

**Title:** Influenza: An Annual Scare

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**Purpose:** The purpose of this course is to provide an overview of influenza. It will include information on etiology, identification, prevention and treatment.

### **Objectives**

- Discuss the impact influenza has on the nation
- List three risk factors for poor outcomes with influenza
- Discuss the impact preventative health care has on reducing the incidence and complications of influenza
- Discuss the diagnostic modes for identifying the disease
- Compare and contrast the treatment modalities for influenza

### **Introduction**

Each year three to five million cases of influenza are responsible for up to a half a million deaths globally. In the United States, influenza causes about 36,000 deaths annually and about 200,000 hospitalizations each year<sup>1 2 3</sup>. In addition, the disease leads to missed work time and much human suffering.

The most severe outbreak of influenza occurred in 1918 which was responsible for approximately 20 to 50 million deaths worldwide, with a little more than a half a million in the United States<sup>1</sup>. Most of the deaths were not a direct result of the influenza but caused by secondary bacterial pneumonia. More recently, there is concern that the avian influenza could produce another severe global outbreak of influenza with similar mortality rates.

Influenza - a contagious respiratory illness – results in illness that ranges from mild to severe. It is transmitted by the respiratory route and is a single-stranded RNA virus with eight different RNA segments surrounded by proteins. The outside of the virus is made up of hemagglutinin and neuraminidase proteins<sup>1</sup>. Hemagglutinin is responsible for the attachment of the virus to the cells that are being infected and neuraminidase is responsible for the release of the virus from cells. The hemagglutinin and neuraminidases are used to classify the virus. For example, the influenza A, H1N1 subtype means that this subtype expresses one hemagglutinin and one neuraminidase.

### **Causes**

Influenza is caused by the influenza virus – either type A or type B<sup>3</sup>. There is also an influenza type C, but it typically causes mild disease and will not be discussed in this course. Clinically, it is not possible to distinguish between influenza A and B. Influenza A is generally more dangerous and associated with higher mortality rates<sup>1</sup>.

The influenza virus changes over time through two main mechanisms - antigenic drift and antigenic shift. Antigenic drift is much more common with influenza type A<sup>2</sup>, but can occur with influenza type B and this is the reason that different vaccines need to be developed annually. It accounts for only small changes in the virus, but enough of a change that the body's immune system does not identify the virus, allowing it to infect someone again without mounting a response.

While the Influenza A viruses change from year-to-year due to antigenic drift, pandemics occur when the virus shifts dramatically. Antigenic shift results in major changes in the virus – due to new hemagglutinin and neuraminidase proteins – which leaves individuals with little defense against the virus. Pandemic viruses are able to attack individuals who have minimal immune defense against the new strain of influenza produced by antigenic shift and may result in complete devastation<sup>4</sup>. Antigenic shift only occurs with influenza A. Antigenic shift is responsible for 2 pandemics in the 20<sup>th</sup> century; the 1957 Asian influenza and 1968 Hong Kong influenza.

### **Avian Influenza**

Avian influenza, avian subtype H5N1, strikes fear into healthcare providers, individuals and politicians<sup>4</sup>. Part of the reason for the concern is because the 1918 Spanish influenza – which killed up to 50 million people world wide -was the worst pandemic recorded and was a strain of avian influenza<sup>4</sup>.

This virus can quickly replicate and has the potential to lead to much morbidity and mortality. Transmission of the virus is more common in Asia where living conditions involve closer contact with poultry than in the United States<sup>4</sup>. This virus was first detected in 1997 in Hong Kong when it killed 6 of the 18 people infected. Another outbreak was seen in Southeast Asia in 2004, but periodic cases continue to pop up. The problem is not very common with only 381 confirmed cases, but it is deadly - it has accounted for 240 deaths<sup>3</sup>.

The current outbreaks of avian influenza, while deadly, were not wide spread. The virus is not easily transmittable from human-to-human and is almost

exclusively transmittable from bird to human. Fortunately, the outbreaks were somewhat contained. If a mutation in the virus would allow easy transmission from human-to-human, there would be a much greater global problem, as more people have contact with humans than with birds. It is hard to determine when the next pandemic will occur.

### **Clinical Presentation**

Influenza is associated with an incubation period of 1 -4 days and is communicable for 3-5 days before onset of signs and symptoms, but is at highest risk for transmission about 24 hours before the onset of symptoms through the peak symptoms<sup>1 2 5</sup>. Children may be infectious for more than 10 days after the onset of symptoms<sup>5</sup>.

Influenza has an abrupt onset of symptoms that consists of fever, chills, reduced energy, myalgia, malaise, headache and non-productive dry cough which is sometimes associated with pleuritic chest pain and sometimes shortness of breath. Symptoms are usually severe, and patients typically feel very ill.

As the disease progresses nasal congestion and sore throat may be more noticeable. In some instances sore throat can be severe. Some patients complain of runny nose, but it is not the most prominent symptom. Some patients complain of ocular symptoms ranging from red, burning eyes to photophobia<sup>1 2 5</sup>.

Fever range can vary but may be as high as 104 degrees Fahrenheit. Fever may persist up to 7 days – but more typically 3 to 4 days. It may take up to 2 weeks to fully recover as cough and malaise may persist.

The presence of diarrhea, vomiting and nausea are not as common, but sometimes occur in children. Young children may present very seriously and appear as though they are septic with high fevers and febrile seizures<sup>5</sup>. As with many disease states, the older adult may present atypically. Confusion and lethargy may be the prominent symptoms.

On physical exam the patient may feel hot, have flushed cheeks and present with cervical lymphadenopathy. The throat and conjunctiva may be infected. Some patients may have red, watery eyes. The examining clinician should evaluate for signs and symptoms of dehydration such as poor oral intake and dry mucous membranes, especially in the young and the elderly. Lungs may reveal wheezing and/or rhonchi. Elevated heart rate may be noticed secondary to fever or low levels of blood oxygen.

When there is an outbreak of influenza in the community and a the patient presents with a fever above 100.4 degrees Fahrenheit and a non-productive cough, influenza should top the list of diagnoses to consider. At times, diagnostic testing is utilized. Rapid tests for influenza along with viral cultures are sometimes used. Lab tests are usually not taken, but influenza may be characterized by leukopenia and sometimes proteinuria<sup>2</sup>. Respiratory distress, secondary to viral pneumonia can follow the disease. Respiratory distress often requires respiratory support.

## **Differential diagnosis**

The patient with influenza may appear very ill and it is important to consider other diagnoses. The common cold is often misdiagnosed when influenza is present. The common cold has a more gradual onset of action and is less commonly associated with fever, myalgia, anorexia, arthralgias, headache and malaise. The common cold is more commonly associated with nasal congestion, sneezing and sore throat.

In addition to the common cold, a variety of other viral and bacterial illnesses can be responsible for influenza including the following signs and symptoms: adenovirus, *Mycoplasma pneumoniae*, rhinovirus, parainfluenza, respiratory syncytial virus and *Legionella*.

Other conditions that should be considered, depending on the severity and the specific signs and symptoms, include: infectious mononucleosis, Lyme disease, sepsis and encephalitis.

Chest infections should be ruled out when influenza is being considered. Bronchitis – either bacterial or viral – can have similar signs and symptoms. Ruling out pneumonia is a critical step in the diagnostic work-up of influenza. Chest x-ray should be considered for those in whom it is suspected or are at high risk, such as older adults or those with chronic medical conditions.

## **Diagnosis and Testing**

A rapid test for influenza can be used to diagnose the disease, but it is often not used. It should not be used unless the testing will affect clinical decision making<sup>5</sup>. The most rapid test is the Quickvue test, which returns results in 10

minutes and offers a sensitivity between 70-80%<sup>1</sup> with a specificity of about 90%<sup>5</sup>. Rapid tests are often used when attempting to detect a community outbreak of the condition or when the diagnosis is unclear.

There are a variety of other tests available including nasopharyngeal or nasal swab, nasal wash, aspirate or viral culture. It is important to test early as effectiveness of treatment is dependent on a timely diagnosis.

Viral cultures are obtained with swabs from the nose and/or throat and sent to the lab for processing. This is the gold standard for diagnosis of the disease but it takes 3-10 days to provide results and is therefore not clinically helpful for the patient in the office as medications helpful in treating influenza must be started within 48 hours of the onset of symptoms.

For avian influenza, the throat swab is more accurate in diagnosis than the nasal swab as viral titers are higher in the throat than the nose. Reverse transcriptase-polymerase chain reaction (PCR) assays should detect avian influenza within four hours<sup>4</sup>.

A complete blood count is sometimes used, but findings are typically nonspecific in influenza. For patients who have a fever beyond 4 days as well as a productive cough, pneumonia should be considered and a white count may show leukocytosis. In addition to a complete blood count, a chest x-ray is indicated if pneumonia is suspected. Those who are considered to have meningitis may undergo a lumbar puncture.

## Complications

Those with weakened immune systems – such as the elderly, very young, immunocompromised or chronically ill – are at increased risk for complications after influenza. Secondary bacterial infection is a common dangerous complication. Pneumonia, bronchitis, sinusitis and otitis media are possible. Rhabdomyolysis may occur but is rare<sup>2</sup>. Other serious complications include: myocarditis, pericarditis, thrombophlebitis and toxic shock syndrome<sup>2</sup>.

After influenza, pneumonia can be either bacterial or viral. Pneumonia as a complication of influenza is a common cause of mortality and it is critical to consider. Pneumonia after influenza is more common in the chronically ill or those at high risk. Viral pneumonia is more prevalent and more risky in those who are pregnant or have rheumatic heart disease<sup>2</sup>. Influenza pneumonia presents with symptoms (cough, dyspnea and cyanosis) that worsens instead of getting better. A chest x-ray will show diffuse infiltrates bilaterally. Influenza pneumonia can lead to acute respiratory failure<sup>1</sup>.

Bacterial pneumonia is often due to *Pneumococci*, *Staphylococci* or *Haemophilus*. Pneumonia caused by *Pneumococci* or *Haemophilus* presents 2-3 weeks after influenza was diagnosed. The most common type of pneumonia is caused by *Pneumococci*. The most serious is caused by *Staphylococci*, which typically presents 2- 3 days after infection<sup>1</sup>.

Fever that persists beyond four days, especially one that is accompanied by a productive cough, should alert the clinician of pneumonia. A chest x-ray and a complete blood count should be evaluated to rule out pneumonia.

## **Prevention**

The Center for Disease Control (CDC) recommends a three-prong approach to the prevention of influenza<sup>5</sup>. The first step is to vaccinate. The second is to stop germs. The third step is to take antiviral medication, if appropriate.

The most effective way to prevent influenza is to get vaccinated. This is most important for people at high risk for serious complications from influenza and anyone who has close contact with high-risk individuals. High-risk people include: those with chronic diseases such as diabetes, asthma, heart disease, chronic obstructive pulmonary disease, those over the age of 50, pregnant women, young children and healthcare workers.

For 2008-2009 there are six approved versions of the influenza vaccine, as well as FluMist nasal spray. The vaccine has a different configuration every year and it is determined by the predicted strains, often based on last year's influenza season. The 2008-2009 vaccine contains three strains of influenza virus – one from type B and two from type A.

It takes 2 weeks (usually 10-14 days) before the vaccine provides adequate immunity and typically provides protection throughout the influenza season. The influenza vaccination is most effective in healthy seniors when compared to seniors with chronic disease. Older adults with chronic disease are more likely to get influenza and more likely to develop pneumonia after they get influenza<sup>6</sup>. Vaccinated older adults are as likely to develop pneumonia as unvaccinated seniors who come down with influenza<sup>6</sup>.

Providers should begin vaccinating their patients as soon as they have influenza vaccine and should continue to offer the vaccine to their patients in December and later. While influenza outbreaks can happen as early as October, most of the time influenza activity peaks in January or later.

According to the CDC<sup>5</sup>, vaccination campaigns should be targeted by mid-October. Efforts to vaccinate people should continue until influenza is no longer present in the community. Typically the influenza season is over in April and May, but some individuals may be candidates for vaccination after this time, for example, those who are traveling to the Southern hemisphere or children who need a second vaccination<sup>5</sup>.

The CDC recommends that anyone who wants to decrease the risk of getting influenza, who is over the age of 6 months, should get vaccinated. Certain groups are given a stronger recommendation to get vaccinated, such as children. All children until the age of 19 should be vaccinated against influenza. Extra focus should be placed on children at high risk for complications.

High-risk adults and those who live with or care for high-risk adults or young children are strongly encouraged to receive influenza vaccination. This includes healthcare workers. Other high-risk patients include:

- Pregnant women
- Individuals over the age of 50
- Sufferers of chronic disease: diabetes, asthma, chronic obstructive pulmonary disease and heart disease
- Residents of nursing homes

- Those who live with children under the age of 6 months.

There are some individuals who should not be vaccinated. This includes individuals who have a severe allergy to chicken eggs or someone who has had a severe reaction in the past to influenza vaccination. Individuals with moderate to severe illness with fever should wait until their acute illness is under control until they get vaccinated. Anyone with a history of Guillain-Barre syndrome within 6 weeks of getting an influenza vaccine<sup>5</sup> should not be vaccinated. Those under the age of 6 months should not be vaccinated.

The trivalent inactivated vaccine is an injectable vaccine that is created with an inactivated virus, so there is no chance of getting influenza from the vaccination. It is dosed one time with some exceptions. Children, who were vaccinated for the first time, under the age of 9 (older than 6 months), who were vaccinated with only one dose in the 2007-2008 influenza season, should receive 2 doses (separated by 4 weeks) of the 2008-2009 influenza vaccine. Also, those older than 6 months and less than 9 years old receiving the vaccination for the first time, should receive two doses separated by 4 weeks in the 2008-9 influenza season. Everyone else should receive only one dose of the 2008-2009 vaccine. Recommendations change every year so it is important to look at the CDC website every year and modify practice based on recommendations.

Side-effects of the vaccination include: swelling or redness at the injection site, fever, soreness or myalgia. Side-effects typically occur shortly after vaccination and usually last about 48 hours.

Health-care workers need to get vaccinated as they are often exposed to the disease and are at high risk to transmit the disease to many of their frail patients who are at high risk for complications from influenza. Physicians have the highest rates of influenza vaccination approaching 90%<sup>7</sup>. Nurse rates are about 60%. The reasons that the nursing rates are lower are partly due to misperceptions including: the vaccine is ineffective, it makes you sick, the nurse is not susceptible to influenza or the flu vaccine can cause influenza. Interventions to improve access among health care workers include: offering free vaccines to workers, offering vaccines to families and roving vaccine units<sup>7</sup>.

Some believe that influenza vaccines should be mandatory among health care workers. Some arguments for mandating include: other medical tests (TB tests) are mandatory and it is a standard of care in medicine and the health-care provider could be held liable if they pass on influenza to one of their patients. On the other hand, many do not believe in mandating as it is seen a personal liberty issue.

Vaccination is safe for individuals infected with HIV, but it may be less effective when CD4 counts are less than 100/mcL<sup>2</sup>.

A live vaccine – FluMist nasal spray - can also be given to prevent influenza. It is made from a weakened virus and will not cause influenza, but may cause a mild illness in some. This vaccine is indicated for non-pregnant individuals between the age of 2 and 49 who are free of any health problems that would put them at risk for any complication of influenza<sup>5</sup>.

The medication is dosed only one time in most with the same caveat as the trivalent inactivated vaccine. Give 2 doses for children between 2 years old and eight years old who either received vaccination for the first time last year who received only one dose or if this is the first year they are receiving vaccination.

Side-effects of the inhaled live vaccine are usually mild and may include: rhinorrhea, myalgia, headache, sore throat, fever, cough and mild, temporary wheezing.

Beyond preventing influenza, the vaccine can provide other benefits. It reduces coronary ischemic events in patients with established heart disease<sup>8</sup>. It is believed that the vaccine not only reduces the severity and complications from influenza, but also provides a reduction in the inflammation and immune elements of atherosclerosis.

The second technique for preventing influenza is stopping the spread of germs. Influenza is spread through respiratory secretion, so reducing the spread of respiratory secretion is critical. It is important that those who are sick cover their mouth and nose when they cough or sneeze and properly dispose of the tissue. Respiratory secretion can live on hands and frequently washing the hands will help reduce the spread of the disease. Avoid touching the nose, mouth or eyes.

Avoid contact with sick people. Those who are sick should stay away from groups of people such as work or school.

When influenza sets up shop in a patient, antiviral medications can treat the infection. For those who have had close contact with someone with influenza,

antiviral mediations may help prevent the disease. When antiviral medications are used for preventative purposes, they are 70-90% efficacious at preventing disease<sup>5</sup>.

Antivirals must be given within 48 hours of exposure to reduce the risk of acquiring the disease. They are typically given for 10 days but longer treatment may be needed in certain situations.

For the 2008-9 influenza season, two medications are recommended for the prevention of influenza: oseltamivir (Tamiflu) and zanamivir (Relenza).

Oseltamivir is approved for treatment and prevention of influenza in those over the age of one. It is dosed 75 mg orally once a day for adults for 10 days. The dose for those who weigh greater than 23 to 40 kilograms is 60 mg once a day for ten days; those who weigh more than 15 to 23 kilograms are dosed at 45 mg once a day for 10 days; and those less than 15 kilograms who are over one year old are given 30 mg orally once a day for 10 days. For prevention, zanamivir is dosed 2 inhalations once a day for 10 days in children five and older, and adults.

Prevention of avian influenza is a little different. Since it is typically transmitted through an infected bird, avoidance of bird fluids is critical. Bird fecal material also has the potential to transmit disease. In 2007, a vaccination against avian influenza was developed against the H5N1 influenza and involved two, 90 mcg injections (28 days apart). Due to the relatively small number of people affected, it is unlikely to be recommended for wide spread use. It is valuable to have the vaccination as it would be helpful if there is a mutation in the

virus allowing more widespread transmission, which would likely be linked to an increased death rate.

## **Treatment**

Early detection is important so intervention can be implemented in a timely fashion. Clinicians should be aware of community outbreaks of the disease so they can be on alert when someone comes in with characteristic signs and symptoms. Since the diagnosis can mimic many other viral illnesses, it is critical that the clinician be aware that it is in the community. The CDC maintains a website that tracks the number of reported cases at [www.flustar.com](http://www.flustar.com). This site should be regularly monitored to determine the presence of the infection in the community.

Antiviral medications are not effective if the onset of symptoms was more than 48 hours before the medication is taken<sup>9</sup>. The benefit of treatment may not be worth the risk of side-effects and must be considered on an individual basis. Elderly and high-risk patients are more likely to see benefit from treatment, but also may be at more risk for adverse events and drug interactions.

Antiviral medications are available to treat disease caused by influenza A and B, but not everyone with influenza needs to be treated. Antiviral agents are only slightly effective in preventing confirmed influenza or influenza-like illness. When given in the first few days of illness, antivirals reduce the duration of illness by approximately one day<sup>9</sup>.

Some studies suggest greater benefit. One study that looked at the use of the neuraminidase inhibitor – zanamivir – was given within 36 hours of the onset of

symptoms and it dramatically reduced the duration of illness. In high-risk patients – the duration was shortened by 2.5 days and in the normal-risk group the duration was shortened by 1.5 days<sup>10</sup>. Another study looked at oseltamivir and showed that illness decreased from 103 hours to 70 hours and the severity decreased by 40%<sup>11</sup>.

In previous years adamantadine (Symmetrel) and rimantadine (Flumadine) were used in the management of influenza. The CDC currently does not recommend the use of adamantadine and rimantadine as it is only effective against type A influenza. In addition, there is more resistance to these medications. Lastly, there are more adverse events with adamantadine and rimantadine when compared to the newer drugs - oseltamivir and zanamivir - that are available.

Oseltamivir and zanamivir - used for the treatment of influenza type A and B - can reduce the duration of the illness by about approximately 1 day and may prevent serious complications such as pneumonia or exacerbation of chronic disease. For these medications to be effective they should be administered within 48 hours of the onset of symptoms and some recommend treatment within 6 hours of the onset of symptoms for full effectiveness<sup>1</sup>. The recommended duration of treatment with oseltamivir and zanamivir is 5 days.

Oseltamivir (Tamiflu) is recommended for those over one year old in treatment and chemoprophylaxis for both Influenza A and/or B. The medication is dosed based on weight – with the same doses for the same weights as

prevention – but, is given twice a day for five days instead of once a day for 10 days.

The medication is classified as pregnancy category C – use caution in pregnant women. In addition, precaution must be used in those with chronic heart and lung disease as well as those with renal insufficiency and those that are breastfeeding. One disadvantage of the medication is that it is an expensive medication and may not be covered by all insurance plans. Oseltamivir is associated with nausea and vomiting, which is more prevalent in children. To minimize this side-effect it should be taken with food. Other side-effects include mental status changes, abnormal behavior and poor blood sugar control. A recent study suggested that behavior changes were not as prevalent as once believed. Patients of all ages on oseltamivir for influenza, were shown not to be at higher risk for neuropsychiatric episodes and central nervous system related problems when compared with those who were not prescribed medications<sup>12</sup>.

Zanamivir (Relenza) – an inhaled medication - is used for treatment of influenza in those 7 years old and older and for chemoprophylaxis in those 5 years old and over. Incidence of side-effects is similar between this medication and placebo<sup>5</sup>. Side-effects include: diarrhea; nausea; sinusitis; nasal signs and symptoms; bronchitis; cough; headache; dizziness; and ear, nose, and throat infections, which occurred in less than 5 percent of patients.

Extreme caution should be implemented in patients with a history of bronchospasm with the use of zanamivir. Many patients with a history of asthma, COPD or bronchospasm may not be able to use the drug due to the risk of

bronchospams. Other carefully selected patients may need to use a bronchodilator before using this medication.

Who should these medications be used for? High-risk patients who have not been vaccinated should be given medications for prophylaxis when exposed. This includes those who have been vaccinated less than two weeks from exposure, as it takes about 2 weeks for the vaccine to provide protection.

Unvaccinated persons, who have been exposed, who care for someone at high risk, should be vaccinated. In addition, these individuals should be given prophylaxis until the vaccination takes effect (about 2 weeks). This includes health-care workers, volunteers at health-care settings and family members of high-risk patients.

Anyone with immune deficiencies may not have an adequate immune response to the influenza vaccine. They should be considered for antiviral medications after an exposure. The person with HIV is one example.

Symptomatic treatment is another critical element to successful treatment of influenza. Bed rest is typically recommended as the body recovers. Assuring adequate hydration to prevent dehydration and treating symptoms are important.

Over-the-counter mucolytics, such as guaifenesin (Mucinex), can be used. When cough is bothersome and keeps the patient up at night the use of cough suppressants may be indicated. Multiple options are available. Over the counter dextromethorphan (Robitussin) is a popular option. Another option is benzonatate (Tessalon Perles), which is dosed 100-200 mg, three times a day as needed. Guaifenesin with codeine (Robitussin AC) can be used every 4 hours

as needed when narcotic cough suppressant is warranted. Cautions must be used with this because it is a narcotic and has the potential to lead to addiction and possible respiratory depression.

Fever is a major symptom in influenza that can make patients feel poorly. The use of antipyretics (such as acetaminophen and ibuprofen) can help control fever and also helps with any myalgia, arthralgias or headache. Aspirin can be used in adults, but should be avoided in those under 19 as this increases the risk of Reye's Syndrome when aspirin is used in the face of a viral illness.

### **Avian Influenza Treatment**

Vaccination against avian influenza is, at the present time, not practical as the disease affects such a small number of people.

Currently, if the disease is contracted, the best treatment is antiviral medications. There is resistance to amantadine (Symmetrel) and rimantadine (Flumadine)<sup>4</sup>, therefore, oseltamivir (Tamiflu) and zanamivir (Relenza), which inhibit viral release from cells, are better options. Treatment must begin in the first 48 hours of exposure. Oseltamivir can reduce severity of the disease by 40 percent and its duration by 30 percent<sup>4</sup>. Unfortunately, there is some resistance to oseltamivir.

Statins can also be used early in the course of illness. It reduces the risk of dying from pneumonia as it quiets the immune system<sup>4</sup>.

Any case of avian flu that develops needs to involve public health experts to reduce the spread. Interventions such as quarantines, widespread use of

respirators, closing schools, surveillance, and travel restrictions may help contain the spread of the illness.

### **Influenza in the Nursing Home**

Nursing home residents are at high risk for complications, including death, from influenza. This is due to the age of nursing home residents along with the multiple co-morbidities that afflict many of them. When one case of influenza is contracted in the nursing home the rate of infection could be high and it can spread quickly given the close proximity of residents. Multiple sources of exposure are common in nursing homes including many visitors, different staff members and volunteers.

A key to preventing morbidity and mortality from influenza in the nursing home is vaccination. Nursing homes with higher vaccination rates of staff and residents have lower rates of outbreaks. Most importantly this can lead to herd immunity. Generally, nursing home residents should get the vaccine as a group – from early October to mid-November - before the influenza season begins. Vaccinations should continue for residents newly admitted to the nursing home through out the influenza season.

When outbreaks occur, there are measures that can be taken. First, when a resident comes down with influenza it is important to isolate the resident. Keep ill residents out of areas where large numbers of people reside such as dining halls, activity rooms or therapy rooms. At this point, it may be helpful to recommend vaccination to residents who did not get vaccinated or refused to be vaccinated.

Staff members need to be diligent in monitoring patients when a case is diagnosed so early detection can occur if another case crops up. Quickly informing the primary care provider is important when a suspected case of influenza is present, so early initiation of antiviral medication can occur. Some nursing homes have standing orders to help facilitate early initiation of antivirals.

Staff should be encouraged to stay home if they are sick with influenza or come down with symptoms during an outbreak. Staff members must use caution to prevent themselves from becoming sick. For example, diligent hand washing and wearing a mask may help reduce transmission.

It may be helpful to confirm the influenza by performing a culture on some of the sick residents to help assure proper treatment. When one case is confirmed by culture, the physician can feel more confident in making the diagnosis in future cases.

### **Prognosis**

Influenza typically lasts for 1-7 days and most people recover without incidence. Mortality rates are low in uncomplicated influenza. Those who are debilitated are at risk for fatality. Often times secondary bacterial pneumonia is the cause of death in influenza. Pregnant women and those with underlying cardiovascular disease are at risk for death by viral pneumonia.

### **Patient Teaching**

Patients need to understand the disease as education will improve the quality of recovery as well as reduce the risk of spreading the infection. Patients should

understand the natural course of the disease and be able to list signs or symptoms that may suggest a complication. Important points to discuss include:

1. People are contagious one day before being sick up to five days after symptoms start. Children may be contagious for longer periods of time.
2. Teach about over-the-counter medications to improve symptoms. Do NOT give aspirin to children or teenagers
3. Encourage plenty of liquids
4. Eliminate alcohol and tobacco products
5. Cough and malaise may last up to two weeks
6. Antibiotics do not help in the treatment of influenza
7. Side-effects of medications should be discussed.
8. Patients should be encouraged to follow- up with their health care provider if they do not improve or if symptoms worsen.

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