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Speed of the Spread of Flu Is Linked to Airline Travel

By NICHOLAS BAKALAR

Airline travel has a significant effect on the spread of [influenza](#), a new study reports, raising the question of whether flight restrictions may be helpful in controlling a [pandemic](#).

Although computer simulations have already suggested a link, this study, published online yesterday in PLoS Medicine, offers the first observations of the phenomenon.

The researchers compared the timing and number of influenza deaths in 122 American cities with the volume of airline travel during the same period for each of nine flu seasons, 1996 to 2005. They found that changes in the rate of spread and the timing of peak mortality each year correlated with yearly fluctuations in monthly airline passenger volume.

Domestic airline travel in November was the best predictor of the speed of influenza spread, the researchers found, although influenza infections and deaths usually peak in late February.

They suggest that travel during the Thanksgiving holiday may be the central event in determining the rapidity of transmission. The fewer domestic airline passengers there are, researchers found, the slower the flu moves across the country.

This effect was particularly pronounced after the Sept. 11 attacks, when a temporary flight ban was instituted in the United States and airline travel volume was lower than in any other season from 1996 to 2005.

In most years, the peak date for influenza mortality in the United States occurs within two days of Feb. 17. But in 2002, the peak date was almost two weeks later, on March 2.

In 2003, 2004 and 2005, the peaks gradually returned to the normal range, Feb. 29, 19 and 17, respectively.

International airline travel similarly alters influenza timing and peak mortality. The scientists found an inverse correlation between the timing of the influenza season each year and the number of international travelers between September and November.

This was particularly evident in the late-arriving flu season of 2001-2, when international flight volume fell to 3.5 million passengers, from 4.9 million the previous year. The fewer international travelers there are from November to January, the later influenza arrives in the United States.

The authors acknowledge certain limitations of their findings. The data they used for establishing cause of death depend on voluntary reports, which are not always reliable.

In addition, deaths from influenza are concentrated in an older population, and there may be considerable variations in peak infection rates depending on age.

Average temperature did not predict the spread of the flu, nor was there any detectable difference caused by the strain of flu that dominated in each year.

The researchers found no influence of airline travel on the severity of the flu, or the number of people who die during each year's flu season. But restrictions on air travel could delay the arrival of a flu and ensure that there is enough time to institute preventive measures.

"Restricting travel would provide critical lead time to stockpile antivirals, develop vaccines, decide on school closures and lessen person-to-person contact," said Dr. Kenneth D. Mandl, the study's senior author.

"Flight restrictions might give us a chance to reduce downstream illness and deaths in a flu pandemic," said Dr. Mandl, an assistant professor of [pediatrics](#) at [Harvard](#) and an attending physician at Children's Hospital Boston. "If we can provide a month of lead time, that gives us an advantage."

Dr. John S. Brownstein, the paper's lead author and an instructor in pediatrics at Harvard, added that restricting air travel as a pandemic control measure would have major economic and social impact.

"It is for policy makers to decide, and we hope to have provided them with the evidence they need to gauge the possible benefit of that decision," Dr. Brownstein said. "Clearly an air traffic ban would be one of multiple measures that could help mitigate the impact of a flu pandemic."

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