Swine Influenza: A Pandemic flu: "The greatest Medical Holocaust in History"

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Abstract

Swine flu is a respiratory disease, caused by influenza type A which infects pigs, they are of many types, and the infection is constantly changing. Until now it has normally infected humans, but the latest form clearly does, and can be spread from person to person probably three coughing and sneeze, WHO has confirmed that at least some of the human cases are newer before seen version of H1N1 strain of influenza type A.H1N1 is the same strain which causes seasonal outbreaks of flu in humans on a regular basis but at least version of H1N1 is different if contains genetic material that is typically found in strains of virus that affects humans, birds and swine. Pigs provide an excellent 'melting pots' for these virus to mix and match with each other. Nobody knows the full impact of a pandemic but experts have warned that it could lost millions of lives worldwide. Here this review focused on the Historical aspects of this influenza, its origin, its impact, transmission and prevention.

Key Words: swine flu, hog flu, pig flu, H1N1 virus, 1918 Pandemic flu

Introduction

Swine influenza (also called *swine flu*, *hog flu*, and *pig flu*) refers to influenza caused by those strains of influenza virus, called swine influenza virus (SIV), that usually infect pigs. Swine influenza is common in pigs in the mid western United States (and occasionally in other states), Mexico, Canada, South America, Europe (including the United Kingdom, Sweden, and Italy), Kenya, Mainland China, Taiwan, Japan and other parts of eastern Asia. Transmission of swine influenza virus from pigs to humans is not common and properly cooked pork poses no risk of infection. When transmitted, the virus does not always cause human influenza and often the only sign of infection is the presence of antibodies in the blood, detectable only by laboratory tests. When transmission results in influenza in a human, it is called zoonotic swine flu. People who work with pigs, especially people with intense exposures, are at risk of catching swine flu. However, only about fifty such transmissions have been recorded since the mid-20th century, when identification of influenza subtypes became possible. Rarely, these strains of swine flu can pass from human to human. In humans, the symptoms of swine flu are

similar to those of influenza and of influenza-like illness in general, namely chills, fever, sore throat, muscle pains, severe headache, coughing, weakness and general discomfort. The 2009 flu outbreak in humans, known as "swine flu", is due to a new strain of influenza A virus subtype H1N1 that contained genes most closely related to swine influenza. The origin of this new strain is unknown. However, the World Organization for Animal Health (OIE) reports that this strain has not been isolated in pigs. This strain can be transmitted from human to human, and causes the normal symptoms of influenza. Pigs can become infected with human influenza, and this appears to have happened during the 1918 flu pandemic and the 2009 flu outbreak [1-9].

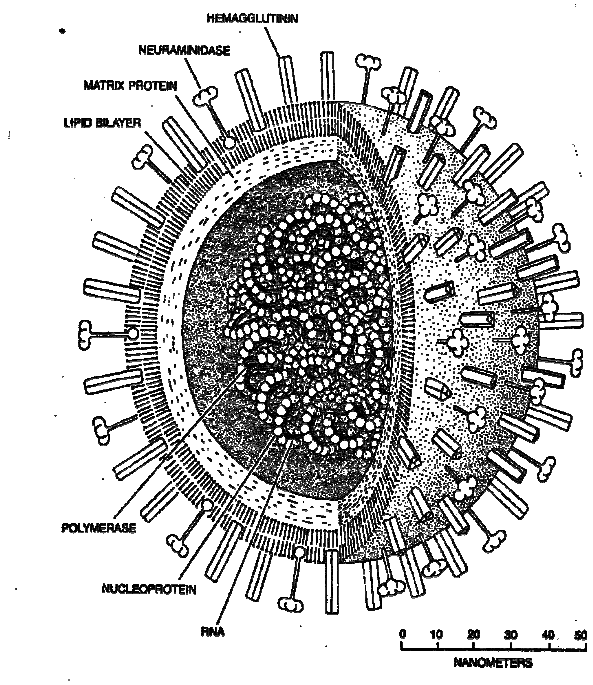

Figure 1: H1N1 Virus

Classification

Of the three genera of influenza viruses that cause human flu, two also cause influenza in pigs, with Influenza virus A being common in pigs and Influenza virus C being rare. Influenza virus B has not been reported in pigs. Within Influenza virus A and Influenza virus C, the strains found in pigs and humans are largely distinct, although due to reassortment there have been transfers of genes among strains crossing swine, avian, and human species boundaries.Influenza C viruses infect both humans and pigs, but do not infect birds. Transmissions between pigs and humans have occurred in the past. For example, influenza C caused small outbreaks of a mild form of influenza amongst children in Japan,[9]and California.[10] Due to its limited host range and the lack of

genetic diversity in influenza C, this form of influenza does not cause pandemics in humans[11].

Influenza A: Swine influenza is known to be caused by influenza A subtypes H1N1, [12], H1N2, H3N1, [13], H3N2 [13], and H2N3 In pigs, three influenza A virus subtypes (H1N1, H3N2, and H1N2) are the most common strains worldwide [15] In the United States, the H1N1 subtype was exclusively prevalent among swine populations before 1998; however, since late August 1998, H3N2 subtypes have been isolated from pigs. As of 2004, H3N2 virus isolates in US swine and turkey stocks were triple reassortants, containing genes from human (HA, NA, and PB1), swine (NS, NP, and M), and avian (PB2 and PA) lineages.[6]

H1N1 Virus

H and N depict the weapons of the virus through which it causes infection. While H stands for hem agglutinin which is the site by which the virus binds to the host cell receptors to cause the disease, N stands for neuraminidase which cleaves the exit points of cells and thus the virus spreads from one cell to any other cell infecting the vicinity. Résistance of persons is obtained by antibodies produced against H antigen while antibodies formed against N antigen (weapon of virus) helps to limit spread of infection [17-18].

Historical Aspects

Swine influenza was first proposed to be a disease related to human influenza during the 1918 flu pandemic, when pigs became sick at the same time as humans.[18] The first identification of an influenza virus as a cause of disease in pigs occurred about ten years later, in 1930.[19] For the following 60 years, swine influenza strains were almost exclusively H1N1. Then, between 1997 and 2002, new strains of three different subtypes and five different genotypes emerged as causes of influenza among pigs in North America. In 1997-1998, H3N2 strains emerged. These strains, which include genes derived by reassortment from human, swine and avian viruses, have become a major cause of swine influenza in North America. Reassortment between H1N1 and H3N2 produced H1N2. In 1999 in Canada, a strain of H4N6 crossed the species barrier from birds to pigs, but was contained on a single farm.[19] The H1N1 form of swine flu is one of the descendants of the strain that caused the 1918 flu pandemic[20-21] As well as persisting in pigs, the descendants of the 1918 virus have also circulated in humans through the 20th century, contributing to the normal seasonal epidemics of influenza.[21] However, direct transmission from pigs to humans is rare, with only 12 cases in the U.S. since 2005.[22] Nevertheless, the retention of influenza strains in pigs after these strains have disappeared from the human population might make pigs a reservoir where influenza viruses could persist, later emerging to reinfect humans once human immunity to these strains has waned [23]

Swine flu has been reported numerous times as a zoonosis in humans, usually with limited distribution, rarely with a widespread distribution. Outbreaks in swine are common and cause significant economic losses in industry, primarily by causing stunting

and extended time to market. For example, this disease costs the British meat industry about £65 million every year[24].

1976 U.S. outbreak

On February 5, 1976, in the United States an army recruit at Fort Dix said he felt tired and weak. He died the next day and four of his fellow soldiers were later hospitalized. Two weeks after his death, health officials announced that the cause of death was a new strain of swine flu. The strain, a variant of H1N1, is known as A/New Jersey/1976 (H1N1). It was detected only from January 19 to February 9 and did not spread beyond Fort Dix [25-27]. This new strain appeared to be closely related to the strain involved in the 1918 flu pandemic. Moreover, the ensuing increased surveillance uncovered another strain in circulation in the U.S.: A/Victoria/75 (H3N2) spread simultaneously, also caused illness, and persisted until March.[27] Alarmed public-health officials decided action must be taken to head off another major pandemic, and urged President Gerald Ford that every person in the U.S. be vaccinated for the disease [28].

The vaccination program was plagued by delays and public relations problems.[29] On October 1, 1976, the immunization program began and by October 11, approximately 40 million people, or about 24% of the population, had received swine flu immunizations. That same day, three senior citizens died soon after receiving their swine flu shots and there was a media outcry linking the deaths to the immunizations, despite the lack of positive proof. According to science writer Patrick Di Justo, however, by the time the truth was known — that the deaths were not proven to be related to the vaccine — it was too late. "The government had long feared mass panic about swine flu — now they feared mass panic about the swine flu vaccinations." This became a strong setback to the program.[30]

There were reports of Guillain-Barré syndrome, a paralyzing neuromuscular disorder, affecting some people who had received swine flu immunizations. This syndrome is a rare side-effect of modern influenza vaccines, with an incidence of about one case per million vaccinations.[31] As a result, Di Justo writes that "the public refused to trust a government-operated health program that killed old people and crippled young people." In total, less than 33% of the population had been immunized by the end of 1976. The National Influenza Immunization Program was effectively halted on Dec. 16.

Overall, there were about 500 cases of Guillain-Barré syndrome (GBS), resulting in death from severe pulmonary complications for 25 people, which, according to Dr. P. Haber, were probably caused by an immunopathological reaction to the 1976 vaccine. Other influenza vaccines have not been linked to GBS, though caution is advised for certain individuals, particularly those with a history of GBS.[32-33] Still, as observed by a participant in the immunization program, the vaccine killed more Americans than the disease did.[34]

1988 zoonosis

In September 1988, a swine flu virus killed one woman in Wisconsin, and infected at least hundreds of others. 32-year old Barbara Ann Wieners was eight months pregnant

when she and her husband, Ed, became ill after visiting the hog barn at the Walworth County Fair. Barbara died eight days later, though doctors were able to induce labor and deliver a healthy daughter before she passed away. Her husband recovered from his symptoms.

Influenza-like illnesses were reportedly widespread among the pigs at the farm they had visited, and 76% of the swine exhibitors there tested positive for antibody to SIV, but no serious illnesses were detected among this group. Additional studies suggested between one and three health care personnel who had contact with the patient developed mild influenza-like illnesses with antibody evidence of swine flu infection[35-36]. However, there was no community outbreak.

1998 US outbreak in swine
In 1998, swine flu was found in pigs in four U.S. states. Within a year, it had spread through pig populations across the United States. Scientists found that this virus had originated in pigs as a recombinant form of flu strains from birds and humans. This outbreak confirmed that pigs can serve as a crucible where novel influenza viruses emerge as a result of the reassortment of genes from different strains. [37-39].

2007 Philippine outbreak in swine
On August 20, 2007 Department of Agriculture officers investigated the outbreak (epizootic) of swine flu in Nueva Ecija and Central Luzon, Philippines. The mortality rate is less than 10% for swine flu, unless there are complications like hog cholera. On July 27, 2007, the Philippine National Meat Inspection Service (NMIS) raised a hog cholera "*red alert*" warning over Metro Manila and 5 regions of Luzon after the disease spread to backyard pig farms in Bulacan and Pampanga, even if these tested negative for the swine flu virus. [40-44]

Transmission

Transmission between pigs: Influenza is quite common in pigs, with about half of breeding pigs having been exposed to the virus in the US[45]. Antibodies to the virus are also common in pigs in other countries. [45]

The main route of transmission is through direct contact between infected and uninfected animals. These close contacts are particularly common during animal transport. Intensive farming may also increase the risk of transmission, as the pigs are raised in very close proximity to each other. [46-47]. Direct transfer of the virus probably occurs either by pigs touching noses, or through dried mucus. Airborne transmissions through the aerosols produced by pigs coughing or sneezing are also an important means of infection. The virus usually spreads quickly through a herd, infecting all the pigs within just a few days. Transmission may also occur through wild animals, such as wild boar, which can spread the disease between farms.[48]

Transmission to humans: People who work with poultry and swine, especially people with intense exposures, are at increased risk of zoonotic infection with influenza virus

endemic in these animals, and constitute a population of human hosts in which zoonosis and reassortment can co-occur.[49] Vaccination of these workers against influenza and surveillance for new influenza strains among this population may therefore be an important public health measure.[50] Transmission of influenza from swine to humans who work with swine was documented in a small surveillance study performed in 2004 at the University of Iowa.[51] This study among others forms the basis of a recommendation that people whose jobs involve handling poultry and swine be the focus of increased public health surveillance. Other professions at particular risk of infection are veterinarians and meat processing workers, although the risk of infection for both of these groups is lower than that of farm workers[52].

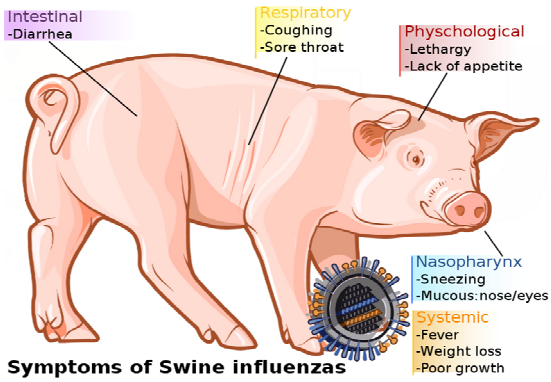

Figure 2: symptoms of Swine flu

Signs and Symptoms

In swine: In pigs influenza infection produces fever, lethargy, sneezing, coughing, difficulty breathing and decreased appetite. In some cases the infection can cause abortion. Although mortality is usually low (around 1-4%), the virus can produce weight loss and poor growth, causing economic loss to farmers. Infected pigs can lose up to 12 pounds of body weight over a 3 to 4 week period.

In humans: Direct transmission of a swine flu virus from pigs to humans is occasionally possible (called zoonotic swine flu). In all, 50 cases are known to have occurred since the first report in medical literature in 1958, which have resulted in a total of six deaths. Of these six people, one was pregnant, one had leukemia, one had Hodgkin disease and two were known to be previously healthy. Despite these apparently low numbers of infections, the true rate of infection may be higher, since most cases only cause a very mild disease, and will probably never be reported or diagnosed.[53-60]

Prevention in humans

Prevention of pig to human transmission
Swine can be infected by both avian and human influenza strains of influenza, and therefore are hosts where the antigenic shifts can occur that create new influenza strains.

The transmission from swine to human is believed to occur mainly in swine farms where farmers are in close contact with live pigs. Although strains of swine influenza are usually not able to infect humans this may occasionally happen, so farmers and veterinarians are encouraged to use a face mask when dealing with infected animals. The use of vaccines on swine to prevent their infection is a major method of limiting swine to human transmission. Risk factors that may contribute to swine-to-human transmission include smoking and not wearing gloves when working with sick animals.

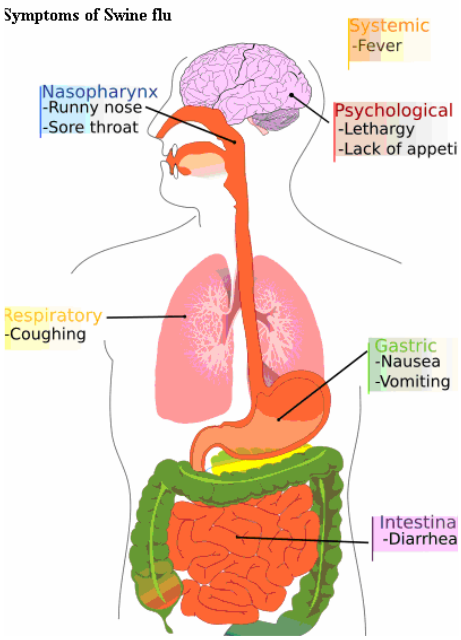

Figure 3: Effects of H1N1 virus in Human Body

Prevention of human to human transmission

Influenza spreads between humans through coughing or sneezing and people touching something with the virus on it and then touching their own nose or mouth. Swine flu cannot be spread by pork products, since the virus is not transmitted through food.[61] The swine flu in humans is most contagious during the first five days of the illness although some people, most commonly children, can remain contagious for up to ten days. Diagnosis can be made by sending a specimen, collected during the first five days for analysis.

Recommendations to prevent spread of the virus among humans include using standard infection control against influenza. This includes frequent washing of hands with soap and water or with alcohol-based hand sanitizers, especially after being out in public. Chance of transmission is also reduced by disinfecting household surfaces, which can be done effectively with a diluted chlorine bleach solution. Although the current trivalent influenza vaccine is unlikely to provide protection against the new 2009 H1N1 strain,

vaccines against the new strain are being developed and could be ready as early as June 2009 [60-66]

Experts agree that hand-washing can help prevent viral infections, including ordinary influenza and the swine flu virus. Influenza can spread in coughs or sneezes, but an increasing body of evidence shows small droplets containing the virus can linger on tabletops, telephones and other surfaces and be transferred via the fingers to the mouth, nose or eyes. Alcohol-based gel or foam hand sanitizers work well to destroy viruses and bacteria. Anyone with flu-like symptoms such as a sudden fever, cough or muscle aches should stay away from work or public transportation and should contact a doctor to be tested.

Social distancing is another tactic. It means staying away from other people who might be infected and can include avoiding large gatherings, spreading out a little at work, or perhaps staying home and lying low if an infection is spreading in a community. Public health and other responsible authorities have action plans which may request or require social distancing actions depending on the severity of the outbreak. [60-66]

1918 flu pandemic

The 1918 flu pandemic (commonly referred to by the misnomer *Spanish flu*) was an influenza pandemic that spread to nearly every part of the world. It was caused by an unusually virulent and deadly Influenza A virus strain of subtype H1N1. Historical and epidemiological data are inadequate to identify the geographic origin of the virus. Most of its victims were healthy young adults, in contrast to most influenza outbreaks which predominantly affect juvenile, elderly, or otherwise weakened patients. The flu pandemic has also been implicated in the sudden outbreak of Encephalitis lethargica in the 1920s.

The pandemic lasted from March 1918 to June 1920, spreading even to the Arctic and remote Pacific islands. It is estimated that anywhere from 70 to 100 million people were killed worldwide, or the approximate equivalent of one third of the population of Europe, more than double the number killed in World War I. This extraordinary toll resulted from the extremely high illness rate of up to 50% and the extreme severity of the symptoms, suspected to be caused by cytokine storms. The pandemic is estimated to have affected up to one billion people: more than half the world's population at the time.

Scientists have used tissue samples from frozen victims to reproduce the virus for study. Given the strain's extreme virulence there has been controversy regarding the wisdom of such research. Among the conclusions of this research is that the virus kills via a cytokine storm (overreaction of the body's immune system) which explains its unusually severe nature and the concentrated age profile of its victims. The strong immune systems of young adults ravaged the body, whereas the weaker immune systems of children and middle-aged adults caused fewer deaths.

History

While World War I did not cause the flu, the close troop quarters and massive troop movements hastened the pandemic, and increased transmission augmented mutation and may have increased the lethality of the virus. Some researchers speculate that the soldiers' immune systems were weakened by malnourishment, and the stresses of combat and chemical attacks, increasing their susceptibility to the disease. Price-Smith has made the controversial argument that the virus helped tip the balance of power in the latter days of the war towards the Allied cause. Specifically, he provides data that the viral waves hit the Central Powers before they hit the Allied powers, and that both morbidity and mortality in Germany and Austria were considerably higher than in Britain and France.

A large factor of worldwide flu occurrence was increased travel. Modern transportation systems made it easier for soldiers, sailors, and civilian travelers to spread the disease quickly to communities worldwide.

Geographic sources
Some scholars have theorized that the flu probably originated in the Far East. Dr. C. Hannoun, leading expert of the 1918 flu for the Institute Pasteur noticed that the former virus was likely to have come from China, mutated in the USA near Boston, and spread to Brest (France), Europe's battlefields, Europe, and the world using Allied soldiers and sailors as main spreaders. C. Hannoun also notice several other theories, such Spain, Kansas, Brest, but as being possible but not likely.

Historian Alfred W. Crosby observed that the flu seems to have originated in Kansas, the political scientist Andrew Price-Smith has published data from the Austrian archives suggesting that the influenza had earlier origins, beginning in Austria during the Spring of 1917. Popular writer John Barry echoed Crosby in proposing that Haskell County, Kansas was the location of the first outbreak of flu. In the United States the disease was first observed at Fort Riley, Kansas, United States, on March 4, 1918, and Queens, New York, on March 11, 1918. In August 1918, a more virulent strain appeared simultaneously in Brest, France, in Freetown, Sierra Leone, and in the U.S. at Boston, Massachusetts. The Allies of World War I came to call it the Spanish flu, primarily because the pandemic received greater press attention after it moved from France to Spain in November 1918. Spain was not involved in the war and had not imposed wartime censorship.

The deadly second wave
What's notable about the 1918 pandemic was that the second wave was much deadlier than the first. During the first wave, which began in early March, the epidemic resembled typical flu epidemics. Those at the most risk were the sick and elderly, and younger, healthier people recovered easily. But in August, when the second wave began in France, the virus had mutated to a much more deadly form in the trenches of the first World War. This was because, in civilian life, evolutionary pressures favor a mild strain. Those who get really sick stay home, but those with a mild strain continue with their lives, go to

work and go shopping, affording the mild strain many more opportunities to spread. But in the trenches of the Great War, the evolutionary pressures were reversed. Soldiers with a mild strain weren't so sick that they needed to leave. Only those who were severely ill were sent back, on crowded trains, to crowded field hospitals, which afforded the deadlier virus the most opportunities to spread. So the second wave began in France and quickly spread around the world a second time. It was the same flu, in that those who recovered from first-wave infections were immune, but it was far more deadly, and the most vulnerable people were those who resembled the soldiers in the trenches — young adults, who were otherwise healthy. Consequently, during modern pandemics, health officials pay attention when the virus reaches places with social upheaval, looking for deadlier strains of the virus.

Devastated communities

Even in areas where mortality was low, those incapacitated by the illness were often so numerous as to bring much of everyday life to a stop. Some communities closed all stores or required customers not to enter the store but place their orders outside the store for filling. There were many reports of places with no health care workers to tend the sick because of their own ill health and no able-bodied grave diggers to bury the dead. Mass graves were dug by steam shovel and bodies buried without coffins in many places. Several Pacific island territories were particularly hard-hit. The pandemic reached them from New Zealand, which belatedly implemented measures to prevent ships carrying the flu from leaving its ports. From New Zealand, the flu reached Tonga (killing 8% of the population), Nauru (16%) and Fiji (5%, 9000 people). Worst affected was Western Samoa, a territory then under New Zealand military administration. A crippling 90% of the population was infected; 30% of adult men, 22% of adult women and 10% of children were killed. By contrast, the flu was kept away from American Samoa by a commander who imposed a blockade. The mortality rate in New Zealand itself was 5%.

Less affected areas

In Japan, 257,363 deaths were attributed to influenza by July 1919, giving an estimated 0.425% mortality rate, much lower than nearly all other Asian countries for which data are available. The Japanese government severely restricted maritime travel to and from the home islands when the pandemic struck.

In the Pacific, American Samoa and the French colony of New Caledonia also succeeded in preventing even a single death from influenza through effective quarantines. In Australia, nearly 12,000 perished.

US Government response

The Great Influenza was the source of much fear in citizens around the world. Further inflaming that fear was the fact that governments and health officials were downplaying the influenza. While the panic from World War I was dwindling, governments attempted to keep morale up by spreading lies and dismissing the influenza. On September 11, 1918, Washington officials reported that the Spanish Influenza had arrived in the city. The following day, roughly thirteen million men across the country lined up to register for the war draft, providing the influenza with an efficient way to spread. However, the influenza had little impact upon institutions and organizations. While medical scientists

did rapidly attempt to discover a cure or vaccine, there were virtually no changes in the government or corporations. Additionally, the political and military events were fairly unaffected due to the impartiality of the disease, which affected both sides alike.

Abrupt End

After the lethal second wave struck in the fall of 1918, the explosion of disease ended abruptly. New cases almost dropped to nothing after the peak in the second wave. In Philadelphia for example, 4,597 people died in the week ending October 16th; by November 11th however, influenza had almost disappeared entirely from the city. One explanation for the rapid decline of the lethality of the disease is that doctors simply got better at preventing and treating the pneumonia which developed after the victims had contracted the virus, although John Barry states in his book that researchers have found no evidence to support this. Another theory states that the 1918 virus has, like all influenza viruses, mutated extremely rapidly to a less lethal strain. There is a general trend for pathogenic viruses to become less lethal as time went on in order to become more contagious. According to this theory, this simply occurred on a very rapid rate for the 1918 virus [67-73]

2009 swine flu outbreak

It is an epidemic of a new strain of influenza virus that was clinically identified in April 2009, a type of *influenza A (H1N1)* virus, commonly called swine flu. It is currently a phase 5 outbreak, one level below an official pandemic. Although the exact origin of the outbreak is unknown it was first detected when officials in Mexico and the United States suspected a link between an outbreak of late-season flu cases in Mexico and cases of influenza in Texas and California. Within days, hundreds more suspected cases were discovered in Mexico, with more cases also showing up in the U.S. and several other countries. By late April, officials from the U.N.'s World Health Organization (WHO), based in Switzerland, and the Centers for Disease Control and Prevention (CDC) in the U.S., were expressing serious concern about the flu outbreak, worried that it might become a worldwide flu pandemic. As a result, WHO raised its alert level to "Phase 5" out of 6 possible, which it defines as a "signal that a pandemic is imminent".

By the end of April, 300 schools had closed across the United States and the Mexican government had ordered a multi-day shutdown of all non-essential activities in the government and private sector, amounting to a shutdown of most of the country's economy. At the same time, however, many scientists were reaching a consensus that the epidemic was so far "relatively mild," and believed that it could be less fatal than previous pandemics.

The new strain is an apparent reassortment of four strains of influenza A virus subtype H1N1. Analysis by the CDC identified the four component strains as one endemic in humans, one endemic in birds, and two endemic in pigs (swine). However, other scientists have stated that analysis of the 2009 swine flu (A/H1N1) viral genome "suggests that all segments are of swine origin", "We are puzzled about sources of information that affirm that the virus is a reassortment of avian, human and swine viruses," and "this preliminary analysis suggests at least two swine ancestors to the

current H1N1, one of them related to the triple reassortant viruses isolated in North America in 1998." One swine strain was widespread in the United States, the other in Eurasia. Worldwide the common human H1N1 influenza virus affects millions of people every year, according to WHO officials, and "these annual epidemics result in about three to five million cases of severe illness, and about 250,000 to 500,000 deaths" annually. In industrialized countries most of these annual deaths occur in people aged 65 or older. By May 2, some pigs in Canada were diagnosed with H1N1. Although some influenza strains can spread between species, the influenza virus is killed by normal cooking procedures, so there is no risk of infection from consumption of well-cooked and pork products.

Initial outbreaks

First recognition, the new strain of swine flu was first recognized as such when the CDC received a sample on April 14 from a patient who fell ill on March 30 in San Diego County, California. A second case was confirmed on April 17 who had fallen ill on March 28 in Imperial County, California.

The outbreak was first detected in Mexico City, where surveillance began picking up a surge in cases of influenza-like illness (ILI) starting March 18. The surge was assumed by Mexican authorities to be "late-season flu" (which usually coincides with a mild Influenza virus B peak) until April 21, when a U.S. Centers for Disease Control and Prevention alert concerning two isolated cases of a novel swine flu was reported in the media. Some samples were sent to the U.S.-based CDC on April 18. The Mexican cases were confirmed by the CDC and the World Health Organization to be a new strain of H1N1.

Cases were also reported in the states of San Luis Potosí, Hidalgo, Querétaro and Mexico State Mexican Health Minister José Ángel Córdova on April 24, said "We’re dealing with a new flu virus that constitutes a respiratory epidemic that so far is controllable." Mexican news media report that the outbreak may have started in February near a Smithfield Foods pig plant amid complaints about its intensive farming practices. The first death from swine flu occurred on April 13, when a diabetic woman from Oaxaca died from respiratory complications. The Mexican fatalities are alleged to be mainly young adults of 25 to 45, a common trait of pandemic flu. Although there have been reports of 152 "probable deaths" in Mexico City and "more than 100 dead from swine flu", the WHO had received reports of only 16 confirmed deaths total and explicitly denied the larger figure as of April 29 [72-75]. The new strain has spread widely beyond Mexico and the U.S., with confirmed cases in eighteen countries and suspected cases in forty-two. Many countries have advised their inhabitants not to travel to infected areas. Areas including Australia, Hong Kong, Iceland, India, Indonesia, Malaysia, Philippines, Singapore, South Korea and Thailand are monitoring visitors returning from flu-affected areas to identify people with fever and respiratory symptoms. Many countries have also issued warnings to visitors of flu-affected areas to contact a doctor immediately if they had flu-like symptoms.

Mexico's schools, universities, and all public events will be closed from April 24, 2009 to May 6, 2009. By May 3, 2009, more than 400 schools in the U.S. closed due to confirmed or probable cases in students or staff, affecting 250,000 students.

Government actions against pigs and pork
Although there is no evidence that the virus is transmitted by food, and influenza A viruses are generally killed by heating, some countries banned import and sale of pork products "as a precaution against swine flu".

International cases and responses [76-77]

Detected human cases by country			
Country	**Cases**		**Deaths**
	Laboratory confirmed	**Probable (Suspected)**	**Confirmed (suspected)**
Total	**1448**	**823 (4130+)**	**27 (101)**
Mexico	802	- (2,955)	26 (101)
United States	383	801 (148+)	1
Canada	140	- (35)	0
Spain	57	0 (60)	0
United Kingdom	27	6 (331)	0
Germany	9	0 (10)	0
New Zealand	6	15 (92)	0
France	4	3 (33)	0
Italy	4	0 (13)	0
Israel	4	- (2)	0
El Salvador	2	2 (3)	0
Costa Rica	1	3 (64)	0
South Korea	1	2 (10)	0
Colombia	1	- (108)	0
Switzerland	1	0 (23)	0
Hong Kong	1	- (3)	0
Austria	1	0 (2)	0
Denmark	1	0 (0)	0
Ireland	1	0 (0)	0
Netherlands	1	0 (0)	0
Portugal	1	0 (0)	0
Other countries	0	1 (238)	0

§ The Mexican government stopped reporting suspected cases and deaths on April 30, 2009 as did Canada.
Number of countries with confirmed cases: 21.
Number of countries with confirmed or suspected cases: 41.
‡ Suspected and probable cases have not been confirmed as being due to this strain of influenza by laboratory tests, although some other strains may have been ruled out.

Several countries, including Serbia, China and Russia banned the import of pork products from North America in general as a response to the outbreak, despite assurances from the

WHO that the disease is not spread through pork. On April 29, the Egyptian Government decided to kill all 300,000 pigs in Egypt, despite a lack of evidence that the pigs had, or were even suspected of having, the virus. This led to clashes between pig owners and the police in Cairo.

Transmission of flu virus from human to animal
In Alberta, Canada, provincial and federal officials announced on May 2 that a 2,200-head pig herd in central Alberta was under quarantine after preliminary findings indicated some of the animals were infected with swine flu. It is thought that a man who had visited Mexico infected the pigs, in contrast to pigs infecting humans. Alberta agriculture minister George Groeneveld said that health officials expected no problems with export of pork from Canada to the United States, and that there was "absolutely no evidence" that the flu virus can be transmitted through eating pork.

Pandemic concern

WHO and CDC officials are concerned that this outbreak may become a pandemic, for the following reasons:

• *New strain*
The virus is a new strain of influenza, from which human populations have not been vaccinated or naturally immunized. In the United States, cases infected 25% of family members. Seasonal flu tends to sicken 5% to 20% of family members.

• *Widespread human transmission*
The virus infects by human-to-human transmission. Investigations of infected patients indicated no direct contact with swine, such as at a farm or agricultural fair. The strain was later confirmed to have been transmitted between humans. In contrast, for example, disease transmission in the last severe human outbreak of influenza, the bird flu that peaked in 2006, was determined to be almost entirely from direct contact between humans and birds.

• *Virulence*
All but one of the fatalities to date has been in Mexico. In Mexico, according to the *New York Times*, the deaths from the illness have primarily been young, healthy adults. Most other influenza strains produce the worst symptoms in young children, the elderly, and others with weaker immune systems. However, the CDC has indicated that symptoms reported from this strain so far are similar to those of normal seasonal flu. While some media outlets have speculated that this virus could cause a cytokine storm in patients, there is presently no evidence for this hypothesis, with the CDC stating that there is "insufficient information to date about clinical complications of this variant of swine-origin influenza A (H1N1) virus infection."

• *Lack of data*
That other crucial factors are still largely unknown, such as transmission rates and patterns (epidemicity) and effectiveness of current influenza treatments, combined with

the innate unpredictability of influenza strains, means that reliable forecasts cannot be made.

As noted, predicting the size and severity of influenza outbreaks is a very inexact science. In 1976 the U.S. government incorrectly predicted a swine flu pandemic that never materialized.
WHO officials observed that because there are "human cases associated with an animal influenza virus, and because of the geographical spread of multiple community outbreaks, plus the somewhat unusual age groups affected, these events are of high concern".
By the end of April, however, some scientists believed that this strain was unlikely to cause as many fatalities as earlier pandemics, and may not even be as damaging as a typical flu season.

Historical chart

Epidemics (avail. data)	Year	People infected	Deaths	Death ratio	Data sources
Spanish flu(worldwide east)	1918–19	500 million	50 million	10%	CDC
Asian flu(U.S.)	1957	45 million	70,000	0.15%	
Hong Kong flu(U.S.)	1968–69	50 million	33,000	0.06%	
Avian flu(worldwide)	1990–today	421	257	61%	
SARS (worldwide)	2002–03	8,096	774	9.56%	
General flu (U.S.)	yearly average	50 million	36,000	0.07%	CNN
Swine flu (worldwide) confirmed	as of 2009-05-04	1061	26	2.45%	WHO

WHO alert phases

Phase 3
Prior to the swine flu outbreak, the WHO worldwide pandemic alert was set at Phase 3 due to H5N1 avian flu, which spread widely in birds with occasional cases in humans. A Phase 3 alert means that a new virus has been confirmed but there is no or limited evidence of human-to-human transmission - insufficient to sustain community-level

outbreaks. The WHO decided not to raise the level of the worldwide pandemic alert after its first meeting, on April 25.

Phase 4
Following the second meeting of the Emergency Committee on April 27, the pandemic alert level was raised to Phase 4. Phase 4, "Sustained Human to Human Transmission," entails community-wide outbreaks. As of April 29, World Health Organization assistant director-general Dr. Keiji Fukuda stated: *[That the organization was] moving closer to Phase 5. What we are trying to do right now is make absolutely sure that we are dealing with sustained transmission in at least two or more countries.*

Phase 5
On April 29, the Emergency Committee had their third meeting, and decided to raise the pandemic alert level to five, the second-highest level, indicating that a pandemic is "imminent," and that human-to-human transmission cases have been recorded in multiple countries. In Catalonia, officials confirmed the first European case of an infection in a person who had not (recently) traveled to Mexico, in a person whose girlfriend had done so, the second WHO region to experience intergenerational transmission of H1N1. [77-86]

2009 NEWS UPDATES

On 8th May 2009: 'Times of India' reported " Canada cracks H1N1 Flu code": Scientist identify Virus origin, Canadian scientist have become the first to genetically sequence the H1N1 the virus, vital in developing test for the infection and drugs and vaccines to treat it. Dr David Butler –Jones, canada's chief public health officer said on Wednesday that researchers at the national Microbiology Laboratory in Winnipeg, Manitaba, genetically sequenced three samples of the virus, isolated from Mexico and The Canadian provinces of Nova Scotia and Ontario.

"A vaccine to treat Swine flu soon": US Food and Drug administration gives Green Signal to sanoi facility. Soon there may be vaccine available for humans to combat the H1N1 influenza (Swine flu).The US Food and Drug Administration (FDA) announced on Tuesday that it has appeared a new manufacturing facility of Sanofi Pastuer in US to produce influenza vaccines, which may be used for the production of vaccines against the H1N1 virus. The facility has been approved for seasonal influenza vaccine production and could be used for the production of vaccine against the 2009 H1N1 influenza strain, a FDA statement said.

On 14th May 2009: Times of India reported that Pharmaceuticals company Cipla's anti-flu drug for H1N1 influenza Oseltamivir has been approved by Wealth Health Organisation (WHO) and included in its lists of prequalified medicinal products. The drug is marketed as 'Tami-flu'(Oseltamivir 75 mg) capsules. Oseltamivir is indicated to treat influenza A (H1N1) infection Known as Swine flu..

On 12th June 2009 Times of India reported that there were 30 cases of Swine flu reported from India and WHO declared it as pandemic flu….
Till 30th August Large number of people affected from this flu and WHO declared it as *'Global pandemic flu'*

Table 1: Current updates as per WHO

Region	Cumulative total as of 23 Aug 2009	
	Cases*	Deaths
WHO Regional Office for Africa (AFRO)	3843	11
WHO Regional Office for the Americas (AMRO)	110113	1876
WHO Regional Office for the Eastern Mediterranean (EMRO)	3128	10
WHO Regional Office for Europe (EURO)	Over 42,557	At least 85
WHO Regional Office for South-East Asia (SEARO)	15771	139
WHO Regional Office for the Western Pacific (WPRO)	34026	64
Total	Over 209438	At Least 2185

***Don't get scared of Swine flu*:**
Do'
- Uncomplicated H1N1 infection is generally a benign and self-limiting illness and most of the patients are cured in just 2-5 days or in just 7 days.
- Rest, hydration (drinking plenty of fluids) and isolation is the best triad to get rid of H1N1 virus.
- Use of only simple acetaminophen to combat fever and aches.
- Wear masks only in crowed, risky places from where the infection can be caught like hospitals, airports etc.
- Must wash hands after coming from outdoor activities.
- Caution can be taken in patients of high risks groups for getting hospitalization, good oxygen and haemodynamic support.
- Properly cooked pork meat can be taken as virus dies at 60 degree C with in 30 minutes of simple heating.

• Vaccination can be given, though not effective 100% as there are 13 types of H and 9 types if N antigen which result in 117 possible combinations of viruses thus making of vaccine against such large combinations of antigens of H1N1 virus is nearly impossible.
• For complications hospitalization is advised

Don'ts Do

• Don't Panic
• Don't create hype against the disease in public
• Antiviral drugs like oseltamivir are likely to be ineffective or have unknown role against the disease so don't create panic for such costly treatments.
• Don't prescribe aspirins as such agents precipitate Reyes Syndrome like complications specially in children.
• Don't show the mortality (death) of previous years as in those days we didn't have good antibiotics to deal with secondary bacterial pneumonias which is a common complication of H1N1.
• Don't sneeze cough, spit in unmannerly fashion: always use hanky to cover your nose and mouth (for flu patients specially).

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