

Does the La Nina weather pattern lead to flu pandemics?

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Worldwide pandemics of influenza caused widespread death and illness in 1918, 1957, 1968 and 2009. A new study examining weather patterns around the time of these pandemics finds that each of them was preceded by La Niña conditions in the equatorial Pacific. The study's authors--Jeffrey Shaman of Columbia University's Mailman School of Public Health and Marc Lipsitch of the Harvard School of Public Health—note that the La Niña pattern is known to alter the migratory patterns of birds, which are thought to be a primary reservoir of human influenza. The scientists theorize that altered migration patterns promote the development of dangerous new strains of influenza.

The study findings are currently published online in *Proceedings of the National Academy of Sciences (PNAS)*.

To examine the relationship between [weather patterns](#) and influenza pandemics, the researchers studied records of ocean temperatures in the equatorial Pacific in the fall and winter before the four most recent flu pandemics emerged. They found that all four pandemics were preceded by below-normal sea surface temperatures—consistent with the La Niña phase of the El Niño-Southern Oscillation. This La Niña pattern develops in the tropical Pacific Ocean every two and seven years approximately.

The authors cite other research showing that the La Niña pattern alters the migration, stopover time, fitness and interspecies mixing of migratory birds. These conditions could favor the kind of gene

swapping—or genetic reassortment—that creates novel and therefore potentially more variations of the influenza virus.

"We know that [pandemics](#) arise from dramatic changes in the influenza genome. Our hypothesis is that La Niña sets the stage for these changes by reshuffling the mixing patterns of migratory birds, which are a major reservoir for influenza," says Jeffrey Shaman, PhD, Mailman School assistant professor of Environmental Health Sciences and co-author of the study.

Changes in migration not only alter the pattern of contact among bird species, they could also change the ways that birds come into contact with domestic animals like pigs. Gene-swapping between avian and pig [influenza](#) viruses was a factor in the 2009 swine flu pandemic.

Provided by Columbia University

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