

Earliest known evidence of 1918 influenza pandemic found

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Examination of lung tissue and other autopsy material from 68 American soldiers who died of respiratory infections in 1918 has revealed that the influenza virus that eventually killed 50 million people worldwide was circulating in the United States at least four months before the 1918 influenza reached pandemic levels that fall.

The study, using tissues preserved since 1918, was led by Jeffery K. Taubenberger, M.D., Ph.D., of the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health. The researchers found proteins and [genetic material](#) from the 1918 influenza virus in specimens from 37 of the soldiers, including four who died between May and August 1918, months before the pandemic peaked. These four cases are the earliest 1918 pandemic influenza cases they know to be documented anywhere in the world, the scientists say.

The clinical disease and tissue damage seen in the pre-pandemic cases were indistinguishable from those evident in cases that occurred during the height of the pandemic. This suggests, says Dr. Taubenberger, that over the course of the pandemic, the virus did not undergo a dramatic change that could explain the unusually high mortality it ultimately caused.

In the current study, the autopsy materials showed that the virus replicated not only in the [upper respiratory tract](#) but also the lower respiratory tract, in a pattern very similar to that of the 2009 [pandemic influenza](#) virus. The team also found evidence that two virus variants

were circulating in 1918. In one, a key [viral protein](#) called hemagglutinin bound well to receptors on human respiratory cells, while the hemagglutinin from the other variant bound less efficiently. Despite this difference in binding ability, both viruses caused similar disease symptoms and replicated in a similar pattern within cells lining the respiratory tract, suggesting that differences in hemagglutinin binding capacity alone do not fully explain the unusually high mortality seen in the 1918 pandemic.

Bacterial co-infections were found in all 68 cases studied, the researchers noted. The role played by bacterial co-infections, such as bacterial pneumonia, in contributing to deaths in the 1918 pandemic was previously described by Dr. Taubenberger and his colleagues in a [2008](#) study. According to the study authors, the new data underscore the crucial role that bacterial infections can play in conjunction with any [influenza virus](#), whether historic or future, and the need for public health officials to prepare to prevent, detect and treat bacterial co-infections during future influenza outbreaks.

More information: Z-M Sheng et al. Autopsy series of 68 cases dying before and during the 1918 influenza pandemic peak. *Proceedings of the National Academies of Sciences* [DOI:10.1073/pnas.1111179108](https://doi.org/10.1073/pnas.1111179108) (2011).

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