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Many U.S. Public Schools In "Air Pollution Danger Zone"

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One in three U.S. public schools are in the "air pollution danger zone," according to new research from the University of Cincinnati (UC).

UC researchers have found that more than 30 percent of American public schools are within 400 meters, or a quarter mile, of major highways that consistently serve as main truck and traffic routes.

Research has shown that proximity to major highways—and thus environmental pollutants, such as aerosolizing diesel exhaust particles—can leave school-age children more susceptible to respiratory diseases later in life.

"This is a major public health concern that should be given serious consideration in future urban development, transportation planning and environmental policies," says Sergey Grinshpun, PhD, principal investigator of the study and professor of environmental health at UC.

To protect the health of young children with developing lungs, he says new schools should be built further from major highways.

"Health risk can be mitigated through proper urban planning, but that doesn't erase the immediate risk to school-age children attending schools that are too close to highways right now," he adds. "Existing schools should be retrofitted with air filtration systems that will reduce students' exposure to traffic pollutants."

The UC-led team reports its findings in the September 2008 issue of the Journal of Environmental Planning and Management, an international scientific journal. This is believed to be the first national study of school proximity and health risks associated with major roadways.

For this study, Grinshpun's team conducted a survey of major metropolitan areas representative of all geographical regions of the United States: Atlanta, Boston, Cincinnati, Denver, Philadelphia, Los Angeles, Memphis, Minneapolis, and San Antonio.

More than 8,800 schools representing 6 million students were included in the survey. Primary data was collected through the U.S. Department of Education's National Center for Education Statistics.

Schools within this data set were then geocoded to accurately calculate distance to the nearest interstate, U.S. highway or state highway.

Past research on highway-related air pollution exposure has focused on residences located close to major roads. Grinshpun points out, however, that school-age children spend more than 30 percent of their day on school grounds—in classrooms, after-school care or extracurricular activities.

"For many years, our focus has been on homes when it comes to air pollution. School attendance may result in a large dose of inhaled traffic pollutants that—until now—have been completely overlooked," he adds.

These past studies suggest this proximity to highway traffic puts school-age children at an increased risk for asthma and respiratory problems later in life from air pollutants and aeroallergens.

This includes research from the UC Cincinnati Childhood Allergy and Air Pollution Study (CCAAPS) which has reported that exposure to traffic pollutants in close proximity to main roads has been associated with increased risk for asthma and other chronic respiratory problems during childhood.

Grinshpun's team found that public school students were more likely to attend schools near major highways compared to the general population. Researchers say the rapid expansion of metropolitan areas in recent years—deemed "urban sprawl"—seems to be associated with the consistent building of schools near highways.

"Major roads play an important role in the economy, but we need to strike a balance between economic and health considerations as we break ground on new areas," says Alexandra Appatova, the study's first author. "Policymakers need to develop new effective strategies that would encourage urban planners to reconsider our current infrastructure, particularly when it comes to building new schools and maintaining existing ones."

The state of California, for example, has passed a law prohibiting the building of new schools within 500 feet (168 meters) of a busy road. New

Jersey is moving a bill through the legislature to require highway entrance and exit ramps to be at least 1,000 feet from schools.

This study was funded in part by grants from UC's Center for Sustainable Urban Engineering and the National Institute of Environmental Health Sciences. UC's Patrick Ryan, PhD, and Grace LeMasters, PhD, also participated in this study. Appatova was an intern in UC's department of environmental health when the study was being conducted.