

SWINE FLU G4 FACT SHEET

WHAT IS SWINE FLU?

Swine flu, or swine influenza, is a popular name given to strains of the influenza A virus of subtype H1N1. Strains that are endemic among humans - such as the A/H1N1pdm09 strain that caused the 2009-10 global pandemic - are considered by health authorities including the CDC (US) and NHS (UK) to be seasonal in nature, and as such are included in seasonal programmes of vaccination.

WHY IS IT CALLED SWINE FLU?

Human endemic swine flu is named as such due to its similarity to pig swine flu, and having genes from swine, avian (bird) and human viruses, with this gene mixing occurring through a process called 'antigenic shift'. This resulted in a virus that could pass first from pigs to humans, and then between other humans.

HOW MANY OUTBREAKS OF SWINE FLU HAVE THERE BEEN IN THE PAST?

The 1918 'Spanish flu' was caused by an ancestral strain of the H1N1 virus (although genome sequencing has revealed that to be entirely avian in origin). Because there was already natural immunity to a form of H1N1 among older people, it lessened the impact of the H1N1 pandemic of 2009-10 - the first pandemic in 40 years - that originated in Mexico and spread quickly among the young who did not have natural immunity to H1N1.

WHAT'S DIFFERENT ABOUT THIS NEW STRAIN OF SWINE FLU?

A strain of swine flu from pig farms in China has been noted as significant due to its pandemic potential. The virus called G4 EA H1N1 is genetically descended from the H1N1 strain that caused the last pandemic in 2009. In fact, it is a unique blend of three lineages: one similar to strains found in European and Asian birds, the H1N1 strain that caused the 2009 pandemic, and a North American H1N1 that has genes from avian, human, and pig influenza viruses.

WHERE DID THIS NEW STRAIN COME FROM? IS CHINA TO BLAME?

No, the G4 strain is a blend of lineages from all over the world, meaning it is not a uniquely Chinese issue, it is an amalgamation of strains from animal farming in places including Europe and North America. The G4 strain isn't the only strain that is being monitored - in China alone between 2011 and 2018, 179 swine influenza viruses were discovered through swab tests on pigs in pig farms.

This is not just a problem in China - a 2015 study carried out by the US National Institutes of Health mapped the genetic sequences of swine flu viruses and found that Europe and the US - the largest global exporters of pigs - are also the largest exporters of swine flu.

BUT IT ONLY HAS 'PANDEMIC POTENTIAL'?

Presently, yes, but the potential is great enough to cause alarm among the scientific community. According to a study published in the PNAS journal by researchers in Beijing, the predominant G4 virus had acquired increased human infectivity "greatly enhances the opportunity for virus adaptation in humans and raises concerns for the possible generation of pandemic viruses."

Gene reassortment occurs more readily in influenza viruses compared to other types of virus, plus the theory that pigs provide the perfect mixing bowl for human, avian and swine flu viruses. All this means there is a very real chance of G4 acquiring a mutation which makes it endemic among humans.

WHAT HAS ANIMAL EXPLOITATION GOT TO DO WITH IT?

Intensive farming of pigs for food provides the perfect conditions for the emergence of new zoonotic diseases. The density of pig populations and unhygienic environments mean viruses are able to jump between pigs much more easily, and then on to workers. Viral gene mixing and mutation is a numbers game - the more pig hosts in which viruses can mix and develop, the greater the chances of a change occurring that results in a virus that can pass from human to human.

WHAT DO THE EXPERTS SAY?

"Pig farming is a massive industry in China and pigs can be important hosts from which novel influenza viruses may emerge," said James Wood, Head of Veterinary Medicine at the University of Cambridge. He added that the study was a "salutary reminder that we are constantly at risk of new emergence of zoonotic pathogens and that farmed animals, with which humans have greater contact than with wildlife, may act as the source for important pandemic viruses." - source: CNN.com

"The likelihood that this particular variant is going to cause a pandemic is low," says Martha Nelson, an evolutionary biologist at the U.S. National Institutes of Health's Fogarty International Center who studies pig influenza viruses in the United States and their spread to humans. But Nelson notes that no one knew about the pandemic H1N1 strain, which jumped from pigs to people, until the first human cases surfaced in 2009. "Influenza can surprise us," Nelson says. "And there's a risk that we neglect influenza and other threats at this time" of COVID-19.' - source: Sciencemag.org

'The Pew Commission, in its 2008 report, concluded that industrialized animal agriculture posed 'unacceptable' public health risks. The report stated: 'Due to the large numbers of animals housed in close quarters in typical [industrial farm animal production] facilities there are many opportunities for animals to be infected by several strains of pathogens, leading to increased chance for a strain to emerge that can infect and spread in humans'' - source: CIWF.org.uk

VIDEOS TO WATCH

[Dr. Gupta explains new swine flu with 'pandemic potential' discovered in China](#)

FURTHER READING

- <https://www.cdc.gov/flu/swineflu/keyfacts-variant.htm>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2897825/>
- <https://www.theguardian.com/world/2020/mar/28/is-factory-farming-to-blame-for-coronavirus>
- <https://www.nature.com/articles/ncomms7696>
- <https://edition.cnn.com/2020/06/30/asia/china-swine-flu-pandemic-intl-hnk-scli-scni/index.html>
- <https://www.pnas.org/content/early/2020/06/23/1921186117>