

Michigan Blood Lead Testing Workgroup: Recommendations to the Michigan Department of Health and Human Services

January 6, 2023 (minor edits October 10, 2023)

Executive Summary

In 2022, the Michigan Department of Health and Human Services (MDHHS) convened a workgroup of subject matter experts and stakeholders in lead exposure prevention to review the current approach to childhood blood lead testing in Michigan and make recommendations that strengthen Michigan's approach. The workgroup was convened because of data indicating that not all children potentially exposed to lead are being tested under Michigan's current requirements and guidelines, especially following the COVID-19 pandemic shutdown. The workgroup met three times between March and July. The workgroup considered Michigan's current targeted approach, approaches in other states, data from Michigan and other states, and published literature. The workgroup concluded that Michigan's approach should be changed and made the following consensus recommendations:

Test all children at 12 AND 24 months or, if not tested at those ages, at least once before 6 years of age. In addition to the universal age-based testing, children less than 6 years of age should be tested based on an annual individual risk assessment but with revised MDHHS risk assessment questions.

Goal of the workgroup

To bring stakeholders together to review the current approach to childhood blood lead testing in Michigan, identify opportunities for improvement, and make recommendations to MDHHS that strengthen Michigan's approach to blood lead testing.

Background

Lead is ubiquitous in the environment, and young children are most susceptible to lead's toxicity. While the utmost goal of public health is to reduce or eliminate lead sources before exposure occurs (primary

prevention), identifying children with lead exposure and providing appropriate interventions (secondary prevention) remains necessary due to ongoing exposures.

Blood lead testing is the best screening tool to identify children who have been exposed to lead.

Michigan’s public health program for lead poisoning prevention was established by the Public Health Code (MCL § 333.5474¹). It does not include a specific mandate to screen children for lead exposure or define lead exposure screening.

MDHHS’s lead exposure screening policies and recommendations have been developed based on a combination of several federal mandates and recommendations from the Centers for Disease Control and Prevention (CDC) and the American Academy of Pediatrics. They include:

- Children enrolled in the Supplemental Nutrition Program for Women, Infants, and Children (WIC) program: Michigan law, MCL § 400.1111², mandates that all children who participate in WIC have a blood lead test. However, WIC agencies are not mandated to test, nor are children excluded from WIC services if they do not have a test. WIC agencies are not permitted to use WIC funds to reimburse for lead testing services.
- Children enrolled in Medicaid: The Centers for Medicare and Medicaid Services (CMS) mandates that all children enrolled in Medicaid have a blood lead test at ages 1 and 2 years or between 24 and 72 months of age if not previously tested.³
- Children living in the City of Detroit: City ordinance⁴ requires that the Detroit Health Department establish policies and procedures for annual blood lead tests from age 6 months through 6 years.
- All other children: The MDHHS Childhood Lead Poisoning Prevention Program (CLPPP) recommends that health care providers use a risk screening questionnaire and obtain a blood lead test if a parent answers “yes” or “don’t know” to any of the seven questions.⁵ There is no guidance on how often this questionnaire should be used to screen for lead exposure.

In 2016, the Michigan Child Lead Poisoning Elimination Board recommended universal blood lead testing at the ages of 9-12 months and again at 24-36 months,⁶ and the [Michigan Child Lead Exposure Commission](#) adopted this recommendation in its 2018 Action Plan.⁷

Definitions

Lead exposure screening: Methods used to assess if a child has had lead exposure. It can include risk questionnaires and blood lead testing.

Blood lead testing: Methods to assess level of lead in blood, includes capillary and venous sampling.

Risk screening: Use of a questionnaire to determine a child’s risk of lead exposure.

Universal testing: Blood lead testing of all children at selected ages, regardless of risk factors.

¹ [Michigan Legislature - Section 333.5474](#)

² [Michigan Legislature - Section 400.1111](#)

³ [Lead Screening | Medicaid](#)

⁴ [§ 24-10-11. Blood lead level testing of children., Division 2. TESTING FOR ELEVATED BLOOD LEAD LEVELS, Article X. LEAD POISONING TESTING AND PREVENTION, Chapter 24. HEALTH AND SANITATION, Code of Ordinances, Detroit \(elaws.us\)](#)

⁵ [Provider Quick Reference with Screening Questions](#)

⁶ Child Lead Poisoning Elimination Board. A Roadmap to Eliminating Child Lead Exposure. November 2016. Available at [Child Lead Poisoning Elimination Board \(michigan.gov\)](#)

⁷ [CLEEC Action Plan.pdf \(michigan.gov\)](#)

A more recent review of information and data from Michigan and nationally by MDHHS indicated that not all Michigan children with lead exposure are identified. This can be attributed to a combination of policy, provider, and patient factors. While no state achieves 100% lead exposure screening, states with clearly defined policies for blood lead testing, often based in law, appear to have higher rates of testing than those with complex or poorly defined policies.

These findings and recommendations prompted consideration of whether a change in approach is needed in Michigan. Accordingly, MDHHS convened a group of Michigan subject matter experts and stakeholders in lead poisoning prevention. The workgroup was charged with developing recommendations for changes based on consideration of Michigan's current approach, a review of data and information from Michigan and other states, and a review of state and national policies.

Process for developing recommendations

- **Workgroup membership:** MDHHS determined that the workgroup should include physicians with expertise in lead poisoning and representatives from local health departments (LHD), impacted medical professional organizations, advocacy groups for children's health and lead poisoning prevention, and the Governor-appointed Child Lead Exposure Elimination Commission. Invitations were emailed in January 2022. The list of individuals who accepted the invitation and the organizations they represent is in Appendix 1.
- **MDHHS's workgroup staffing support structure:** Three staff in MDHHS's Public Health Administration were designated to facilitate the workgroup process. Additional staff from MDHHS's Division of Environmental Health provided subject matter expertise in data analysis and childhood lead poisoning prevention programs and strategies. (See Appendix 2.)
- **Workgroup process:** The workgroup virtually met three times. Prior to each meeting, workgroup members were provided with materials to review. They were also asked to respond to a set of questions before meetings 2 and 3.
 - **Meeting 1 - March 2, 2022, 9 – 10:30 a.m.**
Prior to the meeting, workgroup members were asked to review a briefing document on the issues. (See Appendix 3.) The following summarizes the meeting:
 - Following a presentation of Michigan's blood lead testing policies, an overview of risk screening questionnaires, and data on lead testing in Michigan, workgroup attendees completed a poll asking if Michigan's policies should be changed and 100% said yes.
 - Following a presentation of approaches to blood lead testing in other states (universal, targeted, hybrid) and discussion, a second poll was administered asking which approach would be best for Michigan. Sixty-seven percent said universal testing at certain ages, and 33% indicated universal testing at certain ages plus a school entry requirement.
 - The discussion identified the need for additional information on school mandates, data from other states with universal testing, and data on blood lead testing in Michigan including estimated impacts of universal testing on potential numbers tested with elevated blood lead levels.

- Meeting 2- April 12, 2022, 4 – 5 p.m.
In summary:
 - Data on blood lead testing and elevated blood lead levels (EBLL) from other states with universal testing were presented, showing how testing increased with the change to universal testing. In addition, estimates of the impact of universal testing on numbers tested in Michigan were presented.
 - The results of the pre-meeting survey – “At what ages should children be tested” – were presented, noting the varied responses from workgroup members to this question. The discussion included comments and questions related to universal testing that led the facilitator to conclude that there wasn’t consensus on this point at this stage.
 - The group then discussed the question: Should the group’s recommendation also include a recommendation on risk-screening at ages other than those recommended for universal testing? Most agreed that there should be, but no one approach was identified.

- Meeting 3 – July 11, 2022 4 – 5:30 p.m. In summary:
 - The goal of the meeting was stated: To develop a consensus recommendation on changes to MDHHS’s approach to lead testing.
 - Results of the first set of questions on the pre-meeting survey – “Whether Michigan’s approach should be changed,” and “If adopting universal testing, at what ages” – were presented. Those who had not voted in support of universal testing in the pre-meeting survey were asked to comment on reasons and a discussion followed. Some of the concerns raised included:
 - Negative impacts related to insurance coverage.
 - Diversion of resources away from focusing on children that really need testing or from working on continuous quality improvement in doctors’ practices.
 - Problem of getting children to doctor’s office or to lab for testing not going away with this policy change.
 - Will the public health system be able to handle increased numbers of children tested?
 - The results of the next question in the pre-meeting survey – “At what ages should universal testing apply?” – were presented. Various recommendations for testing at ages other than at 12 and 24 months were discussed. Then a poll was taken. The option that had the most support in the poll was testing at least once by age 6, if not tested at age 12 and 24 months. These track with requirements by Medicaid for ages at which children should be tested.
 - The results of the last question in the pre-meeting survey – “Should there be use of an individual or community-level risk assessment for children outside of age-specific universal testing?” – were presented. Most supported the use of a risk screening questionnaire for children outside of age-specific universal testing, but noted the current MDHHS risk screening questionnaire is not adequate and needs to be revised.

- The facilitator then developed a draft consensus recommendation: “Test all children at 12 AND 24 months, or if not tested at those ages at least once before 6 years of age. In addition to the universal age-based testing, test children based on annual individual risk assessment, but with revised MDHHS risk assessment questions.” Workgroup members were polled to ask if they (1) supported, (2) not first choice but can support, or (3) do not support. None voted that they did not support this recommendation.
- The final question for discussion was whether the universal testing recommendation should be a public health recommendation from MDHHS or incorporated into statute. The discussion focused on two bills recently introduced to the Michigan legislature related to a universal testing mandate, noting that the ages designated for universal testing were slightly different from this workgroup’s recommendation. The workgroup agreed to have its consensus recommendation forwarded to MDHHS for consideration and to the bill sponsors for awareness.

Following meeting 3, the seven workgroup members who did not attend meeting 3 or had signed off before the consensus vote were asked to vote on their support for the consensus recommendation. Six of the seven voted support, and one did not vote.

The draft consensus recommendation was provided to the MDHHS legislative liaison and upper-level management, asking for their consideration in submitting it to the bill sponsors of the introduced universal testing bill.

The full report (this document) was prepared by the MDHHS facilitators following meeting 3 and provided to workgroup members for review. All reviewers supported the recommendations and made only minor suggested revisions to the document.

Recommendations

➤ **Blood Lead Testing consensus recommendations to MDHHS.**

1. All children in Michigan should have a blood lead test at 12 AND 24 months of age, or if not tested at those ages, at least once before 6 years of age.

Rationale: Blood lead levels in young children generally peak around age 2 years when children become more mobile and explore their environments.⁸ Therefore, blood lead testing at 12 months, to capture early exposure, and repeat testing at age 24 months, when exposures peak for most children, provide a baseline lead exposure screening that allows for early detection of lead exposure and corresponds with the ages when lead exposure is most likely to be detected on blood lead tests. Additionally, this recommendation mirrors the current blood lead testing policy for children enrolled in Medicaid. This alignment avoids having different policies for different population groups based on insurance status, which can change over time and may not reflect a child’s lead exposure risk. The universal, age-based recommendation grew out of a

⁸ Lanphear BP, Hornung R, Ho M, Howard CR, Eberly S, Knauf K. Environmental lead exposure during early childhood [published correction appears in J Pediatr. 2002;140(4):490]. J Pediatr. 2002;140(1):40–47

discussion that acknowledged that risk screening questionnaires have not been shown to accurately identify children with elevated blood lead levels when used as a sole screening tool outside of a strategy that incorporates blood lead testing based on age.

2. In addition to the universal age-based testing, children less than 6 years of age should be tested based on an annual individual risk assessment, but with revised MDHHS risk assessment questions.

Rationale: Blood lead testing provides a point-in-time screening for lead exposure, and the universal testing recommendation at 12 and 24 months provides information about early exposure and exposure at the age when lead exposure from common lead exposure sources peaks. In addition, because children's lead exposure risk can change over time, the workgroup recommends that lead exposure risk be assessed on an individual child basis annually after 24 months by questionnaire, with blood lead testing occurring if there is new or ongoing exposure risk.

➤ **Recommendations for supporting and monitoring implementation of universal testing:**

- Further consideration is needed regarding whether this universal testing recommendation should be codified in statute, should the current introduced bill under consideration in the Michigan legislature not pass.
- The current MDHHS risk screening questionnaire should be revised to ensure it is based on common lead exposure sources for children in Michigan, has an acceptable level of specificity and sensitivity, and is practical for use by clinicians evaluating for lead exposure risk.
- MDHHS should work with private health insurers to determine how an MDHHS policy on universal testing would impact families with private insurance, especially those with high deductibles, and identify steps to mitigate adverse impacts.
- MDHHS should monitor blood lead testing data to identify compliance with the policy, positive or negative impacts on public health workload and practice, positive or negative impacts on health disparities in testing and elevated blood lead levels, and overall costs and benefits of the policy on child lead exposure elimination.
- Implementation of this policy may require identification of resources and staffing to support providers and agencies.

Appendix 1: Blood Lead Testing Workgroup Members

Name	Representing	Employment/Position
Sharon Swindell, MD	Michigan Chapter American Academy of Pediatricians (MIAAP) (Former president)	Faculty - University of Michigan
Teresa Holtrop, MD	MIAAP (Former president)	Executive Director- Kids Health Connections
Kanta Bhambhani, MD	Pediatrician specializing in lead poisoning treatment and prevention	Pediatrician - Children's Hospital Detroit
Srikar Reddy, MD FAAFP	Michigan Academy of Family Practice MIAFP (president)	Family Medicine doctor, South Lyon
Teniesha Wright-Jones, DO	MIAFP (Board member)	Family Medicine doctor, Southfield
Russell Faust, MD, PhD	Michigan Association of Public Health and Preventive Medicine Physicians (MAPPP)	Medical Director, Oakland County Health Division
Nirali Bora, MD	Michigan Association of Public Health and Preventive Medicine Physicians (MAPPP)	Medical Director, Kent County Health Department
Paul Bellamy	Kent County Health Department	Public Health Epidemiologist
Anne Bianchi	District Health Department 10	WIC Program Director
Jessica Miller	District Health Department 10	Public Health Nurse
Andrew Cox	Macomb County Health Department	Director/Health Officer
Michelle Estell	Genesee County Health Department	Quality Licensing and Emergency Response Coordinator
Jill Montgomery	Public Health – Muskegon County	Public Health Education and Promotion Supervisor
Jane Nickert	Washtenaw County Health Department	Director of Nursing
Renata Polk	Detroit Health Department	Clinical Operations Manager, Lead Program
<i>Ken Bowen*</i>	<i>LHD Ionia</i>	<i>Health Officer</i>
<i>Tina Wahl, JD**</i>	<i>Michigan Environmental Council</i>	<i>Environmental Health Policy Director</i>
Rebecca Meuninck, PhD	The Ecology Center	Deputy Director
Melissa Mashni, MD	Clinical workgroup, Kent County Lead Action Team	Family Medicine doctor, Grand Rapids
Al Vanderberg	Michigan Childhood Lead Exposure Elimination Commission	County Administrator/Controller, County of Kent
Amy Zaagman	Michigan Council for Maternal and Child Health	Executive Director

*Resigned from workgroup.

** Resigned from workgroup in May to take position at MDHHS as Lead Policy Advisor

Appendix 2: MDHHS Staff Support

Name	Title	Role in Workgroup
James Bell, DSW	State Assistant Administrator, Public Health Administration	Planning and facilitating
Jennifer McDonald, MD, MPH	Consulting Physician, Division of Environmental health (DEH)	Planning, report writing, and facilitating
Martha Stanbury, MSPH	Senior Advisor (DEH)	Planning, report writing, and facilitating
Sarah Lyon-Callo, PhD, MS	Director, Bureau of Epidemiology and Population Health	Senior MDHHS Manager and Subject Matter Expert (SME)
Kory Groetsch, MS	Director, DEH	Manager and SME
Carin Speidel	Manager, Lead Services Section, DEH	Manager and SME
Angela Medina, MA	Public Health Consultant, DEH	SME
Aimee Surma, RN	Nurse Consultant, DEH	SME
Anthony Oliveri, PhD, MPH, CIH	Manager, Environmental Epidemiology and Analytics Section, DEH	Manager and SME
Cynthia Aaron, MD	Consulting Physician, DEH	SME
Tina Wahl, JD	Lead Policy Advisor, DEH	SME

**Childhood Lead Exposure Screening in Michigan:
Review of current and alternative approaches to blood lead testing**

December 10, 2021 (with minor edits November 3, 2022)

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Purpose of this document

This briefing provides an overview of Michigan's current approach to childhood lead exposure screening and frames a discussion of whether a change to our current approach to lead exposure screening would better achieve the public health goal that all Michigan children with lead exposure are identified.

Executive Summary

- Michigan's current approach to childhood lead exposure screening focuses on children less than 6 years of age and includes mandated testing of all children who live in Detroit or are enrolled in Medicaid and WIC and recommended testing of other children based on an assessment of lead exposure risk, using a provider-administered risk screening questionnaire.
- Michigan's targeted approach likely results in children with lead exposure going undetected due to a combination of policy, provider, and patient factors.
 - Based on blood lead testing data from the 2015 and 2016 cohorts of children born in Michigan, about 70% of children received at least one blood lead test by age 3 years, and about 39% were tested at around 2 years of age, the age at which children are most likely to have exposure to lead. Twenty-four% were tested at both ages 1 and 2 years.
 - Lead risk screening questionnaires have been found to have low sensitivity and specificity, i.e., they do not accurately identify children with lead exposure, and they are cumbersome for providers to administer.
- Some other states use targeted approaches that include mandated testing for Medicaid and WIC-enrolled children and risk screening for others, and some states use a combination of targeted testing and universal testing mandates in high-risk jurisdictions (hybrid approach).
- Twelve states and the District of Columbia require all children to be tested (universal approach). (Note: Almost all states require testing of Medicaid-enrolled children at ages one and two years.)
- To ensure Michigan's lead exposure screening strategy aligns with our goal to identify all children with lead exposure, MDHHS is requesting input from key stakeholders and subject matter experts on the advisability of making changes to our current approach to blood lead screening.
 - A workgroup composed of health care providers, public health officials, and advocacy group members will be convened to consider the current approach and alternatives and to make recommendations for changes.
 - The process is planned for completion in Spring 2022 with the submission of a report with recommendations to MDHHS administration.

The Issue

Lead is ubiquitous in the environment and young children are most susceptible to lead's toxicity. While the utmost goal of public health is to reduce or eliminate lead sources before exposure occurs (primary prevention), identifying children with lead exposure and providing appropriate interventions (secondary prevention) remains necessary due to ongoing exposures.

Blood lead testing is the best screening tool to identify children who have been exposed to lead. Ideally, children have at least two blood lead tests, around ages 1 year and 2 years, to detect lead exposure early and at the age when blood lead levels peak, respectively.

Not all Michigan children with lead exposure are identified, because not all are tested due to a combination of policy, provider, and patient factors.

While no state achieves 100% lead exposure screening, states with clearly defined policies for blood lead testing, often based in law, tend to have higher rates of testing than those with complex or poorly defined policies, prompting consideration of whether a change in approach is needed in Michigan.

Definitions

Lead exposure screening: methods used to assess if a child has had lead exposure, can include risk questionnaires and blood lead testing.

Blood lead testing: methods to assess level of lead in blood, includes capillary and venous sampling.

Risk screening: use of a questionnaire to determine a child's risk of lead exposure.

Universal testing: blood lead testing of all children at selected ages, regardless of risk factors.

Michigan's current approach to childhood lead exposure screening

The lead poisoning prevention program was established by the Public Health Code (MCL § 333.5474⁹). It does not include a specific mandate to screen children for lead exposure or define lead exposure screening.

In Michigan, lead exposure screening is a combination of mandated blood lead testing for some and recommend blood lead screening for others, as follows:

- Children enrolled in the Supplemental Nutrition Program for Women, Infants, and Children (WIC) program: Michigan law, MCL § 400.111¹⁰, mandates that all children who participate in WIC have a blood lead test. However, WIC agencies are not mandated to test, nor are children excluded from WIC services if they do not have a test.
- Children enrolled in Medicaid: The Centers for Medicare and Medicaid Services (CMS) mandates that all children enrolled in Medicaid have a blood lead test at ages 1 and 2 years or between 24 and 72 months of age if not previously tested.¹¹

⁹ [Michigan Legislature - Section 333.5474](#)

¹⁰ [Michigan Legislature - Section 400.111](#)

¹¹ [Lead Screening | Medicaid](#)

- Children living in the City of Detroit: City ordinance¹² requires that the Detroit Health Department establish policies and procedures for annual blood lead tests from age 6 months through 6 years.
- All other children: The MDHHS Childhood Lead Poisoning Prevention Program (CLPPP) recommends that health care providers use a risk screening questionnaire and obtain a blood lead test if a parent answers “yes” or “don’t know” to any of the seven questions.¹³

Approaches to childhood lead exposure screening in the U.S.

Since the late 1980s, the Centers for Medicare and Medicaid Services (CMS) has required that children enrolled in Medicaid and the Children’s Health Insurance Program have a blood lead test to screen for lead exposure at 12 and 24 months of age, or between 24 and 72 months of age if not previously tested. In 1991, the CDC recommended universal blood lead level testing for all children, and in 1997, the CDC recommended states and/or local agencies develop their own lead screening recommendations based on local data. Appendix 1 includes the recommendations from CDC and the recommendations from the American Academy of Pediatrics and the American Academy of Family Physicians.

State policies vary for children **not enrolled in Medicaid** and include the following:

- Targeted testing based on a risk screening questionnaire and/or risk factors (e.g., zip code of residence)
- Universal blood lead testing at certain ages
- Universal blood lead testing at certain ages with more frequent testing for children determined to be at higher risk
- A hybrid policy of universal testing in high-risk areas and targeted testing based on risk screening for children living outside of those areas
- Minimal or no blood lead testing requirement or recommendations

Table 1 provides a brief description of selected states’ screening approaches and includes available data on the percentage tested at least once before age 3 years, based on a birth cohort analysis of the state’s blood lead data. [Appendix 2](#) provides a more detailed table of information and data from the twelve states and Washington DC that have universal testing policies.

¹² [§ 24-10-11. Blood lead level testing of children., Division 2. TESTING FOR ELEVATED BLOOD LEAD LEVELS, Article X. LEAD POISONING TESTING AND PREVENTION, Chapter 24. HEALTH AND SANITATION, Code of Ordinances, Detroit \(elaws.us\)](#)

¹³ [Provider Quick Reference with Screening Questions](#)

Table 1: Overview of Lead Exposure Screening Strategies in Selected States:

Strategy	State	Statute/Recommendation	Lead Exposure Screening Recommendation	% Tested at least Once Before Age 3
Hybrid	GA	Recommendation	Testing at 12 and 24 months for Medicaid and high-risk geographic areas. Seven-question risk assessment for other children.	41.97%*
Hybrid	IL	Statute requires all children 6 years or younger be evaluated for lead exposure.	Testing at 12 and 24 months for high-risk zip codes (including all of Chicago) and Medicaid. Ten-question risk assessment at 12 and 24 months for other children. Proof of screening and/or testing required for childcare/school entry.	41.51%*
Hybrid	OH	Statute	Test at age 1 and 2 for Medicaid, high-risk zip code, or other risk factors.	49.64%*
Hybrid	WI	Recommendation. Statute allows for promulgation of rules, but they have not.	Universal testing at ages 12, 18, and 24 months in Milwaukee and Racine. Four-question risk assessment for all other children. Testing at 12 and 24 months for Medicaid.	66.73%*
Hybrid	MN	Recommendation	Universal testing at ages 12 and 24 months in Minneapolis and St. Paul and those arriving from other countries or major metro areas. Seven-question risk assessment for other children. Testing at 12 and 24 months for Medicaid.	81%**
Universal	MA	Statute	Between 9 and 12 months and at ages 2 and 3 years. Required for childcare/school entry.	96%*
Universal	NJ	Statute	Between 9 and 18 months and between 18 and 26 months of age.	90%***

*2013 birth cohort. Source: CDC National Environmental Public Health Tracking Network (<https://ephtracking.cdc.gov/>)

**2015 birth cohort. Source: MN 2018 Blood Lead Surveillance Report ([2018 Blood lead Surveillance Report \(state.mn.us\)](https://www.mn.gov/2018/Blood-Lead-Surveillance-Report))

***2016 birth cohort. ([Childhood Lead Exposure in New Jersey Annual Report 2019](#))

Michigan’s Blood Lead Testing Data

The blood lead testing data of children who were born in Michigan in 2015 and 2016 were analyzed to determine how many were tested at least once before age 3 and 6 years as well as the numbers tested at benchmark age intervals. Blood test data for these two birth cohorts were obtained from the MDHHS blood lead testing surveillance database with blood lead test results reported through March 2021.

Of the 113,211 children born in 2015: (Table 2)

- 78.3% had at one least test before age 6 years, and 70.2% had at least one test before age 3 years.
- 54% were tested at around age 1 year.⁶
- 39.5% were tested around age 2 years.¹⁴
- 30% were tested at age 1 year but not at age 2 years, the age at which children are most likely to have exposure to lead because of hand to mouth behaviors and mobility.
- 24% were tested at both ages 1 year and 2 years.

Table 2 includes 2015 and 2016 birth cohort data. Note: the percentages tested at various intervals are very similar.

Table 2: Number (percent) of the 2015 and 2016 birth cohort tested, including testing within age benchmark intervals

Birth cohort year	# in birth cohort	#(%) tested at least once by age 6*	#(%) tested at least once by before age 3 years (0-35 months)	#(%) tested 9-17 months (“around one year”)	#(%) tested around age one but not tested around age two	#(%) tested 18-35 months (“around 2 years”)	#(%) tested around age two but not tested around age one	#(%) tested at both around age one and two
2015	113,211	88,657 (78.3%)	79,458 (70.2%)	61,098 (54.0%)	33,918 (30.0%)	44,772 (39.5%)	17,592 (15.5%)	27,180 (24.0%)
2016	113,374	84,486 (74.5%)	78,898 (69.6%)	60,706 (53.5%)	33,709 (29.7%)	44,474 (39.2%)	17,476 (15.4%)	26,997 (23.8%)

*Data obtained from MDHHS blood lead surveillance program through March 2021, so not all children would have had their sixth birthday at the time the data was obtained.

Rationale for reconsidering Michigan’s approach to blood lead testing

- Multiple factors contribute to whether a child receives a blood lead test, including patient factors, provider and system factors, and policy factors ([Appendix 3](#)). The policy determinants of blood lead testing are a particular point of influence for MDHHS.

¹⁴ “Around age one” is defined at age 9 -17 months, and “around age two” is defined at 18-35 months.

- Based on data from the 2015 and 2016 birth cohort, only about 39% of children were tested at 2 years, which is when blood lead levels peak,¹⁵ and only 24% were tested at both 1 year and 2 years.
- For children who are not enrolled in Medicaid:
 - The current approach relies on provider and parental assessment of risk.
 - The risk assessment relies on the use of a questionnaire that is cumbersome to incorporate into clinical practice. Furthermore, there is evidence lead risk screening questionnaires, in general, do not accurately identify children with lead exposure.¹⁶
 - MDHHS has not clearly stated in policy and/or statute/regulation that all non-Medicaid children should be assessed using a standard risk screening questionnaire or the intervals at which the questionnaire should be used. In the absence of statute or regulation related to lead exposure screening, recommendations lack authority.
- For Medicaid-enrolled children:
 - The Healthcare Effectiveness Data and Information Set (HEDIS) measure for lead for Medicaid health plans (at least one test by 2 years of age) does not align with the Centers for Medicare and Medicaid Services (CMS) requirement for a test at ages 1 and 2 years. Because HEDIS measures can influence provider-level quality metrics and incentives, this misalignment potentially contributes to decreased testing around 2 years.
 - Children’s insurance status can change without a change in their lead risk.
- Questionnaire-based screening generally has limited sensitivity and specificity¹⁷ and is difficult to incorporate into clinical practice.

Alternative policy approaches to blood lead screening

Two alternative policy approaches to lead exposure screening, which have been implemented in other states, are: (1) mandated universal blood lead testing of all children, regardless of Medicaid status, at specified ages, typically age 1 and 2 years; and (2) universal testing in high-risk areas plus use of a risk screening questionnaire in the rest of the state (a hybrid approach). There are advantages and disadvantages to both options. Table 3 provides a summary comparison of Michigan’s current approach and the two alternative options.

¹⁵ Lanphear BP, Hornung R, Ho M, Howard CR, Eberly S, Knauf K. Environmental lead exposure during early childhood. *J Pediatr*. 2002 Jan;140(1):40-7. doi: 10.1067/mpd.2002.120513. Erratum in: *J Pediatr* 2002 Apr;140(4):490. Eberle Shirley [corrected to Eberly Shirley]. PMID: 11815762.

¹⁶ Cantor AG, Hendrickson R, Blazina I, Griffin J, Grushing S, McDonagh MS. Screening for Elevated Blood Lead Levels in Childhood and Pregnancy Updated Evidence Report and Systematic Review for the US Preventive Services Task Force *JAMA*. 2019;321(15):1510-1526.

¹⁷ Ibid.

Table 3: Advantages and Disadvantages of Two Alternatives to Michigan’s Current Lead Exposure Screening Approach

Approach	Advantages	Disadvantages
Universal blood lead testing at, typically, ages 1 and 2 years	<ul style="list-style-type: none"> ● Clear, simple, unified recommendation for providers and patients. ● Identifies children with lead exposure who fall outside of current approach. ● Provides more complete understanding of sources of exposure to allow for potential targeted interventions and to inform primary prevention efforts. ● Simplifies use of the Michigan Care Improvement Registry (MCIR) and decision support in electronic health records. ● Avoids reliance on risk screening questionnaires, which are cumbersome and have low sensitivity and specificity. ● If mandated in law, can be reinforced by mandates for testing for daycare/school entry. 	<ul style="list-style-type: none"> ● Increase in false positives, particularly from capillary testing. ● Given statewide prevalence of EBLL, providers and the public may object to testing every child because so many children will be screened that do not have an EBLL. ● Potential increased costs due to increased testing. ● Public health agencies would need additional resources to complete public health responsibilities for follow-up with children with EBLLs. ● United States Preventive Services Task Force concluded that evidence is insufficient to assess balance of benefits and harms of screening for EBLL. ● Does not target resources to address existing inequities. ● Likely would need statute change to achieve implementation.
Hybrid (universal blood lead testing in high-risk areas and risk screening for other children)	<ul style="list-style-type: none"> ● Targets resources to better address inequities and needed interventions in high-risk communities. ● Less costly than statewide universal testing. ● Fewer false positives, with less testing of low-risk populations. ● High-risk jurisdictions can implement universal testing voluntarily or by local ordinance. 	<ul style="list-style-type: none"> ● Complex policy for providers and Local Health Departments. ● Relies on risk screening questionnaire. ● More difficult to implement electronic health record decision support. ● Designation of high-risk will not encompass all potential exposure risk. ● Requires a consensus definition for high-risk jurisdictions based on factors such as percentage of older homes, children in poverty, elevated blood levels, and others.

Conclusions

- While multiple factors impact whether children receive blood lead tests, a state’s lead exposure screening recommendation or policy serves as a guide for who should be tested.
- There are challenges and limitations to Michigan’s approach and to each of the alternative approaches that have been implemented in other states.

- Based on experiences of other states, moving to a testing approach that relies less on providers' and parents' assessment of risk and allows for clearer messaging to providers, results in more blood lead testing at ages 1 and 2 years. This would mean the identification of more children with lead exposure, which would allow both for intervention for individual children and to inform primary prevention efforts.

Next Steps

- MDHHS is requesting input from key stakeholders to consider strengths and limitations of the current approach in Michigan and those of alternative approaches, and to make recommendations to MDHHS about a lead exposure screening approach that best supports the public health goal of identifying all children with lead exposure.
- A workgroup of key stakeholders will be convened in February 2022, and a report with their recommendations to MDHHS will be submitted in Spring 2022. Key stakeholders include:
 - Clinicians who provide pediatric care, including representatives from
 - Michigan Chapter of the American Academy of Pediatrics
 - Michigan Academy of Family Physicians
 - Local Health Departments
 - Members of the Michigan Childhood Lead Exposure Elimination Commission
 - Child lead poisoning prevention advocacy groups

Appendix 1: Childhood lead exposure screening recommendations from the CDC, American Academy of Pediatrics and American Academy of Family Physicians

Centers for Disease Control and Prevention (CDC): In 1997, the CDC recommended that state and/or local agencies formulate their own screening recommendations based on local data. They recommended blood lead tests for children living in communities with $\geq 27\%$ pre-1950s housing or $\geq 12\%$ prevalence of BLL ≥ 10 $\mu\text{g}/\text{dL}$ and further targeted blood lead testing for specific groups with higher risk factors in communities with lower prevalence of EBLLs. In the absence of a statewide or local plan, CDC recommended universal testing per 1991 guidance.¹⁸

Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP): In 2012, ACCLPP recommended health care providers follow state and local lead screening guidelines. They also recommended blood lead testing for children from other countries when they arrive in the U.S., neonates born to mothers with lead exposure during pregnancy or lactation (per guidelines), and Medicaid-enrolled children at 12 and 24 months (and once between 36-72 months if not previously tested). For jurisdictions without formal recommendations, the ACCLPP recommended using the 1997 CDC guidelines.¹⁹

American Academy of Family Physicians: Supports the guidance of the United States Preventive Services Task Force which found insufficient evidence to assess the balance of benefits and harms of screening for elevated blood lead levels in asymptomatic children.^{20 21}

American Academy of Pediatrics (AAP)/Bright Futures: The AAP recommends blood lead testing of asymptomatic children based on federal, state, and local requirements. AAP/Bright Futures recommends performing a risk assessment at well child exams 6 months through 6 years and a lead test at 12 and 24 months for children enrolled in Medicaid or those who live in high prevalence areas ($\geq 25\%$ of housing built before 1960 or a prevalence of children with blood lead levels ≥ 5 $\mu\text{g}/\text{dL}$ of $\geq 5\%$). The AAP also recommends testing children with identified lead hazards or living in a home built before 1960 that is in poor repair or renovated in the past 6 months; and children who are immigrants, refugees, or internationally adopted.^{22 23}

¹⁸ Centers for Disease Control and Prevention. Screening Young Children for Lead Poisoning: 31 Guidance for State and Local Public Health Officials. CDC, Atlanta: 1997.

¹⁹ [Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention \(cdc.gov\)](https://www.cdc.gov/leadprevention/low-level-lead-exposure-harms-children-a-renewed-call-for-primary-prevention)

²⁰ American Academy of Family Physicians (AAFP). Clinical preventive services recommendation: lead levels: screening. AAFP website. <https://www.aafp.org/patient-care/clinical-recommendations/all/lead-poisoning.html>. Accessed January 1, 2021.

²¹ US Preventive Services Task Force, Curry SJ, Krist AH, Owens DK, Barry MJ, Cabana M, Caughey AB, Doubeni CA, Epling JW Jr, Kemper AR, Kubik M, Landefeld CS, Mangione CM, Pbert L, Silverstein M, Simon MA, Tseng CW, Wong JB. Screening for Elevated Blood Lead Levels in Children and Pregnant Women: US Preventive Services Task Force Recommendation Statement. JAMA. 2019 Apr 16;321(15):1502-1509.

²² [Bright Futures periodicity schedule.pdf \(aap.org\)](https://www.aap.org/bright-futures/periodicity-schedule)

²³ COUNCIL ON ENVIRONMENTAL HEALTH. Prevention of Childhood Lead Toxicity. Pediatrics. 2016 Jul;138(1):e20161493. doi: 10.1542/peds.2016-1493. Epub 2016 Jun 20. Erratum in: Pediatrics. 2017 Aug;140(2): Erratum in: Pediatrics. 2020 Jun;145(6)

Appendix 2: Overview of States with Universal Blood Lead Testing

Twelve states and Washington D.C. have universal blood lead testing policies for the detection of childhood lead exposure (Table 1).

Highlights include:

Timing of testing: Nine of 13 states (including Washington D.C.) with universal testing mandate blood lead testing twice, once at or around age 1 year and again at or around 2 years, which aligns with the CMS requirement for Medicaid-enrolled children. Two states mandate testing once (Iowa requires one test by age 6 years and Delaware requires a test at or around 12 months with testing at 24 months based on risk assessment), and two states mandate more than two tests (Connecticut requires annual testing 9 months to 35 months of age and Massachusetts requires testing between 9 to 12 months, at age 2 years, and at age 3 years, with potential for testing at age 4 years based on risk factors).

Type of Mandate: States with universal testing generally have statutes and regulations that mandate testing and the timing of testing. Two states, Louisiana and Maryland, have regulations that mandate testing in high-risk areas and have designated the entire state high-risk, resulting in a universal testing mandate.

Enforcement: Mandates in 8 of 13 states with universal testing include a requirement for evidence of blood lead testing prior to enrollment in childcare and/or elementary school. Provider compliance is generally voluntary. At least one state's (Vermont) regulation includes language related to enforcement through referral to a professional regulatory board.

Impact of Universal Testing on Testing Rates: While no state reaches 100% testing at their targeted ages, states with universal testing mandates generally have higher rates of blood lead testing. States who have transitioned from targeted testing to universal blood lead testing provide insight into the effect of adopting universal blood lead testing. For example, New Hampshire's law requiring testing at ages 1 and 2 went into effect in April 2018 and the percentage tested at ages 1 and 2 increased from 64% and 41%, respectively, in 2017 to 70% and 58% in 2019.

Appendix Table 1: Detailed information from the 12 states and Washington DC that have universal testing

State*	Type of Mandate*	Citation *	Age for Testing*	Requirement for Daycare and/or School*	Percentage Tested at Least Once by Age 3 years	Year universal went into effect
CT	Statute	CT GEN STAT § 19a-111g(2015)	Annually 9-35 months of age. If not previously tested, test between 36-72 months of age. If clinically indicated as determined by primary care physician, for all children under 72 months of age. Risk assessment annually for children 36-72 months of age.		98.2% (2012 birth cohort, 2015 Annual report)	Recommended in 2008 and became law in 2009.
DC	Municipal regulation (lead testing timing) and statute (school requirement)	D.C. MUN. REGS. TIT. 22-B, § 7301 D.C. CODE § 38-602	Between 6 months and 14 months of age AND between 22 and 26 months of age. At least twice if child over the age of 26 months has not previously been tested and these tests should be conducted before age 6 years and be at least 12 months apart.	Yes	80.8% (2007 birth cohort, CDC Tracking)	Sometime between 2005 and 2013.
DE	Statute	69 DEL. LAWS, c. 310, § 1.	At or around 12 months of age. Screening at or around 24 months based on determination by provider based on criteria promulgated by the Division of Public Health.	Yes	52% (2009 birth cohort, CDC tracking)	Prior to 2010. In 2010 added a regulation mandating testing between 22-26 months for children at high risk.
IA	Statute and administrative rules	IOWA CODE § 135.105 D IOWA ADMIN CODE r. 641-67.2 IOWA ADMIN	In order to attend school, children must be tested by age 6 years. Statute says parents are strongly encouraged to have the child tested by the age of two.	Yes	82.5% (2012 birth cohort, CDC tracking).	2016

		CODE r. 641-67.4 IOWA ADMIN CODE r. 641-67.6				
LA	Statute and administrative rules	LA. REV. STAT. ANN. § 40:1285.1 LA. ADMIN. CODE TIT. 48, §7005	At 12 months and 24 months of age. Administrative rule that defines timing is not available online.		No recent cohort data available	Unclear timing of defining all parishes as “high risk”
MA	Statute and administrative rules	105 MASS. CODE REGS. 460.050 MASS. GEN. LAWS CH. 111 § 193	Between 9 and 12 months of age AND again at 2 AND 3 years of age. Additionally, children living in cities and towns at high risk for lead poisoning (as determined by the State Program) shall be screened at 4 years of age.	Yes	96% (2013 birth cohort, CDC Tracking)	1987 law, went into effect 1990
ME	Statute	ME. REV. STAT. TIT. 22, § 1317-D	At 1 year of age AND 2 years of age.		No recent cohort data available.	2019
MD	Statute and administrative rules	MD. CODE ANN. HEALTH-GEN. § 18-106 MD. CODE REGS. 10.11.04 .04 MD. CODE REGS. 10.11.04 .05	At 12 AND 24 months of age. Targeted testing between 24 months and 6 years for children in high-risk areas without evidence of previous testing.	Yes	No recent cohort data available	2016

		Maryland Targeting Plan for Areas at Risk for Childhood Lead Poisoning				
NH	Statute	N.H. REV. STAT. ANN. §130-A:5-a	At 12 AND 24 months of age.		No recent cohort data available.	2018
NJ	Administrative rules	N.J. ADMIN. CODE § 8:51A-2.1-2.3	Between 9 and 18 months of age (preferably at 12 months) AND between 18 and 26 months of age (preferably 24 months). Any child 25-72 months who has not been tested or any child up to 72 months of age who has been exposed to a known or suspected source of lead		90% (2016 birth cohort, 2019 Annual Report)	1996
NY	Statute and administrative rules	N.Y. PUB. HEALTH LAW §1370-d NY COMP. CODES R. & REGS. TIT. 10, § 67-1.2	At or around 1 AND 2 years of age.	Yes	57.3% have had TWO tests by age 3 years. No recent cohort data for one test by age 3 years. (2015 birth cohort, NY Community Health Indicator Reports)	
RI	Statute and administrative rules	R.I. GEN. LAWS § 23-24.6-8 216-50 R.I. CODE R. § 3.4.1	At least twice, at least 12 months apart, before the age of 36 months. Risk assessment at all well child exams or at least annually for all children	Yes	78% (2013 birth cohort, CDC tracking).	1991

		216-50 R.I. CODE R. §3.2.1	6 months but under 6 years.			
VT	Statues and administrative rules	VT. STAT. ANN. TIT 18, § 1755 12-5 VT. CODE R. § 46:II	At 12 AND 24 months of age.		94% (2013 birth cohort, Vermont Data Explorer)	2011

*Source: The Network for Public Health Law. State Lead Testing Policies for Children not Enrolled in Medicaid 50-State Survey. 2018. Available at <https://www.networkforphl.org/wp-content/uploads/2019/12/50-State-Survey-Lead-Screening-for-Children-Not-Enrolled-in-Medicaid.pdf>

Appendix 3: Factors that Impact Blood Lead Testing

Appendix Table 2: Factors that impact blood lead testing

Patient Factors	Level of awareness of lead as a harmful exposure. Level of priority in the parents' health concerns for their child. How they perceive their child's risk of lead exposure. How willing they are to have their child have blood sampled. Access to preventive care services. Parental fear and/or shame.
Provider Factors	Level of awareness of lead screening recommendations. Level of awareness of health effects of lead, even at low blood lead concentrations. Whether insurance reimburses for the test. Availability of testing options in their clinic. Level of awareness of lead hazards in their patients' environments. Whether a provider agrees with testing recommendations.
Policy Factors	Level of complexity of recommendations/policy. Level of practicality of implementing recommendations. Whether the policy is a law or a recommendation. Accuracy of promoted risk assessment tools.

Adapted from:

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Moodie SM, Tsui EK, Silbergeld EK. Community- and family-level factors influence care-giver choice to screen blood lead levels of children in a mining community. *Environ Res*. 2010;110(5):484-496.

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