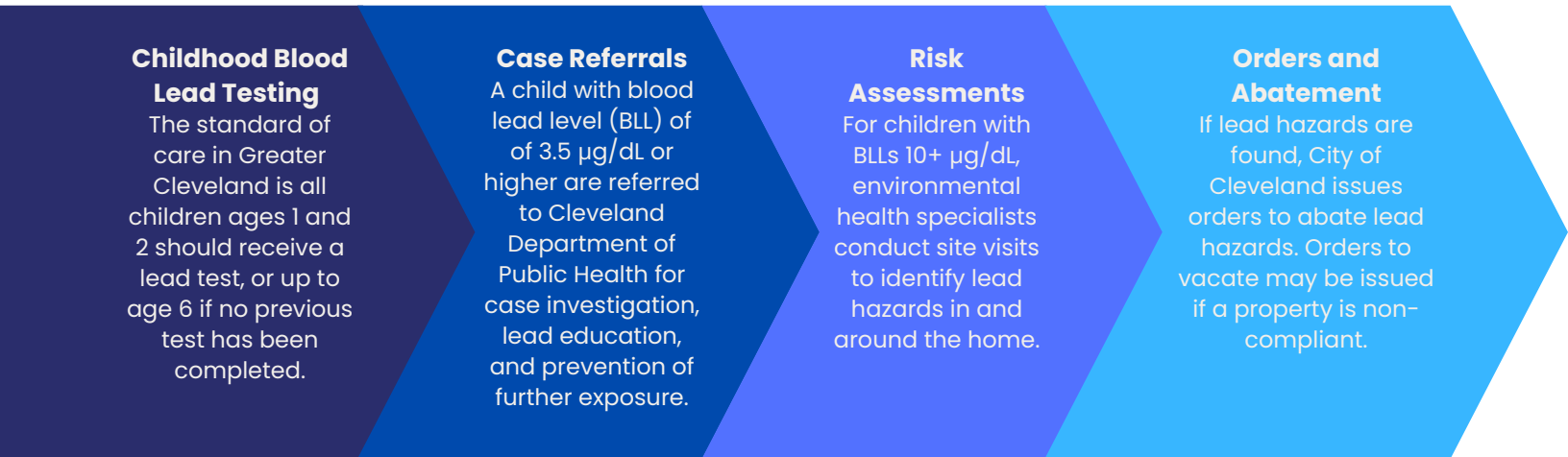# Public Health Lead Investigations

Childhood Blood Lead Testing
The standard of care in Greater Cleveland is all children ages 1 and 2 should receive a lead test, or up to age 6 if no previous test has been completed.

Case Referrals
A child with blood lead level (BLL) of of 3.5 µg/dL or higher are referred to Cleveland Department of Public Health for case investigation, lead education, and prevention of further exposure.

Risk Assessments
For children with BLLs 10+ µg/dL, environmental health specialists conduct site visits to identify lead hazards in and around the home.

Orders and Abatement
If lead hazards are found, City of Cleveland issues orders to abate lead hazards. Orders to vacate may be issued if a property is non-compliant.

Figure 1.

From 2005 to 2019, the percentage of children with elevated blood lead levels decreased. Since 2019, the percentage has been stable.

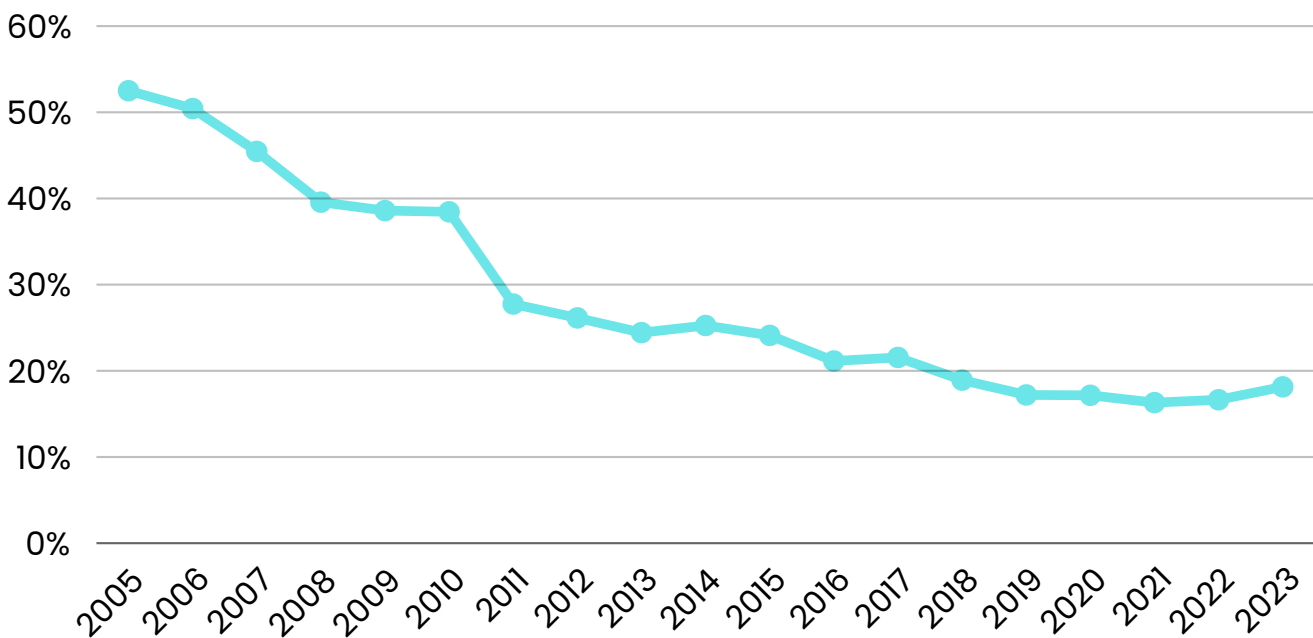Percentage of blood lead tests ≥3.5 µg/dL in children ages 1-5 per year.

Table 1.

The annual number of children ages 1-5 with elevated blood lead levels (BLL) has steadily decreased. At the same time, the frequency of lead testing has also declined.

Lead tests and blood lead levels in children ages 1-5 in Cleveland, 2015-2023.

Test Year	Blood Lead Levels (BLL)				Total Children Tested	Estimated 1-5 Year Population
	3.5-<5 µg/dL	5.0-<10 µg/dL	10-<40 µg/dL	≥40 µg/dL		
2015	1,071	1,311	457	10	11,819	29,182
2016	911	1,199	450	14	12,174	29,553
2017	872	1,169	524	11	11,951	30,022
2018	876	949	388	8	11,739	28,165
2019	822	836	284	8	11,338	27,863
2020	506	578	211	3	7,563	26,830
2021	539	636	254	7	8,805	23,793
2022	530	564	240	13	8,093	25,004
2023	556	593	261	11	7,834	24,159

There is no safe level of lead in the body.

Figure 2.

CDC updated the blood lead reference value to 3.5 µg/dL in 2021.
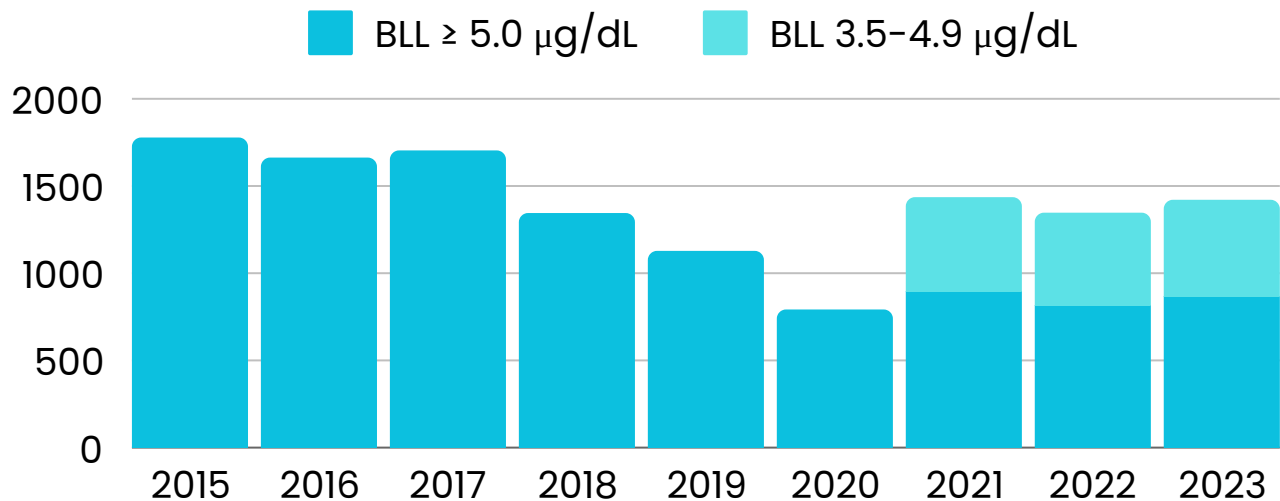
In 2021, the Centers for Disease Control and Prevention (CDC) updated the blood lead reference value (BLRV) from 5.0 micrograms per deciliter (µg/dL) to 3.5 µg/dL for children ages 1-5. representing the 97.5th percentile of blood lead distribution in that age group. This graph shows how many children with BLLs 3.5-4.9 µg/dL now receive prompt actions to reduce the harmful effects of lead and identify and eliminate sources of lead exposure.

There is no safe level of lead in the body.

Public health practitioners and healthcare providers use the BLRV of 3.5 µg/dL to identify children with blood lead levels higher than most U.S. children, determine follow-up actions, and prevent further exposure.

Figure 3.

Cleveland has the most kids with high lead levels in their blood compared to other big cities in Ohio and Detroit, Michigan.

Percentage of tests with elevated BLLs are shown using the 5.0 µg/dL reference value due to data availability.
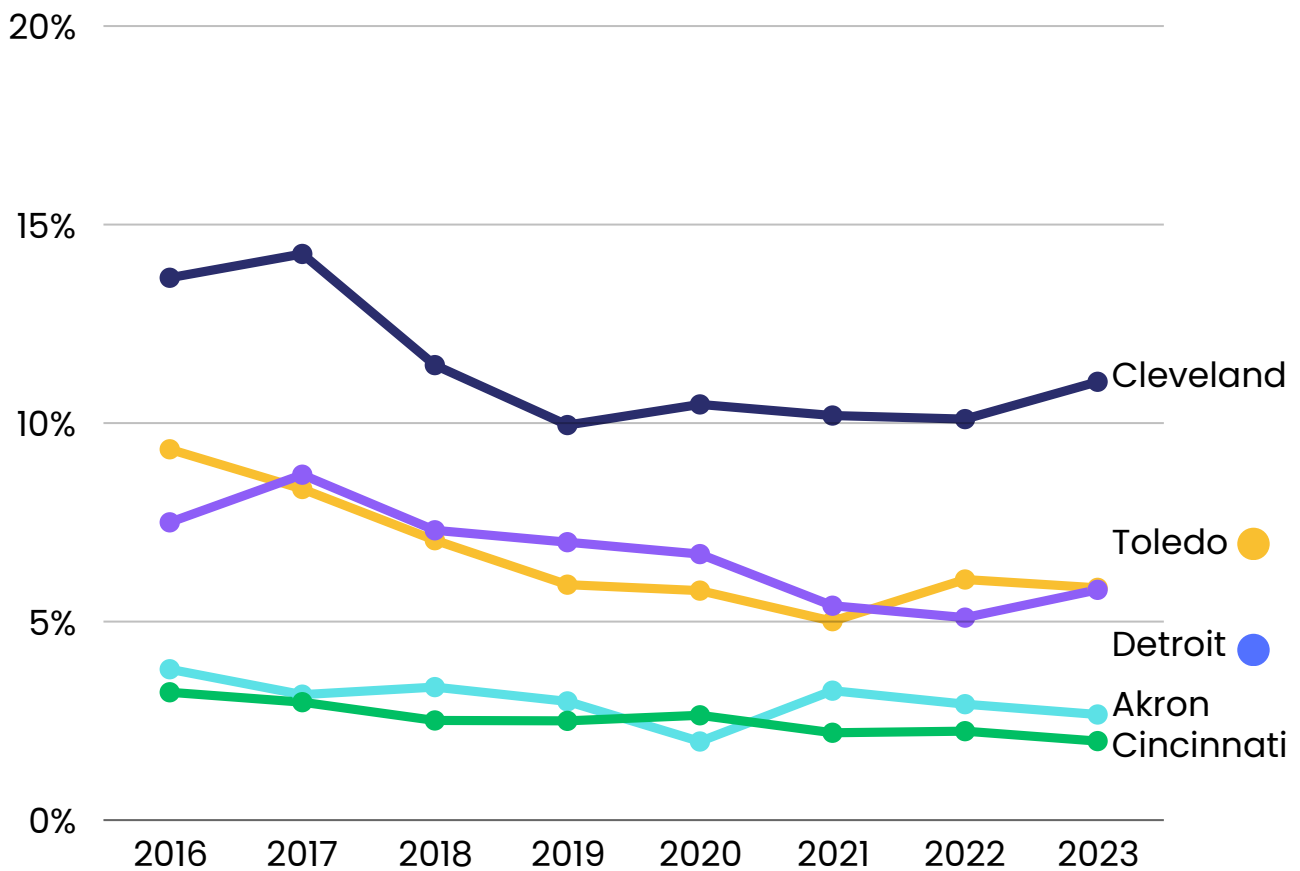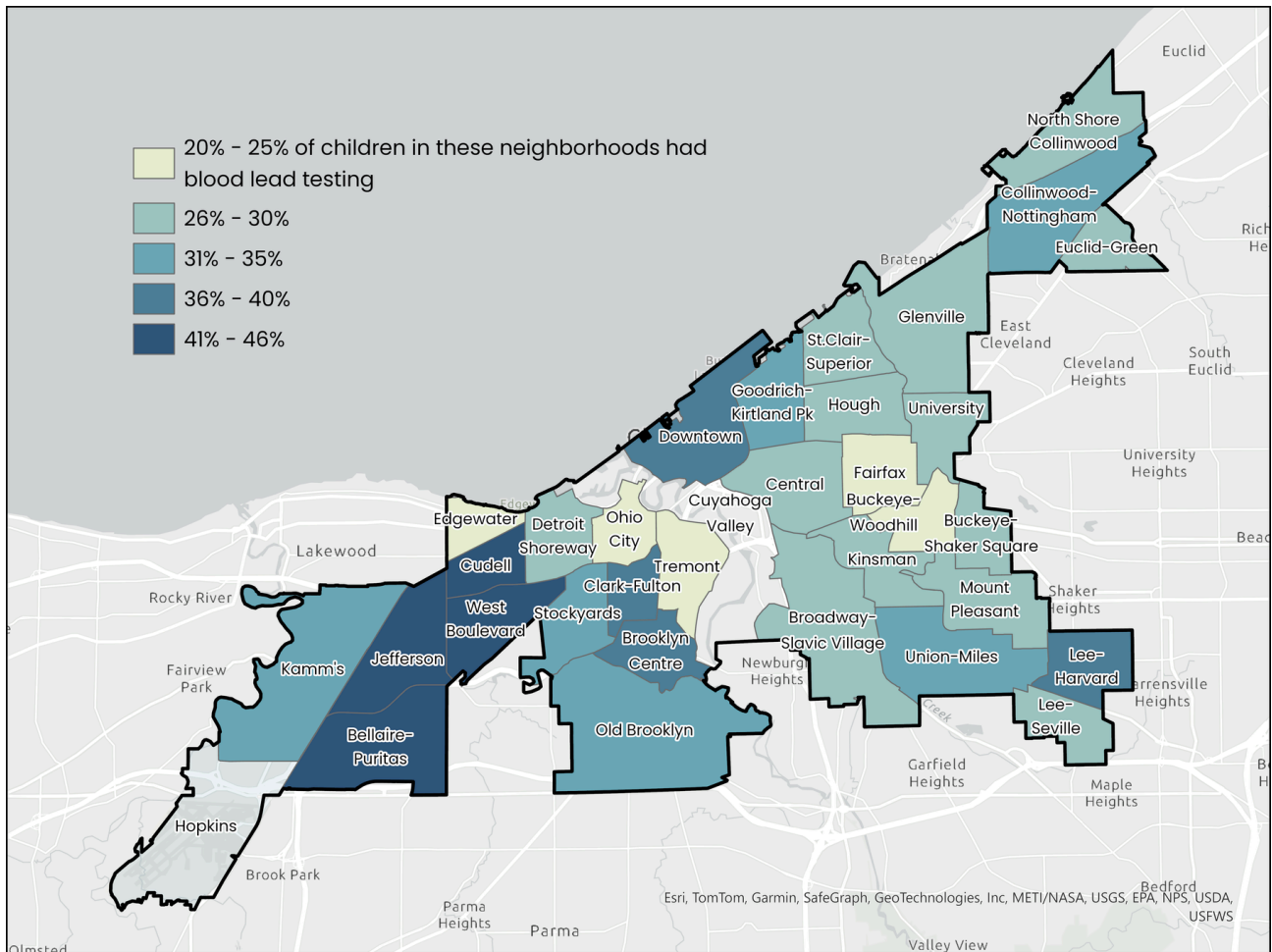
Figure 4.

In 2023, Cleveland's east side neighborhoods had lower rates of lead testing compared to west side.

Percentage of children ages 1-5 who who were tested for lead in 2023.

This map estimates testing rates in neighborhoods during a year period. Children who did not test in 2023 may have tested in previous years and are not represented in these rate estimates.

Figure 5.

From 2019 to 2023, east side neighborhoods accounted for more of the decrease in lead testing than west side neighborhoods.

Percentage change of lead testing for children ages 1-5 (2019 - 2023).
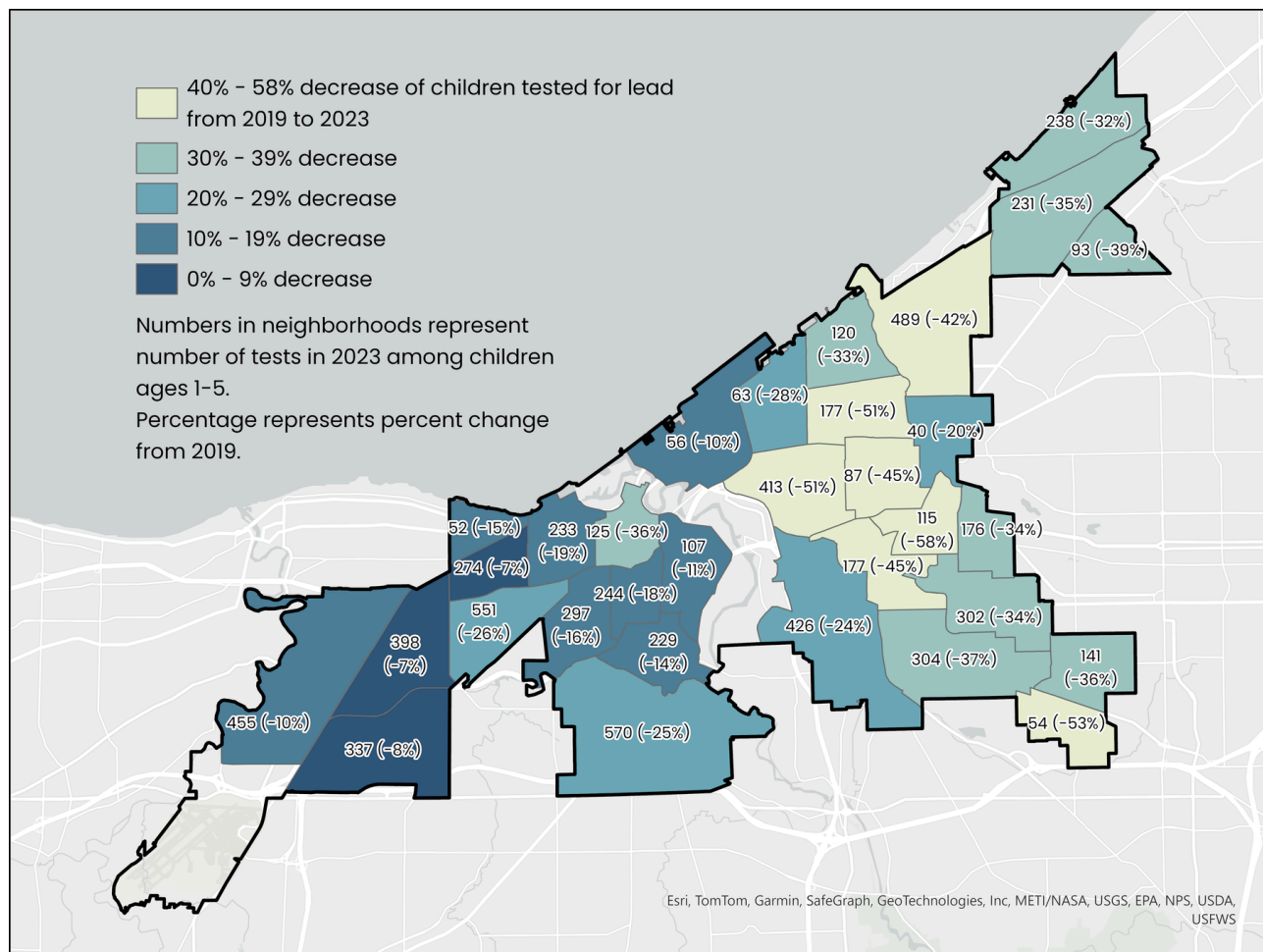
In 2019, 11,338 children aged 1-5 tested for lead. By 2023, only 7,834 children were tested. Even though testing decreased in every neighborhood, this map shows that fewer kids on the east side were getting tested for lead, with some places having >50% fewer tests. The map does not account for demographic changes such as the number of families with young children living in each neighborhood.

Figure 6.

Elevated blood lead levels are not equally distributed across the city. Some neighborhoods have higher rates of children with elevated BLLs ≥3.5 μg/dL compared to others.
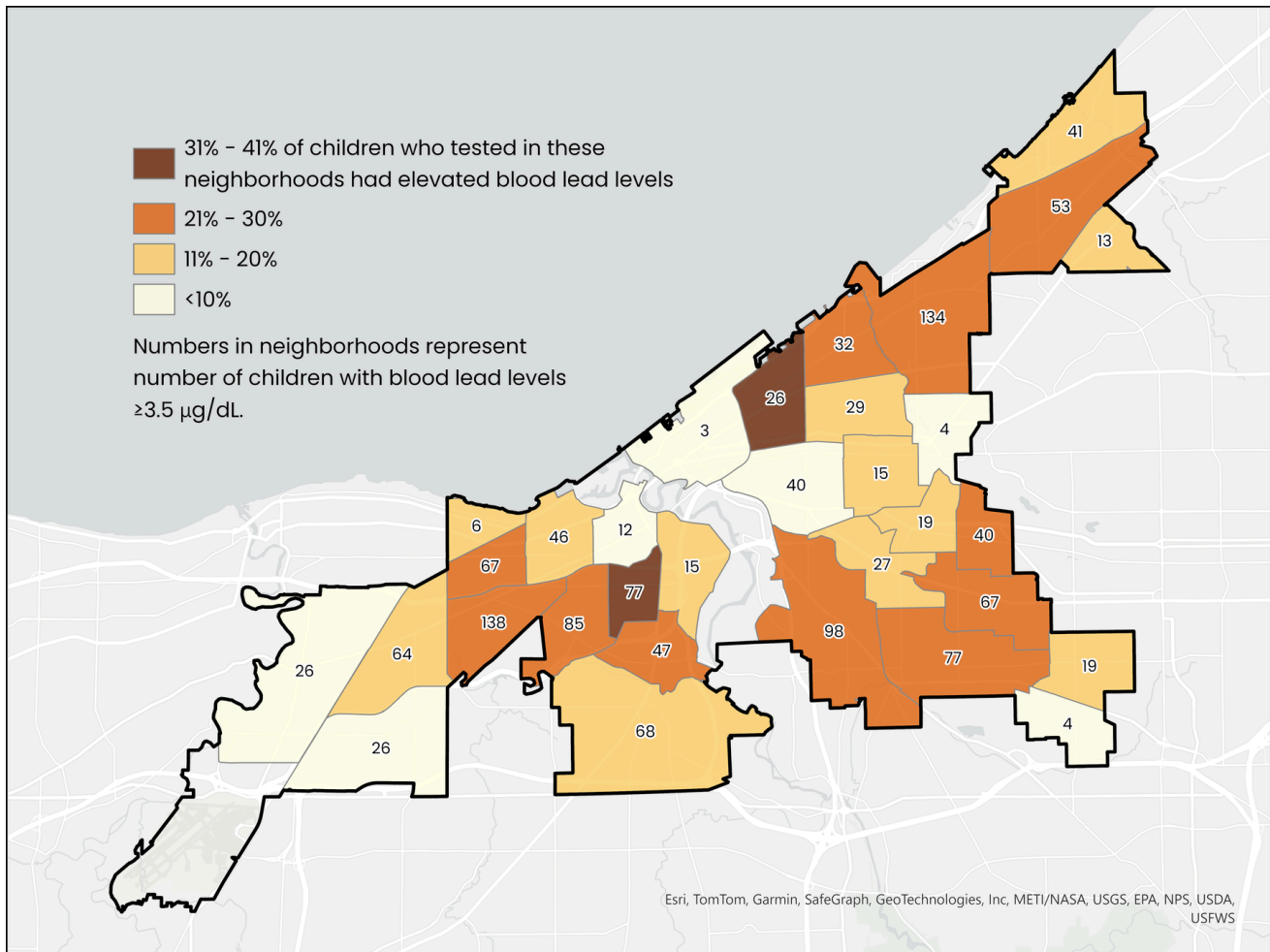
This map shows how many kids had elevated BLLs out of all the kids who tested per neighborhood in 2023. On the west side, the neighborhoods with the highest rates include Clark Fulton, Stockyards, West Boulevard, Cudell, and Brooklyn Center. On the east side, these neighborhoods include Goodrich-Kirtland Park, Glenville, Saint Clair-Superior, Collinwood-Nottingham, Broadway Slavic, Union-Miles, Mount Pleasant, and Buckeye-Shaker Square.

Figure 7.

In 2023, on the west side of Cleveland, most lead exposures resulting in elevated BLLs occured in close proximity of each other in four neighborhoods. On the east side, they were more widespread.
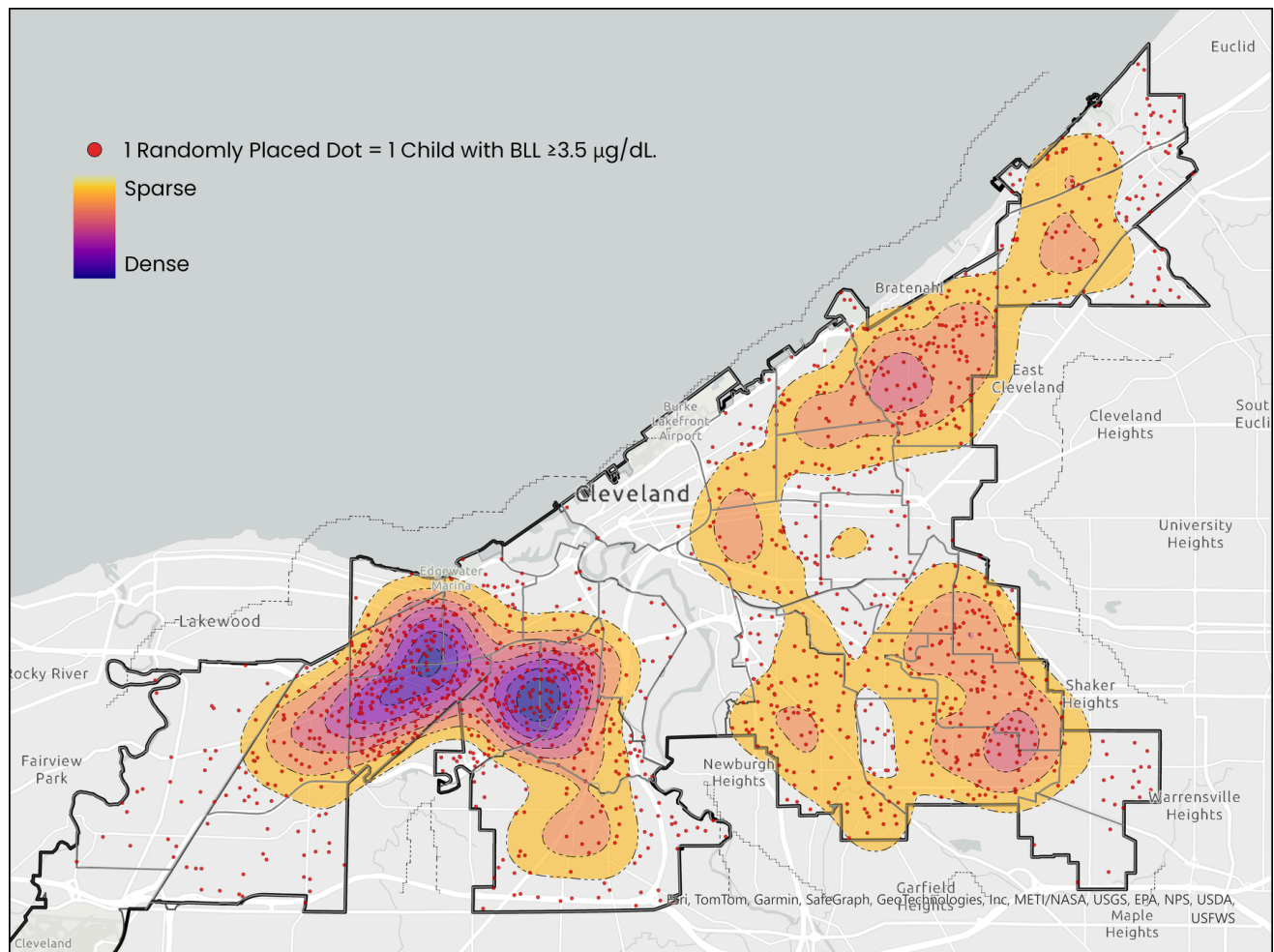
This map shows where lead exposures resulting in elevated BLLs ≥3.5 µg/dL are more concentrated. The dots on the map do not show real places; they just help show how many there are in each area. Darker colors mean there are more cases in the area. In 2023, about 700 kids on both the west and east sides of Cleveland had high levels of lead in their blood, but the cases on the east side are less concentrated in specific neighborhoods. Reasons such as vacant parcels and fewer housing unit may contribute to this pattern.

Acknowledgment and Disclaimer

These data were provided by the Ohio Department of Health, through the DataOhio Portal. The Department specifically disclaims responsibility for any analyses, interpretations, or conclusions from these data.

Methods

Data Sources

- Cleveland's lead testing data are securely shared to Cleveland Department of Public Health as a delegated authority for performing public health lead investigations through the Ohio Healthy Homes Lead Poisoning Prevention Program (OHHLPPP) at Ohio Department of Health (ODH).
- Lead testing data for Ohio cities publicly provided by OHHLPPP and were retrieved from "Blood Lead Testing Public (2016-Present)" on the Data Ohio Portal (data.ohio.gov).
- Lead testing data for Detroit was retrieved from https://mitracking.state.mi.us.
- American Community Survey 1-Year Estimates are used for year-to-year Cleveland population estimates.
- Neighborhood population estimates for 2023 are provided by The Center on Poverty and Community Development.

Estimates

Population estimates used in Table 1 for children ages 1-5 in Cleveland are retrieved from American Community Survey 1-year estimates, which are selected for the currency of the estimate to the respective year. The custom age group of 1-5 is calculated assuming even distributions of single years of age. This assumption is erroneous, but permits rough estimates for the age group of interest.

Figure 4 omits n = 255 individuals who tested in 2023 with invalid addresses.
Figure 5 omits n = 506 individuals who tested in 2019 with invalid addresses.

Analysis

Data are managed using R 4.4.1 and R Studio 2024.04.02. Choropleth, dot density and kernel density maps were created using ArcGIS Pro 3.3.1.