MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

2021 Annual Childhood Lead Poisoning Surveillance Report

Highlights

- Lead paint is the primary source of childhood lead exposure and Massachusetts has the 4th oldest housing stock in the country, making lead exposure a significant health risk for Massachusetts children.
- After a slight increase in 2020, the prevalence of lead poisoning, a venous blood lead level (BLL) ≥10 µg/dL, remained steady in 2021 at 0.28%, with 444 children between 9 months to less than 4 years of age identified as lead poisoned; the prevalence of children estimated to have a BLL ≥5 µg/dL was slightly lower in 2021 compared to 2020 at 1.2%, with a total of 1,836 children**.**
- Lead screening rates have not fully recovered to the 2019 pre-pandemic level of 72%; however, screening rates increased to 68% in 2021, up from 62% in 2020.
- Increases in the prevalence of lead poisoning observed in 2020 were disproportionately seen among high-risk communities; this disparity continued among the 16 high-risk communities identified in 2021.
- Children living in the most rural areas of the state are 1.4 times more likely to have elevated BLLs compared to children living in urban communities; however, this disparity represents a substantial improvement for children living in rural areas compared to 2020, when these children were 2.4 times more likely to have elevated BLLs compared to children living in urban areas.
- Children living in low-income communities are 3.4 times more likely to have elevated BLLs than those in high-income communities.
- Multi-race children are 3 times more likely to have lead poisoning than white children.
- To address health inequities and the impacts of the COVID-19 pandemic on childhood lead exposure, the CLPPP is targeting expanded outreach to high-risk populations and family care practitioners.

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 health risk for children across Massachusetts**. There is no safe level of lead in blood and **childhood exposure to relatively low levels can cause severe and irreversible health effects**,[1] including damage to a child's mental and physical development.[2] Numerous studies have documented correlations between childhood lead poisoning and future school performance, unemployment, crime, violence, and incarceration, making lead exposure an important factor in the social determinants of health.[3,4,5] Lead exposure is also a health equity issue, in which social position (e.g. socio-economic status) and socially assigned circumstances (e.g. race, ethnicity, etc.) prevent equal opportunities for children to reach their full health, social, and economic potential.

Lead paint is the primary source of exposure for lead-poisoned children. **Most often, exposure occurs through ingestion of dust or soil contaminated by loose or deteriorated lead paint**, frequently on windows and exteriors, or disturbed by unsafe renovation work. Historically, lead paint has accounted for 95%

of all lead poisoning cases in Massachusetts. In more recent years, lead paint has accounted for 88%, while exposure from alternative sources such as spices and herbal remedies has increased, accounting for 9% of lead poisoning cases. Exposure sources for the remaining 3% of cases could not be identified.

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, the Department of Public Health's (DPH) Childhood Lead Poisoning Prevention Program (CLPPP) operates an integrated program of laboratory services, mandatory blood lead screening, medical case management for children with elevated blood lead levels, health education, environmental follow-up, and training and licensure of public and private lead inspectors.

This report for the year 2021 contains results of the DPH Childhood Lead Poisoning Prevention Program's annual review of screening rates and blood lead level prevalence, high-risk communities for lead poisoning, and special analyses designed to identify high-risk populations and evaluate progress towards health equity.

1. BLOOD LEAD SCREENING AND PREVALENCE OF EXPOSURE

The screening rate increased from 62% in 2020 to 68% in 2021.

The prevalence of BLLs ≥5 ug/dL decreased from 1.3% in 2020 to 1.2% in 2021.

The prevalence of BLLs ≥10 ug/dL remained the same in 2021 as in 2020, at 0.28%.

Screening by Age

Massachusetts regulations (105 CMR 460.050) **require that all children be tested for blood lead between 9 and 12 months of age and, again, at ages 2 and 3 years.** Additionally, all children should be tested at age 4 years if they live in a high-risk community. The lead screening rate for all children 9-47 months of age was 68% in 2021, an increase from 2020's rate of 62%. In 2021, statewide screening rates for 1-, 2-, and 3-year-old children were 71%, 72%, and 65%, respectively – an increase from 2020. However, 1- and 2-year-old screening rates continued to surpass that of 3-year-olds. Screening children through age 3 is vital since approximately 17% of newly elevated blood lead levels (≥5 µg/dL) are in 3-year-olds and the large majority of those (75% on average) were tested regularly at younger ages with no previous elevations. Failing to screen children through age 3 (and age 4 for high-risk communities) neglects exposed children, preventing these children and their families from receiving services.

Confirmatory Screening of Elevated Blood Lead Levels

The DPH CLPPP requires **venous confirmation of capillary blood lead specimens ≥5 µg/dL**, the federal Centers for Disease Control and Prevention's (CDC) reference value in effect from 2012 to September 2021 and the current Massachusetts definition of a BLL of Concern. Children with venous BLLs at or above 5 µg/dL should receive intervention such as lead education, environmental investigation, and additional medical monitoring. Prior to the 2017 regulatory update requiring confirmatory testing, the rate of confirmatory venous testing was 54%. Though the rate of confirmatory venous testing increased with the regulatory requirement, it remains low. In 2021, only 66% of children received the required venous follow-up test. Analysis indicates that approximately a third of the children with unconfirmed tests would be confirmed elevated had they received the required venous follow-up test. This leaves many children without important interventions to address their lead exposure.

Timely venous confirmatory re-screening is needed to better target public health services. Capillary specimens are a useful tool for preliminary lead screening; they are easier to conduct than venous tests and a negative result is, typically, very reliable. However, there is only a 30% likelihood that a single elevated capillary result (≥5 µg/dL) is truly elevated upon a venous confirmatory rescreen. For capillary test results ≥10 µg/dL, CLPPP staff contact health care providers to ensure the child receives a confirmation venous test. Because many of these cases are resolved as falsely elevated capillary tests, timely venous re-screening would reduce the current level of CLPPP oversight.

Impact of New CDC Reference Value

In October 2021, the CDC lowered the blood lead reference value from 5 µg/dL to 3.5 µg/dL. As shown in Figure 1, Massachusetts saw a total of 2,451 children aged 9-47 months with blood lead level test results between 3.5 and 4.9 µg/dL, but more than half were capillary test results. Only 6% of the capillary test results in this range received confirmatory re-screening, and preliminary data indicates that the reliability of capillary results in this range is low. Capillary testing is a useful screening tool, but without venous follow-up testing for blood lead levels ≥3.5 µg/dL, accurate exposure rates are difficult to calculate. Improved venous confirmatory testing (or venous initial screening) is critical to identify lead-exposed children.

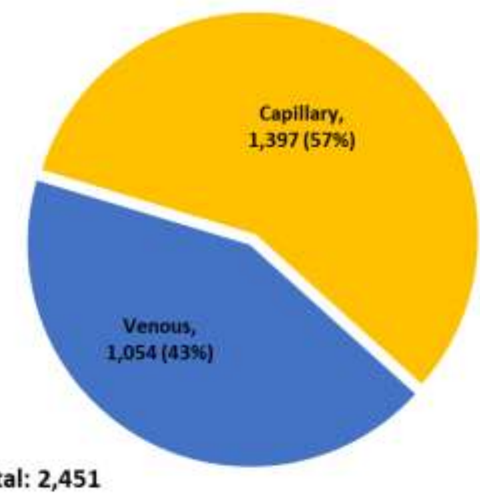


Figure 1. Children with Blood Lead Levels 3.5- 4.9 µg/dL by Test Method 9-47 Months of Age, 2021

Screening Rates by Community

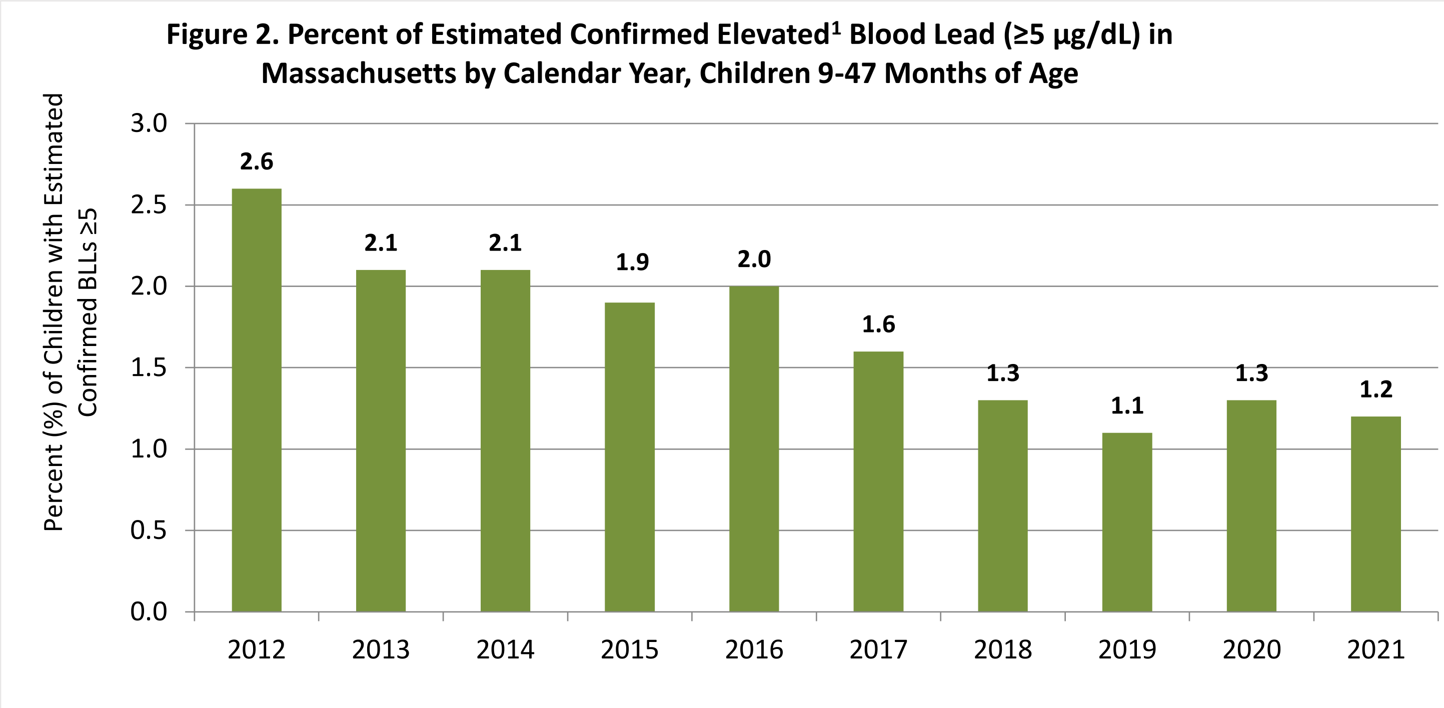
At the community-level, over 95% of communities saw a 2021 screening rate that was similar to or higher than their 2020 screening rate. However, for nearly 59% of these communities, their 2021 screening rate was still lower than their 2019 screening rate. Outreach and prevention activities are focused each year on communities with the lowest screening rates.

Exposure Prevalence

1,836 children had an estimated confirmed BLL ≥5 µg/dL in 2021, CDC's previous reference value for triggering intervention.

444 children were identified as having lead poisoning in 2021, a venous BLL ≥10 µg/dL.

Since the regulatory change in 2017, CLPPP initially saw a significant decrease in elevated blood lead levels (≥5 µg/dL) (Figure 2). However, in 2020, elevated blood lead prevalence increased for the first time in four years. In 2021, the prevalence of elevated blood lead levels improved again, decreasing from 1.3% to 1.2%, but still has not returned to the 2019 level.

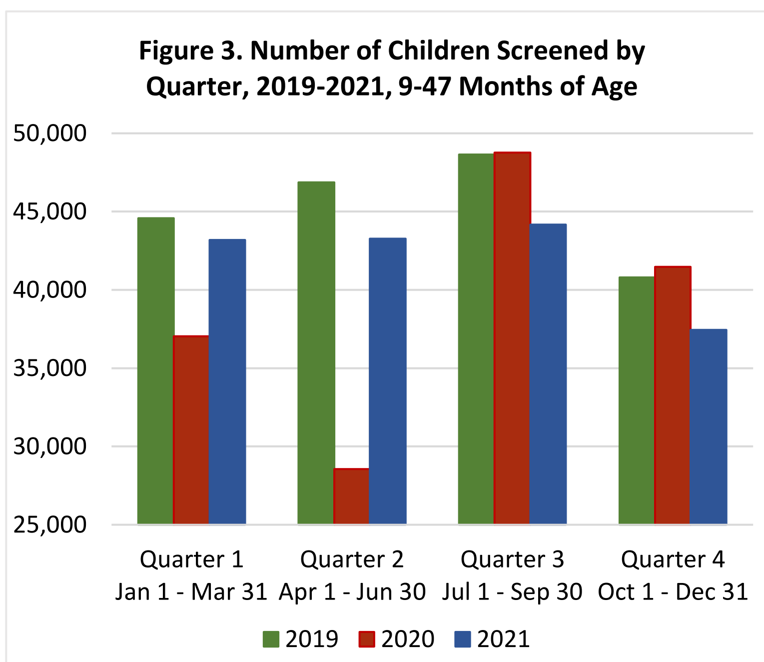


[1] Estimated confirmed BLLs ≥5 include both confirmed results (venous and confirmed capillary tests) and a proportion of unconfirmed capillary results estimated to be truly elevated based on known capillary test reliability.

2. PANDEMIC AND LEADCARE RECALL IMPACTS

Impacts on Lead Screening

In March 2020, the world saw the outbreak of a coronavirus pandemic. In Massachusetts and across the country, a state of emergency was declared and public health orders were issued resulting in closures of schools, child care programs, employment settings, and clinical health care services. Well-child visits were transitioned to a telehealth model. These events resulted in an overall lead screening decrease of 10% in 2020. The COVID-19 pandemic continued to impact lead screening rates in 2021, though not as severely, and a series of major recalls for the point-of-care lead testing device LeadCare II significantly impacted screening rates in the second half of 2021.



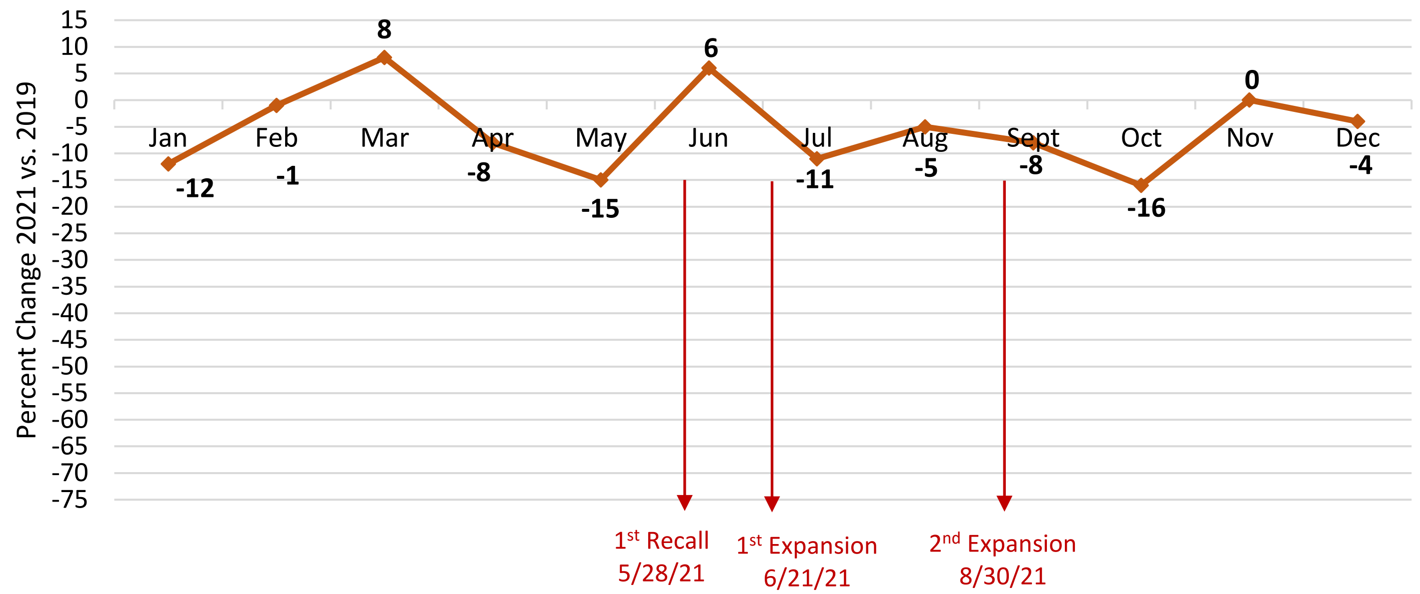
The number of children screened for lead in 2020 fell dramatically during the first wave of the pandemic compared to 2019, as seen in Quarters 1 and 2, but returned to normal during the second half of 2020 (Figure 3). In 2021, screening was again somewhat lower than usual. January was impacted by the winter COVID-19 surge. Screening was also impacted by the LeadCare II test kit recall in June (Figure 4).

LeadCare is a point-of-care lead testing device often used to screen a child's blood lead level in the doctor's office. In early 2021, there were approximately 100 medical practices in

Massachusetts using LeadCare II devices, accounting for approximately 30% of all annual lead testing for children in Massachusetts. Due to concerns over the possibility of falsely low test results, multiple LeadCare II recalls were issued: May 28th, June 21st, and August 30th, 2021 (Figure 4). The major recall in late August halted the use of LeadCare II analyzers for the remainder of 2021.

In response, MA CLPPP issued an alert and contacted all pediatric health care providers with LeadCare II devices. CLPPP staff supported each provider's transition to an external lab to analyze children's blood lead samples. Even with these counter measures, screening rates in July, August, September, October, and December 2021 were lower compared to screening rates in these same months in 2019 (Figure 4).

Figure 4. Percent Change in the Number of Children Screened by Month, 9-47 Months of Age 2021 vs. 2019 (Pre-Pandemic Comparison)



<u>Impacts on Lead Poisoning</u>

The prevalence of lead poisoning in 2021 was unchanged from 2020 but continued to surpass 2019 levels. This increase continues to be of concern since, on an annual basis, rates have historically stayed stable or decreased over time, in large part due to the CLPPP's efforts.

Some possible reasons for increased lead poisoning prevalence observed in 2020 and 2021 include:

- A major shift in the environments of many young children as daycare centers closed and children were spending more time indoors at home than usual;
- Reduced rates of lead screening may have slowed the early identification of lead exposures that usually serves to prevent lead poisoning; and
- Beginning in 2020 and continuing through 2021, there has been an increase in home improvement and renovation projects, a common source of lead poisoning for those living in older homes containing lead-based paint.

3. PRIMARY PREVENTION ACTIVITIES

Primary prevention is vital to eradicating childhood lead exposure. While Massachusetts is fortunate to have an active private sector of lead inspectors and de-leading contractors, **we also have the fourth oldest housing**

stock in the country, with approximately 68% of housing units built before 1978 when lead was banned in residential paint.

Code enforcement lead determinations (abbreviated lead inspections) are key to local primary prevention efforts. Under the Massachusetts Lead Law, parents or guardians with a child under 6 years of age who rent a home built before 1978 can request the local health department to inspect their home for lead violations and enforce de-leading. Currently, CLPPP licenses 178 local Board of Health inspectors in 141 communities to help enforce the Lead Law, covering approximately 20% more communities than the previous year, and CLPPP plans to expand this capacity in 2022.

CLPPP has a dedicated hotline, 800-532-9571, for lead-related questions. In 2021, CLPPP staff answered 1,243 hotline calls. To better communicate with families and educate the public about lead poisoning prevention, CLPPP offers educational materials in six languages, can communicate in nine languages in addition to English, and provides interpreter services as needed.

CLPPP authorizes owners and agents (who work on behalf of owners) to safely do low- or moderate-risk de-leading work. More than 18,000 owners and agents have become trained and authorized to fix the lead hazards in their homes. In 2021, CLPPP offered free virtual moderate-risk de-leading classes to property owners under an order to de-lead their homes.

In FY 2021, MassHousing's *Get the Lead Out* loan program loaned more than $900,000 to qualified property owners to de-lead their homes.

CLPPP publishes the LeadSafeHomes database, which includes inspection and de-leading data for homes built before 1978 from both code enforcement and private inspections. The database was recently upgraded to include downloadable copies of inspection reports and compliance documents. In 2021, the database had 874,707 hits. The upgraded database allows the public to discover a home's lead history and enables users to make important decisions about buying, selling, or renting a home, with a goal of increasing preventative de-leading and encouraging lead-safe renovations. It is especially helpful for parents of young children, rental assistance programs, realtors, and rental property owners.

4. HIGH-RISK COMMUNITIES

Each year, 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 examining rates of newly poisoned children, the age of housing, and income levels for each of the state's 351 cities and towns. **High-risk communities span the state**. In 2021, 16 high-risk communities were identified, representing more than half of lead poisoning cases. Haverhill was added to the 2021 high-risk community list, and Chelsea and Fitchburg dropped off the list since 2020. Children living in high-risk communities are more likely to have lead poisoning than those living in other parts of the state (Figure 5), though this disparity was narrowing until 2020.

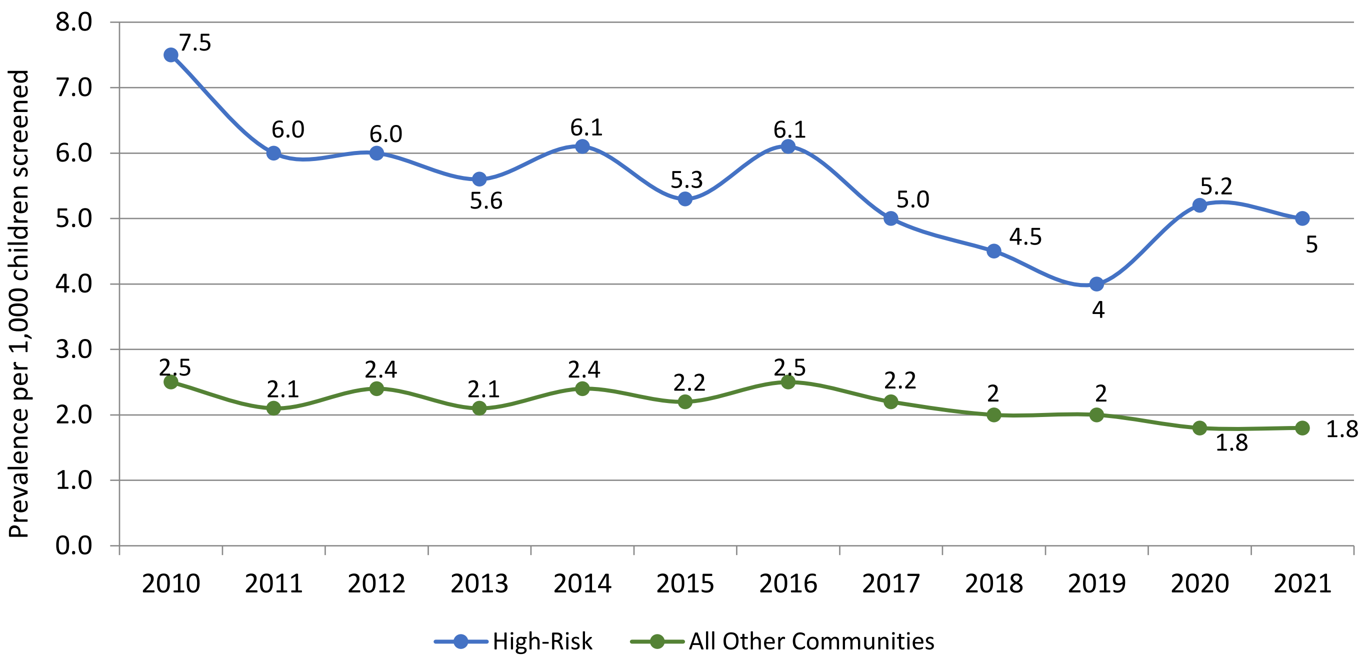
2021 High-Risk Communities[1]

- **New Bedford**
- **Holyoke**
- **Springfield**
- **Fall River**
- **Lynn**
- **Lowell**
- **Brockton**
- **Lawrence**
- **Worcester**
- **Everett**
- **Malden**
- **Chicopee**
- **Westfield**
- **Pittsfield**
- **Boston**
- **Haverhill**

[1]The high-risk communities are listed in order from highest to lowest high-risk score.

Approximately 56% 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. Since 2016 and until 2020, the data show this disparity was shrinking as the rates of poisoned blood lead levels in children living in high-risk communities had been consistently decreasing (Figure 5).However, the pandemic has adversely impacted this trend. In fact, increases in the prevalence of lead poisoning in 2020 were disproportionately observed among high-risk communities, whereas all other communities collectively showed an average continued decrease in lead poisoning. In 2021, the prevalence of lead poisoning remained the same in non-high-risk communities, but decreased slightly for children living in high-risk communities.

Figure 5. Comparison of High-Risk Communities vs All Other Communities: Prevalence of Blood Lead ≥10 µg/dL[1], 9-47 Months of Age, 2010-2021



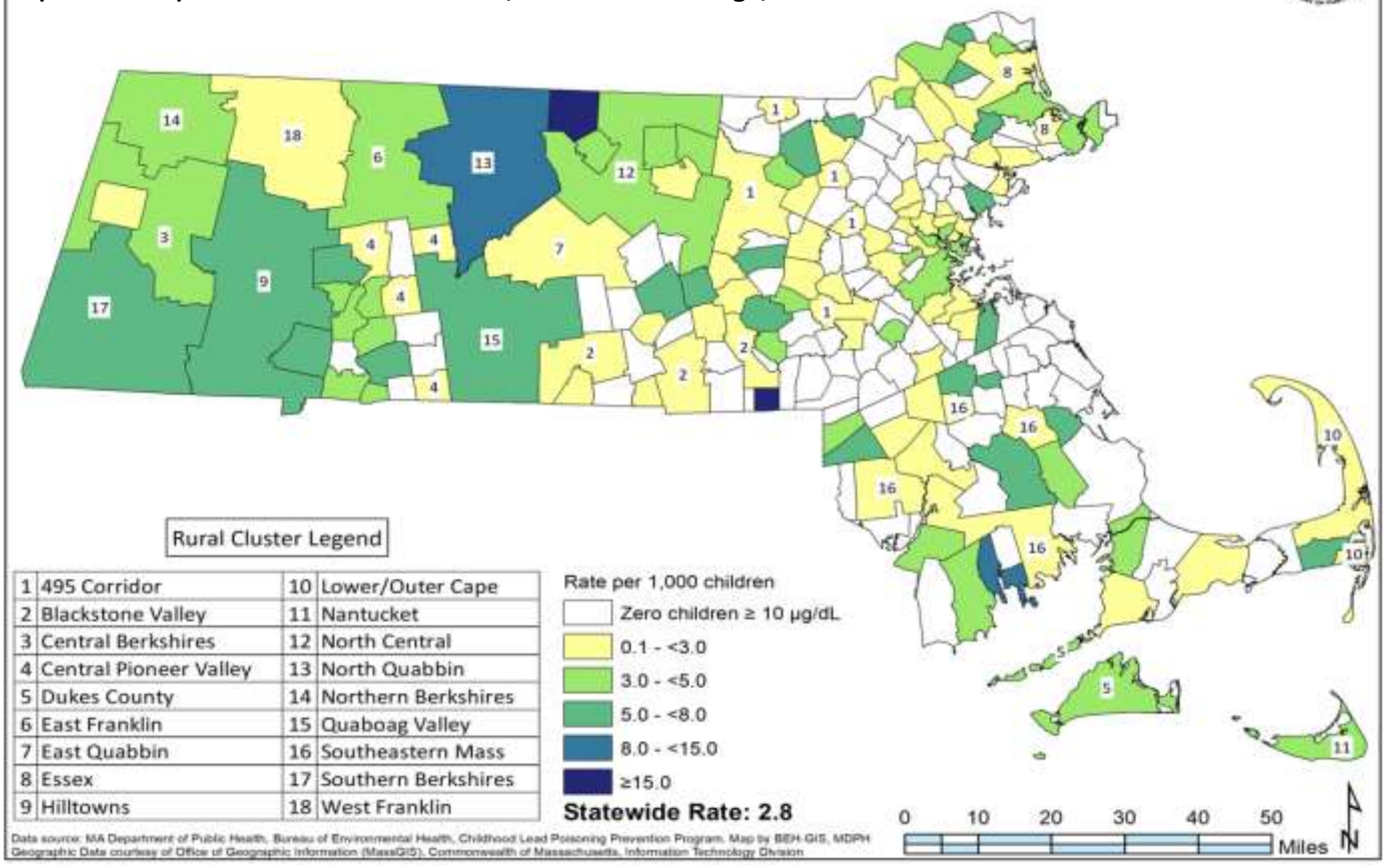
[1]Includes both venous tests and results of two capillary tests ≥10 µg/dL drawn within 84 days of each other.

5. RURAL COMMUNITIES

Rural communities with small populations may not meet the definition of a high-risk community. This is because, by definition, a high-risk community requires a minimum of 15 lead poisoning cases over 5 years. However, **non-high-risk communities can still have high incidence rates of childhood blood lead poisoning even though the total number of cases may be low, meaning that individual children in these communities *are* at high-risk**.

DPH now analyzes and maps screening rates and prevalence of elevated and poisoned blood lead levels by **rural clusters** (Map 1) in addition to individual communities. Rural clusters consist of neighboring or nearby rural communities grouped by the DPH Office of Rural Health and represent geographic areas that have been historically classified together in those regions. Clusters may represent areas of shared services, cultural commonality, or geographic cohesion. Grouping rural communities into clusters enables more robust and reliable blood lead level rates to be generated whereas rates for individual rural communities are frequently suppressed due to small numbers.

Map 1. Prevalence of Confirmed Blood Lead ≥10 µg/dL[1] by Rural Clusters (Numbered)[2] and Urban Communities[3], 9-47 Months of Age, 2021



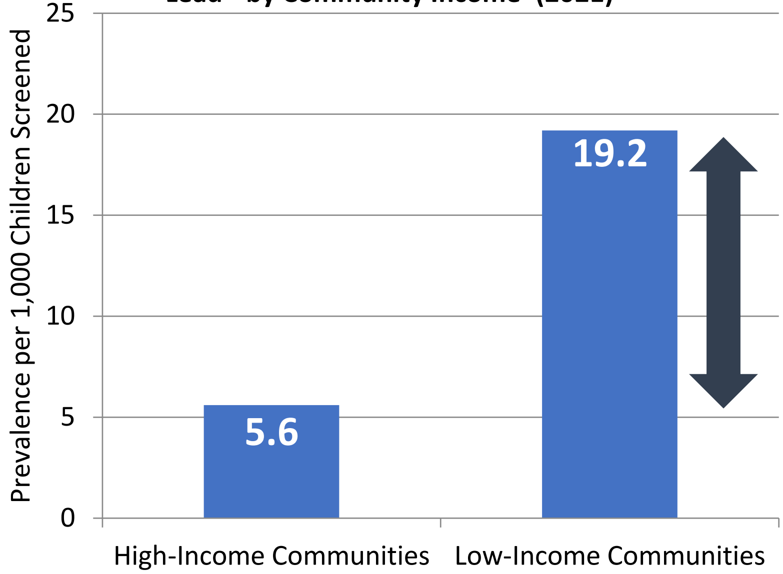
[1]BLLs ≥10 µg/dL are considered poisoned. A confirmed BLL ≥10 µg/dL is defined as a venous test or two capillary tests drawn within 84 days of each other.
[2]Rural definitions are created by the MA Office of Rural Health. See technical notes section for details. All clusters are considered rural and were identified by state rural partners, representing geographic areas that have been historically classified together in those regions.
[3]All other non-numbered geographies are considered urban and are mapped as individual communities/towns.

In 2020, CLPPP first published data on disparities between rural and urban geographies, identifying rural geographies as those that are the least densely populated, most remote, and most isolated from urban core areas. At the time, the average screening rate in the most rural areas of the state was only 49% and the prevalence of blood lead levels ≥5 µg/dL was 32.1 children per 1,000, a prevalence that was 2.4 times greater compared to children living in urban communities. While disparities still exist for the most rural areas of the state, screening rates and the prevalence of blood lead levels ≥5 µg/dL and ≥10 µg/dL have improved substantially, due, in part, to CLPPP's outreach and education efforts targeting these geographies. By 2021, the screening rate in the most rural areas of the state increased to 58% and the prevalence of blood lead levels ≥5 µg/dL decreased to 17.3 children per 1,000, a prevalence that is only 1.4 times greater compared to children living in urban communities.

6. HEALTH EQUITY

Community Income

Figure 6. Prevalence of Children with Elevated Blood Lead [1] by Community Income[2] (2021)



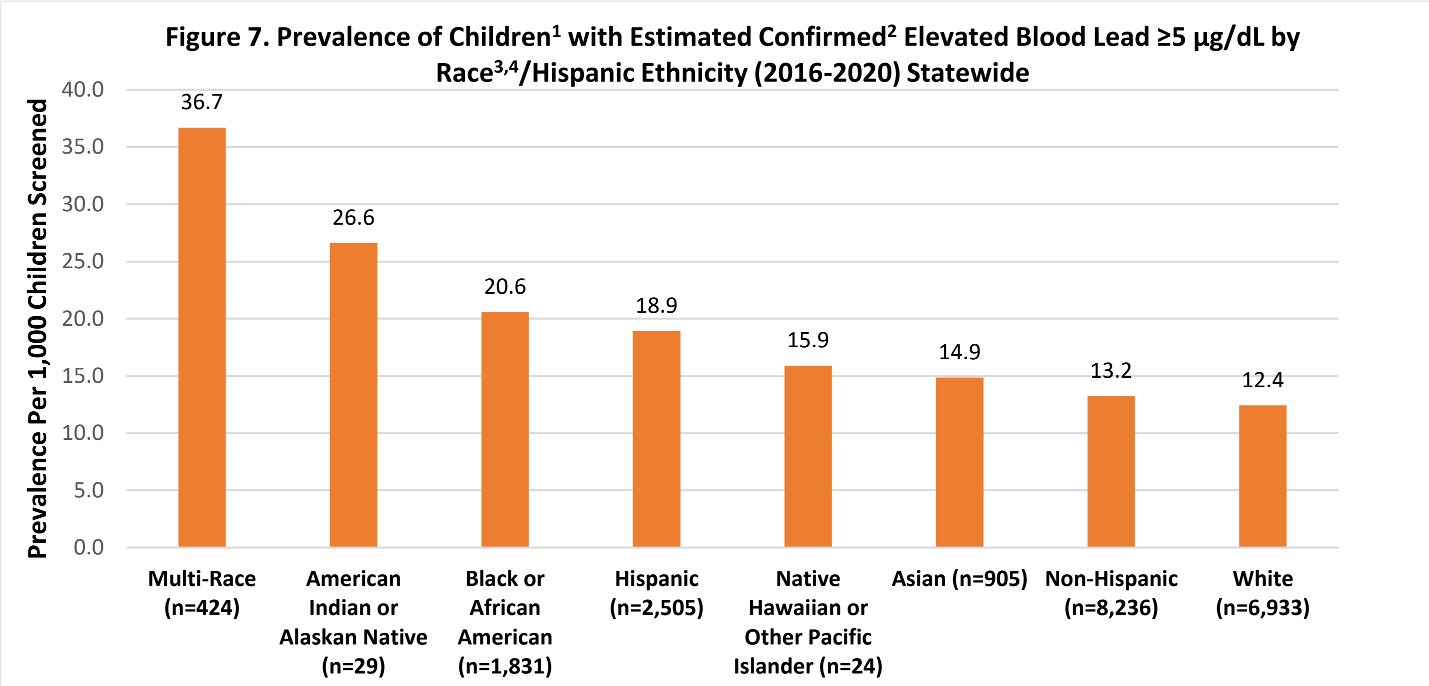
[1]Includes confirmed BLLs (one venous or two capillary blood tests ≥5 µg/dL within 84 days) and a proportion of unconfirmed blood lead tests (single capillary tests) for children 9-47 months of age.

[2]Lowest versus highest quartile of families living at or below 200% of the Federal Poverty threshold using poverty to income ratio data from the U.S. American Community Survey.

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, in 2021, **children living in low-income communities were nearly 3.4 times more likely to have elevated blood lead levels than children living in high-income communities** (Figure 6). This disparity is smaller than the nearly four-fold difference observed in 2020. However, the apparent improvement is due to a small increase in the prevalence of children with elevated blood lead levels living in high-income communities rather than any substantial reduction in prevalence in low-income communities.

Race and Ethnicity

White children have the lowest risk of becoming lead poisoned. **Black children are 1.7 times more likely to have elevated blood lead levels than White children.** Children that identify as **Multi-race are 3 times more likely to have elevated blood lead levels than White children** (Figure 7). 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.[6,7] The risk of lead exposure among children impacted by these historical policies was exacerbated further by pandemic-related conditions, which led to young children spending more time at home.



[1]Includes children between 9 and 47 months of age.

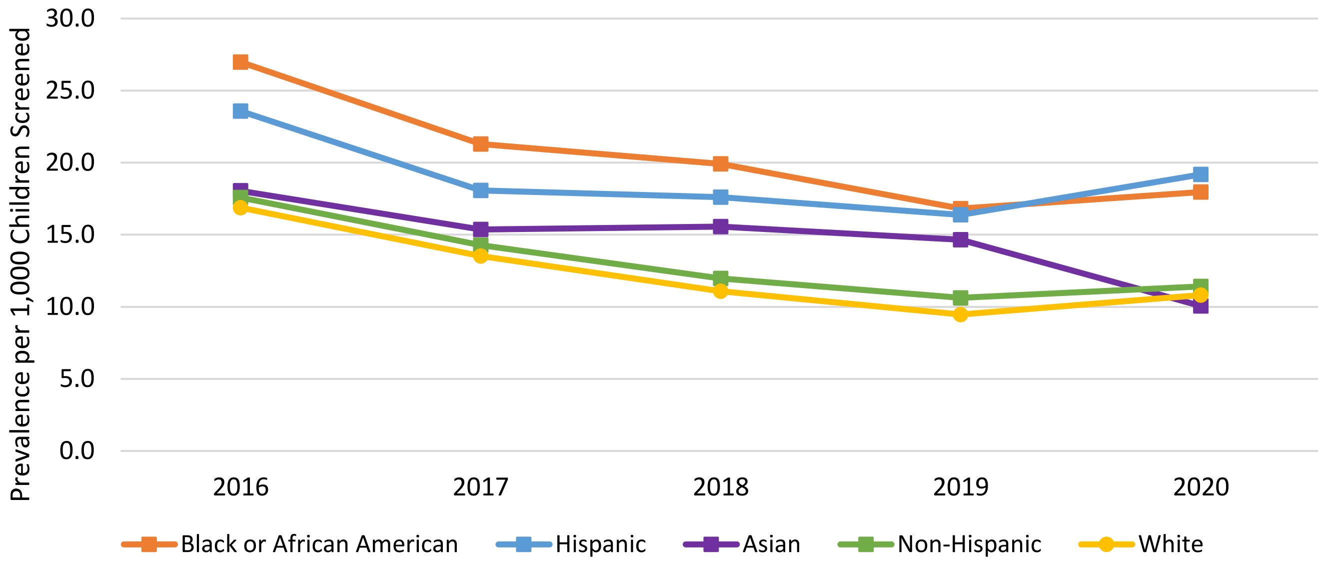
[2]Estimated confirmed BLLs ≥ 5ug/dL include both confirmed (venous and confirmed capillary tests) and a proportion of unconfirmed capillary results estimated to be truly elevated based on known capillary test reliability). Unique children with estimated confirmed BLLs are identified in each year from 2016-2020 and cases are then summed. The same child may be represented more than once in the 5-year range.

[3]Each race listed above includes Hispanic and Non-Hispanic ethnicities.

[4]MDPH acknowledges that race is a social construct which carries no biological significance in distinguishing human beings, However, many health inequities are rooted in the effects of racism experienced by people of color. MDPH collects race information to better understand these health inequities.

As seen in Figure 8, children who identify as **Black, Hispanic, Non-Hispanic, and White** saw a decrease in elevated blood lead level **prevalence from 2016 through 2019, with an increase again in 2020**. Each year since 2017, the disparity between Hispanic and White children has been increasing, with **Hispanic children more likely to exhibit elevated blood lead levels compared to White children**. Specifically, Hispanic children were 1.8 times more likely to exhibit elevated blood lead levels in 2020 than White children, compared to 2017 where Hispanic children were 1.3 times more likely to exhibit elevated blood lead levels than White children (Figure 8).

Figure 8. Estimated Confirmed Blood Lead Prevalence[1] ≥5 µg/dL by Race/Hispanic Ethnicity[2,3], 9-47 Months of Age, 2016-2020



[1]Estimated confirmed BLLs ≥ 5ug/dL include both confirmed (venous and confirmed capillary tests) and a proportion of unconfirmed capillary results estimated to be truly elevated based on known capillary test reliability). Unique children with estimated confirmed BLLs are identified in each year from 2016-2020 and cases are then summed. The same child may be represented more than once in the 5-year range.

[2]Each race listed above includes Hispanic and Non-Hispanic ethnicities. American Indian or Alaskan Native and Native Hawaiian or Pacific Islander have been excluded due to small case counts

[3]MDPH acknowledges that race is a social construct which carries no biological significance in distinguishing human beings, However, many health inequities are rooted in the effects of racism experienced by people of color. MDPH collects race information to better understand these health inequities.

Appendix I: High-Risk Communities for Childhood Lead Poisoning
Calendar Year: 2017 - 2021

Community	% 5-Year Screening	5-Year Cases[1]	Incidence Rate per 1,000[1]	% PIR below 2[2]	% Pre-1978 Housing Units[3]	High-Risk Score[4]
BOSTON	60%	183	2.9	27%	76%	5.4
BROCKTON	63%	87	5.9	28%	81%	12.1
CHICOPEE	49%	17	3.4	27%	79%	6.7
EVERETT	59%	28	4.4	29%	81%	9.5
FALL RIVER	59%	50	4.7	39%	80%	13.5
HAVERHILL	45%	24	3.6	24%	64%	5.1
HOLYOKE	54%	29	5.9	42%	81%	18.2
LAWRENCE	54%	44	3.4	45%	79%	11.2
LOWELL	50%	80	6.1	29%	79%	12.6
LYNN	64%	88	5.5	31%	82%	12.8
MALDEN	59%	35	4.5	26%	76%	8.3
NEW BEDFORD	69%	113	7.5	34%	85%	19.9
PITTSFIELD	63%	18	3.7	22%	84%	6.3
SPRINGFIELD	61%	92	4.7	42%	84%	15.1
WESTFIELD	47%	19	5.9	17%	70%	6.4
WORCESTER	55%	87	4.3	33%	77%	9.9
ALL HIGH-RISK	58%	994	4.4	31%	78%	9.7
MASSACHUSETTS	54%	1,851	2.9	16%	68%	2.9

Comments:
The percent screened and number of newly identified cases with confirmed blood lead levels ≥10 µg/dL (children 9 to 47 months) have been identified for this 5-year period.

Communities with at least 15 cases and a High-Risk Score statistically significantly higher than the state High-Risk Score for this 5-year period have been included.

Footnotes:
[1]Number and rate of incident cases ≥10 µg/dL per 1,000 children (9 to 47 months) screened during this 5-year period. An incident case is only counted once over the course of the 5-year time-period. MA CLPPP defines lead poisoning as a confirmed blood lead level ≥10 µg/dL.

[2]Percentage of families with a poverty to income ratio below 2.00 (i.e., < 200% of the poverty threshold).

[3]Percentage of housing units built prior to 1978 as estimated by the American Community Survey. In 1977, the Consumer Product Safety Commission banned lead-containing paint (16 C.F.R. 1303). Housing units built prior to this date may contain dangerous levels of lead in paint.

[4](5-Year Incidence Rate by community) * (% PIR below 2 by community / % PIR below 2 MA) * (% pre-1978 by community / % pre-1978 MA)

Appendix II: Screening and Prevalence of Childhood Blood Lead Levels for Children 9 months to less than 4 years of age by Community
Calendar Year 2021

Community	Population 9-47 mo[1]	Total Screened	Percent Screened	Blood Lead Levels (µg/dL)[2] 0-4		5-9		10-24		≥25		Estimated Confirmed ≥5[3]		Confirmed ≥10[4]		Percent Pre-1978 Housing Units[5]
				N	%	N	%	N	%	N	%	N	%	N	%	
ABINGTON	615	444	72%	441	(99.3)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	67%
ACTON	699	535	77%	529	(98.9)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	58%
ACUSHNET	286	232	81%	228	(98.3)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	72%
ADAMS	241	195	81%	178	(91.3)	14	(7.2)	NS	(NS)	0	(0.0)	11	(5.6)	NS	(NS)	89%
AGAWAM	838	563	67%	554	(98.4)	7	(1.2)	NS	(NS)	0	(0.0)	7	(1.2)	NS	(NS)	69%
ALFORD	10	4	40%	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	47%
AMESBURY	537	339	63%	334	(98.5)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	0	(0.0)	63%
AMHERST	473	281	59%	279	(99.3)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	60%
ANDOVER	1,111	747	67%	745	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	60%
AQUINNAH	16	3	19%	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	37%
ARLINGTON	1,786	1,186	66%	1,176	(99.2)	8	(0.7)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	87%
ASHBURNHAM	201	116	58%	113	(97.4)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	42%
ASHBY	91	56	62%	53	(94.6)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	57%
ASHFIELD	36	31	86%	31	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	67%
ASHLAND	738	537	73%	527	(98.1)	8	(1.5)	NS	(NS)	0	(0.0)	9	(1.7)	NS	(NS)	41%
ATHOL	399	186	47%	175	(94.1)	9	(4.8)	NS	(NS)	NS	(NS)	8	(4.3)	NS	(NS)	71%
ATTLEBORO	1,716	1,192	69%	1,163	(97.6)	22	(1.8)	7	(0.6)	0	(0.0)	23	(1.9)	6	(0.5)	60%
AUBURN	531	371	70%	370	(99.7)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	74%
AVON	156	130	83%	128	(98.5)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	90%
AYER	296	185	63%	184	(99.5)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	55%
BARNSTABLE	1,494	951	64%	938	(98.6)	12	(1.3)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	52%
BARRE	162	103	64%	101	(98.1)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	60%
BECKET	54	21	39%	21	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	55%
BEDFORD	537	272	51%	272	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	56%
BELCHERTOWN	434	305	70%	303	(99.3)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	39%
BELLINGHAM	623	321	52%	320	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	60%
BELMONT	1,047	572	55%	568	(99.3)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	89%
BERKLEY	201	138	69%	136	(98.6)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	36%
BERLIN	96	74	77%	73	(98.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	42%

BERNARDSTON	48	27	56%	27	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	62%
BEVERLY	1,460	990	68%	972	(98.2)	17	(1.7)	NS	(NS)	0	(0.0)	12	(1.2)	NS	(NS)	71%
BILLERICA	1,250	951	76%	946	(99.5)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	0	(0.0)	61%
BLACKSTONE	285	167	59%	162	(97.0)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	58%
BLANDFORD	22	23	>99%	23	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	72%
BOLTON	184	140	76%	139	(99.3)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	44%
BOSTON	20,903	13,945	67%	13,716	(98.4)	181	(1.3)	45	(0.3)	3	(<0.1)	204	(1.5)	44	(0.3)	76%
BOURNE	467	289	62%	288	(99.7)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	55%
BOXBOROUGH	150	96	64%	94	(97.9)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	42%
BOXFORD	221	231	>99%	230	(99.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	53%
BOYLSTON	153	116	76%	116	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	51%
BRAINTREE	1,368	997	73%	990	(99.3)	6	(0.6)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	75%
BREWSTER	199	108	54%	107	(99.1)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	36%
BRIDGEWATER	814	695	85%	692	(99.6)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	50%
BRIMFIELD	99	59	60%	58	(98.3)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	40%
BROCKTON	4,700	3,288	70%	3,137	(95.4)	125	(3.8)	24	(0.7)	2	(0.1)	140	(4.3)	26	(0.8)	81%
BROOKFIELD	101	50	50%	48	(96.0)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	46%
BROOKLINE	2,221	1,208	54%	1,202	(99.5)	5	(0.4)	1	(0.1)	0	(0.0)	5	(0.4)	0	(0.0)	83%
BUCKLAND	45	19	42%	19	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	73%
BURLINGTON	877	616	70%	616	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	58%
CAMBRIDGE	2,985	2,002	67%	1,982	(99.0)	17	(0.8)	3	(0.1)	0	(0.0)	0	(0.0)	3	(0.1)	71%
CANTON	806	640	79%	634	(99.1)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	0	(0.0)	56%
CARLISLE	142	108	76%	107	(99.1)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	55%
CARVER	346	233	67%	231	(99.1)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	NS	(NS)	47%
CHARLEMONT	27	11	41%	11	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	65%
CHARLTON	399	287	72%	287	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	39%
CHATHAM	90	40	44%	40	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	56%
CHELMSFORD	1,128	888	79%	880	(99.1)	6	(0.7)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	65%
CHELSEA	2,178	1,417	65%	1,394	(98.4)	21	(1.5)	1	(0.1)	1	(0.1)	20	(1.4)	2	(0.1)	70%
CHESHIRE	92	66	72%	65	(98.5)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	69%
CHESTER	26	20	77%	19	(95.0)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	68%
CHESTERFIELD	23	19	83%	18	(94.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	65%
CHICOPEE	1,945	1,111	57%	1,090	(98.1)	16	(1.4)	NS	(NS)	NS	(NS)	18	(1.6)	NS	(NS)	79%
CHILMARK	22	17	77%	17	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	51%
CLARKSBURG	45	34	76%	33	(97.1)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	73%
CLINTON	568	391	69%	382	(97.7)	9	(2.3)	0	(0.0)	0	(0.0)	8	(2.0)	0	(0.0)	67%

COHASSET	264	213	81%	211	(99.1)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	64%
COLRAIN	44	25	57%	23	(92.0)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	70%
CONCORD	507	301	59%	301	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	62%
CONWAY	37	23	62%	21	(91.3)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	59%
CUMMINGTON	10	11	>99%	10	(90.9)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	65%
DALTON	166	115	69%	108	(93.9)	6	(5.2)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	78%
DANVERS	819	653	80%	644	(98.6)	8	(1.2)	NS	(NS)	0	(0.0)	7	(1.1)	NS	(NS)	68%
DARTMOUTH	691	558	81%	551	(98.7)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	57%
DEDHAM	843	661	78%	659	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	76%
DEERFIELD	109	70	64%	68	(97.1)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	58%
DENNIS	276	178	64%	176	(98.9)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	68%
DIGHTON	253	186	74%	186	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	46%
DOUGLAS	267	135	51%	135	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	41%
DOVER	160	145	91%	145	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	62%
DRACUT	1,118	704	63%	703	(99.9)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	54%
DUDLEY	322	236	73%	232	(98.3)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	67%
DUNSTABLE	72	64	89%	64	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	33%
DUXBURY	452	380	84%	377	(99.2)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	57%
EAST BRIDGEWATER	481	360	75%	360	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	59%
EAST BROOKFIELD	66	46	70%	45	(97.8)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	63%
EAST LONGMEADOW	457	342	75%	341	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	62%
EASTHAM	91	52	57%	52	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	51%
EASTHAMPTON	430	240	56%	237	(98.8)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	70%
EASTON	699	506	72%	501	(99.0)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	54%
EDGARTOWN	149	90	60%	89	(98.9)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	32%
EGREMONT	26	18	69%	17	(94.4)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	64%
ERVING	44	23	52%	23	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	72%
ESSEX	114	79	69%	78	(98.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	61%
EVERETT	2,049	1,543	75%	1,515	(98.2)	21	(1.4)	6	(0.4)	1	(0.1)	24	(1.6)	6	(0.4)	81%
FAIRHAVEN	388	282	73%	275	(97.5)	NS	(NS)	NS	(NS)	0	(0.0)	6	(2.1)	NS	(NS)	77%
FALL RIVER	3,715	2,475	67%	2,426	(98.0)	36	(1.5)	12	(0.5)	1	(<0.1)	42	(1.7)	12	(0.5)	80%
FALMOUTH	710	472	66%	468	(99.2)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	60%
FITCHBURG	1,773	998	56%	979	(98.1)	15	(1.5)	NS	(NS)	0	(0.0)	16	(1.6)	NS	(NS)	78%
FLORIDA	21	12	57%	11	(91.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	60%
FOXBOROUGH	626	476	76%	474	(99.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	56%
FRAMINGHAM	3,026	2,074	69%	2,053	(99.0)	19	(0.9)	1	(<0.1)	1	(<0.1)	19	(0.9)	2	(0.1)	75%

FRANKLIN	1,131	681	60%	677	(99.4)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	39%
FREETOWN	213	192	90%	191	(99.5)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	52%
GARDNER	765	434	57%	426	(98.2)	7	(1.6)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	73%
GEORGETOWN	291	188	65%	186	(98.9)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	57%
GILL	31	22	71%	22	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	60%
GLOUCESTER	770	623	81%	594	(95.3)	26	(4.2)	NS	(NS)	0	(0.0)	18	(2.9)	NS	(NS)	76%
GOSHEN	24	17	71%	17	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	69%
GOSNOLD	0	0	-	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	80%
GRAFTON	715	489	68%	484	(99.0)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	48%
GRANBY	136	93	68%	93	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	61%
GRANVILLE	41	26	63%	26	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	59%
GREAT BARRINGTON	152	91	60%	86	(94.5)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	71%
GREENFIELD	559	251	45%	243	(96.8)	8	(3.2)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	81%
GROTON	360	205	57%	199	(97.1)	6	(2.9)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	41%
GROVELAND	187	163	87%	157	(96.3)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	60%
HADLEY	103	81	79%	80	(98.8)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	66%
HALIFAX	252	174	69%	174	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	44%
HAMILTON	272	220	81%	218	(99.1)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	80%
HAMPDEN	105	77	73%	76	(98.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	71%
HANCOCK	20	8	40%	8	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	42%
HANOVER	493	381	77%	380	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	61%
HANSON	294	224	76%	222	(99.1)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	58%
HARDWICK	84	31	37%	30	(96.8)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	66%
HARVARD	130	95	73%	94	(98.9)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	64%
HARWICH	272	173	64%	165	(95.4)	7	(4.0)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	56%
HATFIELD	68	38	56%	38	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	75%
HAVERHILL	2,878	1,730	60%	1,699	(98.2)	23	(1.3)	7	(0.4)	1	(0.1)	28	(1.6)	8	(0.5)	64%
HAWLEY	7	2	29%	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	54%
HEATH	16	7	44%	7	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	46%
HINGHAM	885	614	69%	612	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	57%
HINSDALE	37	42	>99%	40	(95.2)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	60%
HOLBROOK	371	303	82%	298	(98.3)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	0	(0.0)	83%
HOLDEN	704	424	60%	423	(99.8)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	60%
HOLLAND	78	51	65%	51	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	53%
HOLLISTON	533	322	60%	319	(99.1)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	71%
HOLYOKE	1,551	1,034	67%	1,010	(97.7)	19	(1.8)	NS	(NS)	NS	(NS)	22	(2.1)	NS	(NS)	81%

HOPEDALE	175	118	67%	115	(97.5)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	61%
HOPKINTON	691	525	76%	521	(99.2)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	37%
HUBBARDSTON	117	85	73%	85	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	29%
HUDSON	630	467	74%	464	(99.4)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	57%
HULL	213	109	51%	106	(97.2)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	76%
HUNTINGTON	59	42	71%	41	(97.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	71%
IPSWICH	319	240	75%	236	(98.3)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	60%
KINGSTON	473	364	77%	362	(99.5)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	48%
LAKEVILLE	342	269	79%	268	(99.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	45%
LANCASTER	192	157	82%	156	(99.4)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	65%
LANESBOROUGH	78	74	95%	73	(98.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	68%
LAWRENCE	4,570	2,856	62%	2,824	(98.9)	23	(0.8)	7	(0.2)	2	(0.1)	0	(0.0)	9	(0.3)	79%
LEE	137	74	54%	73	(98.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	72%
LEICESTER	294	191	65%	191	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	61%
LENOX	89	61	69%	61	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	73%
LEOMINSTER	1,529	1,141	75%	1,125	(98.6)	15	(1.3)	NS	(NS)	0	(0.0)	14	(1.2)	NS	(NS)	68%
LEVERETT	32	24	75%	23	(95.8)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	55%
LEXINGTON	996	503	51%	502	(99.8)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	68%
LEYDEN	13	11	85%	11	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	56%
LINCOLN	296	163	55%	162	(99.4)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	59%
LITTLETON	333	253	76%	249	(98.4)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	57%
LONGMEADOW	488	286	59%	278	(97.2)	7	(2.4)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	88%
LOWELL	5,019	3,170	63%	3,076	(97.0)	70	(2.2)	19	(0.6)	5	(0.2)	88	(2.8)	23	(0.7)	79%
LUDLOW	495	391	79%	387	(99.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	63%
LUNENBURG	383	256	67%	252	(98.4)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	57%
LYNN	4,939	3,630	73%	3,514	(96.8)	96	(2.6)	19	(0.5)	1	(<0.1)	106	(2.9)	19	(0.5)	82%
LYNNFIELD	378	336	89%	335	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	68%
MALDEN	2,287	1,780	78%	1,744	(98.0)	30	(1.7)	5	(0.3)	1	(0.1)	34	(1.9)	5	(0.3)	76%
MANCHESTER	133	77	58%	76	(98.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	78%
MANSFIELD	764	590	77%	586	(99.3)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	50%
MARBLEHEAD	565	445	79%	441	(99.1)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	85%
MARION	130	88	68%	87	(98.9)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	62%
MARLBOROUGH	1,722	1,105	64%	1,087	(98.4)	11	(1.0)	6	(0.5)	NS	(NS)	15	(1.4)	7	(0.6)	58%
MARSHFIELD	817	579	71%	574	(99.1)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	0	(0.0)	66%
MASHPEE	360	268	74%	267	(99.6)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	24%
MATTAPOISETT	137	99	72%	98	(99.0)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	53%

MAYNARD	451	243	54%	241	(99.2)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	64%
MEDFIELD	428	377	88%	375	(99.5)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	59%
MEDFORD	1,635	1,399	86%	1,377	(98.4)	20	(1.4)	1	(0.1)	1	(0.1)	21	(1.5)	2	(0.1)	78%
MEDWAY	443	283	64%	277	(97.9)	6	(2.1)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	53%
MELROSE	1,085	886	82%	877	(99.0)	7	(0.8)	NS	(NS)	NS	(NS)	6	(0.7)	NS	(NS)	85%
MENDON	175	118	67%	117	(99.2)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	37%
MERRIMAC	148	130	88%	128	(98.5)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	42%
METHUEN	1,876	1,172	62%	1,163	(99.2)	7	(0.6)	NS	(NS)	0	(0.0)	8	(0.7)	NS	(NS)	62%
MIDDLEBOROUGH	772	552	72%	545	(98.7)	NS	(NS)	NS	(NS)	NS	(NS)	6	(1.1)	NS	(NS)	52%
MIDDLEFIELD	8	6	75%	6	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	50%
MIDDLETON	239	171	72%	170	(99.4)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	41%
MILFORD	1,243	722	58%	691	(95.7)	28	(3.9)	NS	(NS)	0	(0.0)	30	(4.2)	NS	(NS)	63%
MILLBURY	424	278	66%	277	(99.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	64%
MILLIS	279	185	66%	184	(99.5)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	51%
MILLVILLE	92	40	43%	40	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	50%
MILTON	993	782	79%	774	(99.0)	7	(0.9)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	80%
MONROE	2	2	100%	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	64%
MONSON	188	124	66%	121	(97.6)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	60%
MONTAGUE	278	117	42%	111	(94.9)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	79%
MONTEREY	23	10	43%	9	(90.0)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	55%
MONTGOMERY	29	11	38%	11	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	56%
MOUNT WASHINGTON	3	1	33%	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	68%
NAHANT	50	67	>99%	67	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	91%
NANTUCKET	566	262	46%	259	(98.9)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	NS	(NS)	39%
NATICK	1,404	1,026	73%	1,019	(99.3)	6	(0.6)	NS	(NS)	0	(0.0)	6	(0.6)	NS	(NS)	61%
NEEDHAM	1,165	886	76%	883	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	69%
NEW ASHFORD	4	2	50%	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	68%
NEW BEDFORD	4,283	3,298	77%	3,150	(95.5)	112	(3.4)	33	(1.0)	3	(0.1)	115	(3.5)	32	(1.0)	85%
NEW BRAINTREE	31	14	45%	14	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	42%
NEW MARLBOROUGH	28	21	75%	20	(95.2)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	63%
NEW SALEM	23	10	43%	9	(90.0)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	60%
NEWBURY	166	120	72%	118	(98.3)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	63%
NEWBURYPORT	481	294	61%	290	(98.6)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	74%
NEWTON	2,818	1,761	62%	1,746	(99.1)	11	(0.6)	4	(0.2)	0	(0.0)	12	(0.7)	4	(0.2)	81%
NORFOLK	378	332	88%	330	(99.4)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	38%
NORTH ADAMS	427	280	66%	253	(90.4)	23	(8.2)	NS	(NS)	0	(0.0)	21	(7.5)	NS	(NS)	87%

NORTH ANDOVER	1,006	680	68%	675	(99.3)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	52%
NORTH ATTLEBOROUGH	1,041	626	60%	611	(97.6)	13	(2.1)	NS	(NS)	NS	(NS)	12	(1.9)	NS	(NS)	58%
NORTH BROOKFIELD	154	80	52%	79	(98.8)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	64%
NORTH READING	487	351	72%	348	(99.1)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	56%
NORTHAMPTON	629	333	53%	323	(97.0)	7	(2.1)	NS	(NS)	0	(0.0)	9	(2.7)	NS	(NS)	73%
NORTHBOROUGH	444	370	83%	365	(98.6)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	49%
NORTHBRIDGE	560	306	55%	300	(98.0)	6	(2.0)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	59%
NORTHFIELD	60	37	62%	34	(91.9)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	63%
NORTON	557	387	69%	382	(98.7)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	42%
NORWELL	410	347	85%	346	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	64%
NORWOOD	1,190	942	79%	931	(98.8)	6	(0.6)	NS	(NS)	NS	(NS)	8	(0.8)	NS	(NS)	76%
OAK BLUFFS	169	46	27%	44	(95.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	48%
OAKHAM	39	26	67%	26	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	44%
ORANGE	239	95	40%	86	(90.5)	6	(6.3)	NS	(NS)	0	(0.0)	6	(6.3)	NS	(NS)	72%
ORLEANS	100	55	55%	55	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	61%
OTIS	34	15	44%	15	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	60%
OXFORD	377	267	71%	266	(99.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	59%
PALMER	351	238	68%	232	(97.5)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	72%
PAXTON	133	80	60%	78	(97.5)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	68%
PEABODY	1,665	1,355	81%	1,341	(99.0)	12	(0.9)	2	(0.1)	0	(0.0)	8	(0.6)	0	(0.0)	64%
PELHAM	31	7	23%	7	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	61%
PEMBROKE	583	430	74%	427	(99.3)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	51%
PEPPERELL	351	232	66%	228	(98.3)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	49%
PERU	16	17	>99%	17	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	56%
PETERSHAM	32	14	44%	14	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	66%
PHILLIPSTON	46	32	70%	31	(96.9)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	47%
PITTSFIELD	1,504	1,048	70%	1,006	(96.0)	39	(3.7)	NS	(NS)	NS	(NS)	30	(2.9)	NS	(NS)	84%
PLAINFIELD	16	12	75%	12	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	57%
PLAINVILLE	329	219	67%	219	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	42%
PLYMOUTH	1,809	1,225	68%	1,220	(99.6)	5	(0.4)	0	(0.0)	0	(0.0)	3	(0.2)	0	(0.0)	50%
PLYMPTON	86	66	77%	66	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	43%
PRINCETON	83	67	81%	66	(98.5)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	47%
PROVINCETOWN	31	8	26%	8	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	67%
QUINCY	3,130	2,356	75%	2,332	(99.0)	20	(0.8)	4	(0.2)	0	(0.0)	21	(0.9)	3	(0.1)	69%
RANDOLPH	1,211	767	63%	766	(99.9)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	69%
RAYNHAM	488	399	82%	396	(99.2)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	46%

READING	919	667	73%	660	(99.0)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	0	(0.0)	73%
REHOBOTH	332	218	66%	218	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	51%
REVERE	2,495	1,598	64%	1,579	(98.8)	17	(1.1)	2	(0.1)	0	(0.0)	18	(1.1)	2	(0.1)	69%
RICHMOND	17	16	94%	15	(93.8)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	72%
ROCHESTER	133	109	82%	109	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	41%
ROCKLAND	648	404	62%	401	(99.3)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	66%
ROCKPORT	129	90	70%	87	(96.7)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	80%
ROWE	15	6	40%	6	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	79%
ROWLEY	180	114	63%	114	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	49%
ROYALSTON	34	17	50%	17	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	49%
RUSSELL	50	33	66%	31	(93.9)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	59%
RUTLAND	301	212	70%	211	(99.5)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	40%
SALEM	1,402	1,046	75%	1,023	(97.8)	22	(2.1)	NS	(NS)	0	(0.0)	19	(1.8)	NS	(NS)	76%
SALISBURY	219	130	59%	129	(99.2)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	47%
SANDISFIELD	26	8	31%	8	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	53%
SANDWICH	498	408	82%	404	(99.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	41%
SAUGUS	784	629	80%	625	(99.4)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	73%
SAVOY	12	9	75%	9	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	53%
SCITUATE	575	486	85%	484	(99.6)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	77%
SEEKONK	388	242	62%	238	(98.3)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	66%
SHARON	657	430	65%	429	(99.8)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	61%
SHEFFIELD	73	50	68%	48	(96.0)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	63%
SHELBURNE	38	18	47%	16	(88.9)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	77%
SHERBORN	112	114	>99%	111	(97.4)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	70%
SHIRLEY	201	113	56%	109	(96.5)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	54%
SHREWSBURY	1,333	831	62%	824	(99.2)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	48%
SHUTESBURY	35	20	57%	19	(95.0)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	52%
SOMERSET	498	330	66%	328	(99.4)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	80%
SOMERVILLE	2,084	1,543	74%	1,520	(98.5)	18	(1.2)	5	(0.3)	0	(0.0)	22	(1.4)	5	(0.3)	83%
SOUTH HADLEY	413	278	67%	277	(99.6)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	67%
SOUTHAMPTON	169	108	64%	108	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	53%
SOUTHBOROUGH	315	255	81%	255	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	48%
SOUTHBRIDGE	635	367	58%	355	(96.7)	11	(3.0)	NS	(NS)	0	(0.0)	7	(1.9)	NS	(NS)	77%
SOUTHWICK	234	169	72%	168	(99.4)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	47%
SPENCER	348	237	68%	235	(99.2)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	66%
SPRINGFIELD	6,459	4,154	64%	4,037	(97.2)	89	(2.1)	25	(0.6)	3	(0.1)	100	(2.4)	25	(0.6)	84%

STERLING	209	157	75%	157	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	52%
STOCKBRIDGE	29	19	66%	16	(84.2)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	73%
STONEHAM	662	623	94%	618	(99.2)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	75%
STOUGHTON	937	748	80%	744	(99.5)	NS	(NS)	NS	(NS)	NS	(NS)	NS	(NS)	NS	(NS)	69%
STOW	239	143	60%	143	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	53%
STURBRIDGE	356	188	53%	187	(99.5)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	53%
SUDBURY	581	453	78%	449	(99.1)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	58%
SUNDERLAND	100	41	41%	39	(95.1)	NS	(NS)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	60%
SUTTON	241	201	83%	199	(99.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	49%
SWAMPSCOTT	498	401	81%	397	(99.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	77%
SWANSEA	428	262	61%	262	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	67%
TAUNTON	2,216	1,508	68%	1,482	(98.3)	22	(1.5)	4	(0.3)	0	(0.0)	20	(1.3)	4	(0.3)	64%
TEMPLETON	290	156	54%	152	(97.4)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	54%
TEWKSBURY	890	693	78%	692	(99.9)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	48%
TISBURY	143	117	82%	116	(99.1)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	51%
TOLLAND	10	2	20%	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	43%
TOPSFIELD	165	135	82%	134	(99.3)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	69%
TOWNSEND	259	194	75%	194	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	58%
TRURO	33	7	21%	7	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	55%
TYNGSBOROUGH	365	264	72%	263	(99.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	25%
TYRINGHAM	6	4	67%	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	58%
UPTON	248	188	76%	186	(98.9)	NS	(NS)	0	(0.0)	NS	(NS)	0	(0.0)	NS	(NS)	44%
UXBRIDGE	464	247	53%	243	(98.4)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	48%
WAKEFIELD	876	688	79%	685	(99.6)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	0	(0.0)	73%
WALES	65	28	43%	27	(96.4)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	45%
WALPOLE	866	738	85%	736	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	59%
WALTHAM	2,167	1,344	62%	1,329	(98.9)	12	(0.9)	3	(0.2)	0	(0.0)	14	(1.0)	2	(0.1)	73%
WARE	340	185	54%	173	(93.5)	6	(3.2)	NS	(NS)	NS	(NS)	11	(5.9)	6	(3.2)	63%
WAREHAM	629	375	60%	369	(98.4)	6	(1.6)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	69%
WARREN	159	58	36%	56	(96.6)	0	(0.0)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	51%
WARWICK	17	5	29%	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	57%
WASHINGTON	12	5	42%	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	57%
WATERTOWN	1,103	795	72%	789	(99.2)	6	(0.8)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	78%
WAYLAND	428	327	76%	327	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	70%
WEBSTER	622	421	68%	411	(97.6)	9	(2.1)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	71%
WELLESLEY	1,058	600	57%	599	(99.8)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	75%

WELLFLEET	58	23	40%	23	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	54%
WENDELL	33	7	21%	7	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	50%
WENHAM	119	112	94%	110	(98.2)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	69%
WEST BOYLSTON	185	164	89%	163	(99.4)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	65%
WEST BRIDGEWATER	232	200	86%	197	(98.5)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	69%
WEST BROOKFIELD	89	62	70%	62	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	65%
WEST NEWBURY	105	108	>99%	107	(99.1)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	51%
WEST SPRINGFIELD	1,076	620	58%	611	(98.5)	9	(1.5)	0	(0.0)	0	(0.0)	8	(1.3)	0	(0.0)	75%
WEST STOCKBRIDGE	22	16	73%	15	(93.8)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	64%
WEST TISBURY	81	40	49%	40	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	31%
WESTBOROUGH	843	510	60%	502	(98.4)	7	(1.4)	NS	(NS)	0	(0.0)	7	(1.4)	NS	(NS)	51%
WESTFIELD	1,285	760	59%	737	(97.0)	18	(2.4)	NS	(NS)	0	(0.0)	17	(2.2)	NS	(NS)	70%
WESTFORD	690	517	75%	510	(98.6)	NS	(NS)	NS	(NS)	0	(0.0)	6	(1.2)	NS	(NS)	40%
WESTHAMPTON	35	17	49%	17	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	62%
WESTMINSTER	221	170	77%	163	(95.9)	NS	(NS)	NS	(NS)	0	(0.0)	6	(3.5)	NS	(NS)	58%
WESTON	315	253	80%	252	(99.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	71%
WESTPORT	342	279	82%	271	(97.1)	7	(2.5)	NS	(NS)	0	(0.0)	NS	(NS)	0	(0.0)	65%
WESTWOOD	484	409	85%	409	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	65%
WEYMOUTH	1,922	1,463	76%	1,449	(99.0)	6	(0.4)	7	(0.5)	1	(0.1)	13	(0.9)	8	(0.5)	73%
WHATELY	47	25	53%	25	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	58%
WHITMAN	553	376	68%	369	(98.1)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	79%
WILBRAHAM	401	318	79%	317	(99.7)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	73%
WILLIAMSBURG	57	32	56%	32	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	67%
WILLIAMSTOWN	142	109	77%	105	(96.3)	NS	(NS)	NS	(NS)	0	(0.0)	NS	(NS)	NS	(NS)	77%
WILMINGTON	824	540	66%	538	(99.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	52%
WINCHENDON	317	181	57%	172	(95.0)	6	(3.3)	NS	(NS)	0	(0.0)	8	(4.4)	NS	(NS)	43%
WINCHESTER	801	571	71%	563	(98.6)	NS	(NS)	NS	(NS)	0	(0.0)	6	(1.1)	NS	(NS)	78%
WINDSOR	10	9	90%	9	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	51%
WINTHROP	618	438	71%	431	(98.4)	7	(1.6)	0	(0.0)	0	(0.0)	6	(1.4)	0	(0.0)	87%
WOBURN	1,423	1,039	73%	1,032	(99.3)	NS	(NS)	NS	(NS)	NS	(NS)	6	(0.6)	NS	(NS)	65%
WORCESTER	7,578	4,650	61%	4,559	(98.0)	64	(1.4)	25	(0.5)	2	(<0.1)	76	(1.6)	24	(0.5)	77%
WORTHINGTON	18	13	72%	11	(84.6)	NS	(NS)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	68%
WRENTHAM	367	291	79%	285	(97.9)	6	(2.1)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	51%
YARMOUTH	644	376	58%	372	(98.9)	NS	(NS)	0	(0.0)	0	(0.0)	NS	(NS)	0	(0.0)	66%
Total for MA	**232,249**	**158,462**	**68%**	**155,952**	**(98.4)**	**2,012**	**(1.3)**	**451**	**(0.3)**	**47**	**(<0.1)**	**1,836**	**(1.2)**	**448**	**(0.3)**	**68%**

Comments:
N = number (counts of children)

Number or prevalence is not shown when N is between 1-5 and total screened is less than 1,200. These small numbers are suppressed to protect privacy.

Footnotes:

[1]This report uses the previous year's population estimates, the most current available at the time of publication. Population count for children 9 to 47 months of age is obtained from UMass Donahue Institute population estimates. For more information, see "About our Data" on mass.gov/dph/matracking. According to MA state regulations (105 CMR 460.050), children are not required to be screened until 9 months of age.

[2]Blood lead levels (BLLs) include both confirmed and unconfirmed blood lead tests. A confirmed test is either a single venous specimen of any value, or two capillary specimens ≥5 µg/dL drawn within 12 weeks of each other. A single capillary blood test of any value is considered unconfirmed.

[3]The CDC used a reference value of 5 µg/dL between 2012 and 2021 to identify children whose BLLs are higher than 97.5% of all U.S. children's levels, based on the National Health and Nutrition Examination Survey (NHANES). There is no safe blood lead level. The number of children with estimated confirmed ≥5 µg/dL BLLs is calculated as the sum of those with confirmed BLLs ≥5 µg/dL and a proportion of unconfirmed capillary tests estimated to be truly ≥5 µg/dL based on known capillary test reliability.

[4]Lead poisoning in this surveillance report is defined as a confirmed BLL ≥10 µg/dL.

[5]Percentage of housing units built prior to 1978 as defined by the American Community Survey. In 1977 the Consumer Product Safety Commission banned lead-containing paint (16 C.F.R. 1303). Housing units built prior to this date may contain dangerous levels of lead in paint.

APPENDIX IV: Technical Notes

High-Risk Community Report:

- **High-Risk Communities**: Communities with a 5-year incidence of confirmed ≥ 10 µg/dL cases of at least 15 and with a 5-year incidence rate that is above the state rate after adjusting for low to moderate income and old housing stock (built pre-1978). The combination of these factors places certain communities at greater risk of childhood lead poisoning. It is important for these communities to extend annual childhood blood lead screening through the age of 4. To help alleviate the burden of childhood lead exposure, an amendment to the Massachusetts Lead Law in 1988 established a *Get the Lead Out* program, which provides loans and grants to help pay for lead paint abatement. The law requires that 50% of the funding be used in high-risk communities. More information about the *Get the Lead Out* program can be found here.
- **Incidence Rate per 1,000**: The number of children (9 to 47 months of age per 1,000 children) identified for the first time with a confirmed blood lead level ≥ 10 µg/dL within the 5-year period. Confirmed cases are defined as either a single venous blood lead test or two capillary blood lead tests drawn within 12 weeks of each other. Incidence is calculated by dividing the number of first-time cases by the total number of children screened in the geographic area and multiplied by 1,000. This determines the rate per 1,000 children. An incident case is only counted once over the course of the 5-year time-period. To determine the blood lead level of a child with multiple tests within the period of evaluation, venous specimens take priority followed by confirmed capillary specimens. Single unconfirmed capillary specimens are not included in the incidence rate.
- **% PIR Below 2**: The poverty to income ratio (PIR), provided by the US Census Bureau, represents the ratio of a family's income to their appropriate poverty threshold, which depends on the number and ages of individuals in the family. A PIR below 1.00 indicates that the income for the respective family is below the official definition of poverty, while a PIR greater than 1.00 indicates income above the poverty level. In identifying high-risk communities, we are interested in families with low to moderate income and have chosen a PIR of 2.00 to define this income cut off. A PIR of 2.00 translates to an income that is 200% of the poverty level. For a family of four (two adults, two children), a PIR of 2.00 equates to an annual income of approximately $45,000.
- **High-Risk Score**: This score is used to determine which communities are at highest risk for childhood lead poisoning. The high-risk score incorporates the 5-year incidence rate of blood lead levels ≥ 10 µg/dL, the percentage of families living below 200% of their poverty threshold, and the percentage of housing built before 1978. The score for each community in Massachusetts with at least 15 cases is compared to the state high-risk score. When the community high-risk score exceeds the state high-risk score by a statistically significant margin, that community is at high-risk for childhood lead poisoning.

Annual Screening and Prevalence Report:

- **Total Screened**: The total number of children 9 to 47 months of age screened for lead poisoning in the given calendar year.
- **Percent Screened**: The percentage of children 9 to 47 months of age who were screened for lead poisoning in the given calendar year. This is calculated by dividing the total number of children screened by the underlying population in the geographic area based on the population estimate for the given calendar year. The 2021 report calculates percent screened using 2020 population estimates developed by the UMass Donahue Institute (UMDI) using 2020 decennial Census data. For more information about UMDI population estimates, visit the "About our Data" page on Environmental Public Health Tracking (EPHT). Screening rate data in this report may differ from other publications, such as EPHT reports.

- **μg/dL**: micrograms per deciliter, the unit of measurement for blood lead specimens.
- **Blood Lead Levels**: The number and percentage of children within each blood lead level category, out of all children screened 9 to 47 months of age. Only one blood lead specimen is counted per child. If a child has had more than one blood lead specimen within the designated time-period, then the highest specimen is counted, with venous specimens taking priority, followed by confirmed capillary specimens and, finally, unconfirmed capillary specimens when no confirmed specimens are available. On December 1, 2017, the MA CLPPP began requiring venous confirmation of capillary blood lead specimens ≥5 μg/dL. Prior to that date, capillary blood lead specimens between 5 and 9 μg/dL were frequently unconfirmed. Unconfirmed capillary blood lead specimens ≥10 μg/dL are less common but may exist due to a failure to re-test according to guidelines. In December 2017, the MA CLPPP also revised its regulations to define childhood lead poisoning as a venous blood lead level ≥10 μg/dL and to define a blood lead level of concern as one between 5 and 9 μg/dL. The CDC reference level for blood lead in children, in effect from 2012-2021, is 5 μg/dL. For more information regarding the CDC reference level, please visit the CDC's information page on blood lead levels here.
- **Estimated confirmed ≥5**: Capillary blood tests can be a useful tool for preliminary lead screening because they are easier to conduct than venous tests, especially on children. However, a single capillary test does not provide adequate precision or reliability to be considered confirmatory of an elevated blood lead level. Only about 1/3 of capillary results in the 5-9 μg/dL range are found to be truly ≥5 μg/dL upon retest. Until confirmatory testing of preliminary capillary results 5-9 μg/dL becomes standard practice in Massachusetts, as required by MA CLPPP as of December 1, 2017, a calculation is employed to estimate the true number of children with blood lead levels ≥5 μg/dL. The number of children with estimated confirmed ≥5 μg/dL blood lead levels is calculated as the sum of those with confirmed blood lead levels ≥5 μg/dL and a proportion of those having unconfirmed blood lead levels ≥5 μg/dL. The proportion of unconfirmed blood lead levels ≥5 μg/dL estimated to be truly elevated is based on the annual statewide proportion of capillary results in the 5-9 μg/dL range found to be truly ≥5 μg/dL upon retest (positive predictive value).

Other:

- **Rural cluster definitions**: Rural levels and clusters are defined by the MA Office of Rural Health. More detail can be found here.

APPENDIX V: References

1. 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

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7. Moody HA, Darden JT, and Pigozzi BW. “The Relationship of Neighborhood Socioeconomic Differences and Racial Residential Segregation to Childhood Blood Lead Levels in Metropolitan Detroit.” Journal of Urban Health, 2016, 93(5):820-839.

For More Information

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