

# The Rise of an old Killer in India?

Ankit Mitra

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India is seeing a surge in viral infections due to H3N2, Covid-19 and swine flu. While most of the cases are due to H3N2, data shows that swine flu and covid cases are also rising in the country. As per the government, Influenza A H1N1 (7%), also known as swine flu, is the third most commonly detected influenza virus of all the influenza viruses found in samples taken from persons suffering from severe acute respiratory infections (SARI) or influenza like illness (ILI). According to Integrated Disease Surveillance Programme (IDSP), 955 cases of H1N1 have been reported by states till February 28. The Union Health Ministry said that majority of the H1N1 cases, also referred to as swine flu, are reported from Tamil Nadu (545), Maharashtra (170), Gujarat (170), Kerala (42) and Punjab (28).

So, what is swine flu? Swine influenza also known as pig influenza, swine flu, hog flu or pig flu is an infection caused by any of several types of swine influenza viruses. Swine influenza virus (SIV) or swine-origin influenza virus (S-OIV) refers to any strain of the influenza family of viruses that is endemic in pigs. The swine influenza virus is common throughout pig populations worldwide. Transmission of the virus from pigs to humans is rare, and does not always lead to human illness, often resulting only in the production of antibodies in the blood. If transmission causes human illness, it is called zoonotic swine flu. People with regular exposure to pigs are at increased risk of swine flu infections. Around the mid-20th century, identification of influenza sub-types was made possible, allowing accurate diagnosis of transmission to humans. Since then, only 50 such transmissions have been confirmed. These strains of swine flu rarely pass from human to human. Symptoms of zoonotic swine flu in humans are similar to those of influenza and of influenza-like illness and include chills, fever, sore throat, muscle pains, severe headache, coughing, weakness, shortness of breath, and general discomfort. What are the viruses that causes swine flu? As of 2009, identified SIV strains include influenza C and the subtypes of influenza A known as H1N1, H1N2, H2N1, H3N1, H3N2, and H2N3.

What's the cause of these recent cases? These recent cases are caused by the H1N1. So, what this H1N1 precisely is? In virology, H1N1 (A/H1N1) is a subtype of influenza A virus. It is an orthomyxovirus that contains the glycoproteins hemagglutinin and neuraminidase. For this reason, this is described as H1N1, H1N2 etc., depending on the type of H or N antigens they express with metabolic synergy. Hemagglutinin causes red blood cells to clump together and binds the virus to the infected cell. Neuraminidase is a type of glycoside hydrolase enzyme which helps to move the virus particles through the infected cell and assist in budding from the host cells. Some strains of H1N1 are endemic in humans and cause a small fraction of all influenza-like illness and a small fraction of all seasonal influenza, for instance in 2004–2005. Other strains of H1N1 are endemic in pigs (swine influenza) and in birds (avian influenza). Its size is 80 to 120 nm ( $3.1 \times 10^{-6}$  to  $4.7 \times 10^{-6}$  in) in diameter. What's its source? Aquatic birds are the primary source of Influenza A virus (IAV), which is also widespread in various mammals, including humans and pigs. IAV circulate in humans and cause seasonal epidemics.

Why I'm calling it an old killer? As per my research there are many outbreaks of this virus but the 3 major outbreaks of H1N1 strains in humans include:

- The 1918 Spanish flu pandemic—Suspected cases are 500 million (estimated) and deaths are 25–50 million (generally accepted), other estimates range from 17 to 100 million.
- The 1977 Russian flu pandemic - Mostly affected a population younger than 25 or 26 years of age, and resulted in approximately 700,000 deaths worldwide.
- The 2009 swine flu pandemic—Suspected cases are 700 million to 1.4 billion (estimate) or 11 to 21 percent of the global population of 6.8 billion at the time and lab confirmed deaths are 18,449 (reported to the World Health Organisation) while estimated excess deaths are 284,000. However, in a 2012 study, the Centers for Disease Control and Prevention (CDC) estimated more than 284,000 possible fatalities worldwide, with numbers ranging from 150,000 to 575,000.

India was also hit by such outbreaks. As per my research, with more than 300 infections and over 20 deaths, India's health ministry declared an outbreak "well under control" with "no reason to panic" in April 2012. Not only in 2012, but during the early 2015 there is an outbreak in India. The states of Gujarat and Rajasthan were the worst affected. According to the Indian Health Ministry, 31,974 cases of swine flu had been reported and 1,895 people had died from an outbreak by mid-March. India had reported 937 cases and 218 deaths from swine flu in the year 2014. By mid-February 2015, the reported cases and deaths in 2015 had surpassed the previous numbers. The total number of laboratory confirmed cases crossed 33,000 mark with death of more than 2,000 people. The precise number of infected ones are 33,761 infected (as of 30 March 2015) and deaths are 2,035 dead (as of 30 March 2015). Do we have medications? As per my research, annual vaccination is the primary and most effective way to prevent influenza and influenza-associated complications, especially for high-risk groups.

Vaccines against the flu are trivalent or quadrivalent, providing protection against an H1N1 strain, an H3N2 strain, and one or two IBV strains corresponding to the two IBV lineages. Two types of vaccines are in use: inactivated vaccines that contain "killed" (i.e. inactivated) viruses and live attenuated influenza vaccines (LAIVs) that contain weakened viruses. There are three types of inactivated vaccines: whole virus, split virus, in which the virus is disrupted by a detergent, and subunit, which only contains the viral antigens HA and NA. Most flu vaccines are inactivated and administered via intramuscular injection. LAIVs are sprayed into the nasal cavity. Influenza can be prevented or reduced in severity by post-exposure prophylaxis with the antiviral drugs oseltamivir, which can be taken orally by those at least three months old, and zanamivir, which can be inhaled by those above seven years of age. But as we all know PREVENTION IS BETTER THAN CURE infection control should be our first priority. Social distancing measures as well as hand hygiene is important in reducing the spread of influenza. This includes frequent hand washing with soap and water, using alcohol-based hand sanitizers, and not touching one's eyes, nose, and mouth with one's hands. Covering one's nose and mouth when coughing or sneezing is important. Other methods to limit influenza transmission include staying home when sick, avoiding contact with others until one day after symptoms end, and disinfecting surfaces likely to be contaminated by the virus, such as doorknobs, personally I think it can be prevented if we follow these rules and regulations.