

# *epi*TRENDS

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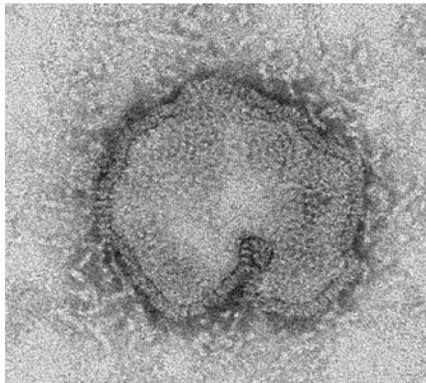
## Influenza A (H7N9) Virus

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This spring, Chinese public health authorities reported human illness with a new avian influenza A (H7N9) virus. While there is currently no evidence this virus is spreading among people, it is possible the virus could acquire the ability to easily spread from person to person and result in a pandemic. Public health agencies throughout the world are preparing to respond should a pandemic develop.

### Influenza A Viruses

Influenza A viruses are classified into subtypes based on two proteins on the surface of the virus, hemagglutinin (H) and neuraminidase (N). Subtypes can be further characterized into strains. In recent years, the influenza A viruses causing seasonal influenza outbreaks in humans have been influenza A subtypes (H1) and (H3), both of which undergo periodic changes in the specific strains circulating.



Influenza A H7N9 [www.cdc.gov](http://www.cdc.gov)

Different influenza subtypes affect many types of animals, but birds (avian) and pigs (swine) are thought to be the primary animal reservoirs for novel types of influenza viruses able to infect humans. Avian influenza A viruses are characterized as “highly pathogenic” if they cause severe illness in infected birds. “Low pathogenic” avian influenza viruses cause mild or no symptoms in infected birds.

### Novel Influenza

Novel influenza A viruses are those strains not currently circulating among humans, typically avian or swine strains. An influenza pandemic results when a novel influenza strain spreads globally. Pandemics can cause significant morbidity and mortality because human populations have no or little existing immunity to the new strain from either prior influenza illness or vaccine. In 2009, a novel influenza A (H1N1) virus resulted in a

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pandemic and replaced the previously circulating influenza A (H1N1) strain.

Rare cases of human infection with other novel viruses have been detected during recent years. An ongoing outbreak of a highly pathogenic avian influenza A (H5N1) virus has resulted in 628 laboratory-confirmed human cases and 374 deaths across Asia, the Middle East, and Africa as of April 28<sup>th</sup>, 2013. In the United States, 329 people have been infected with influenza A (H3N2) variant virus, a rare swine influenza virus acquired through close contact with pigs. In the past, avian influenza A (H7) virus has caused conjunctivitis and mild to moderate influenza in humans, with only one known fatal case.

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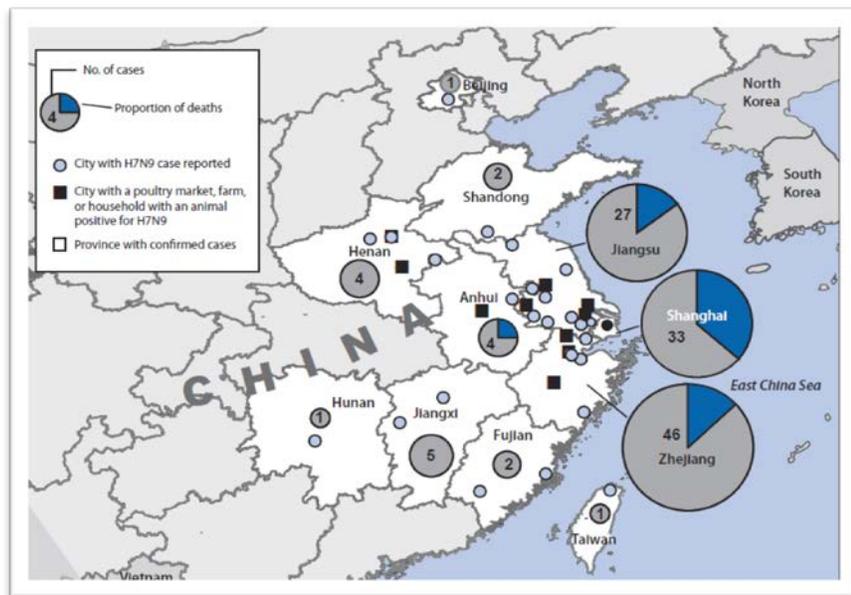
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### **Influenza A (H7N9) Virus Infections**

This year a new influenza A (H7N9) virus was found to cause human illnesses in China. From February 19<sup>th</sup> – May 9<sup>th</sup> there have been 131 cases identified with 32 deaths (24%), although not all cases have recovered yet. The cases have been reported from eight contiguous provinces and two municipalities in China. Other than cases in China a single travel-associated case was reported from Taiwan.



China, February 19–April 29, 2013 - Confirmed (n = 126) and fatal (n = 24) infections with avian influenza A(H7N9) , MMWR, [www.cdc.gov](http://www.cdc.gov)

Most patients known to be infected with the influenza A (H7N9) virus have been critically ill with severe lower respiratory tract illnesses including pneumonia, respiratory failure, and acute respiratory distress syndrome (ARDS) resulting in high case mortality. Of 82 cases detected early in the outbreak, the median age was 63 years (range 2 to 89 years); only four were pediatric cases including two children with

mild symptoms. Overall the patients have been mainly male urban residents, and 76% had an underlying medical condition.

The full clinical spectrum of influenza A (H7N9) virus infections is not known but few mild cases have been documented. One asymptomatic child who was a contact of a case has tested positive for the virus. From a study in affected areas in China, of 5551 outpatients with influenza-like illness only one tested positive for influenza A (H7N9) virus, compared with 12% of 664 patients hospitalized with pneumonia in the region. This suggests mild illness is rare.

Almost all of the identified H7N9 cases have been sporadic, without epidemiologic links. Of 77 early cases with detailed exposure information, four (5%) were poultry workers and 63 (77%) had animal exposure, mainly to chickens or ducks. During follow up in China of 1251 close contacts of cases, including primarily family members and healthcare workers, 19 contacts were symptomatic but none tested positive for H7N9. As of April 17<sup>th</sup>, three family clusters have been identified. Limited human-to-human transmission after prolonged close contact with ill family members could not be ruled out in these clusters. At present there is no evidence of sustained human-to-human transmission.

All eight genes of the influenza A (H7N9) virus are of avian origin. However, no illness outbreaks have been identified in poultry in China. The China Ministry of Agriculture reported testing of 68,060 bird and environmental specimens for H7N9 virus. Only 46 (0.07%) were positive for H7N9, coming from chickens, ducks, pigeons (feral and captive), and environmental specimens. All swine specimens tested were negative.

There is guidance from Centers for Disease Control and Prevention (CDC) for the public health response in this developing situation. CDC has requested enhanced surveillance for influenza among patients with symptoms of influenza who had traveled to China within 10 days of onset or who had close contact with a known H7N9 case. None of 37 patients tested in the United States through April 29<sup>th</sup> have been positive for H7N9 virus. In addition, CDC made available to public health laboratories rRT-PCR kits to test for influenza A (H7). There has been ongoing surveillance in the United States for avian influenza in commercial poultry flocks with no detection of H7N9 virus. CDC is collaborating with international public health agencies and vaccine manufacturers on research for vaccine development.



CDC H7N9 Reagent Kits [www.cdc.gov](http://www.cdc.gov)

Enhanced surveillance for novel influenza viruses will continue in the United States and Washington State. Local health jurisdictions can consult with Office of Communicable Disease Epidemiology (877-539-4344) regarding testing of symptomatic patients with risk factors. Infection control recommendations for symptomatic patients under investigation as possible influenza A (H7N9) virus infection include standard, contact, and airborne precautions with eye protection. Prompt antiviral treatment is recommended for all cases that are under investigation or confirmed. Other public health activities to control influenza will likely change and expand as new information becomes available that expands understanding of the virus.

## References

Emergence of Avian Influenza A(H7N9) Virus Causing Severe Human Illness – China, February - April 2012. MMWR May 10, 2013.

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Qun Li, Lei Zhou, Minghao Zhou, et. al. Preliminary Report: Epidemiology of the Avian Influenza A (H7N9) Outbreak in China. NEJM April 24, 2013.

<http://www.nejm.org/doi/full/10.1056/NEJMoa1304617>

## Resources

WHO: [http://www.who.int/influenza/human\\_animal\\_interface/avian\\_influenza/en/](http://www.who.int/influenza/human_animal_interface/avian_influenza/en/)

CDC: <http://www.cdc.gov/flu/avianflu/index.htm> and <http://www.cdc.gov/flu/swineflu/> (includes links to recent MMWR articles)

DOH: <http://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/Flu/Pandemicflu.aspx>