

Patients can emit small, influenza-containing particles into the air during routine care

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A new study suggests that patients with influenza can emit small virus-containing particles into the surrounding air during routine patient care, potentially exposing health care providers to influenza. Published in *The Journal of Infectious Diseases*, the findings raise the possibility that current influenza infection control recommendations may not always be adequate to protect providers from influenza during routine patient care in hospitals.

Werner E. Bischoff, MD, PhD, and colleagues from the Wake Forest School of Medicine in North Carolina screened 94 patients for flu-like symptoms during the 2010-2011 [influenza season](#). Study participants had been admitted to the emergency department (52 patients) or an inpatient care unit (42 patients) of Wake Forest Baptist Medical Center, where vaccination for influenza is mandatory for health care providers.

Nasopharyngeal swabs were collected from each patient. Samples were analyzed by rapid testing and by PCR analysis. Air samples were obtained by placing three six-stage air samplers from within 1 foot, 3 feet, and 6 feet of patients. No aerosol-generating procedures—such as bronchoscopy, sputum induction, intubation, or [cardiopulmonary resuscitation](#)—were conducted while [air sampling](#) took place. During air sampling, the number of patients' coughs and sneezes were counted and assessed for severity. Patients also completed a questionnaire at admission to report symptoms and the number of days they were sick.

Of the 94 patients enrolled, 61 patients (65 percent) tested positive for

[influenza virus](#). Twenty-six (43 percent) released influenza virus into the air. Five patients (19 percent) emitted up to 32 times more virus than others. This group of patients with influenza, described by the researchers as "super-emitters," suggested that some patients may be more likely to transmit influenza than others. High concentration of influenza virus released into the air was associated with high [viral loads](#) in nasopharyngeal samples. Patients who emitted more virus also reported greater severity of illness.

The current belief is that influenza virus is spread primarily by large particles traveling up to a maximum of 3 to 6 feet from an infected person. Recommended precautions for health providers focus on preventing transmission by large droplets and following special instructions during aerosol-generating procedures. In this study, Dr. Bischoff and his team discovered that the majority of influenza virus in the air samples analyzed was found in small particles during non-aerosol-generating activities up to a 6-foot distance from the patient's head, and that concentrations of virus decreased with distance. The study addressed only the presence of influenza-containing particles near patients during routine care, not the actual transmission of influenza infection to others.

Fitted respirators are currently required for health care providers during aerosol-generating procedures with patients. During routine, non-aerosol-generating patient care, the current precautions recommend that providers wear a non-fitted face mask. Based on their findings, Dr. Bischoff and investigators are concerned that providers may still be exposed to infectious dosages of influenza virus up to 6 feet from patients with small wide-spreading particles potentially exceeding the current suggested exposure zones.

These findings suggest that current infection control recommendations may need to be reevaluated, the study authors concluded. The detection

of "super-emitters" raises concerns about how individuals with high viral load may impact the spread of influenza, they noted. "Our study offers new evidence of the natural emission of influenza and may provide a better understanding of how to best protect [health care providers](#) during routine care activities," the study authors wrote. However, studies of influenza virus transmission will be necessary before the role of super-emitters can be firmly established, they noted.

In an accompanying editorial, Caroline Breese Hall, MD, from the University of Rochester School of Medicine and Dentistry in New York, highlighted the importance of a better understanding of influenza transmission as global travel has increased the likelihood of a rapid worldwide influenza outbreak. Although the study did not show that influenza transmission actually occurred, Dr. Hall noted, the findings "question the traditional belief that influenza is primarily spread by close contact with an infected person or by direct contact with infectious secretions."

While the study adds to the current understanding of the risks of [influenza infection](#) among patients and health providers, the findings also help define questions that still need to be answered, Dr. Hall noted. (Editor's Note: Dr. Hall died on Dec. 10, 2012, at the age of 73, shortly after completion of the editorial accompanying this study.)

Whatever protective equipment or infection control practices are used for preventing influenza transmission, vaccination of health providers remains a fundamental and key part of protecting them from influenza, noted Dr. William Schaffner, professor medicine and chair of the department of preventive medicine at Vanderbilt University School of Medicine in Nashville, Tenn., who was not involved with the study. "Influenza vaccination, although not perfect, is the best tool we have to protect [health care](#) workers—and their [patients](#)—from [influenza](#) illness."

More information: Fast Facts:

1) Researchers found that patients with influenza can emit small, influenza virus-containing particles into the surrounding air during routine patient care, potentially exposing health care providers to influenza virus up to 6 feet away from infected patients.

2) Five patients (19 percent) in study were "super-emitters" who emitted up to 32 times more virus than others. Patients who emit a higher concentration of influenza virus also reported greater severity of illness.

3) The findings suggest that more research on how influenza is transmitted is needed and that current influenza infection control recommendations for health providers may need to be reevaluated.

Provided by Infectious Diseases Society of America

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