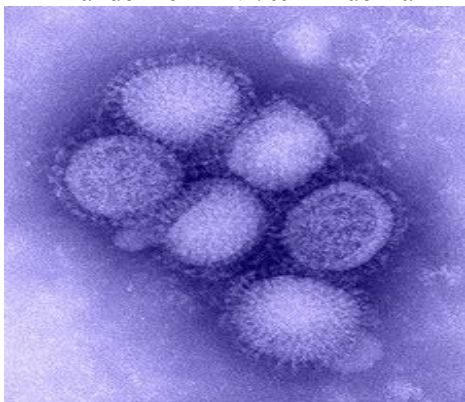


Swine Flu

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Pandemic H1N1/09 Influenza



Electron microscope image of the H1N1 influenza virus. The viruses are ~100 nanometres in diameter.

Epidemiology: The outbreak began in the state of Veracruz, Mexico. The Mexican government failed to contain the spread of virus despite closing most of public and private facilities. WHO and US Centers for Disease Control (CDC) stopped counting cases and in June declared the outbreak to be a pandemic. The initial outbreak was called the "H1N1 influenza" or "Swine Flu by American media. It is officially called pandemic H1N1/09 virus by the WHO[1]. The first confirmed swine flu death occurred at Texas Children's Hospital in Houston, Texas[2].

Signs and symptoms: The symptoms of swine flu are similar to other influenzas, and may include a fever, cough (typically a "dry cough"), headache, muscle or joint pain, sore throat, chills, fatigue, and runny nose. Diarrhea, vomiting, and neurological problems have also been reported in some cases[3]. People at higher risk of serious complications include those aged over 65, children younger than 5, children with neurodevelopmental conditions, pregnant women (especially during the third trimester)[4], and those of any age with underlying medical conditions, such as asthma, diabetes, obesity, heart disease, or a weakened immune system (e.g., taking immunosuppressive medications or infected with HIV)[5]. More than 70%

of hospitalizations in the US have been people with such underlying conditions, according to the CDC[6].

Symptoms in severe cases: In severe cases, patients generally begin to deteriorate around 3 to 5 days after symptom onset. Deterioration is rapid, with many patients progressing to respiratory failure within 24 hours, requiring immediate admission to an intensive care unit. Upon admission, most patients need immediate respiratory support with mechanical ventilation[7].

Following constitute "emergency warning signs" and advised seeking immediate care if a person experiences any one of these signs[8].

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|--|--|
| In adults: Difficulty breathing or shortness of breath Pain or pressure in the chest or abdomen Sudden dizziness Confusion Severe or persistent vomiting Low Temperature | In children: Fast breathing or working hard to breathe 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 that improve but then return with fever and worse cough Fever with a rash Being unable to eat Having no tears when crying |
|--|--|

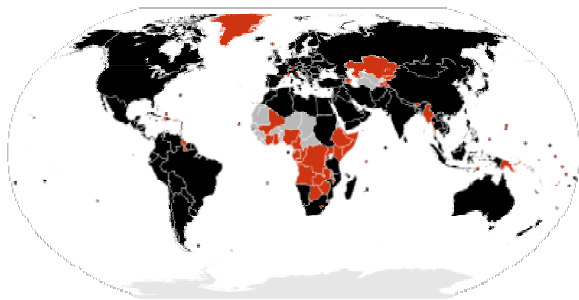
Diagnosis: Confirmed diagnosis of pandemic H1N1/09 flu requires testing of a nasopharyngeal, nasal, or oropharyngeal tissue swab from the patient by Real-timeRT-PCR[9]. More widely available tests include rapid influenza diagnostic tests (RIDT) and direct and indirect immunofluorescence assays (DFA and IFA) give false negative results[10].

Virus characteristics: It has been determined that the strain contains genes from five different flu viruses: North American swine influenza, North American

avian influenza, human influenza, and two swine influenza viruses typically found in Asia and Europe. The virus is currently less lethal (mortality about 0.01-0.03%) and is unlikely to get more lethal[11].

Transmission: Flu viruses are spread mainly from person to person through coughing or sneezing by people with influenza. Sometimes people may become infected by touching something – such as a surface or object – with flu viruses on it and then touching their mouth or nose[12]. The basic reproduction number (the average number of other individuals that each infected individual will infect, in a population that has no immunity to the disease) for the 2009 novel H1N1 is estimated to be 1.75[13]. Most transmissions occur soon before or after the onset of symptoms[14].

Prevention: Initial vaccine doses should go to priority groups such as pregnant women, people who live with or care for babies under six months old, children six months to four years old and health-care workers[15]. Clinical trials showed that the new vaccine protects adults with only one dose. For children under the age of 10, two administrations of the vaccine, spaced 21 days apart, are recommended. The seasonal flu will still require a separate vaccination[16].



Deaths ■ Confirmed cases See also: H1N1 live map, WHO updates

Vaccines: Till November 19, 2009, over 65 million doses of vaccine had been administered in over 16 countries; the vaccine seems safe and effective, producing a strong immune response that should protect against infection[17]. The current trivalent seasonal influenza vaccine neither increases nor decreases the risk of infection with H1N1[18].

Infection control: WHO stated that containment was not feasible but it did not recommend closing borders or restricting travel[19]. Chinese government announced quarantine for suspected passengers. US airlines made no major changes. Masks were not generally provided by airlines and the CDC did not

recommend that airline crews wear them. Some non-US airlines, mostly Asian ones, took measures such as stepping up cabin cleaning, installing state-of-the-art air filters, and allowing in-flight staff to wear face masks[20].

Schools: The swine flu outbreak has led to numerous precautionary school closures in several countries. Rather than closing schools, the CDC recommended that students and school workers with flu symptoms should stay home for either seven days total, or until 24 hours after symptoms subside-whichever is longer. They have additionally urged schools to suspend any rules, including penalizing late papers or missed classes[21].

Workplace: Persons in the workplace should stay home sick for seven days after getting the flu, or 24 hours after symptoms end, whichever is longer[21].

Facial masks: The CDC does not recommend use of face masks in non-health care settings, such as schools, workplaces, or public places, with a few exceptions: people who are ill with the virus should consider wearing one when around other people, and people who are at risk for severe illness while caring for someone with the flu[22]. Masks give people a false sense of security and are "better than nothing, but it's hard to completely block out an airborne virus since it can easily slip through the gaps". According to mask manufacturer, "there are no established exposure limits for biological agents such as swine flu virus." However, despite the lack of evidence of effectiveness, the use of such masks is common in Asia[23].

Quarantine: Countries have initiated quarantines or have threatened to quarantine foreign visitors suspected of swine flu. Hong Kong quarantined an entire hotel with 240 guests; Australia ordered a cruise ship with 2,000 passengers to stay at sea because of a swine flu threat. Egyptian Muslims who went on the annual pilgrimage to Mecca risked being quarantined upon their return[24].

Pigs and food safety

Swine influenza, despite its origin in pigs, this strain is transmitted between people and not from swine to people. Eating properly cooked pork or other food products derived from pigs would not cause flu[25].

Treatment: A number of methods have been recommended to help ease symptoms, including adequate liquid intake and rest. Aspirin and other salicylate products should not be used (by anyone, but especially by people under 19) with any flu-type symptoms because of the risk of developing Reye's

Syndrome. If the fever is mild and there are no other complications, fever medication is not recommended[26].

People in at-risk groups should be treated with antivirals (oseltamivir or zanamivir) as soon as possible when they first experience flu symptoms. People who develop pneumonia should be given both antivirals and antibiotics. Antivirals are most useful if given within 48 hours of the start of symptoms and may improve outcomes in hospitalized patients. If oseltamivir (Tamiflu) is unavailable or cannot be used zanamivir (Relenza) is recommended as a substitute. Peramivir is an experimental antiviral drug approved for hospitalized patients in cases where the other available methods of treatment are ineffective or unavailable[27].

Side effects: Both medications have known side effects, including lightheadedness, nausea, vomiting, loss of appetite, and trouble breathing. Children were reported to be at increased risk of self-injury and confusion after taking oseltamivir[26].

Resistance: As of January 2010, the World Health Organization (WHO) reported 190 out of over 15,000 samples of the prevalent 2009 pandemic H1N1 (swine) flu tested worldwide have shown resistance to oseltamivir (Tamiflu)[27]. No circulating flu has yet shown any resistance to zanamivir (Relenza), the other available anti-viral[28].

Effectiveness of antivirals questioned: Antiviral drugs oseltamivir (Tamiflu) and zanamivir (Relenza) can ward off pneumonia and other serious conditions linked to influenza. Analysis of 20 studies showed oseltamivir offered mild benefits for healthy adults if taken within 24 hours of onset of symptoms, but found no clear evidence it prevented lower respiratory tract infections or other complications of influenza[29].

| 20th century flu pandemics | | | | | |
|----------------------------|-----------|----------------------|-------------------------------|----------------------------|--------------------|
| Pandemic | Year | Influenza virus type | People infected (approximate) | Estimated deaths worldwide | Case fatality rate |
| Spanish flu | 1918–1919 | A/H1N1 | 33% (500 million) | 20–100 million | >2.5% |
| Asian flu | 1956–1958 | A/H2N2 | ? | 2 million | <0.1% |
| Hong | 1968– | A/H3N2 | ? | 1 | <0.1% |

| | | | | | |
|--------------|------------|------------------------------|---------------------------------|--|-------|
| Kong flu | 1969 | | | million | |
| Seasonal flu | Every year | mainly A/H3N2, A/H1N1, and B | 5–15% (340 million – 1 billion) | 250,000 – 500,000 per year | <0.1% |
| Swine flu | 2009 | Pandemic H1N1/09 | > 622,482 (lab-confirmed) | 14,286 (lab-confirmed [†] ; ECDC) ≥8,768 (lab-confirmed [†] ; WHO) | 0.03% |

■ *Not necessarily pandemic, but included for comparison purposes.*

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