

Data Brief: Childhood Lead Exposure in Massachusetts

December, 2019

Background

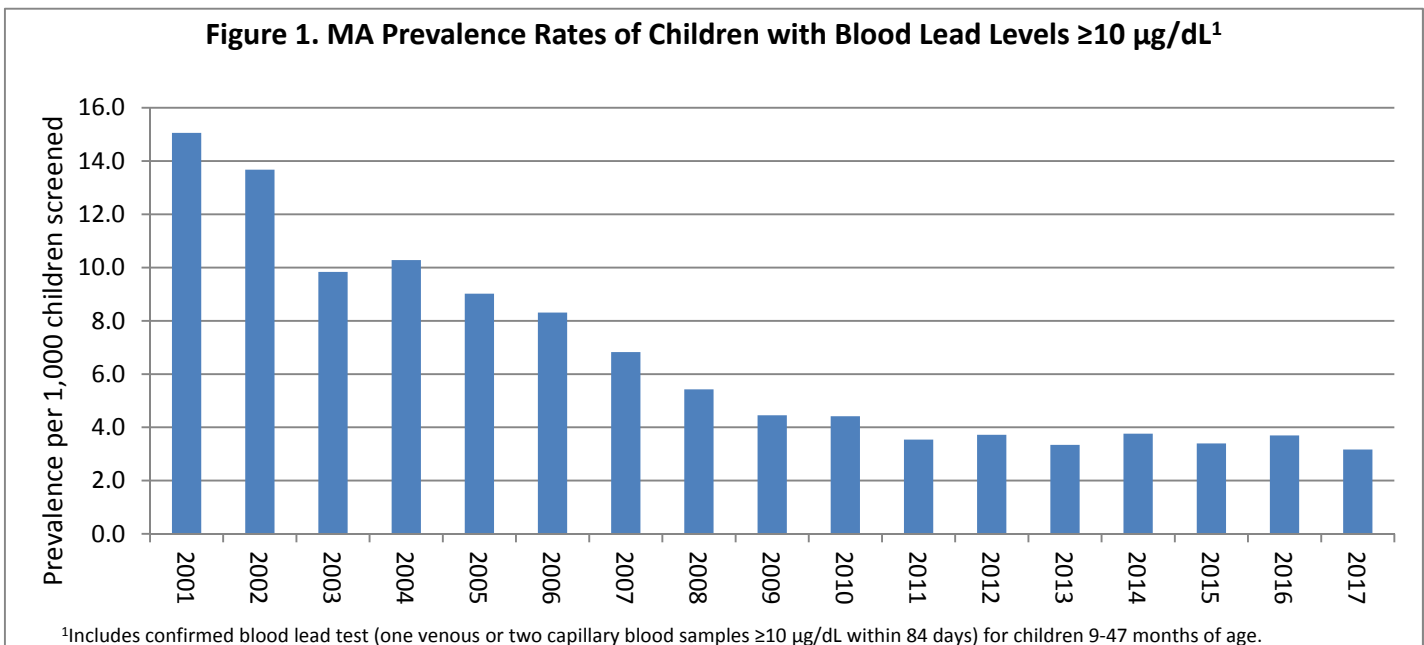
While the Commonwealth has made substantial gains in mitigating the harmful effects of lead exposure through public health interventions over the past 45 years, **lead exposure remains a significant health risk for children across Massachusetts**. There is no safe level of exposure to lead **and childhood exposure to relatively low levels can cause severe and irreversible health effects**,ⁱ including damage to a child’s mental and physical development.ⁱⁱ Numerous studies have documented correlations between childhood lead poisoning and future school performance, unemployment, crime, violence, and incarceration, making lead exposure an important contributor to the social determinants of health.ⁱⁱⁱ

The Massachusetts Lead Law (see MGL c. 111, §§ 189A-199B) **requires any dwelling unit where a child under six years of age resides to be lead safe**, regardless of a child’s blood lead level (BLL) or whether the property is owner-occupied. To implement the law, DPH’s Childhood Lead Poisoning Prevention Program (CLPPP) established an integrated program of laboratory services, mandatory blood lead screening, medical case management for children with elevated blood lead levels, environmental follow-up, training and licensure of public and private lead inspectors, and health education.

DPH updated its lead regulations effective December 1, 2017. Changes to the regulation included redefining “lead poisoning” in Massachusetts as a venous BLL of ≥ 10 $\mu\text{g}/\text{dL}$ (lowered from 25), establishing a “Blood Lead Level of Concern” as a BLL of 5-9 $\mu\text{g}/\text{dL}$ and extended lead exposure prevention services to all families with a child having a BLL of ≥ 5 $\mu\text{g}/\text{dL}$.

Blood Lead Screening Data

Figure 1. MA Prevalence Rates of Children with Blood Lead Levels ≥ 10 $\mu\text{g}/\text{dL}$ ¹



Lead screening data from calendar year 2017 indicates that 3,555^{iv} children may have BLLs that, according to the Centers for Disease Control and Prevention (CDC), require case management (BLLs ≥ 5 $\mu\text{g}/\text{dL}$). Of those, 549 children were identified with having BLLs legally considered “lead poisoned” pursuant to current Massachusetts regulation (venous BLL of 10 $\mu\text{g}/\text{dL}$ or greater).^v While the percentage of children with elevated BLLs in Massachusetts has historically declined, most recent statewide trends have plateaued (See Figure 1).

Housing and Lead

Lead paint is the primary hazard. When children are identified as lead poisoned, **most often the source of the exposure is through ingestion of dust or soil contaminated by loose or deteriorated lead paint**, frequently on windows and exteriors, or disturbed by unsafe renovation work in their homes. **In 2017, 88% of childhood lead poisoning cases were caused by exposure to lead paint.** Alternative sources such as spices or herbal remedies accounted for 9% of cases.

Massachusetts has the fourth oldest housing stock in the country, with approximately 71% of housing built before 1978 – the year lead was banned in residential paint. **Only ~10% of pre-1978 housing stock in Massachusetts has had an inspection for lead hazards and been confirmed free from lead hazards.**

With over 1.8 million housing units in Massachusetts built pre-1978 still not considered lead safe, children will likely continue to be exposed to high levels of lead in their homes.

High Risk Communities

Utilizing data, DPH identifies communities with a higher risk of childhood lead poisoning to better target resources and reduce health inequities associated with lead exposure in those communities. DPH determines risk by looking at rates of newly poisoned children, the age of housing, and income levels for each of the 351 cities and towns. **High-risk communities are in every part of the state.** In 2017, 19 high-risk communities were identified.

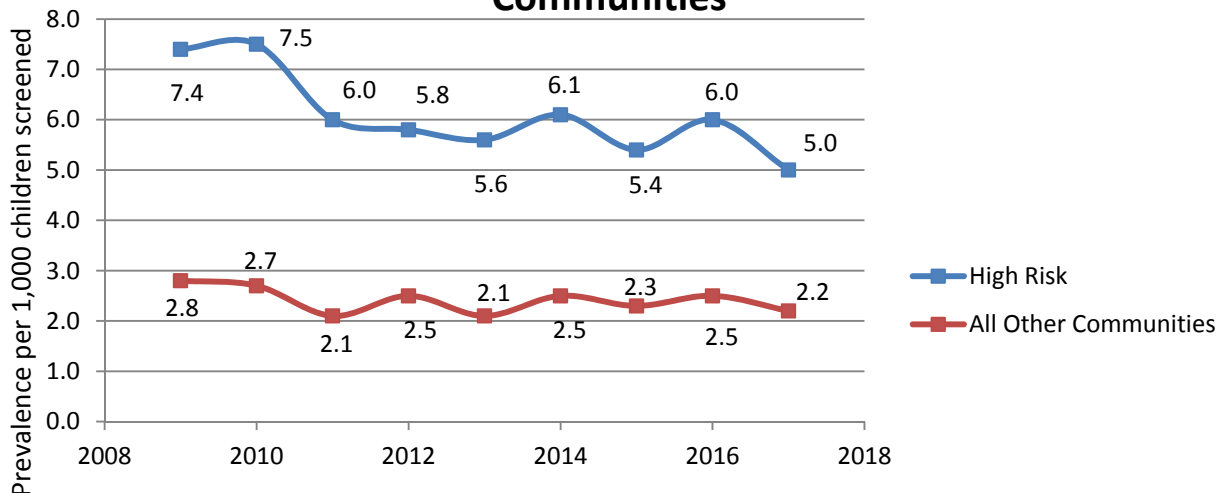
Children living in high risk communities are more likely to have lead poisoning than those living in other parts of the state. (see Figure 2, below).

Approximately 54% of identified cases of children with lead poisoning live in high-risk communities even though only about one third of Massachusetts children live in those communities. This inequity in the prevalence of poisoned childhood blood lead levels has persisted, despite reductions in BLLs overall.

2017 High Risk Communities

- Boston
- Brockton
- Chelsea
- Chicopee
- Everett
- Fall River
- Fitchburg
- Haverhill
- Holyoke
- Lawrence
- Lowell
- Lynn
- Malden
- New Bedford
- North Adams
- Pittsfield
- Southbridge
- Springfield
- Worcester

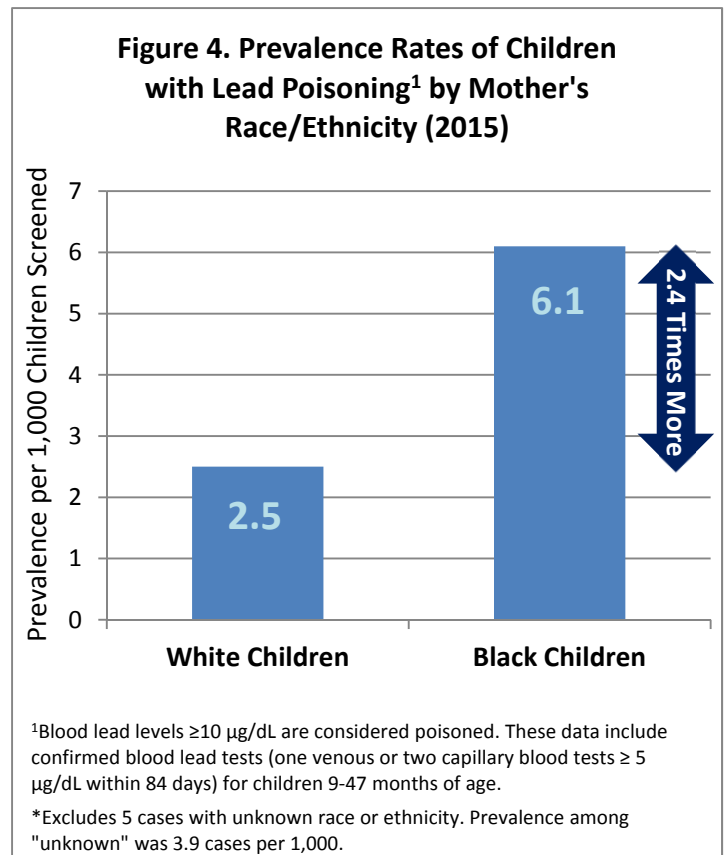
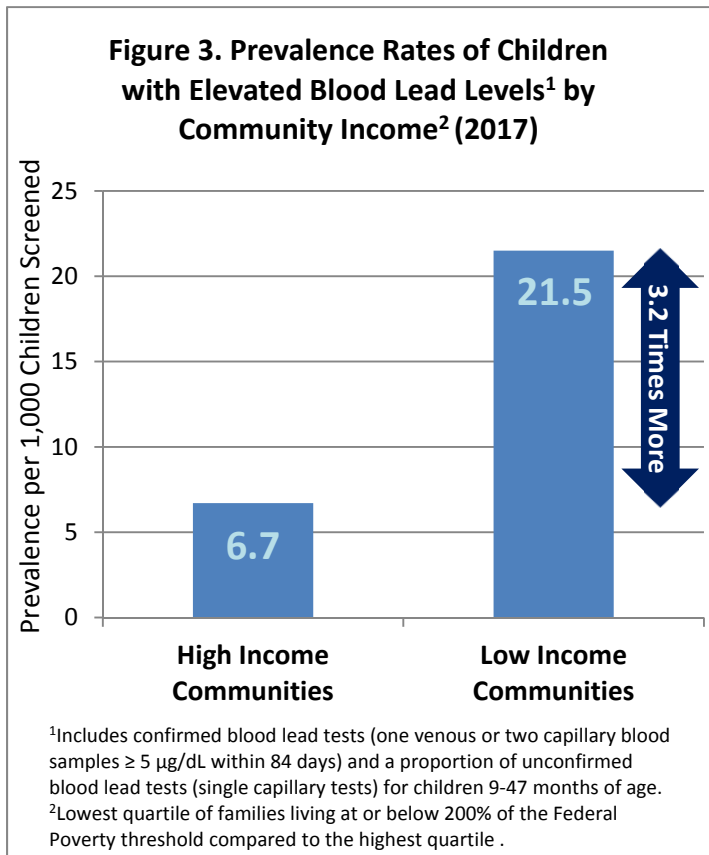
Figure 2. Comparison of Prevalence Rate of Blood Lead Levels $\geq 10 \mu\text{g}/\text{dL}$ ¹: High-Risk Communities vs. All Other Communities



¹Includes confirmed blood lead tests (one venous or two capillary blood samples $\geq 10 \mu\text{g}/\text{dL}$ within 84 days) for children 9-47 months of age.

Health Equity

While lead continues to affect children in all communities across Massachusetts, data collected by DPH shows that **lead exposure disproportionately impacts lower income communities and communities of color**, making lead exposure a critical health equity issue. Specifically, **children living in low income communities are more than 3 times more likely to have elevated blood lead levels than children living in high income communities** (See Figure 3), children of color are 1.5 times more likely than white children to exhibit dangerous levels of lead in their blood, and **black children are nearly 2.5 times more likely to have lead poisoning than white children** (See Figure 4). Historical housing policies that have perpetuated segregation and limited opportunity for home ownership, such as redlining, have led to the increase in risk factors for lead poisoning in black communities, including older housing stock, dilapidated housing and fewer owner-occupied housing units.^{vi}



For more information on DPH's Childhood Lead Prevention Program, visit:
www.mass.gov/orgs/childhood-lead-poisoning-prevention-program

ⁱ Advisory Committee on Childhood Lead Poisoning Prevention for the Centers for Disease Control and Prevention. Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention. January 2012: http://www.cdc.gov/nceh/lead/acclpp/final_document_030712.pdf

ⁱⁱ See, Lanphear, BP, "The Conquest of Lead Poisoning: A Pyrrhic Victory," Environmental Health Perspectives, Oct 2007, A484-A485.

ⁱⁱⁱ See, e.g., Brown, MJ. "Costs and Benefits of Enforcing Housing Policies to Prevent Childhood Lead Poisoning." Medical Decision Making, 2002, 22:482-492; Gould, E. "Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control." Environmental Health Perspectives, 117(7):1162-1167; Reyes, Jessica, "Environmental Policy as Social Policy? The Impact of Childhood Lead Exposure on Crime." National Bureau of Economic Research, May 2007. Available at <http://www.nber.org/papers/w13097>.

^{iv} Blood lead levels include both confirmed and unconfirmed blood lead specimens.

^v Blood lead levels include both confirmed and unconfirmed blood lead specimens.

^{vi} See, Sampson, Robert J. "The Racial Ecology of Lead Poisoning: Toxic Inequality in Chicago Neighborhoods, 1995-2013" DuBois Review: Social Science Research on Race (2016); Moody H, Darden J. and Pigozzi B. "The Relationship of Neighborhood Socioeconomic Differences and Racial Residential Segregation to Childhood Blood Lead Levels in Metropolitan Detroit", Journal of Urban Health, (820-839)(2016)