Skeletal remains debunk myth surrounding 1918 flu pandemic

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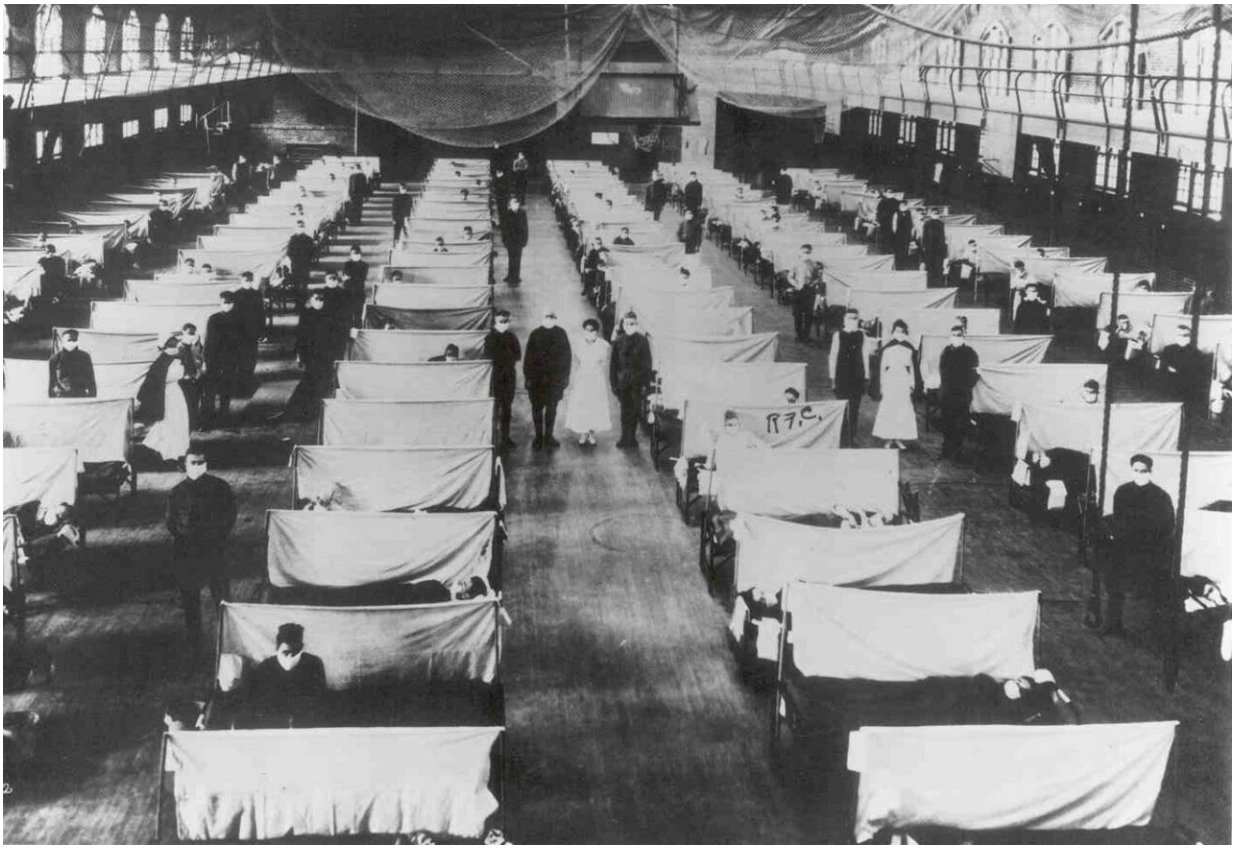

Credit: University of Colorado at Boulder

Look back at the chronicle of global pandemics, and the flu pandemic of 1918 stands out as an anomaly for one reason: According to the history books, it struck healthy adults in their prime just as often, if not more so,

than the weak or sickly.

This assumption has influenced research and literature for decades.

But new research published Oct. 9 in the journal *PNAS* suggests it may not be true at all.

In examining the skeletal remains of nearly 400 individuals, researchers from the University of Colorado Boulder and McMaster University found that in 1918—just like in 2020—people exposed to environmental, social or nutritional stressors before-hand were significantly more likely to succumb to a novel virus when it emerged.

The findings shine a light on how modern-day communities could better prepare for pandemics and reveal potential shortfalls in relying exclusively on written texts to understand the past.

"This idea that the 1918 flu killed healthy young people is not supported by our findings," said co- author Sharon DeWitte, a professor of anthropology at CU Boulder who specializes in bioarchaeology—constructing the past via the study of human bones. "Instead, we found that this pandemic, like many others across history, disproportionately killed frail people."

Questioning folk wisdom with science

In just two years, the flu pandemic of 1918 infected nearly one-third of the world's population and killed more than 25 million people.

Literature is filled with tragic references to it disproportionally striking the young and vibrant.

"It seems to get the big, strong ones first," lamented one character in

Thomas Wolfe's classic flu-era novel Look Homeward Angel. "The illness seemed to be as fatal to strong adults as to young children and to the old and debilitated," reported a U.S. Naval Hospital doctor.

Yet despite such anecdotes, the study authors could find no scientific data to support these claims.

"It may be one of those ideas that begins as folk wisdom and gets reproduced in the literature over and over until it becomes canon," DeWitte said. "We wanted to take a step back and ask: Do we really know what we think we know?"

She notes that historical documents, while useful, tend to emphasize the fate of the privileged, while leaving out the perspectives of women, children and the disenfranchised.

Skeletal remains can be gathered from a larger cross-section of society. And they reflect a lifetime of experiences, from traumatic injuries and diseases to nutritional deficits, which leave traces on teeth and bones.

"What skeletal evidence can do is provide us with information about people who aren't necessarily represented in those historical documents," said DeWitte. "It can give us a window into their actual lived experiences."

Studying a pandemic during a pandemic

DeWitte first got interested in bioarchaeology at age 14 when she was diagnosed with scoliosis and underwent surgery.

"I would fantasize about future archaeologists digging up my body and being able to spin a tale about my life based on the fact that I had this metal rod that did not decompose," she recalls.

She spent her early career in a cemetery in England, studying remains of those who had died of the bubonic plague, or Black Death, which killed a stunning 30 to 50% of the population in the 14th Century. Her work showed that the elderly and frail were most likely to succumb.

For the new study, she and co-author Amanda Wissler, assistant professor of anthropology at McMaster University in Ontario, turned to the Hamann-Todd Human Osteological Collection. It includes more than 3,000 century-old human skeletons housed in the basement at the Cleveland Museum of Natural History.

Wissler spent hours in that basement, as the COVID-19 pandemic wore on, poring over the bones of 369 individuals who died before or during a different pandemic a century earlier.

The irony was not lost on her.

"It's very important to me to always remember that these were actual people," said Wissler, who knew their names, ages and dates of death. "It can be intense work."

With magnifying glass in hand she tenderly looked over their shinbones in search of porous lesions—a lasting indicator of trauma, infection, stress or malnutrition.

The most frail, based on their bone lesions, were 2.7 times more likely to have died during the flu epidemic, the study found.

Wissler notes that because the flu epidemic of 1918 was so widespread it did, indeed, strike people in the prime of their lives sometimes, and those stories resonated, fueling the notion that it was a rare killer of the young.

"When a 25-year-old dies you remember it more," said Wissler. Their study, however, shows that even young victims tended have bones that hinted at prior health problems.

"These findings suggest that there was some underlying source of frailty among the victims of the 1918 flu," they write.

The researchers suspect that, like with COVID and the Black Plague, socioeconomic status, education, access to health care, and institutional racism may have played a role. But further research is necessary.

They caution that the sample size was small and the specimens were all from the Cleveland area so may not fully reflect national realities.

But there are lessons to be learned from these bones, the authors said, There is danger in public health messaging that suggests everybody is equally likely to get sick.

"What we have learned is that in future pandemics there will almost certainly be variation between individuals in the risk of death," said DeWitte. "If we know what factors elevate that risk, we can expend resources to reduce them— and that's better for the population in general."

More information: Amanda Wissler et al, Frailty and survival in the 1918 influenza pandemic, *Proceedings of the National Academy of Sciences* (2023). DOI: 10.1073/pnas.2304545120

Provided by University of Colorado at Boulder