Pollutants in some urban areas increase Parkinson's disease risk

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Scientists at Washington University School of Medicine in St. Louis have found that high emissions of manganese and copper in urban environments can significantly increase risk of Parkinson's disease.

(PhysOrg.com) -- High levels of manganese and copper pollution in urban areas are linked to increased risk of Parkinson's disease, according to a large-scale analysis of urban pollution and Parkinson's incidence in the United States.

Scientists at Washington University School of Medicine in St. Louis found that people living in areas with higher levels of manganese pollution had a 78 percent greater risk of Parkinson's disease than those living in areas free of such pollution. High levels of copper in the environment increased Parkinson's risk by 11 percent.

"We're following up with individual patients, examining exposure histories, disease progression and responses to treatments, and if those studies confirm this correlation, we may need to reevaluate the limits we place on environmental discharges of these pollutants," says lead author Allison Wright Willis, MD, assistant professor of neurology.

The comparison, published in American Journal of Epidemiology, was conducted using Medicare data and industrial discharge reports to the Environmental Protection Agency (EPA).

"Every year since 1988, any factory or other industry that releases more than a predefined amount of any of 650 chemicals into the environment has to report those discharges to the EPA," Willis says. "We used that data to construct a comparison of areas with high levels of manganese, copper and lead pollution versus areas where there were few or no releases of those elements."

Researchers focused only on urban areas to avoid pesticides, another group of compounds whose presence in the environment is believed to increase risk of Parkinson's disease.

Willis and her colleagues then used Medicare data to identify 35,000 Parkinson's patients who were living in the area in which they were diagnosed eight years or more before diagnosis. When adjusted for age, race, sex, there were 274 new cases of Parkinson's disease per 100,000 people in areas with little or no reported manganese, copper or lead pollution. In areas with high manganese pollution, that number rose to 489.4, and in areas with high copper levels, it increased to 304.2.

Areas with high lead emissions were not associated with a significant increase in Parkinson's disease. Several earlier studies have associated lead exposure with Parkinson's risk, Willis says, including research that has found increased lead levels in the bones of Parkinson's patients. She speculates that other sources of lead exposure besides industrial emissions - water contamination, for example, or contaminated paint - may have a stronger influence on Parkinson's disease risk.

Many different industries produced the pollutant emissions in the geographic areas studied.

"There's no one group to blame," Willis says. "Manganese, copper and lead emissions were

reported by industries ranging from food, tobacco and beverages to wood products, furniture, apparel and stone work. Others included producers of electrical and computer equipment, metalworking and chemical facilities and metal mining."

The researchers were surprised when they looked at the socioeconomic status of areas with higher pollutant levels. Instead of being uniformly poor and economically depressed, many are middle-class and upper-income areas.

"These pollutants are everywhere, and I think that strongly emphasizes the need to look into their effects in greater detail," Willis says.

More information: Willis AW, Evanoff BA, Lian M, Galarza A, Wegrzyn A, Schootman M, Racette BA. Metal emissions and urban incident Parkinson disease: a community health study of medicare beneficiaries using geographic information systems. *American Journal of Epidemiology*, online Oct. 19, 2010.

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