

# LEAD POISONING BURDEN AND SCREENING CHILDREN UNDER SIX, TENNESSEE, 2017 – 2021

## Tennessee Childhood Lead Poisoning Prevention Program

### Summary:

- From 2017–2019, Tennessee’s screening rates averaged 17.9%. In 2020 and 2021, rates fell to 16.9% and 16.1%, respectively, as a result of the COVID-19 pandemic and Magellan’s Lead Care II Test Kit Recall. These were the lowest annual rates in the last five years.
- The blood lead burden for children 5 µg/dL and above has continued its steady decline since 2017, reaching 0.9% in 2021. In 2021, the burden for those 10 µg/dL and above fell below 0.3% for the first time ever after several years of stagnation.
- Despite continuing declines in blood lead burden, there is **no** safe blood lead concentration.†
- From 2017–2021 the county-level aggregate screening rate varied widely, ranging from 24–100%.
- Non-urban children covered by public insurance (includes Medicaid/TennCare, Indian Health Services, Tricare, and other government services) were more likely to receive screening and have EBLL compared to their urban counterparts.
- Black children were more likely to receive screening than their White counterparts regardless of insurance coverage type.
- There was no statistically significant difference in EBLL rates between Black and White children when controlling for insurance coverage type.

Fig. 1 Annual Blood Lead Screening Among Children Under Age 6, Tennessee, 2017–2021

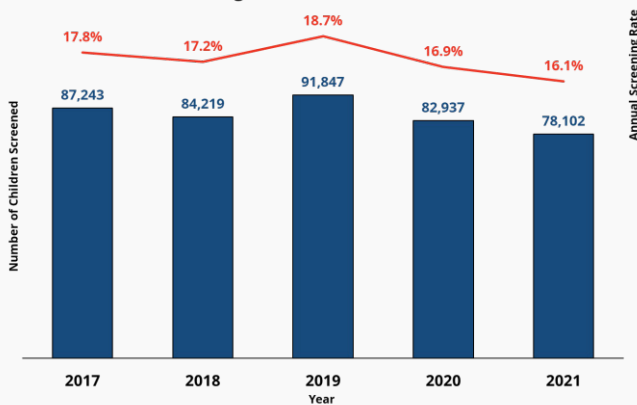


Fig. 2 Blood Lead Burden Among Screened Children Under 6 Years of Age, Tennessee, 2017-2021

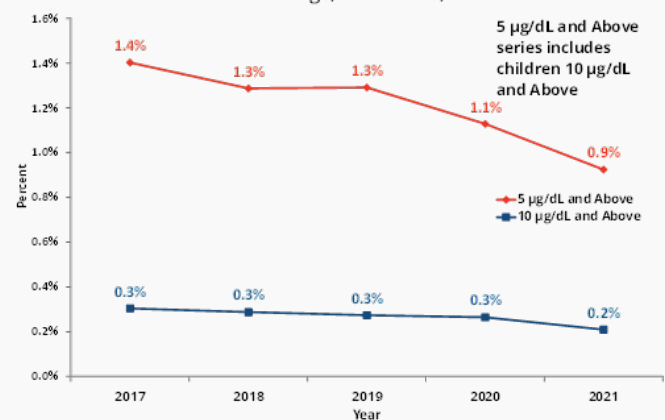
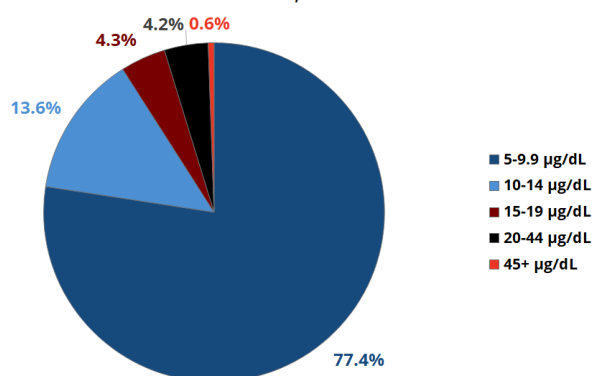


Fig. 3 Children Under 6 with EBLL by Blood Lead Level, Tennessee, 2021



- In 2020 and 2021, Tennessee’s screening numbers and rates fell to their lowest levels since 2017 (Fig. 1).
- The annual screening rate decreased by nearly 10% from 2019 to 2020 and an additional 5% from 2020 to 2021 (Fig. 1) due to the COVID-19 pandemic and Lead Care II Test Kit Recall.
- The rate of EBLL ≥ 5 µg/dL reached a low of 0.9% in 2021.
- The rate of EBLL ≥ 10 µg/dL fell below 0.3% for the first time ever in 2021 (Fig. 2).
- In 2021, more than three in four (77.4%) children with EBLL had blood lead levels between 5 and 9 µg/dL. Nearly 5% of children with EBLL had blood lead levels ≥ 20 µg/dL (Fig. 3).

Fig 4. Aggregate Screening Rate by County, Children Under Age 6, Tennessee, 2017–2021

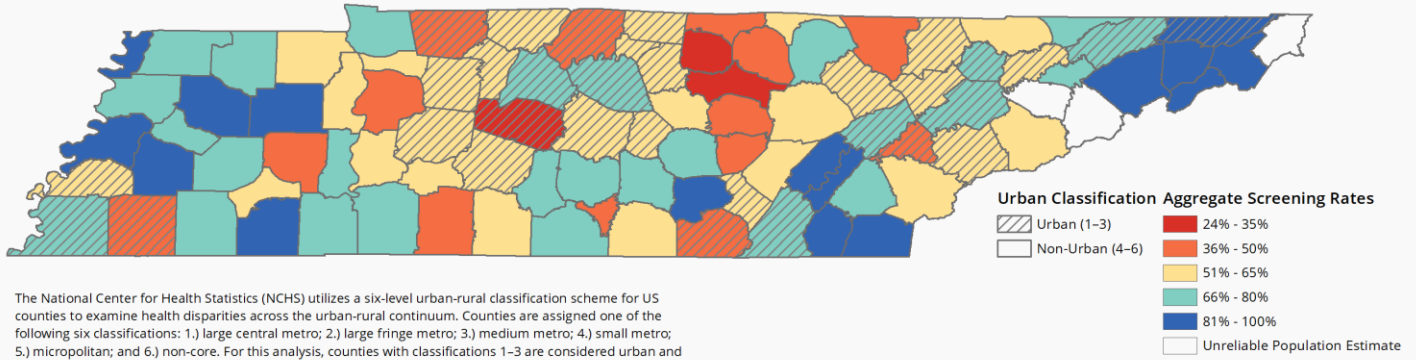


Fig. 5 2021 Population Estimate and 2017–2021 Screening Cohort by Residency Location, Tennessee

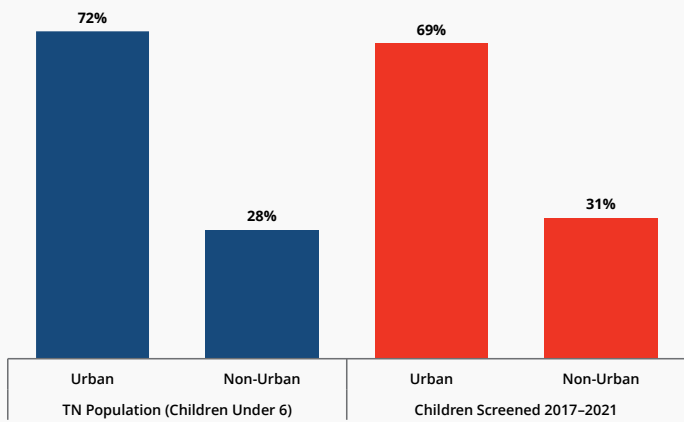


Fig. 6 Race Distribution Among Screened Children, Tennessee, 2017–2021

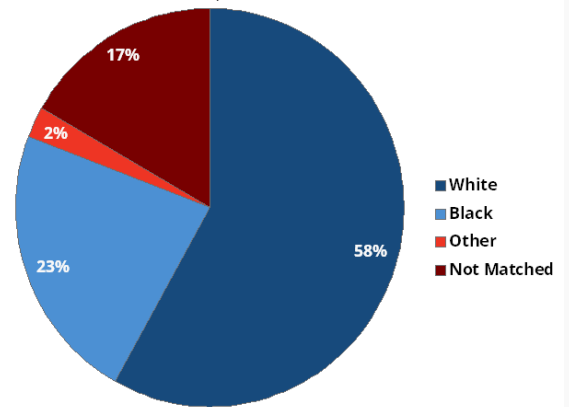
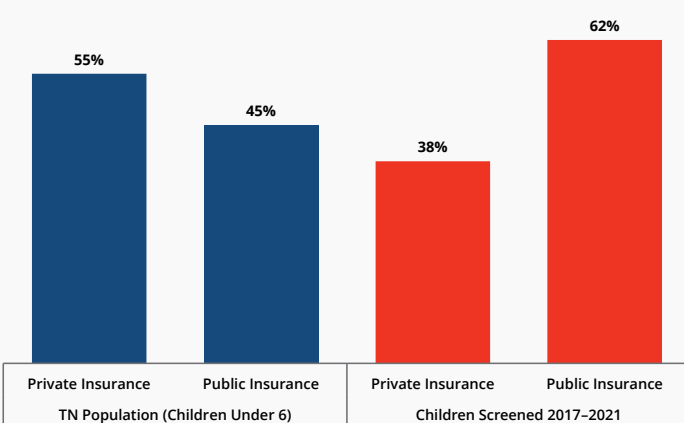


Fig. 7 2021 Population Estimate and 2017–2021 Screening Cohort by Payor, Tennessee



- Sullivan County had an aggregate screening rate above 80%, the highest among the six metropolitan counties in 2017-2021. Fourteen rural counties also had an aggregate screening rate above 80% (Fig. 4).
- 69% of children screened were urban residents (Fig. 5). This is 3 percentage points less than the population estimate, and the difference was statistically significant.\*
- 83% of children screened were successfully matched to a birth file record with a known race value (Fig. 6).
- The screened cohort has a considerably higher percentage of children on public insurance (62%) compared to the overall under 6 population estimate (45%) (Fig. 7). The difference was statistically significant.\* This can be explained by the practice of universal testing for TennCare children at the age of 12 and 24 months and screening for other children who will be tested if they have risk factors.

Fig. 8 Aggregate Screening Rates by Residency Location and Payor, Tennessee, 2017–2021

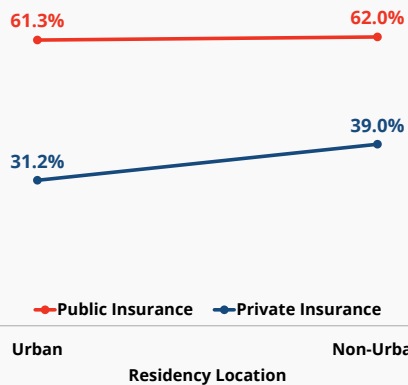


Fig. 9 EBLL Rates by Residency Location and Payor, Tennessee, 2017–2021

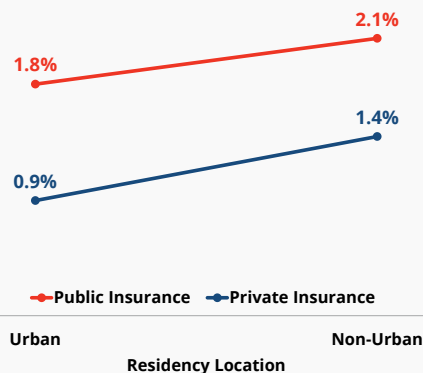
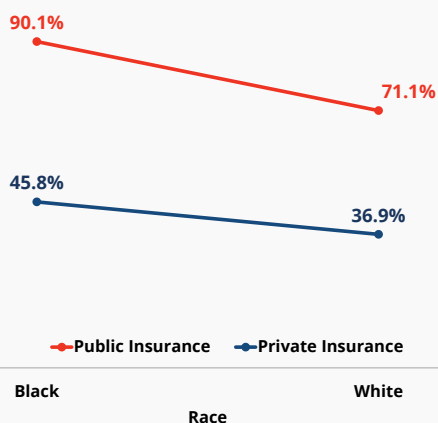


Fig. 10 Aggregate Screening Rates by Race and Payor, Tennessee, 2017–2021



- During 2017–2021, publicly insured children had higher screening rates and EBLL rates than children on private insurance, regardless of residency location. The difference in screening rates was smaller among non-urban children than urban children while the difference in EBLL rates was similar (Fig. 8 & Fig. 9).
- Publicly insured children had higher screening rates than their private counterparts regardless of race. However, the gap was greater among Black children. Black children with public coverage had the highest screening rate (90.1%) while White children on private insurance had the lowest (36.9%) (Fig. 10).
- When controlling for payor source, the difference in EBLL rate between Blacks and Whites was not statistically significant (chart not shown).

## Definitions/Methods:

- Annual screening rate: Number of children screened for blood lead in a year divided by the under six population.
- Aggregate screening rate: Number of children who had at least one blood lead test prior to age six divided by the under six population estimate for the last year in the aggregate time interval.
- EBLL: A single blood lead test (capillary or venous)  $\geq 5 \mu\text{g/dL}$ . Children with confirmed EBLL in prior years are not included in yearly totals.
- EBLL rate: Number of unique children with an EBLL result divided by the total number of children screened.
- Deduplication methodology:
  - Annual screening: Each child's first elevated result was kept. If multiple results were collected on the same date, the lowest elevated result was kept. If a child had no elevated results, the lowest result collected on the first date was kept. Annual totals include one test per child and exclude children with a confirmed EBLL in prior years.
  - Five-year aggregated screening: Same procedure as the annual screening except the period is expanded to five years.
- The payor and race information were taken from the TN Vital Statistics birth records were matched with the screening data based on child's first name, last name, and date of birth. 16.7% of children screened from 2017–2021 were not matched to a birth file record indicating their predominant race; nearly 25% of this screening cohort was not matched to a birth file record that included payor information.
- Residency location was determined by matching population estimates and screening totals for each county with that county's value assigned by the National Center for Health Statistics' (NCHS) Urban-Rural Classification Scheme. NCHS values range from 1 (large central metro) to 6 (non-core). Counties assigned values 1–3 were considered urban while those assigned values 4–6 were considered non-urban.

## Data Sources:

Lead Screening Data: LeadTRK. Division of Family Health and Wellness, Tennessee Department of Health. Data updated on May 19, 2023.

Statewide and county level population: Division of Vital Records and Vital Statistics, Tennessee Department of Health.

Race data and payor information for screened children: Division of Vital Records and Vital Statistics, Birth File Records 2009–2021, Tennessee Department of Health.

Private and public insurance population by race and county: American Community Survey 2021 5-year estimates Tables S2703 and S2704.

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<sup>†</sup>The Centers for Disease Control and Prevention (CDC), Childhood Lead Poisoning Prevention. <https://www.cdc.gov/nceh/lead/prevention/default.htm>.

\*Chi-square testing was used to test the differences in residency distribution among population estimates and the actual screening cohort with significance level of 0.05.