

Study provides new clues to how flu virus spreads

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The Gesundheit II machine collects the breath exhaled from flu sufferers. Study volunteers sit for 30 minutes with their heads in the horizontal cone attached to the machine, which sucks in the air around their heads to collect tiny airborne droplets generated deep in the lungs. Researchers can then analyze the aerosols for the presence and quantity of virus. Credit: Donald Milton

People may more likely be exposed to the flu through airborne virus than previously thought, according to new research from the University of

Maryland School of Public Health. The study also found that when flu patients wear a surgical mask, the release of virus in even the smallest airborne droplets can be significantly reduced.

"People are generally surprised to learn that scientists don't know for sure how flu spreads," says Donald Milton, M.D., Dr.P.H., who directs the Maryland Institute for Applied Environmental Health and led the study of influenza virus aerosols published in the journal [PLoS Pathogens](#) on March 7, 2013.

"Our study provides new evidence that there is nearly nine times more [influenza virus](#) present the smallest [airborne droplets](#) in the breath exhaled from those infected with flu than in the larger droplets that would be expected to carry more virus," explains Dr. Milton. "This has important implications for how we prevent the spread of flu."

Routes of flu transmission include: 1) direct or indirect (e.g., doorknobs, keyboards) contact with an infected person, 2) contact via large droplet spray from a respiratory fluid (via coughs and [sneezes](#)), and 3) inhalation of fine [airborne particles](#), which are generated by the release of smaller, virus-containing droplets via normal breathing and coughing. The relative importance of these modes of influenza transmission has not been well understood, but is critical in devising effective interventions to protect [healthcare workers](#) and vulnerable people, such as infants and the elderly.

The Centers for Disease Control recommends that persons with influenza wear surgical masks to prevent transmission to susceptible individuals. Yet, this recommendation has been supported so far by only one study of mask impact on the containment of large droplet spray during [influenza infection](#). Maryland's study is the first to provide data showing that using a [surgical mask](#) can reduce the release of even the smallest droplets containing infectious virus. For this reason, health care

facilities should put surgical masks on those suspected of having influenza, and individuals with influenza can protect their families by wearing a mask.

Study Methods

Dr. Milton and his research team, including scientists from Harvard and Boston University Schools of Public Health and the University of Hong Kong, collected the exhaled breath from 38 [flu patients](#) and tested both the coarse ($\geq 5 \mu\text{m}$) and fine (

The researchers also tested the impact of wearing a surgical mask on the virus shedding into airborne droplets. Wearing a surgical mask significantly decreased the presence of virus in airborne droplets from exhaled breath. There was a 2.8 fold reduction in the amount of virus shed into the smallest droplets, and a 3.4 fold overall reduction in virus shed in both the coarse and fine and airborne particles.

Provided by University of Maryland

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