

## REVIEW ON INFLUENZA WITH SPECIAL EMPHASIS ON SWINE FLU

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## ABSTRACT

The study in this paper is an attempt to cover what is influenza and its types, the history of influenza, different types of influenza with special emphasis on swine flu. The article takes review from various journals, books and agencies like NIV, to cover the following aspects for the benefit of the readers -What is swine flu virus, how it spreads, history of pandemics, transmission of virus from swine to human and human to human Signs and symptoms of swine flu. Diagnosis, prevention and treatment of swine flu. Emergencies of swine flu. Alternative treatments, Safety masks and other accessories. General hygiene, precautions in public, dos and don'ts, care during travel, home remedies. The review also includes-current status of swine flu in India and in the world.

## INTRODUCTION

## Influenza

Commonly referred to as the **flu**, is an infectious disease caused by RNA viruses of the family Orthomyxoviridae (the influenza viruses), that affects birds and mammals. The most common symptoms of the disease are chills, fever, sore throat, muscle pains, severe headache, coughing, weakness/fatigue and general discomfort. Sore throat, fever and coughs are the most frequent symptoms. In more serious cases, influenza causes pneumonia, which can be fatal, particularly for the young and the elderly. Although it is often confused with other influenza-like illnesses, especially the common cold, influenza is a more severe disease than the common cold and is caused by a different type of virus. Influenza may produce nausea and vomiting, particularly in children, but these symptoms are more common in the unrelated gastroenteritis, which is sometimes called "stomach flu" or "24-hour flu". Typically, influenza is transmitted through the air by coughs or sneezes, creating aerosols containing the virus.

## Structure of Influenza

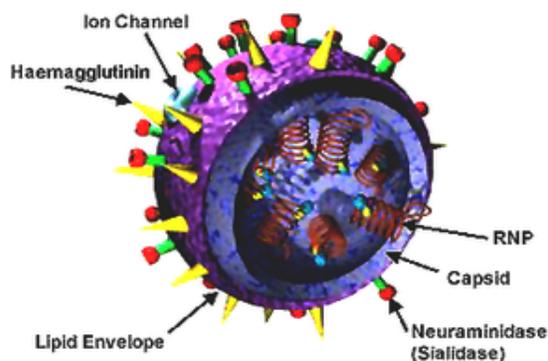


Fig. 1: "The gene structure and replication of influenza virus". *Annu. Rev. Biochem.* 52: 467-506

The influenza virion (as the infectious particle is called) is roughly spherical. It is an enveloped virus - that is, the outer layer is a lipid membrane which is taken from the host cell in which the virus multiplies. Inserted into the lipid membrane are 'spikes', which are proteins - actually glycoproteins, because they consist of protein linked to sugars - known as HA (hemagglutinin) and NA (neuraminidase).

Influenza can also be transmitted by direct contact with bird droppings or nasal secretions, or through contact with contaminated surfaces. Airborne aerosols have been thought to cause most infections, although which means of transmission is most important is not absolutely clear. Influenza viruses can be inactivated by sunlight, disinfectants and detergents. As the virus can be inactivated by soap, frequent hand washing reduces the risk of infection.

Influenza spreads around the world in seasonal epidemics, resulting in the deaths of between 250,000 and 500,000 people every year, up to millions in some pandemic years.

## Classification

1. Influenza virus A
2. Influenza virus B
3. Influenza virus C

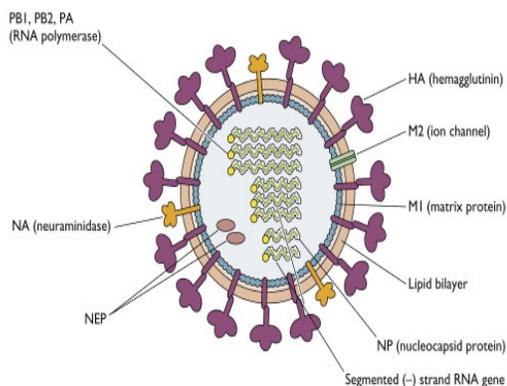


Fig. 2: "The gene structure and replication of influenza virus". *Annu. Rev. Biochem.* 52: 467-506

Beneath the lipid membrane is a viral protein called M1, or matrix protein. This protein, which forms a shell, gives strength and rigidity to the lipid envelope. Within the interior of the virion are the viral RNAs - 8 of them for influenza A viruses.

These are the genetic material of the virus; they code for one or two proteins. Each RNA segment, as they are called, consists of RNA

joined with several proteins shown in the diagram: B1, PB2, PA, NP. These RNA segments are the genes of influenza virus.

**Influenza virus nomenclature (For a Fujian flu virus)**

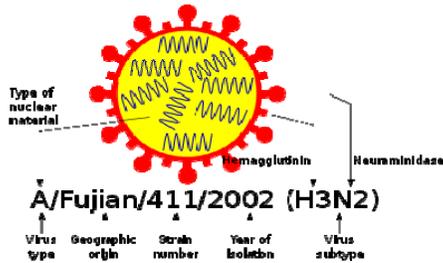
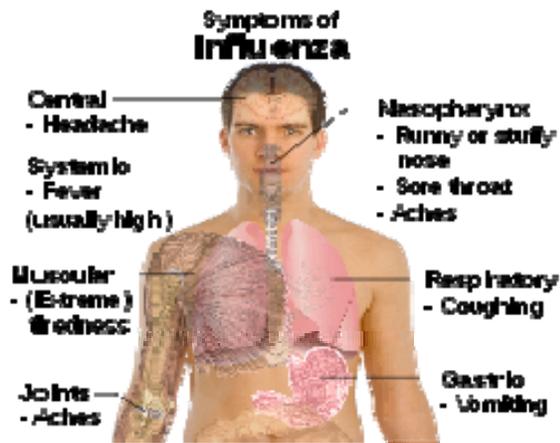


Fig. 3: "The gene structure and replication of influenza virus". *Annu. Rev. Biochem.* 52: 467-506., "Assembly and budding of influenza virus". *Virus Res* 106 (2): 147-65

**Sign and symptoms<sup>1</sup>**

- Fever and extreme coldness (chills shivering, shaking (rigor))
- Cough
- Nasal congestion
- Body aches, especially joints and throat
- Fatigue
- Headache
- Irritated, watering eyes
- Reddened eyes, skin (especially face), mouth, throat and nose



Symptom	sensitivity	specificity
Fever	68-86%	25-73%
Cough	84-98%	7-29%
Nasal congestion	68-91%	19-41%

**Pandemic spread<sup>16, 17</sup>**

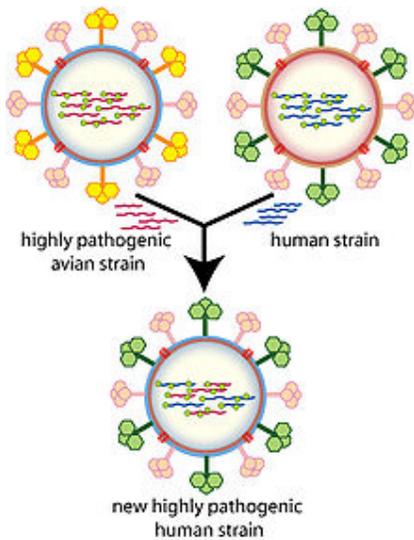


Fig. 4:

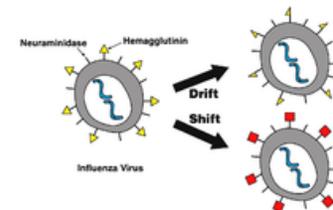


Fig. 5: Antigenic drift creates influenza viruses with slightly modified antigens, while antigenic shift generates viruses with entirely novel antigens.

**Types of flu**

1. Bird flu or Avian flu
2. Swine flu in 2009
3. H1N1, which caused Spanish Flu in 1918
4. H3N2, which caused Hong Kong Flu in 1968
5. H2N2, which caused Asian Flu in 1957

**Bird flu**

Also called: Avian flu, Avian influenza, H5N1

Birds, just like people, get the flu. Bird flu viruses infect birds, including chickens, other poultry and wild birds such as ducks. Most bird flu viruses can only infect other birds. However, bird flu can pose health risks to people. The first case of a bird flu virus infecting a person directly, H5N1, was in Hong Kong in 1997. Since then, the bird flu virus has spread to birds in countries in Asia, Africa and Europe.

Human infection is still very rare, but the virus that causes the infection in birds might change, or mutate, to more easily infect humans. This could lead to a pandemic, or a worldwide outbreak of the illness.

During an outbreak of bird flu, people who have contact with infected birds can become sick. It may also be possible to catch bird flu by eating poultry that is not well cooked or through contact with a person who has it. Bird flu can make people very sick or even cause death. There is currently no vaccine.

### Flu

Also called: Grippe, Influenza Flu is a respiratory infection caused by a number of viruses. The viruses pass through the air and enter your body through your nose or mouth. Between 5% and 20% of people in the U.S. get the flu each year. The flu can be serious or even deadly for elderly people, newborn babies and people with certain chronic illnesses.

Symptoms of the flu come on suddenly and are worse than those of the common cold. They may include

- Body or muscle aches
- Chills
- Cough
- Fever
- Headache
- Sore throat

Is it a cold or the flu? Colds rarely cause a fever or headaches. Flu almost never causes an upset stomach. And "stomach flu" isn't really flu at all, but gastroenteritis.

The main way to keep from getting the flu is to get a yearly flu vaccine. If you get the flu, your health care provider may prescribe medicine to help your body fight the infection and lessen symptoms.

### Swine Flu

Swine flu is an infection caused by a virus. Swine flu is also known as swine influenza, hog flu and pig flu. In 2009 the media labeled as

"swine flu" the flu caused by 2009's new strain of swine-origin A/H1N1 pandemic virus just as it had earlier dubbed as "avian flu" flu caused by the recent Asian-lineage HPAI (High Pathogenic Avian Influenza) H5N1 strain that is still endemic in many wild bird species in several countries.

Swine influenza is an infection by any one of several types of swine influenza virus. Swine influenza virus (SIV) or S-OIV (swine-origin influenza virus) is any strain of the influenza family of viruses that is endemic in pigs. As of 2009, the known SIV strains include influenza C and the subtypes of influenza A known as H1N1, H1N2, H3N1, H3N2, and H2N3. Swine influenza virus is common throughout pig populations worldwide

### History<sup>8, 9, 10, 11</sup>; -

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.<sup>[17]</sup> The first identification of an influenza virus as a cause of disease in pigs occurred about ten years later, in 1930.<sup>[18]</sup> 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.

The H1N1 form of swine flu is one of the descendants of the strain that caused the 1918 flu pandemic. 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.<sup>[20]</sup> However, direct transmission from pigs to humans is rare, with only 12 recorded cases in the U.S. since 2005. 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. 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.

### 20th century flu pandemics

Pandemic	Year	Influenza A virus subtype	People infected (approx)	Deaths (est.)	Case fatality rate
1918 flu pandemic	1918–19	H1N1	0.5 to 1 billion (near 50%)	20 to 100 million	>2.5%
Asian flu	1956–58	H2N2		2 million	<0.1% ?
Hong Kong flu	1968–69	H3N2		1 million	<0.1%
Seasonal flu	Every year	mainly A/H3N2, A/H1N1, and B	5–15% (340 million – 1 billion) <sup>[17]</sup>	250,000–500,000 per year <sup>[18]</sup>	<0.05%

### 1918 pandemic in humans

The 1918 flu pandemic in humans was associated with H1N1 and influenza appearing in pigs; this may reflect a zoonosis either from swine to humans or from humans to swine. Although it is not certain in which direction the virus was transferred, some evidence suggests that, in this case, pigs caught the disease from humans. For instance, swine influenza was only noted as a new disease of pigs in 1918, after the first large outbreaks of influenza amongst people. Although a recent phylogenetic analysis of more recent strains of influenza in humans, birds, and swine suggests that the 1918 outbreak in humans followed a reassortment event within a

mammal,<sup>[24]</sup> the exact origin of the 1918 strain remains elusive. It is estimated that anywhere from 50 to 100 million people were killed worldwide.

### 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.

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. 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.<sup>[28]</sup> The vaccination program was plagued by delays and public relations problems. On October 1, 1976, immunizations began and three senior citizens died soon after receiving their injections. This resulted in a media outcry that linked these deaths to the immunizations, despite the lack of any proof that the vaccine was the cause. 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.

There were reports of Guillain-Barré syndrome, a paralyzing neuromuscular disorder, affecting some people who had received swine flu immunizations. Although if a link exists is still not clear, this syndrome may be a rare side-effect of influenza vaccines. 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, 48,161,019 Americans, or just over 22% of the population, had been immunized by the time the National Influenza Immunization Program (NIIP) was effectively halted on December 16, 1976.

Overall, there were 1098 cases of Guillain-Barré Syndrome (GBS) recorded nationwide by CDC surveillance, 532 of which occurred after vaccination and 543 before vaccination.<sup>[33]</sup> There are about one to two cases of GBS per 100,000 people every year, whether or not people have been vaccinated.<sup>[34]</sup> The vaccination program seems to have increased this normal risk of developing GBS by about to one extra case per 100,000 vaccinations. The CDC states that most studies on modern influenza vaccines have seen no link with GBS, although one review gives an incidence of about one case per million vaccinations.

#### 1988 zoonosis

In September 1988, a swine flu virus killed one woman and infected 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 a county fair in Walworth County, Wisconsin. Barbara died eight days later, after developing pneumonia. The only pathogen identified was an H1N1 strain of swine influenza virus.<sup>[39]</sup> Doctors were able to induce labor and deliver a healthy daughter before she died. Her husband recovered from his symptoms.

Influenza-like illness (ILI) was reportedly widespread among the pigs exhibited at the fair. Of the 25 swine exhibitors aged 9 to 19 at the fair, 19 tested positive for antibodies to SIV, but no serious illnesses were seen. The virus was able to spread between people, since 1-3 health care personnel who had cared for the pregnant woman developed mild influenza-like illnesses, and antibody tests suggested that they had been infected with swine flu. 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. Genetic components of these 1998 triple-hybrid strains would later form six out of the eight viral gene segments in the 2009 flu outbreak.

#### 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.

#### 2009 outbreak in humans

The H1N1 viral strain implicated in the 2009 flu pandemic among humans often is called "swine flu" because initial testing showed many of the genes in the virus were similar to influenza viruses normally occurring in North American swine.<sup>[46]</sup> But further research has shown that the outbreak is due to a new strain of H1N1 not previously reported in pigs.

In late April, Margaret Chan, the World Health Organization's director-general, declared a "public health emergency of international concern" under the rules of the WHO's new International Health Regulations when the first cases of the H1N1 virus were reported in the United States. Following the outbreak, on May 2, 2009, it was reported in pigs at a farm in Alberta, Canada, with a link to the outbreak in Mexico. The pigs are suspected to have caught this new strain of virus from a farm worker who recently returned from Mexico, then showed symptoms of an influenza-like illness. These are probable cases, pending confirmation by laboratory testing.

The new strain was initially described as an apparent reassortment of at least four strains of influenza A virus subtype H1N1, including one strain endemic in humans, one endemic in birds, and two endemic in swine. Subsequent analysis suggested it was a reassortment of just two strains, both found in swine. Although initial reports identified the new strain as swine influenza (i.e., a zoonosis originating in swine), its origin is unknown. Several countries took precautionary measures to reduce the chances for a global pandemic of the disease. The 2009 swine flu has been compared to other similar types of influenza virus in terms of mortality: "in the US it appears that for every 1000 people who get infected, about 40 people need admission to hospital and about one person dies". There are fears that swine flu will become a major global pandemic in the winter months, with many countries planning major vaccination campaigns.

#### Initial outbreaks

##### Mexico

The virus was first reported in two U.S. children in March 2009, but health officials have said that it apparently infected people as early as January 2008 in Mexico. The outbreak was first detected in Mexico City on March 18, 2009, immediately after the outbreak was officially announced, Mexico requested material support from the U.S., and within days of the outbreak Mexico City was "effectively shut down." Some countries canceled flights to Mexico while others halted trade. Calls to close the border to contain the spread were rejected.

Some experts today assume that Mexico already had hundreds of cases before the outbreak was officially recognized, and was therefore in the midst of a "silent epidemic". As a result, Mexico was reporting only the most serious cases, possibly leading to a skewed initial estimate of the case fatality rate."

##### United States

The new strain was first diagnosed in two children, neither of whom had been in contact with pigs, by the CDC, first on April 14, 2009 in San Diego County, California and a few days later in nearby Imperial County, California (it was not identified as a new strain in Mexico until 24 April).

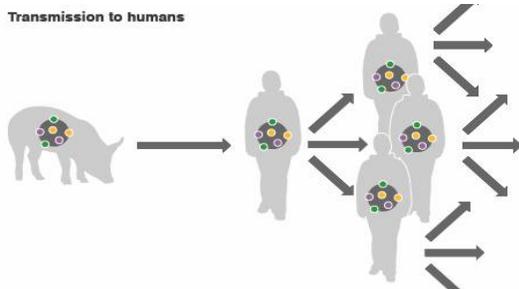
**Transmission:****1. Transmission between pigs**

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

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. The direct transfer of the virus probably occurs either by pigs touching noses, or through dried mucus. Airborne transmission 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.

**2. 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. Vaccination of these workers against influenza and surveillance for new influenza strains among this population may therefore be an important public health measure. 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. 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.

**Sign and Symptoms of Swine flu: -<sup>1</sup>****In children**

Rapid Breathing or Difficulty in breathing.  
Grayish or Bluish Skin Color  
Dehydration  
Persistent or severe vomiting  
Not able to interact properly with people, become irritable  
Flu like symptoms, bad cough and fever

**In adults**

Shortness of breath or difficulty in breathing  
Pain in chest or abdomen  
Sudden dizziness or loss of energy  
Severe or continuous vomiting  
Flu like symptoms, bad cough and fever

**Diagnosis of Swine flu:**

Swine flu is presumptively diagnosed clinically by the patient's history of association with people known to have the disease and

**A-H1N1/09 (Pandemic "Swine Flu") Spread in Humans: -**

Like most viruses, it enters the body through the mucous membranes - the eyes, the nose or the mouth. Swine flu is spread just like the regular seasonal flu spreads. It goes from person to person through close contact and direct touch, indirect touch, or respiratory droplets carrying the virus from person to person or from person to environmental surfaces through coughs and sneezes.

If you touch where a person with swine flu touches, you will most likely pick up the virus and get the swine flu. That is how it spreads indirectly. Stay a minimum of six feet away from someone with a known infection, avoid close contact from crowded places.

You get direct spreading when you have skin to skin contact or direct person to person contact with an infected individual, such as shaking hands, kissing, or caring for a child or other infected person with hands-on care. You could be infected by getting too close to someone who has it. Do not hug people who have the swine flu. Wait for them to recover, then hug them.

Do not share drinking glasses or eating utensils with someone, this can also spread the disease. There is some evidence to suggest that it can be spread through gastrointestinal means, such as saliva, emesis (vomit), and feces (stool). The importance of hand washing before and after eating, using the restroom, or providing personal care to an infected individual must be stressed. Teach your family proper hand washing technique. (See related question for this information). Flu viruses can also be spread by handling money.

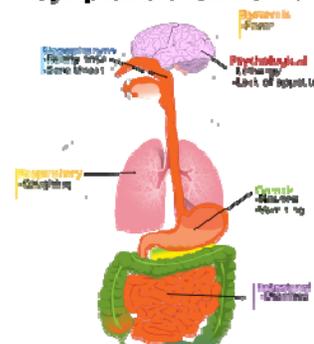
**It spreads:**

Everywhere, It has infected people in every country of the world. This pandemic virus from 2009 (A-H1N1/09) spread faster than any other flu in the past and to every country in the world. It is now (Oct 2010) in the "Post Pandemic Phase" but it continues to be active in small outbreaks in some countries.

**Pandemic flu:**

A flu pandemic occurs when a new influenza virus spreads quickly and few people have immunity. While influenza viruses were only discovered about a century ago, researchers believe flu pandemics hit about two or three times each century. Some pandemics kill a few million people globally. The most severe flu pandemic on record was the 1918 Spanish Flu. Researchers estimate it killed about 50 million people around the world.

According to the Centers for Disease Control and Prevention (CDC), in humans the symptoms of the 2009 "swine flu" H1N1 virus are similar to those of influenza and of influenza-like illness in general. Symptoms include fever (greater than 100°F or 37.8°C) Stuffy nose, cough, sore throat, body aches, headache, chills and fatigue.

**Symptoms of Swine Flu**

their symptoms listed above. Usually, a quick test (for example, nasopharyngeal swab sample) is done to see if the patient is infected with influenza A or B virus.

Most of the tests can distinguish between A and B types. The test can be negative (no flu infection) or positive for type A and B. If the test is positive for type B, the flu is not likely to be swine flu (H1N1). If it is positive for type A, the person could have a conventional flu strain or swine flu (H1N1).

However, the accuracy of these tests has been challenged, and the U.S. Centers for Disease Control and Prevention (CDC) has not completed their comparative studies of these tests. However, a new test developed by the CDC and a commercial company reportedly can detect H1N1 reliably in about one hour; as of October 2009, the test is only available to the military.

#### Difference between Cold and Swine flu: -

Symptom	Cold	Swine Flu
<b>Fever</b>	Fever is rare with a cold.	Fever is usually present with the flu in up to 80% of all swine flu cases. A temperature of 100°F or higher for 3 to 4 days is associated with the swine flu.
<b>Coughing</b>	A hacking, productive (mucus-producing) cough is often present with a cold	A nonproductive (non-mucus producing) cough is usually present with the swine flu
<b>Aches</b>	Slight body aches and pains can be part of a cold.	Sever aches and pains are common.
<b>Stuff Nose</b>	Stuffy nose is commonly present with a cold and typically resolves spontaneously within a week	Stuffy nose is not commonly present.
<b>Chills</b>	Chills are uncommon.	60% of people who have the flu experience chills
<b>Tiredness</b>	Tiredness is fairly mild.	Tiredness is moderate to severe.
<b>Sneezing</b>	Sneezing is commonly present.	Sneezing is not very common.
<b>Sudden Symptoms</b>	Cold symptoms tend to develop over a few days.	The swine flu has a rapid onset within 3 to 6 hours. The swine flu hits hard and includes sudden symptoms like high fever, aches and pains.
<b>Headache</b>	A headache is fairly uncommon	A headache is very common, present in 80% of cases
<b>Sore Throat</b>	Sore throat is commonly present	Sore throat is not commonly present, but appears sometimes
<b>Chest Discomfort</b>	Chest discomfort is mild to moderate	Chest discomfort is often severe

#### Infectious period

The infectious period for a confirmed case of swine influenza A (H1N1) virus infection is defined as 1 day prior to the case's illness onset to 7 days after onset.

A Probable case of swine influenza A (H1N1) virus infection is defined as a person with an acute Febrile respiratory illness who is:

- Positive for influenza A, but negative for H1 and H3 by influenza RT-PCR, or
- Positive for influenza A by an influenza rapid test or an influenza immunofluorescence Assay (IFA) plus meets criteria for a suspected case A *suspected case* of swine influenza A (H1N1) virus infection is defined as a person with acute Febrile respiratory illness with onset
- Within 7 days of close contact with a person who is a confirmed case of swine Influenza A (H1N1) virus infection, or
- Within 7 days of travel to community either within the United States or internationally

Where there are one or more confirmed swine influenza A (H1N1) cases, or resides in a community where there are one or more confirmed swine influenza cases.

#### Close contact:

It is defined as: within about 6 feet of an ill person who is a confirmed or suspected case of swine influenza A (H1N1) virus infection during the infectious period.

#### Treatment of Swine Flu

Oseltamivir is the recommended anti viral drug for the treatment or prevention of infection with the influenza A H1N1. The Mayo Clinic and Medline list a number of ways to help ease symptoms, including adequate liquid intake and rest, soup to ease congestion, and over-the-counter drugs to relieve pain. Aspirin, for instance, "is very effective for treating fever in adults" although in children and adolescents, aspirin is not usually given due to the risk of Reye's syndrome while over-the-counter drugs relieve symptoms, they do not kill the virus. Most patients were expected to recover without

**Confirmed case** of swine influenza A (H1N1) virus infection is defined as a person with an

Acute febrile respiratory illness with laboratory confirmed swine influenza A (H1N1) virus

Infection by one or more of the following tests:

1. Real-time RT-PCR (real time- polymerase chain reaction)
2. Viral culture

medical attention, although those with pre-existing or underlying medical conditions were more prone to complications. According to the CDC, antiviral drugs can be given to treat those who become severely ill, two of which are recommended for swine flu symptoms: oseltamivir (Tamiflu) and zanamivir (Relenza). To be most useful, they must be taken within 2 days of showing symptoms. They work by deactivating an enzyme the virus needs to grow and spread. Therefore, when taken soon after symptoms are noticed, "they may shorten the illness by a day or so," according to the Mayo Clinic. Oseltamivir is an oral medication, but zanamivir is inhaled through a device similar to an asthma inhaler and shouldn't be used by anyone with respiratory conditions, such as asthma and lung disease.

#### Vaccines

Vaccines have been developed to protect against the virus that causes swine flu. There are two different brands of vaccine – Pandemrix and Celvapan. Many people given the Pandemrix vaccine will only need one dose. People who have the Celvapan vaccine will need two doses three weeks apart.

Is it the same as the seasonal flu vaccination No. The swine flu vaccine is different from the seasonal flu vaccination that's offered every year. The seasonal flu vaccine does not protect against swine flu. If you are usually advised to have the seasonal flu vaccination, you should have it. You may be offered the swine flu vaccine as well.

The seasonal flu vaccine does not protect against swine flu.

#### Who will get the vaccination first

The vaccine is being offered first to people who are most likely to become seriously ill if they catch swine flu. These people are in the following priority groups:

1. **Adults and children over six months of age who have a long-term health condition, including:**
  - Chronic lung disease
  - Chronic heart disease
  - Chronic kidney disease
  - Chronic liver disease
  - Chronic neurological diseases
  - Diabetes mellitus

- Immuno-suppression caused by a disease or treatment for a disease.

For example, this may include people who do not have a spleen, and people who are on immunosuppressant treatment or are taking high doses of systemic steroids.

## 2. Pregnant women at any stage of pregnancy

Being pregnant can put you more at risk of being seriously ill if you catch swine flu. So far, evidence suggests that pregnant women are four times more likely to develop serious complications from swine flu and up to five times more likely to need to go to hospital. The risks of flu are highest at the later stages of pregnancy.

## 3. People who live in the same house as someone whose immune system is compromised by disease or treatment

If you live with someone who is having treatment for cancer, for example, and you catch swine flu, they might catch it from you and become very ill. If you have a severely compromised immune system, ask the people you live with to think about getting vaccinated to help protect you against catching swine flu. If you are unsure about whether you should be vaccinated, speak to your GP or practice nurse.

### People with egg allergies: -

The Pandemrix vaccine is prepared in hens' eggs in the same way that seasonal flu vaccines are. It should not be given to people who have had a confirmed anaphylactic reaction (experiencing shock or difficulty breathing) after being exposed to egg products. The Celvapan vaccine is not prepared using eggs, so you should have this vaccine if you have a severe allergy to eggs.

### Side effects: -

All vaccinations can produce side-effects such as redness, soreness and swelling at the site of the injection

### Emergency warning signs for

#### A. Adult-

- Difficulty breathing or shortness of breath
- Pain or pressure in the chest or abdomen
- Sudden dizziness
- Confusion
- Severe or persistent vomiting
- Flu-like symptoms improve but then return with fever and worse cough

#### B. Children: -

- Fast breathing or trouble breathing
- Bluish skin color
- Not drinking enough fluids
- Not waking up or not interacting
- Being so irritable that the child does not want to be held
- Flu-like symptoms improve but then return with fever and worse cough
- Fever with a rash

### Swine flu virus the same as Human H1N1viruses

No. The genetic composition of H1N1 swine flu viruses is different from human H1N1 viruses and, therefore, vaccines for human seasonal flu would not provide protection from H1N1 swine flu viruses.

### Minimizes the spread of germs <sup>24</sup>

In CDC recommends:

- Cover your nose and mouth with a tissue when you cough or sneeze.
- Throw the tissue in the trash after you use it.

- Wash your hands often with soap and water, especially after you cough or sneeze.
- Alcohol-based hand cleaners are also effective.
- Try to avoid close contact with sick people.
- Avoid touching your eyes, nose or mouth. That is how germs spread.

### Highest risk from H1N1 Swine flu to: -

- Pregnant women are six times more likely to have severe flu disease than women who are not pregnant.
- Young children, especially those under 2 years of age
- People with asthma.
- People with chronic lung conditions
- People with cardiovascular conditions (except high blood pressure)
- People with liver problems
- People with kidney problems
- People with blood disorders, including sickle cell disease
- People with neurologic disorders
- People with neuromuscular disorders
- People with metabolic disorders, including diabetes
- People with immune suppression, including HIV infection and medications that suppress the immune system, such as cancer chemotherapy or anti-rejection drugs for transplants
- Elderly people are at high risk of severe flu disease -- if they get it. Relatively few swine flu cases have been seen in people over age 65.

### Alternate Treatment<sup>28</sup>

#### A. Homeopathy

Homeopathy can both prevent and cure swine flu, sans any side effects, say doctors who practise this alternative medicine system in India where 'Homeopathy can prevent, cure swine flu' over 700 people have been diagnosed with the disease. "Based on the symptoms, homeopathy can offer an effective cure to swine flu. Moreover, it does not have any side effects," says Harcharanjeet Kaur, a homeopath at Baksons homeopathy clinic. "Gelsemium and Bryonia were the two homeopathic remedies that proved to be effective against the H1N1 strain back then. These could be of great use even today," Batra said.

#### B. Ayurveda-

The Panchgavya Medical Research Centre, Jodhpur, which deals with Ayurved have formulated an alternative remedy Swine flu. It claims to be more effective and safe than the conventional allopathic treatment. It focus on Panchgavya - the traditional Indian therapeutic practice which uses the five products of cow - its milk, curd, ghee, urine and dung. "The preparation we have developed at our centre will not only treat swine flu but will also act as a preventive medicine", claims head of centre, Rajkumar Singh Bhandari. Vaidya NK Tripathi informed that the preparation has been named as "Flu-go."

#### C. Nature cases-

##### More Herbs for Flu

Wonder herb Tulsi (Holy Basil) can not only keep the dreaded swine flu at bay but also help in fast recovery of an afflicted person, Ayurvedic practitioners claim. Dr Bhupesh Patel, a lecturer at Gujarat Ayurved University, Jamnagar says "Tulsi can control swine flu and it should be taken in fresh form. Juice or paste of at least 20-25 medium sized leaves should be consumed twice a day on an empty stomach." This increases the resistance of the body and, thereby, reduces the chances of inviting swine flu," believes Patel.

The yoga guru Baba Ramdev asked people to go the ayurvedic way to combat swine flu and said consumption of the extract of 'giloi' plant (tinospora) along with 'tulsi' leaves can help strengthen the respiratory and immune system to keep the disease away.

Amid growing panic in the wake of rising death toll from swine flu, yoga guru Baba Ramdev on Tuesday said that yoga had the power to

cure Influenza A(H1N1). While addressing a press conference Baba Ramdev said, "There is no need to panic." He further assured the masses that the way he had successfully treated many patients suffering from diseases like chicken pox and dengue with the help of Indian medicinal plants, swine flu also can be treated with the help of these.

He also urged everyone to opt for a healthy lifestyle with lots of exercise. As the killer swine flu virus hits the immune system of a person hard, healthy people will have a better chance to fight with flu, he added. Further, while explaining the role of 'yoga' in battling the A(H1N1) virus, he said, "If we keep our respiratory organs healthy, then not only we can fight the swine flu but also can stay fit to fight any other disease."

#### Safe to eat Pig meat

Yes. There is no evidence that swine flu can be transmitted through eating meat from infected animals. However, it is essential to cook meat properly. A temperature of 70C (158F) would be sure to kill the virus.

#### Safety Precautions:

- Avoid live animal markets, poultry and pig farms in affected countries
- Always maintain high levels of personal hygiene, especially before and after Food reparation and in-out of toilets.
- Regular wash your hands
- Cook pork thoroughly
- Do not consume half-done pork
- While in an affected region, seek immediate medical attention if you develop influenza-like symptoms. (High Fever, body pain, coughing and red nose)

#### Food safety issues: -

- Cook food thoroughly
- Follow good hygienic practices
- No "pink" parts for meat
- Buy food from safe and established supermarkets
- Check the expiry date (if any)
- Choose a clean and known restaurant for dining

#### Travel Adviosory<sup>24, 28</sup>: -

##### Before any travel to affected area

Educate yourself and others traveling with you.

Take specific vaccinations as recommended by CDC of both US and Thailand.

Assemble travel health kit.

Check your health insurance plan.

##### During travel to an affected area

Avoid all direct contact with pigs and visiting the farms.

Practice careful and frequent hand washing.

Consume thoroughly cooked food.

Seek immediate medical attention if symptoms occur.

##### After your return

Monitor your health for 10 days

If you become ill with high fever consult a doctor immediately.

#### 5 Simple steps a customer should take to while traveling <sup>24, 25,28</sup>: -

1. Check on health care resources in the area you'll be visiting before you depart.
2. While you're in an area with reported swine flu cases, wash your hands often with soap and water, or if soap isn't available, use an alcohol-based hand gel.

3. Avoid touching your eyes, nose, or mouth.
4. If you get sick while traveling, cover your mouth and nose with a tissue when you sneeze or cough, and throw the tissue in the trash afterward.
5. Seek medical care if you are ill with a fever and other symptoms of swine flu, especially if you think you may have had contact with someone with swine flu or severe respiratory illness in the seven days before you got sick.

#### Do's And Don'ts while traveling: -

- Try to avoid close contact with sick people.
- If you're sick, don't travel, except to get local medical care. Try to limit contact with other people, so your germs don't spread.

#### Prevention of Swine flu Infections <sup>20, 24</sup>

The CDC recommends taking these steps:

- Wash your hands regularly with soap and water, especially after coughing or sneezing. Scrub for at least 20 seconds and rinse thoroughly.
- If soap and water are not available, wash your hands with an alcohol-based hand gel. Rub your hands together until the alcohol dries completely.
- Avoid close contact -- that is, being within 6 feet -- with people who have flu-like symptoms.
- Avoid touching your mouth, nose, or eyes. That's not easy to do, so keep those hands clean.
- If you have flu-like symptoms -- fever plus at least cough or sore throat -- other flu symptoms -- stay home for seven days after symptoms begin or until you've been symptom-free for 24 hours -- whichever is longer.
- Wear a face mask (consider using an N95 respirator) if you must come into close contact with a sick person. "Close contact" means within 6 feet. Note: There is no definitive proof that a face mask prevents flu transmission. Do not rely solely on a face mask to prevent infection.
- Wear an N95 respirator if helping a sick person with a nebulizer, inhaler, or other respiratory treatment. Note: There is no definitive proof that a respirator prevents flu transmission. Do not rely solely on a respirator to prevent infection.
- People who have or are suspected of having swine flu should wear a face mask, if available and tolerable, when sharing common spaces with other household members, when outside the home, or when near children or infants.
- Breastfeeding mothers with swine flu symptoms should express their breast milk, and the child should be fed by someone else.

#### Types of Face Mask and Respirators<sup>4, 5, 24</sup>

- Unless otherwise specified, the term "facemasks" refers to disposable masks cleared by the U.S. Food and Drug Administration (FDA) for use as medical devices. This includes facemasks labeled as surgical, dental, medical procedure, isolation, or laser masks. Such facemasks have several designs. One type is affixed to the head with two ties, conforms to the face with the aid of a flexible adjustment for the nose bridge, and may be flat/pleated or duck-billed in shape. Another type of facemask is pre-molded, adheres to the head with a single elastic band, and has a flexible adjustment for the nose bridge. A third type is flat/pleated and affixes to the head with ear loops. Facemasks cleared by the FDA for use as medical devices have been determined to have specific levels of protection from penetration of blood and body fluids.

- Unless otherwise specified, "respirator" refers to an N95 or higher filtering facepiece respirator certified by the U.S. National Institute for Occupational Safety and Health (NIOSH).
- Three feet has often been used by infection control professionals to define close contact and is based on studies of respiratory infections; however, for practical purposes, this distance may range up to 6 feet. The World Health Organization uses "approximately 1 meter"; the U.S. Occupational Safety and Health Administration uses "within 6 feet." For consistency with these estimates, this document defines close contact as a distance of up to 6 feet.

#### Personnel protections Equipments<sup>24,25,28</sup>

**PPE reduces the risk of infection if used correctly. It includes:**

- Gloves (nonsterile),
- Mask (high-efficiency mask) / Three layered surgical mask,
- Long-sleeved cuffed gown,
- Protective eyewear (goggles/visors/face shields),
- Cap (may be used in high risk situations where there may be increased aerosols),
- Plastic apron if splashing of blood, body fluids, excretions and secretions is anticipated.



**Goggles**



**N-95 mask**



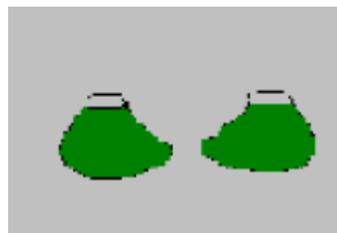
**Gown(Must for lab work)**



**Triple layer mask**



**Gloves**



**Shoes cover**

*Correct procedure for applying PPE in the following order:*

1. Follow thorough hand wash
2. Wear the coverall.
3. Wear the goggles/ shoe cover/and head cover in that order.
4. Wear face mask
5. Wear gloves

**The masks should be changed after every six to eight hours.**

*Remove PPE in the following order:*

- Remove gown (place in rubbish bin).
- Remove gloves (peel from hand and discard into rubbish bin).
- Use alcohol-based hand-rub or wash hands with soap and water.

**Fig. 6:**

- Remove cap and face shield (place cap in bin and if reusable place face shield in container for decontamination).
- Remove mask - by grasping elastic behind ears – do not touch front of mask
- Use alcohol-based hand-rub or wash hands with soap and water.
- Leave the room.
- Once outside room use alcohol hand-rub again or wash hands with soap and water.

#### Similarities between the Swine flu and Earlier pandemic virus

Flu viruses are classified by two proteins on their surface, called H for hemagglutinin and N for neuraminidase. The swine flu found in Mexico and the 1918 Spanish Flu viruses are of the H1N1 subtype. Both viruses appear to have originated in animals. Researchers believe the Spanish Flu spread to people from birds. The two viruses

are not identical, and there are still many genetic differences between them that researchers are studying.

#### Drugs that treat Swine flu: -

Roche Holding AG's Tamiflu and GlaxoSmithKline Plc's Relenza both react against swine flu.

#### General Health Tips<sup>24, 25, 28</sup>: -

##### ✓ **Avoid close contact**

With sick people. Keep safe distance

##### ✓ **Stay home when you are sick**

If possible, stay home from work, school, and errands

##### ✓ **Cover your mouth and nose**

Cover mouth and nose with tissue when coughing or sneezing

##### ✓ **Clean your hands**

Frequent hand washing will protect you from germs

##### ✓ **Avoid touching your eyes, nose or mouth**

Germs often spread when a person touches something that is contaminated and then touches his or her eyes, nose or mouth

#### Home remedies for Swine flu: -

There are no home remedies for swine flu, especially when you have to figure out if it is swine flu or season flu. Swine Flu requires anti-viral drugs because treating it is an emergency issue. However you can prevent the spread of swine flu and strengthen your immune system by doing the following:

1. Wash your hands properly before having a meal, not just with soap and water.
2. Wear face mask before going outside. If someone is coughing or sneezing near you, cover your nose and mouth with palms or a hanky. Swine flu gets into the body through the mouth and nose.
3. Drink lemon balm tea because it has anti-viral properties.
4. Chew fresh garlic cloves because they have antiviral properties as well.
5. Steam inhalation with chamomile or eucalyptus thrice a day can relieve lung congestion and prevent swine flu symptoms

#### Do's and Don't: <sup>-24</sup>

- Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in the trash after you use it.

- Wash your hands often with soap and water, especially after you cough or sneeze. Alcohol-based hand cleaners are also effective.
- Wash your hands at regular intervals with disinfectants.
- Keep surfaces like doorknobs, tables, etc. clean with disinfectants.
- Don't touch your mouth, nose, eyes after touching strangers and unknown surfaces.
- Don't touch yourself or others after sneezing or coughing. First, wash your hands.
- Avoid public contact or use mask when in crowded areas. The swine flu attacks the respiratory tract.
- Avoid travelling, if you have any of the mentioned symptoms.
- Avoid close contact with people having respiratory illnesses.
- If you have no tissue or handkerchief, do not clean nose with hands. Instead, use the cuff of your shirt or clothes.
- Get plenty of sleep, be physically active, manage your stress, drink plenty of fluids, and eat nutritious food.
- If you develop influenza-like-illness (ILI) (fever with either cough or sore throat), self-isolate yourself at home for 7 days after the onset of the illness or at least for 24 hours after symptoms have resolved, whichever is longer.
- Persons who experience ILI and wish to seek medical care should contact their health care providers to report illness (by telephone or other

#### Current status in INDIA<sup>26</sup>

##### 1. Deaths-

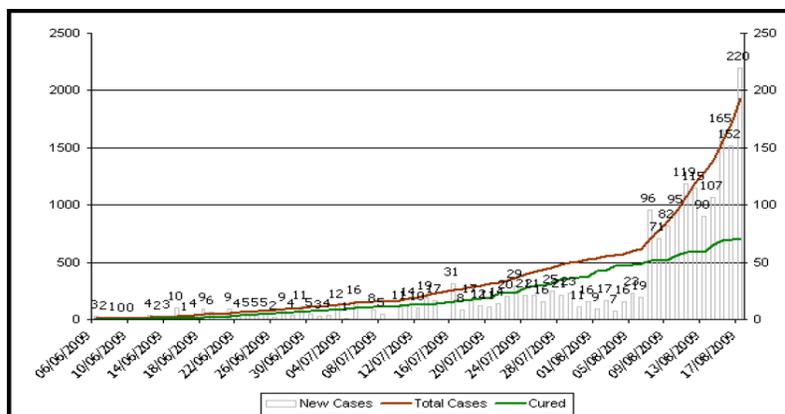
The first death was a 14-year-old girl. On 8th and 9th of August a 43-year-old man in Ahmedabad, Gujarat, a 42-year-old teacher in Pune and a 53-year-old woman in Mumbai died. On August 10 a 53-year-old doctor in Pune and a 4-year-old in Chennai died.<sup>[7]</sup> On August 11th a 7-year-old girl in vadodara, Gujarat. On August 13, a 26-year-old woman became Bangalore's first victim of swine flu. An eleven-month-old boy, a 75-year-old woman and a 37 year old woman died taking the toll in Pune, severely hit by the virus, to 15 and across the country to 24. A lady having a young daughter of 5 yrs died near Mumbai in Khopoli on August 14. On August 16, three people died at different hospitals in Bangalore, according to the reports.

As on 17th August, 2009, the total number of infections in India is 1927 with 220 being affected on a single day. 29 people have succumbed to the disease.

#### 2009 flu pandemic data

Confirmed deaths (increase in last 7 days) source: ECDC - September 15, 2009	3,696	(+205)
EU and EFTA	137	(+16)
Other European Countries & Central Asia	0	(+0)
Mediterranean & Middle East	93	(+12)
Africa	58	(+17)
North America	882	(+10)
Central America & Caribbean	117	(+9)
South America	1,698	(+48)
North-East & South Asia	238	(+68)
South-East Asia	280	(+16)
Australia & Pacific	193	(+9)

Deaths in India	684
Confirmed cases in India	21,731
Cured cases in India	15,967
Deaths worldwide	9,596

Total Infections as on 17<sup>th</sup> August: Top 10 cities

Pune	574
Mumbai	324
Delhi	316
Bangalore	131
Hyderabad	87
Chennai	82
Gurgaon	39
Ahmedabad	34
Kolkata	25
Calicut	23

## Free Helplines: -

All India toll free helpline: 1075 or 1800-11-4377

- **Delhi:** Ram Manohar Lohia Hospital: 011-24525211, 23404328, 23365525
- **Delhi:** Deen Dayal Hospital: 011-2512 5259
- **Kolkata:** Infectious Diseases Hospital: 09433392182 / 09434009077
- **Chennai:** Communicable Diseases Hospital - 044-25912686.
- **Coimbatore:** Coimbatore Medical College Hospital - 09442012555
- **Hyderabad:** AP Chest Diseases Hospital: 040-23814939
- **Mumbai:** Kasturba Hospital: 022-23083901, 23083902, 23083903, 23083904
- **Pune:** Dr Naidu Infectious Disease Hospital - 09923130909
- **Bangalore:** Rajiv Gandhi Institute of Chest Diseases - 91-80-26632634

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