

Public Health Emergency

General

A pandemic is a disease that attacks or affects the population of an extensive area. This can be an entire country or continent. Each year, different strains of influenza are labeled as potential pandemic threats, for example. Although recently brought under control, Severe Acute Respiratory Syndrome (SARS) has shown the potential of becoming a pandemic. Neither the World Health Organization nor the Center for Disease Control and Prevention (CDC) has classified SARS. The following diseases have the potential to infect Juniata County.

West Nile Virus (WNV)

This virus is usually spread by mosquitoes, and Juniata County is under enhanced surveillance. A mild case will mimic the flu, while severe cases are life threatening. No drugs or vaccines are available to treat West Nile Virus, however, most people fully recover from it. In more severe cases, intensive supportive therapy is indicated, often involving hospitalization, intravenous fluids, airway management, respiratory support (ventilator), prevention of secondary infections (pneumonia, urinary tract), and good nursing care.

Influenza

On average, 10-20 percent of the United States population will contract the flu by person-to-person contact each year. This is commonly a result of respiratory droplets released during coughing and sneezing. Some of these influenza cases will be fatal. Each year, the flu causes the loss of approximately 36,000 American lives. This disease has the ability to suddenly affect all age groups on a global scale. The elderly, small children, those with weakened immune systems, and those affected by other illnesses are especially susceptible. "Avian Influenza" is a version of the flu that affects birds and is transmitted most commonly to humans by birds or through an intermediate host.

Mad Cow Disease

Bovine Spongiform Encephalopathy (BSE) is commonly called "Mad Cow Disease." It is a fatal brain disease that occurs in livestock. In human cases, it is referred to as Creutzfeldt-Jakob Disease, or CJD. It can be acquired in humans by consuming the meat of an infected animal.

Hepatitis

Hepatitis is a disease affecting the liver. Hepatitis is usually spread by person-to-person contact. The different types of Hepatitis are explained below.

- Hepatitis A (HAV) – a liver disease that can affect anyone
- Hepatitis B (HBV) – caused by a virus that attacks the liver, this virus can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death

- Hepatitis C (HCV) – a liver disease, which is found in the blood of those infected. HCV is spread by contact with the blood of an infected person.

History

West Nile Virus

According to the Centers for Disease Control and Prevention (CDC), West Nile Virus infected a reported 237 humans in Pennsylvania, resulting in eight deaths, in 2003.

Influenza

Influenza Pandemics during the 20th Century

During the 20th Century, the emergence of several new Influenza A virus subtypes caused three pandemics, all of which spread around the world within a year of being detected.

- 1918-1919 "Spanish flu" [A (H1N1)] caused the highest number of known influenza deaths. More than 500,000 people died in the United States, and up to 50 million people may have died worldwide. Many people died within the first few days after infection, and others died of secondary complications. Nearly half of those who died were young, healthy adults. Influenza A (H1N1) viruses still circulate today, after being introduced again into the human population in 1977.
- 1957-1958 "Asian flu" [A (H2N2)] caused about 70,000 deaths in the United States. First identified in China in late February 1957, the Asian flu spread to the United States by June 1957.
- 1968-1969 "Hong Kong flu" [A (H3N2)] caused about 34,000 deaths in the United States. This virus was first detected in Hong Kong in early 1968 and spread to the United States later that year. Influenza A (H3N2) viruses still circulate today.

Both the 1957-1958 and 1968-1969 pandemics were caused by viruses containing a combination of genes from a human influenza virus and an Avian Influenza virus. The 1918-1919 pandemic virus also appears to have had an avian origin.

Pennsylvania's \$600 million poultry industry lost \$70 million from 1983-1984 as a result of an avian flu outbreak.

Mad Cow Disease

As stated by the U.S. Department of Agriculture, there has been only one confirmed case of Mad Cow Disease in the United States.

Hepatitis

In 2003, the Pennsylvania Department of Health and the CDC investigated an outbreak of Hepatitis A among patrons of a national chain restaurant in western Pennsylvania.

Approximately 555 persons with Hepatitis A were identified, including at least 13 food service workers and 75 residents of six other states who dined at the restaurant. Preliminary analysis of a case-control study implicated green onions as the source of the outbreak. Hepatitis A can be contracted by eating food which was handled by infected workers at some point in the food processing chain, or which was not properly cleaned.

Department of Health

http://www.dsf.health.state.pa.us/health/lib/health/guide/NOTIFIABLE_DISEASES.html

Vulnerability

West Nile Virus

According to the Pennsylvania West Nile website, the virus is not present in Juniata County¹,

Influenza²

Introduction

An influenza pandemic is a global outbreak of disease that occurs when a new Influenza A virus appears or “emerges” in the human population, causes serious illness, and spreads easily among people worldwide. Pandemics are different from seasonal outbreaks or “epidemics” of influenza. Seasonal outbreaks are caused by subtypes of influenza viruses that already circulate among people, whereas pandemic outbreaks are caused by new subtypes, by subtypes that have never circulated among people, or by subtypes that have not circulated among people for a long time. Past influenza pandemics have led to high levels of illness, death, social disruption, and economic loss.

Appearance (Emergence) of Pandemic Influenza Viruses

There are many different subtypes of influenza or “flu” viruses. Pandemic viruses emerge as a result of a process called “antigenic shift,” which causes an abrupt or sudden, major change in Influenza A viruses. The appearance of a new Influenza A virus subtype is the first step toward a pandemic. However, to cause a pandemic, the new virus subtype also must have the capacity to spread easily from person to person. Once a new pandemic influenza virus emerges and spreads, it usually becomes established among people and circulates for many years as seasonal epidemics of influenza. The U.S. Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) have large surveillance programs to monitor and detect influenza activity around the world, including the emergence of possible pandemic strains of influenza virus.

¹ <http://www.westnile.state.pa.us> January 2007

² www.CDC.gov December 2005

Vaccines to Protect Against Pandemic Influenza Viruses

A vaccine probably would not be available in the early stages of a pandemic. When a new vaccine against an influenza virus is being developed, scientists around the world work together to select the virus strain that will offer the best protection against that virus. Manufacturers then use the selected strain to develop a vaccine. Once a potential pandemic strain of influenza virus is identified, it takes several months before a vaccine becomes widely available. If a pandemic occurs, the U.S. government will work with many partner groups to make recommendations guiding the early use of available vaccine.

Antiviral Medications to Prevent and Treat Pandemic Influenza

Four different influenza antiviral medications (Amantadine, Rimantadine, Oseltamivir, and Zanamivir) are approved by the U.S. Food and Drug Administration (FDA) for the treatment and/or prevention of influenza. All four usually work against Influenza A viruses. However, the drugs may not always work, because influenza virus strains can become resistant to one or more of these medications. For example, the Influenza A (H5N1) viruses identified in humans in Asia in 2004 and 2005 have been resistant to Amantadine and Rimantadine. Monitoring of avian viruses for resistance to influenza antiviral medications continues.

Preparing for the Next Pandemic

Many scientists believe it is only a matter of time until the next influenza pandemic occurs. The severity of the next pandemic cannot be predicted, but modeling studies suggest the impact of a pandemic on the United States could be substantial. In the absence of any control measures (vaccination or drugs), it has been estimated that in the United States, a “medium-level” pandemic could cause 89,000-207,000 deaths, 314,000-734,000 hospitalizations, 18-42 million outpatient visits, and another 20-47 million sick people. Between 15-35 percent of the U.S. population could be affected by an influenza pandemic, and the economic impact could range between \$71.3 - \$166.5 billion.

Influenza pandemics are different from many of the threats for which public health and health care systems are currently planning. A pandemic will last much longer than most public health emergencies, and may include “waves” of influenza activity separated by months. In 20th Century pandemics, a second wave of influenza activity occurred 3-12 months after the first wave). The numbers of health care workers and first responders available to work will likely be reduced; they will be at high risk of illness from exposure in the community and in health care settings. Some may have to miss work to care for ill family members. Resources in many locations could be limited, depending on the severity and spread of an influenza pandemic.

Because of these differences and the expected size of an influenza pandemic, it is important to plan preparedness activities that will permit a prompt and effective public health response. The U.S. Department of Health and Human Services (HHS) supports pandemic influenza activities in the areas of surveillance (detection), vaccine development and production, strategic stockpiling of antiviral medications, research, and risk communications. In May 2005, the U.S. Secretary of

HHS created a multi-agency National Influenza Pandemic Preparedness and Response Task Group. This unified initiative involves CDC and many other agencies (international, national, state, local, and private) in planning for a potential pandemic. Its responsibility includes revision of a U.S. National Pandemic Influenza Response and Preparedness Plan.

Avian Influenza (Bird Flu)

Avian Influenza in Birds

This is general information about Avian Influenza (bird flu) and information about one type of bird flu, called Avian Influenza A (H5N1) that has caused infections in birds in Asia and Europe, and in humans in Asia.

Avian Influenza is an infection caused by Avian (bird) Influenza (flu) viruses. These influenza viruses occur naturally among birds. Wild birds worldwide carry the viruses in their intestines, but usually do not get sick from them. However, Avian Influenza is very contagious among birds and can make some domesticated birds very sick or cause death.

Infected birds shed influenza virus in their saliva, nasal secretions, and feces. Susceptible birds become infected when they have contact with contaminated secretions or excretions on surfaces that are contaminated from infected birds. Domesticated birds may become infected with Avian Influenza virus through direct contact with infected waterfowl or other infected poultry, or through contact with surfaces (such as dirt or cages) or materials (such as water or feed) that have been contaminated with the virus.

Infection with Avian Influenza viruses in domestic poultry causes two main forms of disease, distinguished by low and high extremes of virulence. The "low pathogenic" form may go undetected and usually causes only mild symptoms (such as ruffled feathers and a drop in egg production). However, the highly pathogenic form spreads more rapidly through flocks of poultry. This form may cause disease that affects multiple internal organs and has a mortality rate that can reach 90-100 percent, often within 48 hours.

Outbreaks of Avian Influenza H5N1 occurred among poultry in eight countries in Asia (Cambodia, China, Indonesia, Japan, Laos, South Korea, Thailand, and Vietnam) during late 2003 and early 2004. At that time, more than 100 million birds in the affected countries either died from the disease or were killed to control the outbreaks. By March 2004, the outbreak was reported under control. Since late June 2004, however, new outbreaks of Influenza H5N1 among poultry were reported by several countries in Asia (Cambodia, China [Tibet], Indonesia, Kazakhstan, Malaysia, Mongolia, Russia [Siberia], Thailand, and Vietnam). It is believed these outbreaks are ongoing. Influenza H5N1 infection also has been reported among poultry in Turkey, Romania, and Ukraine. Outbreaks of Influenza H5N1 have been reported among wild migratory birds in China, Croatia, Mongolia, and Romania.

Human Infection with Avian Influenza Viruses

The risk from Avian Influenza is generally low to most people, because the viruses do not usually infect humans. However, confirmed cases of human infection from several subtypes of Avian Influenza infection have been reported since 1997. Most cases in humans have resulted from contact with infected poultry (e.g., domesticated chicken, ducks, and turkeys) or surfaces contaminated with secretion/excretions from infected birds. The spread of Avian Influenza viruses from one ill person to another has been reported very rarely, and transmission has not been observed beyond one person.

“Human Influenza” virus usually refers to those subtypes that spread widely among humans. There are only three known A subtypes of influenza viruses (H1N1, H1N2, and H3N2) currently circulating among humans. It is likely that some genetic parts of current Human Influenza A viruses came from birds originally. Influenza A viruses are constantly changing and might adapt over time to infect and spread among humans.

During an outbreak of Avian Influenza among poultry, there is a possible risk to people who have contact with infected birds or surfaces that have been contaminated with secretions or excretions from infected birds. The table that follows illustrates the chicken population and egg production for Juniata County between 1978-1999.

Juniata County Chicken Population and Egg Production, 1978-1999					
Year	Chicken Population	Egg Production	Year	Chicken Population	Egg Production
1978	194,000	39.867 M	1988	299,000	48.707 M
1979	235,000	44.120 M	1989	535,000	91.168 M
1980	215,000	43.769 M	1990	500,000	130.266 M
1981	205,000	40.688 M	1991	528,500	131.083 M
1982	200,000	38.926 M	1992	493,000	127.720 M
1983	290,000	60.242 M	1996	255,000	75.517 M
1984	260,000	54.150 M	1997	358,700	78.000 M
1985	230,000	53.835 M	1998	362,800	79.000 M
1986	240,000	54.368 M	1999	380,100	81.000 M
1987	300,000	54.216 M			

Source: USDA National Agricultural Statistics Service

Symptoms of Avian Influenza in humans have ranged from typical Human Influenza-like symptoms (fever, cough, sore throat, and muscle aches) to eye infections, pneumonia, severe respiratory diseases (such as acute respiratory distress), and other severe and life-threatening complications. The symptoms of Avian Influenza may depend on which virus caused the infection.

Studies done in laboratories suggest that the prescription medicines approved in the United States for Human Influenza viruses should work in treating Avian Influenza infection in humans. However, influenza viruses can become resistant to these drugs, so these medications may not always work. Additional studies are needed to demonstrate the effectiveness of these medicines.

Human Health Risks During the H5N1 Outbreak

The H5N1 virus does not usually infect people, but more than 140 human cases have been reported by the World Health Organization since January 2004. Human cases of Influenza A (H5N1) infection have been reported in Cambodia, China, Indonesia, Thailand, and Vietnam. For the most current information about Avian Influenza and cumulative case numbers, see the World Health Organization (WHO) website at http://www.who.int/csr/disease/avian_influenza/en/. Most of these cases have occurred as a result of people having direct or close contact with infected poultry or contaminated surfaces; however, a few cases of human-to-human spread of H5N1 have occurred.

Of the few Avian Influenza viruses that have crossed the species barrier to infect humans, H5N1 has caused the largest number of detected cases of severe disease and death in humans. In the current outbreaks in Asia and Europe, more than half of those infected with the virus have died. Most cases have occurred in previously healthy children and young adults. However, it is possible that the only cases currently being reported are those in the most severely ill people, and that the full range of illness caused by the H5N1 virus has not yet been defined.

So far, the spread of H5N1 virus from person to person has been rare and has not continued beyond one person. Nonetheless, because all influenza viruses have the ability to change, scientists are concerned H5N1 virus eventually could be able to infect humans and spread easily from one person to another. Because these viruses do not commonly infect humans, there is little or no immune protection against them in the human population. If H5N1 virus were to gain the capacity to spread easily from person to person, an influenza pandemic (worldwide outbreak of disease) could begin.

No one can predict when a pandemic might occur. However, experts around the world are watching the H5N1 situation in Asia and Europe very closely, and are preparing for the possibility that the virus may begin to spread more easily and widely from person to person.

Treatment and Vaccination for H5N1 Virus in Humans

The H5N1 virus that has caused human illness and death in Asia is resistant to Amantadine and Rimantadine, two antiviral medications commonly used for influenza. Two other antiviral medications, Oseltamavir and Zanamavir, would probably work to treat influenza caused by H5N1 virus, but additional studies need to be done to demonstrate their effectiveness.

Currently there is not a commercially available vaccine to protect humans against H5N1 virus seen in Asia and Europe. However, vaccine development efforts are taking place. Research studies to test a vaccine to protect humans against H5N1 virus began in April 2005, and a series of clinical trials is underway.

Mad Cow Disease

As previously stated, there has only been one case of Mad Cow Disease in the United States. In 1997, a ban was established by the U.S. Department of Agriculture (USDA) on the importation of live animals or animal products from countries with the disease. According to the U.S. Department of Agriculture, Juniata County had around 19,600 cattle located throughout the County's farms in 2007. Of course, when considering this vulnerability, it must be acknowledged that residents could purchase imported beef from areas outside of Juniata County.

Juniata County Cattle Inventory, 1975-2007					
Year	All Cattle	Milk Cattle	Year	All Cattle	Milk Cattle
1975	20,200 head	-	1992	20,900 head	-
1976	20,700 head	-	1993	21,000 head	-
1977	21,000 head	-	1994	20,500 head	-
1978	20,000 head	-	1995	20,500 head	-
1979	20,000 head	-	1996	20,800 head	-
1980	21,400 head	-	1997	20,500 head	-
1981	21,500 head	-	1998	20,500 head	-
1982	23,100 head	-	1999	20,900 head	-
1983	22,200 head	-	2000	20,700 head	-
1984	23,200 head	-	2001	20,200 head	8,300 head
1985	21,700 head	-	2002	19,800 head	8,000 head
1986	22,300 head	-	2003	19,300 head	7,500 head
1987	21,600 head	-	2004	18,200 head	7,400 head
1988	21,700 head	-	2005	18,700 head	7,600 head
1989	20,800 head	-	2006	18,600 head	7,600 head
1990	19,200 head	-	2007	19,600 head	7,400 head
1991	19,100 head	-			

Source: USDA National Agriculture Statistics Service

Hepatitis

Vulnerability to Hepatitis viruses is basically the same around the country. The keys to avoiding Hepatitis are vaccinations, good hygiene, and common sense. Adequate sanitation and clean personal habits will help reduce the spread of Hepatitis A and Hepatitis B. In areas where sanitation is questionable, water should be boiled, food should be cooked, and fruit should be peeled.

Probability

Currently, the probability of a widespread public health emergency occurring in Juniata County is relatively low, with a frequency of every 30 years or less; however there exists the potential for the H5N1 virus to increase the probability of a public health emergency to affect Juniata County in the future. Instances can vary greatly in the degree of severity. Minor outbreaks of less serious communicable diseases and viruses, such as seasonal influenza, occur more frequently.

Maximum Threat

Public health emergencies typically occur on a regional basis. Sources include infected animals, contaminated food, and improperly prepared food. While all of Juniata County is vulnerable to a public health emergency, the likely source of a severe infection may be a farm or restaurant. In the event of a large scale public health emergency, such as with a potential pandemic, the maximum threat to the County lies in dense population concentrations around urban areas, and in outlying commercial agricultural operations with dense populations of fowl and swine. The health and safety of persons in the affected area and the sustainability of existing economic and financial conditions are at greatest risk.

Secondary Effects

The secondary effects of a public health emergency can vary from minimal to severe. In the event of a limited or easily contained public health emergency, such as season influenza or hepatitis, the County may experience nominal disruption to government functions and industry commodities and services. Social impacts and environmental impacts could also be nominal. In the event of a widespread public health emergency, such as in the event of pandemic influenza, the secondary effects will be severe. There will be a high level of absenteeism and staffing shortages among the County's workforce at all levels and across all occupations. Critical services, such as public safety, public health, and government functions, will be greatly reduced. Severe disruption of utilities, transportation, and commerce will occur. Travel restrictions and business closures may occur. Agri-business could suffer as the result of widespread culling, quarantines, and bans. The resulting economic and social impacts will be very high.