown above the blue bars. Mortality waves indicate the timing of the deaths during each pandemic. The 1918 pandemic (Panel B) had a mild first wave during the summer, followed by two severe waves the following winter. The 1957 pandemic (Panel C) had three winter waves during the first 5 years. The 1968 pandemic (Panel D) had a mild first wave in Britain, followed by a severe second wave the following winter. The shaded columns indicate normal seasonal patterns of influenza.

Clinical Description

Seasonal influenza causes fever, cough, sore throat, rhinitis, headache, myalgia and prostration. Cough can be severe and last for over two weeks. Fever, in association with systemic symptoms are the most striking clinical findings and distinguish influenza

from other viral upper respiratory conditions. Complications are more common in the very young and the very old and include: bacterial or viral pneumonia, worsening of chronic underlying disease, sinusitis, otitis media, febrile seizures, and encephalitis.

Etiologic Agent

Influenza viruses belong to the family orthomyxoviridae, and are designated as influenza A, influenza B or influenza C.

Influenza A viruses are divided into 16 hemagglutinin (H) and 9 neuraminidase (N) subtypes. The current subtypes circulating in humans are influenza A (H1N1) and (H3N2). Antigenic drift results in minor changes in influenza viruses from one season to the next and allows the virus to evade host defenses, necessitating a new vaccine every year.

The term 'antigenic shift' is used to describe more dramatic changes, usually due to changes in subtype. The 2009 novel influenza A (H1N1) represented a dramatic shift in antigenic structure of H1N1 influenza viruses due to reassortment with novel avian and swine strains. Antigenic shift can result in a pandemic with increased morbidity and mortality.

Influenza B viruses do not have subtypes. Two antigenically distinct lineages – the Yamagata and the Victoria lineage -- are currently circulating worldwide.

Influenza C viruses cause sporadic disease, in contrast to influenza A and influenza B, which can cause widespread epidemics.

Influenza viruses are named for their type, geographic site of isolation, laboratory number, year of isolation, and subtype (for influenza A viruses only). For example, the influenza viruses in the current vaccine (and predicted to be in circulation this season) are:

A/California/7/2009 (H1N1)-like
A/Perth/16/2009 (H3N2)-like

B/Brisbane/60/2008-like

Predicting which influenza viruses are likely to be circulating during a given season is an inexact science. Antigenic drift and shift can occur at any time. However, predictions are based on laboratory isolates identified prior to the onset of influenza season, and these predictions result in a good match between circulating virus and vaccine during most years.

Reservoir

In nature, aquatic birds are the reservoir for influenza viruses. Birds and swine are thought to be a source of new human subtypes that arise through genetic reassortment.

However, humans are usually infected by human influenza viruses and humans serve as the reservoir for these strains: seasonal H1N1, H3N2 and B.

Mode of Transmission

Transmission of seasonal influenza occurs through droplet spread, predominantly during coughing or sneezing by the infected person; as well as direct or indirect contact with nasopharyngeal secretions.

Incubation Period

The incubation period for influenza is estimated at 2 days with a range of 1-4 days.

Period of Communicability

People are infectious 24 hours prior to onset of illness and up to 7 days after illness onset in adults and longer in young children.

Outbreak Recognition

Case Definition for Influenza-like illness (ILI): Fever (≥100°F or 37.8°C, oral or equivalent) AND cough and/or sore throat (in the absence of a known cause other than influenza).

1. Healthy Populations Outbreak Definition:

a. Increased absenteeism in association with influenza-like illness and/or laboratory confirmed influenza (e.g., schools, workplaces).

b. Three or more cases of influenza-like illness in a congregate setting within a 3-day period (e.g., daycare, sports team, etc.),

c. Two or more laboratory-confirmed cases of influenza within a 3-day period in a congregate setting (e.g., classroom, daycare).

2. Susceptible Populations (Long term care facilities)
   a. Three or more cases of influenza-like illness occurring within 72 hours should prompt testing for influenza.

   b. When influenza viruses are circulating, even one positive laboratory test for influenza in conjunction with other compatible illnesses on the unit indicates that an outbreak is occurring.

      Additional information for management of influenza outbreaks in Long-term care facilities can be found at: http://www.cdc.gov/flu/professionals/infectioncontrol/ltc-facility-guidance.htm

Case Definition

Influenza-like-illness (ILI) is defined as fever > 100 °F with cough and/or sore throat without another identified cause.

1. Pediatric Death from Influenza
   a. Clinical Description
      An influenza-associated death is defined for surveillance purposes as a death resulting from a clinically compatible illness that was confirmed to be influenza by an appropriate laboratory or rapid diagnostic test. There should be no period of complete recovery between the illness and death. Influenza-

associated deaths in all persons aged <18 years should be reported. A death should **not** be reported if:

- There is no laboratory confirmation of influenza virus infection.
- The influenza illness is followed by full recovery to baseline health status prior to death.
- The death occurs in a person 18 years or older.
- After review and consultation there is an alternative agreed upon cause of death.

b. Laboratory criteria for diagnosis

Laboratory testing for influenza virus infection may be done on pre- or post-mortem clinical specimens, and include identification of influenza A or B virus infections by a positive result by at least one of the following:

- Influenza virus isolation in tissue cell culture from respiratory specimens;
- Reverse-transcriptase polymerase chain reaction (RT-PCR) testing of respiratory specimens;
- Immunofluorescent antibody staining (direct or indirect) of respiratory specimens;
- Rapid influenza diagnostic testing of respiratory specimens;
- Immunohistochemical (IHC) staining for influenza viral antigens in respiratory tract tissue from autopsy specimens;
- Four-fold rise in influenza hemagglutination inhibition (HI) antibody titer in paired acute and convalescent sera*.

c. Case classification

Confirmed - A death meeting the clinical case definition that is laboratory confirmed. Laboratory or rapid diagnostic test confirmation is required as part of the case definition; therefore, all reported deaths will be classified as confirmed.

d. Comment

*Serologic testing for influenza is available in a limited number of laboratories, and should only be considered as evidence of recent infection if a four-fold rise in influenza (HI) antibody titer is demonstrated in paired sera. Single serum samples are not interpretable.

2. Novel Influenza

a. Clinical Description

An illness compatible with influenza virus infection (fever >100 degrees Fahrenheit with cough or sore throat)

b. Laboratory criteria for diagnosis

A human case of infection with an influenza A virus subtype that is different from currently circulating human influenza H1 and H3 viruses. Novel subtypes include, but are not limited to, H2, H5, H7, and H9 subtypes. Influenza H1 and H3 subtypes originating from a non-human species or from genetic reassortment between animal and human viruses are also novel subtypes. Novel subtypes will be detected with methods available for detection of currently circulating human influenza viruses at state public health laboratories (e.g., real-time reverse transcriptase polymerase chain reaction [RT-PCR]). Confirmation that influenza A virus represents a novel virus will be performed by CDC's influenza laboratory

c. Exposure

Criteria for epidemiologic linkage:

- The patient has had contact with one or more persons who either have or had the disease, AND
- Transmission of the agent by the usual modes of transmission is plausible

OR

- A case may be considered epidemiologically linked to a laboratory confirmed case if at least one case in the chain of transmission is laboratory confirmed

d. Case Classification

- *Suspected:* A case meeting the clinical criteria (pending laboratory confirmation). Any case of human infection with an influenza A virus that is different from currently circulating human influenza H1 and H3 viruses is classified as a suspected case until the confirmation process is complete.
- *Probable:* A case meeting the clinical criteria and epidemiologically linked to a confirmed case, but for which no confirmatory laboratory testing for novel influenza virus infection has been performed.
- *Confirmed:* A case of human infection with a novel influenza A virus confirmed by CDC's influenza laboratory. Once a novel virus has been identified by CDC, confirmation may be made by public health laboratories following CDC-approved protocols for that specific strain, or by laboratories using an FDA-authorized test specific for detection of that novel influenza strain.

e. Comment

Once a novel virus is identified by CDC, it will be nationally notifiable until CSTE in consultation with CDC determines that it is no longer necessary to report each case.

3. Laboratory Confirmation and Subtyping of Influenza Viruses

a. Laboratory diagnosis may be accomplished through the West Virginia Office of Laboratory Services.

b. Submit a nasopharyngeal swab specimen or viral isolate for confirmatory testing and subtyping. For details, see: http://www.wvdhhr.org/labservices/labs/virology/influenza.cfm

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Preventive Interventions

While vaccine is now recommended for all persons aged 6 months and older, other interventions include:

1. General preventive measures:
   a. Wash hands frequently.
   b. Avoid contact with ill persons. Ill persons should stay home from work and school.
   c. Cover the nose and mouth when coughing or sneezing. Use your sleeve if a tissue is not available. Discard used tissues.
   d. Avoid touching eyes, nose, and mouth
2. Infection control according to current guidelines available at: http://www.cdc.gov/flu/professionals/infectioncontrol/healthcaresettings.htm
3. Guidance for prevention and control are available at:
   a. Schools and daycares: http://www.cdc.gov/flu/school
   b. Workplaces: http://www.cdc.gov/flu/business
   c. General: http://www.cdc.gov/flu/index.htm
4. Antiviral treatment and prophylaxis guidelines are available from the CDC: http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm

Treatment

Patients, who are severely ill, hospitalized or at high risk for complications of influenza, should be offered antiviral medication. Close contacts of patients with seasonal influenza can be considered for antiviral prophylaxis if they are at high risk for complications. Guidelines for the 2011-2012 influenza season can be found on the CDC website at:

1. http://www.cdc.gov/flu/professionals/antivirals/index.htm

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2. Summarized : http://www.cdc.gov/flu/pdf/professionals/antivirals/clinician-antivirals-2011.pdf

3. Centers for Disease Control and Prevention MMWR Recommendations and Reports Vol. 60, No. 1: http://www.cdc.gov/mmwr/pdf/rr/rr6001.pdf

Surveillance Indicators

1. Enrolled sentinel provider, by county.
2. Proportion of weeks sentinel provider reported, by county.
3. Proportion of weeks ILI is reported, by county.
4. Summary data (updated weekly) are posted to: http://www.dhhr.wv.gov/oeps/disease/flu/Pages/fluSurveillance.aspx

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