

**INFLUENZA**  
**VACCINE FIU**  
2008-2009 *formulation*

lot:

881

expiry date:

05/12

code:

881

expiry date:

05/12



# PANDEMIC INFLUENZA

## CHAPTER 4.9

*New York City does not take flu season lightly. The city's high population density, reliance on crowded mass transit systems, and role as an international travel hub amplify the risk of pandemic influenza, a global outbreak of the flu. An outbreak could last many months, return in waves, and cause major daily disruptions and even death.*

### WHAT IS THE HAZARD?

#### PANDEMIC AND SEVERE SEASONAL INFLUENZA

Although many disease outbreaks could affect New York City, the one that tends to be the most common is seasonal influenza. Symptoms include fever, achiness, respiratory difficulties, and extreme fatigue for up to two weeks. The disease is spread through human-to-human transmission when people with the flu cough or sneeze, spreading droplets that contain the virus, or when people touch contaminated surfaces and then their nose or mouth.

Typically, five to 20 percent of the population gets seasonal flu each year during flu season in the fall and winter. After getting the flu, some people may develop immunity to them. However, because small changes can occur in seasonal flu strains, getting a new flu vaccination every year is strongly recommended as the best protection against seasonal flu.

Influenza becomes pandemic when a genetic change in a strain of influenza allows the virus to spread quickly across a large segment of population over a large geographic area. Often, this process begins when a strain of animal influenza mutates and becomes infectious to humans and then spread from person-to-person. People are more susceptible to contracting the virus because they are not immune to new strains, and no vaccine for the new strain is readily available.

Even though vaccines might not be ready, antiviral medications can be prescribed by a doctor within 48 hours of symptoms to shorten the time a person is ill. As pandemic outbreaks subside, the once new strain of influenza becomes part of the group of influenza strains responsible for seasonal flu. As vaccinations become available and naturally developed immunization to the strain occurs, the virus loses the impact that makes a pandemic outbreak so concerning.

Influenza pandemics are unpredictable and spread rapidly, possibly reaching global populations within six weeks, making public health response a challenge. Current animal-based (zoonotic) influenza strains are being monitored globally by the World Health Organization, the Centers for Disease Control (CDC), and other national and international public health organizations, for their potential to develop into a pandemic.

## PANDEMIC INFLUENZA IMPACT ESTIMATES FOR EACH WAVE IN NYC

	MILD/ MODERATE SCENARIO	SEVERE SCENARIO
Infection rate	5 – 10% of population	20 – 25% of population
Number of people infected	410,000 – 820,000	1,640,000 – 2,050,000
Fatality rate	0.02%	2%
Number of fatalities	80 – 160	33,000 – 41,000

SOURCE: CENTERS FOR DISEASE CONTROL AND PREVENTION. PANDEMIC INFLUENZA ([HTTP://WWW.CDC.GOV/FLU/PANDEMIC-RESOURCES/](http://www.cdc.gov/flu/pandemic-resources/)) USING 2010 U.S. CENSUS POPULATION FOR NYC: 8.2 MILLION

### WHAT IS THE RISK?

Because New York City is an international air-travel hub and port of entry, it would not take long for a naturally occurring influenza pandemic to reach New York from elsewhere. New York’s dense urban environment and the close physical interactions among the general public, especially on public transportation, make its residents exceptionally vulnerable to outbreaks of respiratory illness, including pandemic influenza.

Part of the challenge of responding to this kind of outbreak is predicting when a strain of influenza will become a pandemic and what its impact will be. Historically, pandemic influenza outbreaks have occurred globally every 10 to 60 years. The 20th century saw three outbreaks, with the pandemic of 1918-19 (Spanish Flu) being the most severe. Mild to moderate outbreaks occurred in 1957 to 1958 (Asian Flu) and 1967 to 1968 (Hong Kong Flu). The most recent pandemic was H1N1 in 2009.

H1N1 was first identified in Mexico in April 2009. The first reported case in the New York City was in Queens that same month, followed by a global pandemic that in New York City lasted through 2010. NYC’s Department of Health and Mental Hygiene (DOHMH) estimates that as many as one million New Yorkers were infected. H1N1 continues to infect people to this day, now as the most common seasonal flu strain.

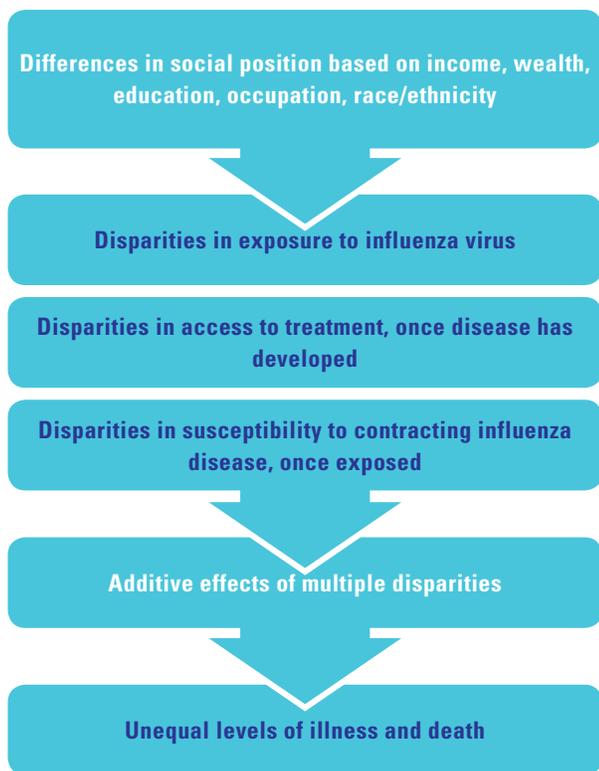
History shows that the number of people infected by pandemic influenza will increase and decrease in waves (two or three 8-12 week periods) separated

by many weeks of relative inactivity, over a 12- to 18-month period. Pandemic influenza outbreaks may have mild to moderate impacts that can cause a small number of fatalities. Severe impacts could cause up to 41,000 fatalities for each wave in New York City.

### VULNERABILITY

Studies of pandemic influenza outbreaks have shown that some populations are more susceptible to infection or significant illness than others. Infection rates may be highest in school-aged children (as much as 40 percent) who are often the biggest transmitters of influenza viruses in the community. The World Health Organization considers the following populations to be at higher risk for negative medical outcomes (such as significant illness, hospitalizations, or death) from pandemic influenza: pregnant women, children, and seniors (aged 65 years or older), individuals with chronic health conditions, and healthcare workers.

Not only do certain physical and health conditions make some populations more vulnerable to pandemic influenza, societal factors can amplify the risk of disease spread. DOHMH conducted a study to identify areas of clustered population groups most vulnerable to a pandemic in New York City. The study was based on a model of vulnerability that examined how income, race, and other social attributes influence exposure, susceptibility, and access to treatment during an outbreak.



SOURCE: BLUMENSHINE ET AL. 2008.

Here is a sampling of study findings:

- **Exposure** - Transmission of pandemic influenza is typically airborne, but the flu can also spread through direct and indirect contact. Low-income populations may be more vulnerable to exposure to the virus than other groups because they are more likely to experience crowded living conditions and workplaces and to depend upon public transportation. Because frequent contact with infected populations increases the risk of exposure, healthcare providers, care givers, and first responders are also especially vulnerable.
- **Susceptibility** - The elderly, the very young, and people with pre-existing conditions such as diabetes, cardiovascular disease, or HIV are more susceptible to negative outcomes from an influenza infection. Environmental stressors and social behaviors including high-stress work situations, poor or unsafe housing, or drug addiction and alcoholism can increase the likelihood and severity of infection.
- **Access to treatment** - Lack of access to treatment may also increase vulnerability. In

## SOME OTHER DISEASE OUTBREAKS THAT COULD AFFECT NYC:

**Coronavirus:** An upper-respiratory tract illness that spreads by airborne transmission and ranges from mild to moderate to very serious such as Severe Acute Respiratory Syndrome – coronavirus (SARS-CoV) and Middle East Respiratory Syndrome – coronavirus (MERS-CoV).

**Novel Viral Outbreak:** Occurs when a previously unknown viral disease is identified. Examples include West Nile Virus, Lyme Disease, and HIV.

**Bacterial Outbreaks:** Caused by the use of biological agents by terrorists such as aerosolized anthrax or by naturally-occurring outbreaks, such as meningococcal meningitis.

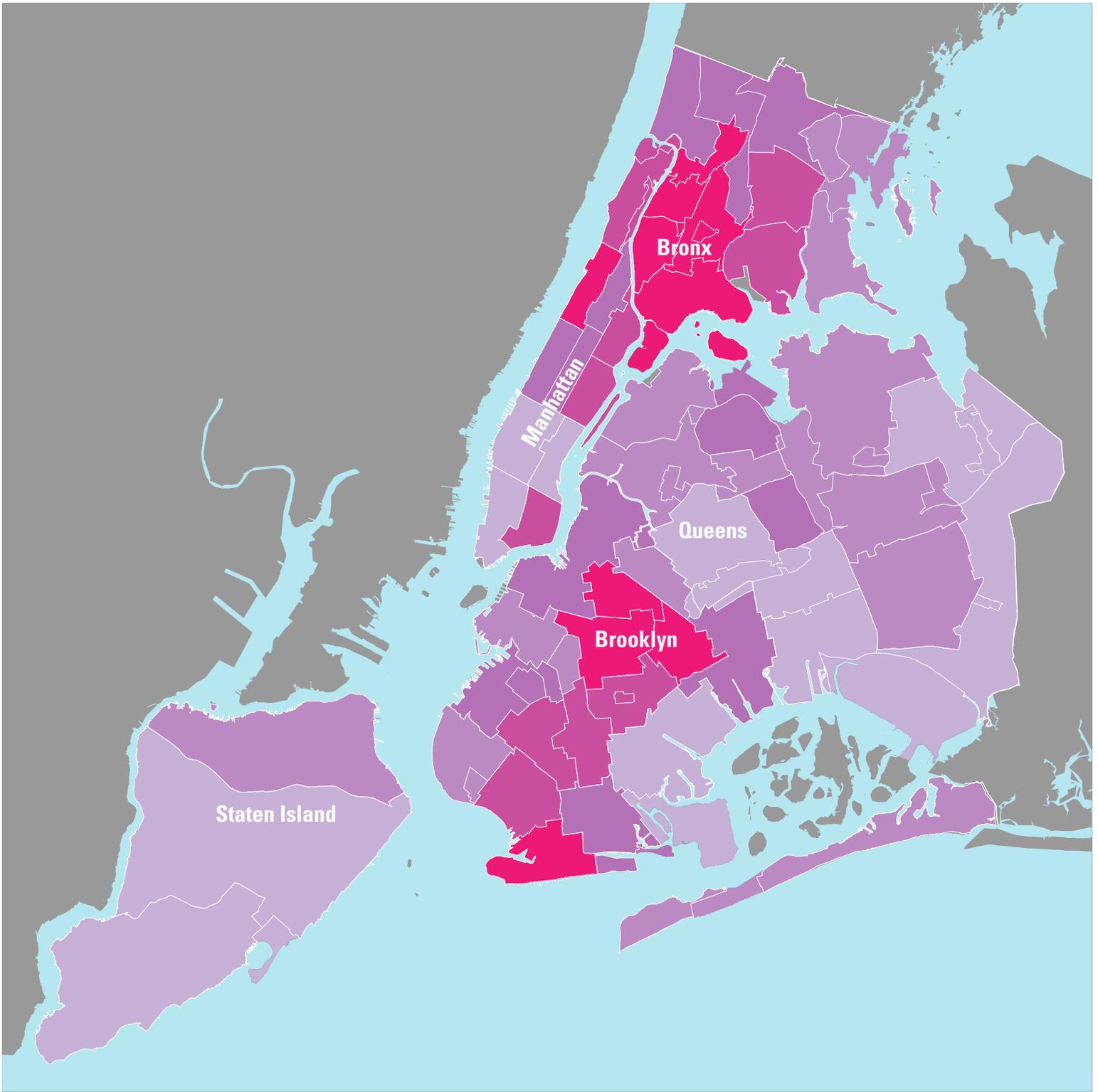
**Measles:** A highly contagious viral disease that causes fever and a rash. Anyone who is not vaccinated can get measles at any age. It can be spread by contact with an infected person who coughs and sneezes. During the spring of 2014, there were 26 cases in New York City.

**Mumps:** A viral illness that affects the salivary glands. It is spread by respiratory droplets that are released when an infected person coughs or sneezes.

general, uninsured, low-income populations, immigrants, and people with disabilities have less access to care and treatment. People unable or unwilling to get vaccinations or to obtain care if infected may be more vulnerable to severe medical complications.

The ability of healthcare facilities to maintain continuity of care is another important factor. Pandemic influenza outbreaks can disrupt the continuity of care for people with pre-existing conditions (such as diabetes, cancer treatments, and HIV) because pandemics impact healthcare workers, who are working within a healthcare system strained by the influx of infected people while also dealing with increased absenteeism of healthcare staff who become ill.

Based on its analysis of exposure, susceptibility, and access to treatment, DOHMH identified population clusters vulnerable to pandemic flu outbreaks in New York City. Clusters of those most susceptible to pandemic influenza are found in Southwest Bronx, Morningside Heights, Bedford-Stuyvesant, East New York, Crown Heights and Coney Island.

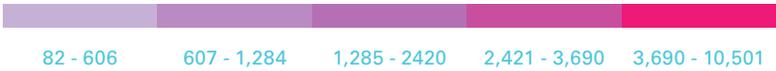


**DENSITY OF POPULATIONS WITH  
VULNERABILITY TO PANDEMIC INFLUENZA**

SOURCE: NYC DOHMH



MOST VULNERABLE PER SQUARE MILE



## CDC ESTIMATE OF PAN FLU IMPACTS ON NEW YORKERS

SOURCE: NYC EMERGENCY MANAGEMENT H1N1 PLAYBOOK, 2010.

MILD/MODERATE SCENARIO	SEVERE SCENARIO
Similar to seasonal flu and Spring 2009 H1N1 outbreak	Infection and fatality rates much higher than seasonal flu
Increased worker absenteeism	Prolonged and severe worker absenteeism
Affects different populations than seasonal influenza (i.e., mainly different age groups)	Public and private sector firms struggle to maintain critical functions
Public concern greater than normal flu season	Intense demand for information by a concerned public
"Worried well" surge into emergency rooms and stress healthcare system	Sick and worried well could disrupt healthcare system
May be spot shortages of hospital bed availability, medical staff, and supplies	Prolonged and severe shortages of hospital bed availability, medical staff, and supplies
Public expects control measures beyond those for seasonal influenza	Recommended infection control measures (e.g., school closure, cancelled public gatherings) likely to be severe
Lower rates of fatalities in comparison to a severe scenario	Increased rate of fatalities
Economy not as affected in comparison to a severe scenario	Loss of ability to acquire goods and services

### EXTENT/SEVERITY

The severity and extent of disease outbreaks according to epidemiological studies follow three levels: endemic, epidemic, and pandemic. Endemic disease spread pertains to specific areas among particular people. An epidemic is much more severe because it happens when new cases of the disease exceed what is anticipated based on previous experiences. A pandemic is an epidemic of infectious disease that has spread across the region and on a global scale. The consequences of a pandemic influenza depend on the severity of the outbreak and can range from daily inconveniences to more devastating outcomes. Some impacts of a mild outbreak include increased worker absenteeism and spot shortages of hospital staff and medical supplies.

In a moderate outbreak, schools and daycare centers may be closed and public events canceled. The outbreak may impact different population groups than a typical flu season. Hospitals may be crowded depending on the number of people who are infected or fear they may be infected.

A more severe scenario would include prolonged and severe worker absenteeism, increase in fatalities, potential disruption of critical services, and strained hospital resources. A pandemic that impacts many people and with a high mortality rate could have severe economic impacts. Because disease outbreaks often occur in waves, some economic sectors might not be able to recover from one wave before the next one hits.

## **SOCIAL DISTANCING AS A SELECTIVELY APPLIED CONTAINMENT STRATEGY**

Because a vaccine might not be ready until six to nine months after an outbreak occurs, reducing influenza exposure by minimizing personal contacts is imperative.

New York City's dense concentration of living and working space and its heavy dependence on public transportation make social distancing particularly challenging. Closing schools and canceling public events during a severe pandemic can have far-reaching social and economic impacts on New Yorkers. These closures would only be recommended if the benefits were considered greater than the impacts.

### **HOW DO WE MANAGE THE RISK?**

While the occurrence of a pandemic influenza may be unpredictable, well-understood strategies can be employed to manage its risks. The City, including DOHMH relies on protocols, communication tools, public education efforts, and promotion of workplace environmental controls in the public and private sectors.

### **NEW YORK CITY PROTOCOLS FOR PREPAREDNESS AND RESPONSE**

DOHMH's Pandemic Influenza Preparedness and Response Plan (2013) defines the operations and protocols for responding to and limiting exposure to pandemic influenza. DOHMH will assess epidemiologic, clinical, and behavioral characteristics of the pandemic strain and recommend containment measures to limit the flu's spread while minimizing social disruption and cost. The Commissioner of DOHMH, in consultation with the Mayor, can issue orders that reduce exposure, such as school closures, cancellation of public gatherings, and hygiene advisories, such as advisories for frequent hand washing and staying home while ill.

In the event of a pandemic influenza outbreak, DOHMH will increase surveillance activities, which include monitoring influenza-like illness activity. DOHMH has a state-of-the-art 24/7 system for monitoring disease patterns. This syndromic surveillance system involves routinely monitoring emergency room visits, ambulance calls, and pharmacy sales to detect early warning signals of a possible outbreak.

DOHMH will also monitor illness within the city to detect further pandemic waves and guide clinical and public health decisions about how to best use limited medical resources.

### **A STRATEGIC FOCUS ON CONTAINMENT**

In the early stages of an influenza pandemic, before a vaccine is available (usually six to nine months), community measures are essential to limiting the spread of disease. Since droplets can reach from three to six feet after they are coughed and sneezed into the environment, increasing the spacing between individuals can reduce exposure.

Measures to promote this – called social distancing strategies or non-pharmaceutical interventions – include limiting or staggering public transportation ridership, closing schools, encouraging alternative modes of travel (driving, carpooling, biking, or walking), canceling public events, implementing alternate work schedules, and encouraging telecommuting and vacations

### **MOBILIZING RESOURCES FOR A MULTIPRONGED RESPONSE**

During a pandemic, hospitals and other healthcare facilities will care for a large number of infected patients. Planning for this demand focuses on developing surge capacity in acute and critical care facilities, and on further strengthening communication between DOHMH and health care providers. DOHMH will work with the State Department of Health to monitor and address staffing, supply, and resource needs.

Antiviral drugs are prescription drugs that can reduce influenza symptoms and may shorten the duration of illness if taken within 48 hours of the first signs of illness. The drugs may also make a person less likely to spread influenza to others. These drugs will be distributed by the government to healthcare facilities as well as through pharmacies, to patients with prescriptions.

Meanwhile, officials at the CDC will work with partners in universities and industry as well as state and local health authorities to produce a vaccine for the virus that is causing a pandemic. Once a vaccine becomes available, it may be administered as a two-dose regimen, with doses 30 days apart, as it was for children under the age of ten during the 2009 H1N1 pandemic. Initial supplies may be limited. DOHMH's distribution systems may include hospitals, clinics, nursing homes, other health care facilities, private physician's offices, and Points of Dispensing (PODS, temporary emergency sites that are publicly accessible to large numbers of people). Information on vaccine availability will be provided through 311, a city-run online vaccination locator, the press, social media, etc.

## COMMUNICATION AND EDUCATION CAMPAIGNS

Communicating clear, accurate information to the public throughout an influenza outbreak is critical to limiting exposure, given the ever-changing nature of a pandemic influenza. The City prepares for pandemic influenza by testing communication protocols, developing communication tools, training agency staff, and coordinating with agencies, stakeholders, and community groups to build strong partnerships.

In the event of an influenza pandemic, the government, at the federal, state and local levels, will issue prompt alerts. As an outbreak progresses, the government will keep the public supplied with timely information about the status of the pandemic using television, radio, the Internet (including social media), and call centers.

DOHMH develops messages targeted to high-risk populations including children, caregivers, pregnant women, the elderly, and individuals with chronic health conditions. To communicate important information to non-English-speaking (or less-English-proficient) populations, the City makes critical health information available through translation and interpretation. Language needs have been identified and messages are tailored to meet the needs of special and vulnerable populations.

## FOUR STAGES OF PANDEMIC INFLUENZA DEFINED BY THE WORLD HEALTH ORGANIZATION

### Interpandemic phase:

The period between influenza pandemics.

### Alert phase:

This is the phase when influenza caused by a new subtype has been identified in humans. Increased vigilance and careful risk assessment, at local, national, and global levels, are characteristic of this phase. If the risk assessments indicate that the new virus is not developing into a pandemic strain, a de-escalation of activities towards those in the interpandemic phase may occur.

### Pandemic phase:

This is the period of global spread of human influenza caused by a new subtype. Movement between the interpandemic, alert and pandemic phases may occur quickly or gradually as indicated by the global risk assessment, principally based on virological, epidemiological, and clinical data.

### Transition phase:

As the assessed global risk reduces, de-escalation of global actions may occur, and reduction in response activities or movement towards recovery actions by countries may be appropriate, according to their own risk assessments.

DOHMH also communicates through its website, which includes an interactive map that visitors can use to locate flu clinics (flu locator) and widgets that deliver vital flu information to users. Through the media, 311, and many other outlets, DOHMH provides practical information about flu symptoms, when to go to the doctor, when to stay home, where to go for treatment, how to care for people who are sick, and where to get a vaccination when vaccines are available.

NYC Emergency Management's Ready New York Pandemic Flu guide, available on the agency's web site, explains possible pandemic influenza symptoms, how a pandemic may affect the city, and what steps the public can take to prevent its spread. NYC Emergency Management coordinates closely with DOHMH to ensure that messaging is clear, accurate, and consistent.



**POLICEMEN WEARING MASKS PROVIDED BY THE AMERICAN RED CROSS IN SEATTLE, 1918**

### THE 1918 SPANISH FLU

In 1918, the virus eventually called Spanish flu was first identified in the United States. Cities' response to the outbreak influenced the consequences.

In Philadelphia, four months after Spanish flu was identified, more than 12,000 people had died. Despite the outbreak, the City continued to allow large public gatherings, including citywide parade in support of the war effort.

In St. Louis, doctors persuaded the City to register influenza cases with the health department. Police officers helped shut down schools, churches, and other gathering places. The death rate in St. Louis was less than half the rate in Philadelphia.

In New York City, health officials also encouraged behavioral modifications to limit the flu's spread. For example, business hours were staggered to reduce demand on public transit systems in the mornings and afternoons. The City promoted health education efforts by urging New Yorkers to cover their mouths when coughing and sneezing and encouraged people to stop spitting in public. Although these measures were not strictly enforced, violators could face misdemeanor fines. The death rate during the pandemic was lower than Philadelphia's.

**Lessons learned:** The varied death rates could be attributed to the timing of strategies for carrying out prevention measures. Cities that instituted social distancing early in the epidemic had peak death rates 30 to 50 percent lower than those that did not. The most successful interventions were in communities where the political and health authorities broadly agreed on what needed to be done and the public cooperated.

## PROMOTING WORKPLACE CONTROLS

Flu can easily spread in the workplace. Both employers and employees can exercise environmental controls to limit its spread. Employers can:

- Maintain standard workplace cleaning routines.
- Encourage employees to stay home if they are sick and to not return to work until they have been fever-free for 24 hours without the use of fever-reducing medications.
- Ensure access to hand-washing facilities or to alcohol-based hand sanitizer if soap and water are not available.
- Promote vaccination.
- Promote respiratory etiquette, which includes encouraging covering coughs and sneezes, keeping hands clean and away from your face, and discouraging hand shaking.

In 2009 the City created the Agency Influenza Health and Safety Program aimed at reducing the occupational exposure of non-medical City employees. It is designed to help City agencies develop their own agency-specific plans for limiting the spread of flu. The program includes a Job Risk Assessment that entails careful examination of a workplace and the tasks each worker performs. The objective is to identify workplace hazards and determine whether existing precautions are sufficient, or if further controls should be put in place.

The approach can be adapted to differing agency conditions and can be used for multiple-scale influenza scenarios. It can also be used by private sector parties as a guide for developing their own Influenza Health and Safety Plans.

The City's Awareness Level Training program helps City agencies promote staff awareness through employee training that covers influenza health effects, modes of transmission, preventive measures, and job risk assessments. Control measures include safe work practices, administrative controls, engineering controls, and the use of Personal Protective Equipment.