

Pollution linked to hospitalizations for pneumonia in older adults

December 23 2009

Older adults with long-term exposure to higher levels of pollution are at higher risk for hospitalization for pneumonia, according to researchers in Canada.

"Our study found that among older individuals, long-term exposure to traffic pollution independently increased their risk of hospitalization for pneumonia," said principal investigator, Mark Loeb, M.D., of McMaster University.

The research will be published in the January 1 issue of the American Thoracic Society's [American Journal of Respiratory and Critical Care Medicine](#).

Pneumonia is a leading cause of sickness and death among older adults, and rates of hospitalizations for pneumonia among patients 65 and older have been increasing in recent years.

In addition to traffic pollution associated with roads, Hamilton has a large industrial steel-making complex in the north end of the city, creating a large exposure zone for residents. The researchers recruited 365 [older adults](#) from Hamilton, Ontario, who had been hospitalized with radiologically confirmed pneumonia in one of Hamilton's four emergency departments between 2003 and 2005. Control subjects from the same catchment areas as the patients were enrolled contemporaneously, and then compared their exposures to [nitrogen dioxide](#) (NO₂), [sulfur dioxide](#) (SO₂), and fine particulate matter less than

2.5 μm (PM_{2.5}) using data from air-quality monitoring stations and land use regression models.

The researchers found that long-term (more than 12 months) exposures to NO₂ and PM_{2.5} were each associated with a more than doubled risk of hospitalization from pneumonia. Individuals with long-term exposure to NO₂ had 2.3 times the risk for hospitalization with pneumonia; for PM_{2.5}, the odds ratio was 2.26.

"We postulate that long-term exposure to [air pollution](#) may have increased individuals' susceptibility to pneumonia by interfering with innate immune defenses designed to protect the lung from pathogens; this may have included epithelial cell damage, reductions in bronchial macrophages, or reductions in natural killer cells," said Dr. Loeb.

Exposure to SO₂ was not associated with increased risk of hospitalization.

"Given the large population exposure to ambient air pollution, the results of this study highlight the important health impact that long-term exposure to ambient air pollution can have on respiratory infections," wrote Dr. Loeb. "It also emphasizes the need to monitor emissions from vehicles, given that ground level NO₂ is derived predominantly from traffic."

"While we don't know what is increasing the rates of pneumonia, we felt that studying air pollution was a good idea. Assessing if there is a correlation between rising pneumonia rates and increasing air pollution would be of interest," said Dr. Loeb.

In future research, Dr. Loeb hopes to examine whether there is a genetic component to susceptibility to the health effects of pollution.

"Examining genetic variants to see if there is interaction between genetic

basis and air pollution in the causal pathway of [pneumonia](#) would be very interesting," he said.

Provided by American Thoracic Society

Citation: Pollution linked to hospitalizations for pneumonia in older adults (2009, December 23)
retrieved 27 April 2024 from

<https://medicalxpress.com/news/2009-12-pollution-linked-hospitalizations-pneumonia-older.html>

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