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# CURRENT TREND IN SWINE-INFLUENZA A (H1N1) VIRUS INFECTION IN HUMANS IN CENTRAL INDIA

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**ABSTRACT**

WHO declares on June 11, 2009, that H1N1 (Swine-influenza A) is pandemic. There have been nearly 29220 H1N1 cases across INDIA till March 13, 2015. The reports have shown sharp increase in the number of infections reported in recent days from Delhi, Gujrat, Maharashtra, Madhya-Pradesh, Rajasthan, and Telangana. This article enlightens the brief review about the swine influenza virus, its modes of spread, and prevention measures. The aim of this article is to bring awareness in general and know the consequences of the infection.

## INTRODUCTION

Influenza is a seasonal respiratory illness caused by flu viruses. The viruses can cause mild to severe illness sometimes resulting in death. It is important to note that the flu is different from a common cold or seasonal allergies. Generally, the onset of the flu is sudden and symptoms include fever (usually high), headache, chills, sore throat, runny or stuffy nose, dry cough, severe exhaustion, muscle aches and stomach symptoms, such as nausea, vomiting and diarrhea. The flu differs from the common cold in that it lasts longer (about two weeks) and can be temporarily debilitating even in healthy individuals. Swine influenza is a highly contagious acute respiratory disease of pigs [1] caused by one of the several strains of swine influenza A. The virus is spread among pigs by aerosols, through direct and indirect contact, and also by asymptomatic carrier pigs. There are three types of Influenza viruses – A, B, and C. Influenza A is further categorized into subtypes based on the type of two surface proteins – hemagglutinin (H) and neuraminidase (N).

## VIROLOGY

On April 15 and April 17, 2009, the Centers for Disease Control and Prevention identified two cases of human infection with a swine-origin influenza A (H1N1) virus. The World Organization for Animal Health reports that Swine Influenza strain has not been isolated in pigs. This strain can be transmitted from human to human and causes the normal symptoms of influenza. Basically these viruses causing pig's flue are classified as influenza A, B, and C. Transmission mainly occurs between pigs and pigs and humans. The viruses are 80–120 nm in diameter. 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 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 [2,3].

## PATHOGENESIS

Transmission Influenza is spread from person-to-person by contact with respiratory secretions from an infected person. When an infected person coughs or sneezes, the viruses are carried in large droplets which settle on the surfaces of the upper respiratory tracts of persons who are nearby (i.e. within three feet of the infected person). The viruses can also spread by direct or indirect contact with respiratory secretions – touching

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contaminated surfaces and then touching the eyes, nose or mouth [4,5,6].

Infected children can spread the virus for 10 days or longer. Due to the highly contagious nature of influenza virus, first responders who may be exposed to or are taking care of persons suspected of influenza should wear appropriate protection. The swine influenza A (H1N1) virus is likely to be transmitted in the same manner as the seasonal flu spreads. The main transmission of flu viruses from person to person is through coughing or sneezing. Transmission can also occur by touching something with flu viruses on it and then touching the mouth or nose. Persons with swine flu should be considered potentially contagious as long as they are symptomatic and possibly for up to seven days following illness onset. Children, especially younger children, can potentially be contagious for a longer period. People infected with the swine flu may be able to infect others on day one before symptoms develop and up to seven or more days after becoming sick. Viruses and bacteria can live up to two hours or longer on surfaces such as cafeteria tables, doorknobs and desks. Washing hands frequently will help reduce the chance of getting contamination from common surfaces. One concern with this recent strain of swine influenza A (H1N1) virus is that there is a real threat to persons with seemingly healthy immune systems [7,8]. The danger is that healthy people have no defenses built up to this influenza virus and causing a healthy immune system to overreact and attack the body's healthy organs and systems – this makes a healthy 15-60 year old individual more likely to succumb to this new virus. The severe illness and deaths associated with seasonal influenza epidemics are in large part the result of secondary complications, including primary viral pneumonia, secondary bacterial pneumonia (particularly with group A *Streptococcus*, *Staphylococcus aureus*, and *Strep. pneumoniae*) [9,10] and exacerbations of underlying chronic conditions [25]. These same complications may occur with swine influenza infection. Patients who are at highest risk for severe complications of swine influenza infection are children under the age of 5 years, adults 65 years of age or older, children and adults of any age with underlying chronic medical conditions, and pregnant women [11-13].

## LABORATORY DIAGNOSIS

Tests for Influenza (Diagnosis) The most common method for diagnosing influenza is the Rapid Flu Test. Depending on the type of test used, it can identify influenza A and B. Proper sample collection is critical for testing. Because the tests rely on detecting the virus shed in the respiratory secretions of the infected person, the test must be done during the first few days of illness when there is viral shedding. The best sample is a nasal aspirate, but nasopharyngeal swabs are most frequently used. With the patient's head tilted back, a Dacron swab (like a very long Q-tip) is inserted into a nostril until there's resistance (1-2 inches) and then rotated several times. The major advantages of the Rapid Flu Test are that it can be done in an outpatient setting and the results return within 30 minutes to two hours. The major disadvantages are that true influenza cases will be missed up to 30 percent of the time (false negative result) and some without influenza will be misdiagnosed as having influenza (false positive result). The gold standard for diagnosing influenza is a viral culture. The virus from the nasal secretion is grown and identified in the laboratory. The advantage of a viral culture is that the specific viral strain and type can be identified. Such detailed information is critical in detecting influenza outbreaks (including surveillance for the pandemic strain) and for developing vaccines. The major disadvantages are that the results take about three to ten days and not all labs are equipped to perform a viral culture. In response to the current outbreak of swine influenza, the U.S. Food and Drug Administration (FDA) has issued Emergency Use Authorizations (EUAs) at the request of the CDC. The FDA will make available to public health and medical personnel important diagnostic and therapeutic tools to identify and respond to the swine flu virus under certain circumstances. The EUAs are for the use with certain Relenza and Tamiflu antiviral products and for the rRT-PCR Swine Flu Panel diagnostic test. In authorizing an EUA for the rRT-PCR Swine Flu Panel diagnostic test, the FDA has determined that it may be effective in testing samples from individuals diagnosed with influenza A infections and whose virus subtypes cannot be identified by test that are currently available. This EUA will allow the CDC to distribute the swine flu test to public health and other qualified laboratories that have personnel and equipment trained to perform and interpret the results [12-14].

## PREVENTION

An effective vaccine could potentially thwart an epidemic before it becomes a pandemic. However, once the potential pandemic strain is identified, it takes several months for the vaccine to be developed and mass produced for wide distribution. For the current outbreak and imminent pandemic, fire fighters must continue to practice preventive measures, such as respiratory hygiene, cough etiquette and annual flu vaccination. As with all biological hazards, universal precautions should be practiced. Influenza epidemics result in about 35,000 deaths each year in the United States. Contributing to the high death rate is the inadequate level of vaccination among health care workers who unknowingly transmit the virus to persons susceptible for a serious illness from influenza. Data from several studies indicate that vaccination of health care workers significantly reduces the influenza death rate among the patients for whom they provide care. Currently there is no vaccine available for this strain of the swine flu. However, there are actions people can take every day to help prevent the spread of

germs that cause respiratory illnesses such as influenza. These steps can protect your health:

2. Wash your hands often with soap and water, especially after a cough or sneeze. Alcohol-based hand sanitizers are also effective.
3. Avoid touching your eyes, nose or mouth.
4. Try to avoid close contact with sick people.
5. If you get sick with influenza, the CDC recommends that you stay home from work or school and limit contact with others to keep from infecting others.

## TREATMENT

Four antiviral medications are approved by the U.S. Food and Drug Administration (FDA) for treatment and prevention of influenza – Tamiflu (oseltamivir), Relenza (zanamivir), Symmetrel (amantadine) and Flumadine (rimantadine). While antivirals taken at the onset of the illness may decrease the severity and duration of the illness, there is no definitive treatment for influenza. If antiviral treatment is given within 48 hours, it may reduce the severity of symptoms and the duration of illness. Treatment of infected persons does not prevent further spread of infection, but it may reduce the viral shedding and thus the degree of contagion. Antivirals do not help if given beyond 48 hours of onset and will not work against other viruses or against bacterial infections that may occur as a complication of influenza. A patient may develop resistance to one or all antivirals. The bird flu (Influenza A H5N1) identified in humans in Asia in 2004 to 2005 is already resistant to amantadine and rimantadine, and higher doses of oseltamivir must be given for a longer period to be effective. Observational studies indicate that early intervention and an extended regime of oseltamivir may help increase the chance of survival, but results are inconclusive due to limited data. For the swine flu specifically, the CDC recommends the use of Tamiflu (oseltamivir) or Relenza (zanamirvir) to treat and prevent infection. [12-14].

Ministry of health and family welfare had given treatment guidelines [15].

Patient are divided in three categories depending on the symptoms and risk group i.e. category A,B and C. Category A include patient with symptoms of mild fever, cough, sore throat, with or without bodyache, headache, diarrhea and vomiting. These patients are advised symptomatic treatment only. These patients are neither tested nor given oseltamivir, however they are advised

1. Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in the trash.

home isolation.

Category B is further divided into B1 and B2. B1 includes symptoms as in category A plus high grade fever and severe sore throat. These patients are advised home isolation. Oseltamivir may be given in these patients. B2 includes symptoms as in category A plus high risk group woman, persons > 65 years, patient with lung ,heart, liver and kidney diseases. These patients are advised home isolation. Oseltamivir should be given in these patients. Category B patients are also not advised testing.

Category C includes symptoms as in category A and B plus breathlessness, chest pain, drowsiness, low BP, sputum with blood, bluish discolouration of nails, irritable child and worsening underlying chronic conditions. They are to be immediately hospitalized and treated with Oseltamivir. They immediately tested.

Oseltamivir is advised for not treatment but also prophylaxis. Dose is as follows

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| Weight < 15 kg | 30 mg BD for 5 days |
| Weight 15-23 kg | 45 mg BD for 5 days |
| Weight 24 to< 40 kg | 60 mg BD for 5 days |
| Weight >40 kg | 70 mg BD for 5 days |
| Infants < 3 months | 12 mg BD for 5 days |
| Infants 3-5 months | 20 mg BD for 5 days |
| Infants 6-11 months | 25 mg BD for 5 days |

Vaccines are available which can be given by nasal spray or through intramuscular [16]. Vaccine is recommended for Health care provider. Vaccine is not recommended for general public. They should be encouraged to take precaution. In case of symptoms, he should immediately attend nearest health facility for early diagnosis and treatment.

Patient should be provided three layered N-95 respirator mask or surgical mask to prevent spread of infection. These masks are not required for relatives.

Ministry of health and family welfare had not given its stand regarding the use of alternative medicine. Giloy juice is an ayurvedic preparation for prevention. Mero-sol 1000x is homeopathic medicine for prevention and treatment [17].

## CONCLUSION

Prevention and control measures for swine influenza must be followed strictly to avoid spread of swine flu.

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