

# Combined factors compound lead exposure disparity for Milwaukee children

August 21 2020, by Laura Otto

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Milwaukee children do not have equal risk of lead exposure. The combined neighborhood factors of race, poverty and low homeownership compound the risk for elevated childhood blood lead levels in Milwaukee County, according to a study by public health researchers at the University of Wisconsin-Milwaukee.

Neighborhoods with [children](#) that have high levels of lead exposure are predominantly on the north and south sides of Milwaukee. However, that alone doesn't tell the full story, said Helen Meier, assistant professor in UWM's Zilber School of Public Health.

"A neighborhood is not just one thing," Meier said. "Many of these factors occur together in our neighborhoods, so we wanted to know what the combined impact of these factors were on neighborhood childhood blood lead levels."

Using data from the Wisconsin Department of Health Services and the U.S. Census Bureau, Meier and graduate student Emily Lynch performed an analysis of nearly 50,000 individual blood lead level tests from children spread out among 215 Milwaukee County census tracts. The research was published in the journal *PLOS ONE* in June.

The researchers found the combined effect of the factors is greater than the sum of each effect, Meier said. Race made a difference as majority nonwhite neighborhoods had higher average blood lead levels than majority white areas. They also found no significant difference between the mean blood lead levels in white neighborhoods with different socioeconomic indicators. Neighborhoods with all three factors—low homeownership, poverty and majority nonwhite—had the highest average blood lead levels in the county.

While the association between socioeconomic status and racial inequality to childhood lead exposure has been well-documented, Lynch said, drivers of childhood lead exposure in Milwaukee are understudied. And Milwaukee has the second-lowest Black homeownership rate among the nation's largest metropolitan areas at 27.2%.

Lead is a persistent contaminant that is found in paint, dust, soil, water piping and air emissions. While the Centers for Disease Control and

Prevention classifies childhood blood lead levels at or above 5  $\mu\text{g}/\text{dL}$  (micrograms per deciliter) as "elevated," there is no safe level of lead exposure. Still, while the statewide average of children with blood lead levels greater than or equal to 5  $\mu\text{g}/\text{dL}$  was 5% in 2016, 8.8% of Milwaukee County children under age six had elevated levels, according to the state Department of Health Services.

The researchers hope the study will help stimulate [public policy](#) on prevention efforts in vulnerable [neighborhoods](#), Meier said. The City of Milwaukee Health Department currently rations services to children, with one blood lead test  $\geq 20 \mu\text{g}/\text{dL}$  or two blood lead tests  $\geq 15 \mu\text{g}/\text{dL}$  drawn at least 90 days apart. That means many children with elevated [blood](#) lead levels do not receive case management.

"That's our goal in looking at upstream factors, or 'risks of risk,'" she said. "We must ensure that children aren't exposed to lead in the first place."

Housing and economic policies could address racial and economic inequality, especially for renters. Other cities are strengthening tenant laws, codifying tenant rights and requiring "lead safe" certifications for rental units, Meier said.

**More information:** Emily E. Lynch et al. The intersectional effect of poverty, home ownership, and racial/ethnic composition on mean childhood blood lead levels in Milwaukee County neighborhoods, *PLOS ONE* (2020). [DOI: 10.1371/journal.pone.0234995](https://doi.org/10.1371/journal.pone.0234995)

Provided by University of Wisconsin - Milwaukee

Citation: Combined factors compound lead exposure disparity for Milwaukee children (2020,

August 21) retrieved 27 April 2024 from <https://medicalxpress.com/news/2020-08-combined-factors-compound-exposure-disparity.html>

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