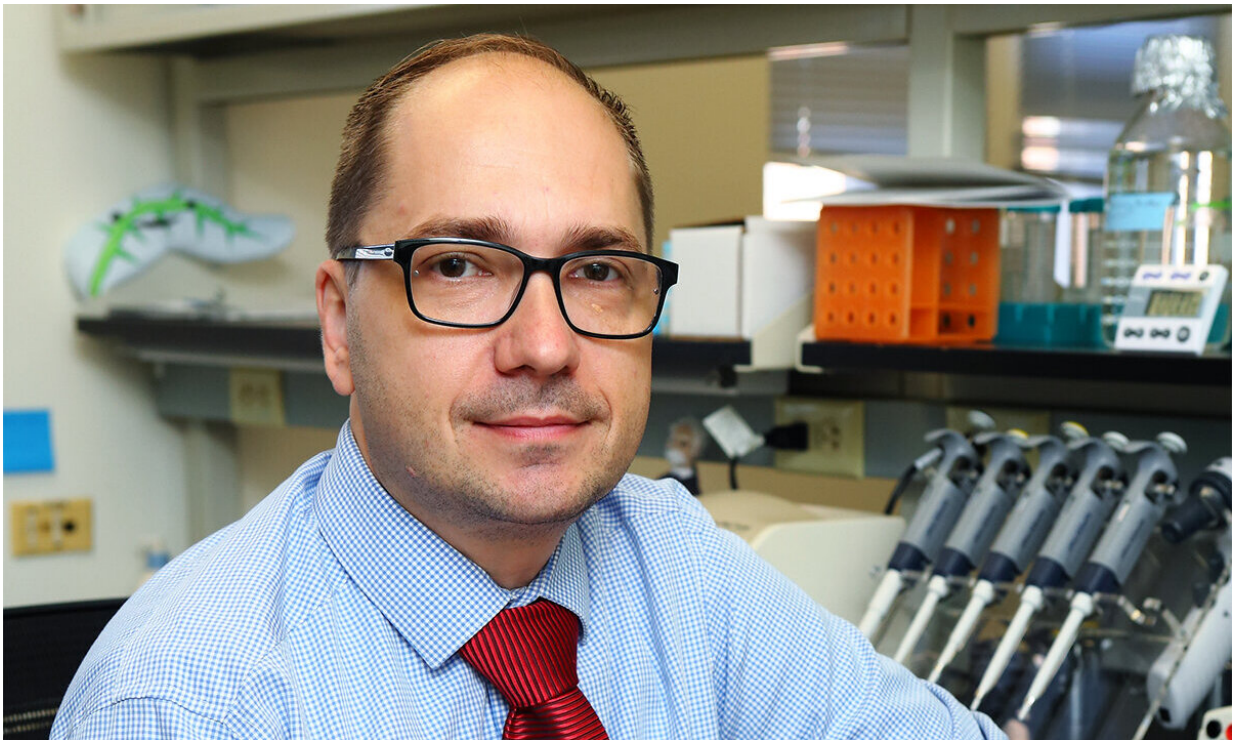


Cumulative environmental exposures increase diabetes risk in rural populations

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Dr. Robert Sargis. Credit: UIC/Jenny Fontaine

University of Illinois at Chicago researchers are the first to show that cumulative environmental exposures affect rural and urban populations differently when it comes to diabetes risk. Multiple environmental factors were associated with a greater risk for diabetes in rural and sparsely populated counties compared with their urban counterparts.

Their findings, which are based on an evaluation of 3,134 counties nationwide, are published in the *Journal of Diabetes Investigation*.

According to the U.S. Centers for Disease Control and Prevention, [diabetes](#) affects over 30 million people in the U.S., and 84 million people have prediabetes. While excess food consumption and a lack of exercise are known to influence [diabetes risk](#), those factors alone fail to account for how fast the population is developing diabetes. And while researchers have been interested in how [environmental factors](#) affect diabetes risk, a majority of studies have been in urban areas, leaving rural areas neglected in these analyses.

"This is one of the few studies to look at [environmental effects](#) on diabetes risk nationally and to determine whether or not there is a difference between urban and rural drivers," said Dr. Jyotsna Jagai, first author and research assistant professor of environmental and occupational health sciences at the UIC School of Public Health. "The drivers for both environmental quality and diabetes risk may vary in urban and rural areas. Being able to look at the entire country and look at this continuum of urban/rural was an advantage."

To measure the cumulative environmental effect on diabetes risk, Jagai and her colleagues developed an Environmental Quality Index, or EQI. The EQI was derived from combined data from various environmental domains, including the quality of air, water and land, in addition to the built and sociodemographic factors within a given area.

The sociodemographic domain was based on collected data such as median household income, education or violent crime rates, for example. Built domain factors included density of fast-food restaurants, density of fatal accidents and percent of highways versus roadways, for example. Each domain also was assessed independently to determine the biggest drivers of environmental risk on diabetes in specific areas.

"The EQI's cumulative assessment is unique," said Dr. Robert Sargis, co-author and UIC associate professor of endocrinology, diabetes and metabolism in the College of Medicine. "In most studies, we are not looking at the combination of factors. We look at single chemicals or single classes of chemicals and how they are associated with disease risk. This study pulls together all of the factors we think increase risk and puts them into a single measure to look at the cumulative environment."

Overall, in rural and less populated areas, lower overall [environmental quality](#) was associated with a higher prevalence of diabetes. Specifically, diabetes risk was most closely associated with air, built and sociodemographic domains. In urban areas, diabetes risk was associated with air and sociodemographic domains only.

"There might be something happening in [rural areas](#) that is different than in urban areas. Our findings suggest that environmental exposures may be a bigger factor in rural counties than in [urban areas](#) in the U.S.," Jagai said. "The environment that we are exposed to is broader than pollutants alone. Our health is dependent on these combined effects, such as sociodemographic or built stressors, that can impact our livelihoods."

The researchers say that the discrepancies of environmental risk factors for diabetes in urban versus rural populations could inform how communities and policymakers approach structural problems that promote disease development. Jagai says that studies like this can specifically help overlooked populations.

"Understanding local social and economic demographic factors can help communities develop environmental regulations and policies to improve the health outcomes of their residents," she said.

More information: Jyotsna S Jagai et al, Association between environmental quality and diabetes in the USA, *Journal of Diabetes*

Investigation (2019). [DOI: 10.1111/jdi.13152](https://doi.org/10.1111/jdi.13152)

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