

Viral infection in nose can trigger middle ear infection

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Middle ear infections, which affect more than 85 percent of children under the age of 3, can be triggered by a viral infection in the nose rather than solely by a bacterial infection, according to researchers at Wake Forest Baptist Medical Center.

By simultaneously infecting the nose with a [flu virus](#) and a bacterium that is one of the leading causes of ear infections in children, the researchers found that the flu virus inflamed the nasal tissue and significantly increased both the number of bacteria and their propensity to travel through the Eustachian tube and infect the [middle ear](#).

The study is published in the current online issue of the American Society for Microbiology's journal *Infection and Immunity*.

"Every individual has bacteria in the nose that most of the time doesn't cause problems," said the study's lead author, W. Edward Swords, Ph.D., professor of microbiology and immunology at Wake Forest Baptist. "However, under certain conditions those bacteria can migrate to the middle ear and cause an ear infection, and now we have a better understanding of how and why that happens."

The bacterium used in the animal study, *Streptococcus pneumoniae*, is known to exist in the noses of children in two phases, one relatively invasive and the other relatively benign. The more invasive phase is more frequently found in the infected ears of children. However, the study indicated that the flu virus promoted bacterial growth and ear

infection regardless of which phase of the bacterium was present in the nose.

"These findings suggest that a [flu infection](#) modifies the response of the immune system to this particular bacterium, enabling even the type that has previously been considered benign to infect the middle ear," Swords said.

Provided by Wake Forest University Baptist Medical Center

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