



Maryland
Department of
the Environment

LEAD POISONING PREVENTION PROGRAM 2022 HB 1110 STUDY REPORT

– FINAL REPORT –
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EXECUTIVE SUMMARY

On April 12, 2022, Governor Larry Hogan signed House Bill 1110 (Chapter 86, Acts of 2022), entitled *Environment-Lead Poisoning Prevention-Elevated Blood Lead Level*. The bill amended sections of the Maryland Healthy Children Act (Chapter 341, Acts of 2019). These amended sections would incorporate into the State's lead poisoning prevention programs the Centers for Disease Control and Prevention (CDC) Blood Lead Reference Value (BLRV) of 3.5 µg/dl. The CDC reduced the BLRV from 5 to 3.5 µg/dl on October 28, 2021. The 2022 legislation contained the following requirements along with the associated effective dates:

- Effective October 28, 2022, when a child under the age of 6 or a pregnant woman has an elevated blood lead level (EBL) of greater than or equal to 3.5 µg/dL, MDE or the local health department must notify the parent/guardian or pregnant woman and the property owner. MDE must assist the local health departments with case management, as needed.
- On or before December 31, 2022, MDE must study and report the findings of its evaluation of the most effective means of incorporating the CDC's BLRV into the State's lead poisoning prevention programs.
- Effective January 1, 2024, when a child under the age of 6 or a pregnant woman has an EBL of greater than or equal to 3.5 µg/dL, an environmental investigation must be conducted. If the environmental investigation reveals a defect in an affected property (i.e., certain pre-1978 rental property), then the property owner must satisfy the modified risk reduction standard.

House Bill 1110 (Chapter 86, Acts of 2022), directed the Maryland Department of the Environment (MDE) to consult with the Maryland Department of Health, local health departments, the Green and Healthy Homes Initiative (GHHI), and other relevant stakeholders, and required the Maryland Department of the Environment to conduct a study and evaluate the most effective means of incorporating the CDC's BLRV of 3.5 µg/dl into the State's lead poisoning prevention programs, including the environmental investigations required under § 6-305 of the Environment Article. After discussions and research, several issues were identified, which are discussed further in this report. Section IX presents recommended actions for the State to most effectively implement the new BLRV. In summary, the recommendations call for: identifying additional resources and positions for MDE to conduct case management and related activities for children diagnosed at the lower BLRV; identifying additional resources to support local health department's case management in coordination with MDE; assessing any necessary changes to standards for lead in environmental media or products are needed to incorporate the new BLRV; improving the detection and mitigation of diverse sources of lead exposure; evaluating the need for future changes in the environmental investigation protocols; and conducting enhanced and targeted outreach related to the BLRV.

I. INTRODUCTION

Childhood lead exposure remains a preventable environmental hazard in Maryland. Persons at risk include children from birth to age six, and pregnant women. Exposure to this neurological toxin can lead to learning disabilities, behavioral problems, and other psychological issues. There is no safe level of lead, and this toxin crosses all cultural, socioeconomic, and geographic boundaries.

To reduce the incidence of childhood lead poisoning, the Maryland Department of the Environment (MDE) has implemented a successful lead poisoning prevention program for over 25 years. Since the implementation of the Reduction of Lead Risk in Housing Act, Title 6, Subtitle 8, of the Environment Article (Act) in 1996, Maryland has seen a 98% decline in childhood lead poisoning statewide. The Act includes the following major components:

- **Rental Property Owner Requirements.** Pre-1978 residential rental property owners must either have their properties inspected and determined to be lead-free, or to annually register their properties and have them inspected for chipping, peeling, or flaking paint and lead dust at each change in occupancy. MDE implements and enforces these requirements and accredits lead paint inspectors and abatement contractors.
- **Childhood Blood Lead Surveillance.** The Maryland Department of Health (MDH) administers regulations requiring health care providers to have children blood tested for lead at age 1 and 2. MDE receives blood lead results for children tested in the state, maintains a Childhood Lead Registry, and tracks trends in testing and blood lead levels.
- **Coordination with Local Health Departments on Case Management.** MDE notifies local health departments of elevated blood lead level cases and coordinates on case management, including outreach to families.
- **Environmental Investigations.** MDE (and the Baltimore City Health Department) perform detailed environmental investigations to determine sources of lead exposure for children with elevated blood lead levels.

MDE's partner agencies, MDH and the Department of Housing and Community Development (DHCD) also play significant roles in reducing childhood lead poisoning.

Part of the success of Maryland's lead poisoning prevention programs comes from the strengthening and expansion of those programs over time. In 1996, the blood lead level that was considered elevated, triggering actions under the Act, was 25 µg/dL. Over time, this has decreased, in recognition that children can experience adverse health impacts even at low levels of lead and that there is no level of lead that is considered safe. In 2019, legislation passed that lowered the State's elevated blood lead level (EBL) from 10 to 5 µg/dL, to match the CDC's blood lead reference value (BLRV) at that time. That change went into full effect for Maryland's lead poisoning prevention programs beginning in July 2020.

On October 27, 2022, CDC lowered the BLRV to 3.5 µg/dL. The BLRV is based on data from the National Health and Nutrition Examination Survey (NHANES) 2015-2016 and 2017-2018 cycles and represents the 97.5th percentile of blood lead levels among children in the U.S. The new, lower BLRV is a positive indication that blood lead levels among U.S. children continue to decline overall; it also demonstrates that to continue to make progress in further reducing childhood lead levels, programs will need to continue to adapt, including by intervening at lower levels of lead exposure. In 2022, Maryland enacted House Bill 1110 (Chapter 86, Acts of 2022), which established a timeline for implementation of the CDC's new BLRV of 3.5 µg/dL in the state's lead poisoning prevention programs. Specifically:

- Effective October 28, 2022, when a child under the age of 6 or a pregnant woman has an EBL of greater than or equal to 3.5 µg/dL, MDE or the local health department must notify the parent/guardian or pregnant woman and the property owner, and assist the local health departments with case management, as needed.
- On or before December 31, 2022, MDE must study and report the findings of its evaluation of the most effective means of incorporating the CDC's BLRV into the State's lead poisoning prevention programs, including environmental investigations.
- Effective January 1, 2024, when a child under the age of 6 or a pregnant woman has an EBL of greater than or equal to 3.5 µg/dL, an environmental investigation must be conducted. If the environmental investigation reveals a defect in an affected property (i.e., certain pre-1978 rental property), then the property owner must satisfy the modified risk reduction standard.

This report presents findings and recommendations from MDE's evaluation of the most effective means of incorporating the CDC's BLRV into the State's lead poisoning prevention programs. In preparing this report, MDE consulted with MDH, DHCD, the Green and Healthy Homes Initiative, and local health departments.

II. BLOOD LEAD TESTING, REPORTING, AND NOTIFICATIONS

MDH adopts and administers regulations governing healthcare providers' testing of children for lead. In 2016, MDH adopted regulations requiring healthcare providers to test children at ages one and two, or whenever exposure is suspected. Under Code of Maryland Regulations (COMAR) 26.02.01, labs are required to send results of blood lead tests for Maryland children to MDE, where they are maintained in a Childhood Lead Registry (CLR).

When a blood lead test result confirms an EBL of a child aged 0-6 years or a pregnant woman, MDE notifies the local health department, the parent (if the patient is a child), and the owner of the property in which the child or pregnant woman resides. Prior to October 28, 2022, MDE made these notifications for confirmed blood lead levels of 5 µg/dL or greater. On October 28, 2022, MDE began notifications at the new BLRV of 3.5 µg/dL or greater.

To estimate the anticipated number of additional cases requiring notification for blood lead levels between 3.5 and 5 µg/dL, MDE reviewed CLR data from 2019. (2019 was selected to avoid any impacts related to decreases in testing during the COVID-19 pandemic.) Table 1 below shows the number of children aged 0-72 months, tested for lead in 2019, who had a blood lead level between 3.5 and 5 µg/dL, by jurisdiction and sample type. Based on this data, MDE estimates that approximately 1,070 confirmed cases of EBL between 3.5 and 5 µg/dL will occur annually with the implementation of the new BLRV. This includes all venous and capillary results in that range for 2019, and 2020, reflecting the assumption that with updated medical case management guidelines for the new BLRV, medical providers will order follow up tests for a larger portion of the capillary samples, some portion of which will result in venous levels within the 3.5-5 µg/dL range. This is a rough projection that could be impacted by a variety of factors, including testing rates. For comparison, there were 2,254 confirmed cases of 5 µg/dL or greater requiring notifications in 2021, meaning it is anticipated that the number of notifications MDE will send annually will be at least 1-2 times more likely with the implementation of the new BLRV. Each notification requires surveillance staff to determine if the property is a rental or owner-occupied, confirm the addresses to send notifications, and complete referrals to local jurisdictions and for environmental investigations.

Table 1: Number of Children 0-72 Months Tested for Lead in 2019					
with Blood Lead Level of 3.50-4.99 µg/dL by Jurisdiction and Sample Type					
		Blood Lead Level ≥3.5 and <5.00 µg/dL			
		Sample Type			
County	Number of Children Tested	Total	Capillary	Venous	Unknown
Allegany	1,167	51	45	6	0
Anne Arundel	12,909	164	139	25	0
Baltimore	18,369	285	176	109	0
Baltimore City	15,526	500	157	343	0
Calvert	1,332	5	1	4	0
Caroline	802	19	14	5	0
Carroll	2,918	75	63	12	0
Cecil	1,615	82	76	6	0

Charles	3,003	56	49	7	0
Dorchester	624	18	5	13	0
Frederick	5,456	127	119	8	0
Garrett	450	3	3	0	0
Harford	4,966	128	115	13	0
Howard	6,151	68	47	21	0
Kent	204	3	3	0	0
Montgomery	24,880	226	166	60	0
Prince George's	21,958	215	105	108	2
Queen Anne's	1,001	7	3	4	0
Saint Mary's	2,063	10	5	5	0
Somerset	439	6	1	5	0
Talbot	680	12	9	3	0
Washington	2,784	38	15	23	0
Wicomico	2,112	44	30	14	0
Worcester	815	19	15	4	0
Statewide	132,224	2,161	1,361	798	2

III. COORDINATION WITH LOCAL HEALTH DEPARTMENTS ON MEDICAL CASE MANAGEMENT

The primary role of case management is to promote, sustain, and coordinate resources and services for children with lead poisoning, including notifications, education related to the lead exposure, home visiting, or telephonic home visiting programs to help parents and families.

As described above, as of October 28, 2022, the process of case management is initiated when MDE receives a lab result showing that a child under the age of 6 or a pregnant woman has a confirmed EBL ≥ 3.5 $\mu\text{g}/\text{dL}$. In these cases, MDE notifies MDH, the local health department, the

parent or guardian of the child or the pregnant woman, as well as the owner of the property where the child or pregnant woman resides or regularly spends at least 24 hours per week.

As a part of medical case management, the CDC's Recommended Actions Based on Blood Lead Levels provide a detailed protocol for guidance on clinical actions for a given blood lead level. This guidance was updated to include the current BLRV. On January 25, 2022, MDH published and mailed a letter to medical providers regarding the new BLRV. MDE and MDH emphasize the importance of obtaining a confirmatory venous sample at the recommended time interval for capillary specimens performed as point of care (POC) tests, as well as a follow-up blood lead test at the recommended interval or sooner to ensure there is no ongoing lead exposure. Both schedules were recommended to be followed by providers in the care management of children residing in the state.

An essential element of primary prevention care case management places emphasis on the follow-up testing of children tested with LeadCare™ test kits between October 27, 2020, and the present time. An increasing number of providers are using point of care (POC) testing in their clinics. There are still questions around the POC tests and their reliability to detect blood lead levels at the new lower BLRV, and MDE and MDH continue the coordination of efforts for monitoring the impact of the expanded recall of LeadCare™ blood lead kits by Magellan Diagnostics in October 2021. It is anticipated that this will be a source of additional questions, therefore, providers are expected to follow the recommendations of the CDC on venous sample follow-up testing of children with a lead level of <3.5 $\mu\text{g}/\text{dL}$.

Concurrent with the notifications to MDH, the local health departments, parents, and property owners, MDE surveillance staff also refer confirmed cases to the Lead Poisoning Prevention Program's Compliance Division for environmental case management in the form of environmental investigations, discussed in more detail in Section IV. After notification, local health departments perform medical case management follow up with families and coordinate with MDE on the results of those efforts. The exact form this takes varies by jurisdiction; for example, some local health departments perform case management telephonically. Other local health departments coordinate with MDE during the scheduling of the environmental investigation and perform a home visit at the same time to provide information that can help reduce the impacts of lead exposure. Additionally, under a program administered by MDH, 11 local health departments offer expanded home visiting services to families with children under age 18 that are diagnosed with EBLs of ≥ 5 $\mu\text{g}/\text{dL}$ and are eligible for Medicaid or the Maryland Children's Health Program (Anne Arundel, Baltimore, Charles, Dorchester, Frederick, Harford, Prince George's, St. Mary's and Wicomico Counties and Baltimore City).

Cooperation between MDE environmental risk assessors who perform environmental investigations and LHD staff helps to build trust with families and ensures effective coordinated medical and environmental case management. MDE recognizes that programs for lead case management vary considerably by jurisdiction based on local needs and available resources. Working with each of the 23 jurisdictions, representing each county in Maryland, requires tailoring the coordination accordingly. In order to assess how the reduction of the EBL level to 3.5 µg/dL will be incorporated into medical case management programs by local health departments, MDE solicited input from local health departments in a memo and survey distributed in August 2022. The following questions were framed to gather essential information on field practices, perceived resource needs, and planned lead case management program activities for the advancement of the scheduled implementation of the CDC blood lead reference value.

1. Does your department currently or does it intend in the future to conduct home visits for EBLs ≥ 3.5 µg/dL?
2. If not, does your department currently or does it intend in the future to conduct telephonic case management for EBLs ≥ 3.5 µg/dL?
3. If your department plans to conduct home visits for EBLs ≥ 3.5 µg/dL, are you willing to make the first contact with the family and co-schedule the home visit with MDE's environmental investigation?
4. If your department plans to conduct only telephonic case management for EBLs ≥ 3.5 µg/dL are you willing to make the first contact with the family to schedule MDE's environmental investigation?
5. While MDE is unable to provide additional funding for case management at this time, we are interested in other ways we can help. Are there additional materials or resources from MDE that would help you in your case management of EBLs ≥ 3.5 µg/dL?

Approximately, 69% (16) of the 23 jurisdictions submitted written responses. Most respondents reported that they did not intend to conduct home visits for EBLs ≥ 3.5 µg/dL but did plan to continue telephonic home visiting. Most also indicated a willingness to make the initial contact with the family. The majority reported concerns for resource availability to allow them to accompany MDE staff to environmental visits. The case managers were not willing to make contact for scheduling environmental investigations. Of the respondents, only two (2) or 12% were willing to make first contact and co-schedule the home visit with MDE environmental investigations. These results suggest an agreement among the local health departments that local health department contact with families, as well as coordination with MDE risk assessors, is beneficial, but that home visiting for all cases ≥ 3.5 µg/dL will not be possible for the majority of local health departments without additional resources.

Local health departments reported that other materials or resources from MDE that would be helpful for case management include:

- Methods that may simplify the process to access MDE's database for updated lab lead levels and improve case management tracking outcomes, includes the application of the Healthy Homes and Lead Poisoning Surveillance System (HHLPSS) database availability to LHDs to improve data sharing capacities;
- Production of additional videos and informational tool kits to inform families of the condition of their homes and the effects of lead on the body;
- Increase parent willingness to participate in secondary prevention activities based on the sharing of the Environment Inspection Disposition document that reports the inspector's summary of findings. Local Health Department case managers will provide assistance to MDE in promoting a better understanding of established lead prevention standards to the guardians and client's family members that can increase the likelihood of compliance to eliminating potential or real sources of lead in the environment. Answering specific questions and tailoring targeted prevention messages for the poisoned child family member(s) can enhance rapport building and improved communications in goal planning to achieve next step actions;
- Printed copies of educational materials. It was acknowledged that current lead poisoning educational information for parents is available through MDE, the U.S. Environmental Protection Agency (EPA), and the U.S. Department of Housing and Urban Development (HUD) websites. However, the case managers related that because there is no funding for letters, envelopes, postage, etc., copies of printed materials could be helpful.

IV. ENVIRONMENTAL INVESTIGATIONS

A. Process for Conducting Environmental Investigations

MDE has, since the inception of its Lead Poisoning Prevention Program, performed environmental investigations for EBL cases, consistent with guidelines developed by HUD¹. In 2020, with the reduction of the EBL level to 5 µg/dL, MDE adopted regulations formalizing the environmental investigation process.² Those regulations incorporate the procedures outlined in the HUD guidelines.

An environmental investigation is a detailed investigation that is performed by MDE or a local health department to identify one or more lead hazards for a child under age 6 or pregnant woman diagnosed with an EBL. An environmental investigation is performed at the child or pregnant woman's primary residence and, if warranted, at a secondary property where the child or pregnant

¹ U.S Department of Housing and Urban Development (HUD) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing, Second Edition, July 2012.

² COMAR 26.16.08.

woman spends 24 or more hours per week. Under EPA and MDE regulations, an environmental investigation may only be performed by an MDE-accredited risk assessor, who must complete training, pass a test, and have at least one year of prior lead inspection experience.

An environmental investigation consists of several parts. First, the risk assessor administers a questionnaire with the family to identify basic housing information and potential sources of exposure for the child or pregnant woman. The risk assessor performs a visual inspection of the property and performs a paint survey to determine the presence of lead-based paint. Finally, the risk assessor performs environmental sampling. Samples include dust, bare soil where the child or pregnant woman frequents, and, if warranted based on the questionnaire, spices, cosmetics, or other products used by the child or pregnant woman. The results of the environmental investigation are compiled in a report that is provided to the family and the property owner.

Currently, MDE performs environmental investigations for EBLs of 5 µg/dL or greater in all Maryland jurisdictions except for Prince George’s County with EBLs of 10 µg/dL or greater and Baltimore City, where the Baltimore City Health Department performs all investigations under a Memorandum of Agreement with MDE.

Under the 2022 legislation, environmental investigations for EBLs of 3.5 µg/dL or greater will begin January 1, 2024. While CDC has revised its case management guidelines to recommend an environmental investigation for EBL cases of 3.5 µg/dL or greater, CDC also notes that “BLLs < 5 µg/dL may not trigger a HUD environmental investigation when the housing is covered by the HUD’s Lead Safe Housing Rule. Additionally, environmental investigations for BLLs that are 3.5–19 µg/dL vary based on jurisdictional requirements and available resources.”³ As of the date of this report, HUD has not updated its guidelines for environmental investigations to incorporate the lower BLRV.

B. Sources Identified During Environmental Investigations.

Since the inception of the program, environmental investigations have adhered to the HUD Guidelines, Chapter 16. In accordance with the guidelines, an investigation should include assess the following potential sources of lead exposure:

- House dust;
- Paint that is not intact or is subject to friction;

³ CDC, Recommended Actions Based on Blood Lead Level, <https://www.cdc.gov/nceh/lead/advisory/acclpp/actions-blls.htm>

- Exposed soil, especially in play areas; and
- Other media as appropriate.

When the EBL level was decreased to 5µg/dL, MDE established new testing protocols for lead in spices and cosmetics. The Department also continued to test consumer products such as toys, ceramics, cookware, jewelry and keys, when the questionnaire used during the environmental investigation suggested those items may be potential sources.

A review of environmental investigations performed for cases of EBL of 5 µg/dL or higher shows that lead-based paint is still a significant contributor to overall lead exposure among Maryland children. This is especially true among children who live in older housing. Table 2 shows cumulative results, by county, for lead hazards that were identified during environmental investigations for CY 2016-2020. Of the 1,002 environmental investigations, lead-based paint and dust hazards were identified 52% of the time. However, particularly in newer housing, environmental investigations increasingly identify other, non-paint sources, such as spices, cosmetics, ceramics, toys, soil, parental occupations or hobbies, and exposure outside the U.S. Additionally, environmental investigations may find that there is no readily identifiable source.

Table 2: Lead Hazards Identified During Environmental Investigations by County, Cumulative CY 2016-2020

County	Total Environmental Investigations	Lead Paint	Lead Dust	Water Soil	Cosmetics	Spices	Personal Items (Jewelry)	Hobbies (Ammunition, stained glass)	Recent Travel Outside US or Recent Arrival to US	Pottery or Cookware	Renovation	Occupation	Consumer Products (Toys, other)	Unable to Determine
Allegany	26	13	15	4	0	0	0	0	0	0	2	0	0	0
Anne Arundel	35	7	5	0	4	14	1	4	6	0	0	2	1	0
Baltimore	127	31	15	2	2	35	13	6	22	0	0	0	1	19
Calvert	3	2	1	0	0	0	0	2	1	0	0	0	0	0
Caroline	9	3	2	3	0	0	0	1	0	0	0	0	0	3
Carroll	12	8	6	1	0	0	1	0	1	0	0	0	0	3
Cecil	5	1	1	1	0	0	2	1	0	0	0	0	0	0
Charles	10	1	1	0	0	4	0	2	0	0	0	0	0	2
Dorchester	10	9	7	0	0	0	0	0	0	0	0	0	0	1
Frederick	25	11	12	3	2	4	5	3	3	0	1	1	0	1
Garret	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Harford	11	5	4	1	0	21	0	1	1	1	0	0	1	0
Howard	44	4	1	1	14	24	11	0	12	3	1	0	2	5
Kent	2	0	0	0	1	0	0	0	0	0	0	0	0	1
Montgomery	96	10	15	4	13	41	8	3	31	12	2	2	1	13
Prince George's	221	17	12	3	19	11	7	3	89	0	1	4	81	51
Queen Anne's	2	2	1	1	0	0	0	0	0	0	0	0	0	0
Saint Mary's	2	0	1	0	1	1	0	0	0	0	0	1	0	0
Somerset	4	3	0	0	0	0	0	0	1	0	0	0	0	0
Talbot	9	3	1	1	0	0	0	2	1	0	0	0	0	3
Washington	37	19	14	32	1	2	2	0	2	0	0	2	0	4
Wicomico	23	16	8	3	0	0	0	3	0	0	0	0	0	3
Worcester	6	3	2	0	0	0	1	1	0	0	0	0	0	1
Totals Counties	720	168	124	60	57	157	51	33	170	16	7	12	87	110
Baltimore City	282	218	7	2	0	0	9	2	3	3	0	0	0	36

As environmental investigations are performed on cases with lower blood lead levels, it is anticipated that there may be more investigations identifying non-paint sources or not identifying any sources. Because the CDC's BLRV was only fairly recently lowered to 3.5 µg/dL and few, if any, states are conducting environmental investigations for blood lead levels between 3.5 and 5 µg/dL, there is a lack of available data about sources identified during investigations at these lower levels. MDE will need to analyze the results of environmental investigations after January 1, 2024, to determine whether fewer environmental investigations conducted on EBLs between 3.5 and 5 µg/dL identify lead-based paint sources, and if so, whether any changes to the environmental investigation protocol are warranted in light of that information. For example, MDE may need to evaluate whether its protocol should include sampling of additional items that may result in lower EBLs; peer reviewed studies and scientific articles suggest that baby food, formula, and fruit juices may not be manufactured at safe levels, thus creating the need for additional environmental testing⁴. Finally, MDE should monitor for any federal guidance regarding environmental investigations for lower EBLs, including any updates to the HUD guidelines.

One question that MDE has explored is whether any changes to the environmental investigation protocol are warranted to identify potential exposure more effectively through drinking water. Currently, MDE risk assessors generally sample water during environmental investigations where no other source has been identified in a property with a private drinking water well, or where the family otherwise suspects water as a potential source. MDE conducted a small pilot in Summer 2022 in which water was sampled for all environmental investigations in which it could be arranged (meaning the family agreed to sampling and was able to forego use of the water source in advance of the investigation to allow for a first draw sample). The results of the pilot showed that out of thirty-six homes where water was sampled, only one had an elevated level of 26 µg/L, which was the result of a fixture containing lead, as opposed to lead service lines. In this case, water would have been sampled absent the pilot because no other source of lead was identified. Therefore, based on the results of this initial pilot, no immediate change to the protocols are needed, though this may need to be reevaluated in the future.

While the types of samples analyzed may not change significantly because of the lower EBL level, to the extent that screening levels or clearance standards change to account for the lower EBL level, MDE will need to compare the results of the samples taken during environmental investigations to the new screening levels or clearance standards when assessing whether a hazard exists (See Section VII).

⁴ U.S. Department of Health and Human Services, Food and Drug Administration, Center for Food Safety and Applied Nutrition, Draft Supporting Documents for Establishing FDA's Action Levels for Lead in Juice, April 2022; Regulatory Toxicology and Pharmacology 110 (2020), U.S. Food and Drug Administration's interim reference levels for dietary lead exposure in children and women of childbearing age; U.S. House of Representatives, Subcommittee on Economic and Consumer Policy, Committee on Oversight and Reform, Baby Foods are Tainted with Dangerous Levels of Arsenic, Lead, Cadmium, and Mercury, Feb. 4, 2021.

V. CASE MANAGEMENT ACTIVITIES IN OTHER STATES

Sections II - IV discuss Maryland's case management process for EBLs and how the lower EBL level may be incorporated into that process. MDE also reviewed other states' initial responses to the CDC's BLRV of 3.5 µg/dL. In late July 2022, MDE confirmed and approved a Health and Environmental Survey instrument that included 17 items as a questionnaire to be distributed by email on August 25, 2022, to State-wide Childhood Lead Prevention Programs directors and administrators in the United States. The survey's purpose was to determine what plans or policy decisions, if any, were being implemented in other states to address CDC's change in the lowering of the BLRV guidelines.

This evaluation was designed specifically to establish if other states within EPA Region 3, or surrounding areas are conducting medical case management and environmental investigations for persons at risk (children under the age of 6 and pregnant persons) diagnosed with a BLRV of 3.5 µg/dL or higher, and if States are or plan to implement additional environmental sampling and testing procedures due to the revised BLRV.

As of September 23, 2022, there were eight completed surveys with responses, representing the following states: Vermont (1), Illinois (1), Delaware (1), Oklahoma (1), West Virginia (1), Alabama (2), and Virginia (1). The analysis of the eight participant responses supported the following findings relating to the case management planning for implementation. First, all state respondents (8 in total) except for one indicated an active plan to implement CDC's new 3.5 µg/dL guidelines. Five states reported they were currently in the implementation phase with only one reporting a delay in planned implementation due to need for HHLPSS⁵ updates with a start-up timeline unknown. Two states reported requirements for change in their case management protocols, environmental and early intervention regulations. All eight respondents replied that they expected an impact based on lowering the BLRV. Two reported that their States were continuing assessments of the potential impacts. Specific impact areas defined included outreach, a doubling of caseloads, and an increased burden on local health departments. Four respondents reported resources were available to assist with implementing their state's plan and the remaining four respondents reported a direct need for additional funding to address provider outreach, hiring of additional nurses, case managers, and other additional lead program staff. The participants represented Lead Program Managers, Alabama Childhood Lead Poisoning Prevention Program (ACLPPP), CDC's Childhood Lead Prevention Program (CLPPP) and Agency Directors, and Assistant CLPPP Directors.

The survey questions also included items concerning the planning to address environmental investigations related to CDC's lowering of the BLRV. First, all respondents reported implementing environmental investigations, however only one reported conducting investigations

⁵ HHLPSS is the Healthy Homes and Lead Poisoning Surveillance System, which is the web-based platform used by some states to manage data for lead surveillance.

on levels 5-9 µg/dL. Five indicated that environmental investigations were automatic for levels ≥ 15 µg/dL and two reported environmental investigations for levels ≥ 10 µg/dL. In addition, two respondents clarified their response by highlighting that any physician order at any level, including 3.5 µg/dL, would result in an environmental investigation in the state. The following responses were received related to sampling during environmental investigations:

- All respondents reported conducting XRF readings to detect lead-based paint, if buildings were pre-1978.
- All respondents indicated conducting dust sampling of floors and windowsills and soil sampling, with one responding, when needed.
- Three reported that they did not conduct water sampling and one state reported water sampling when indicated by the investigation. One replied that water sampling is performed only in wells.
- Four participants reported that their states do not conduct spice and cosmetic sampling.
- The majority (6) of respondents reported no sampling of baby food or juices, and two states indicated that they conducted baby food and juice sampling, as needed.

Lastly, all eight participants reported that they send copies to family, providers and property owners of the environmental investigation report or an advisory letter with a summary of findings.

Overall, among the states that responded, there was broad intention to adopt a case management process consistent with CDC's recommendations for the new BLRV of 3.5 µg/dL. However, the states did not necessarily intend to extend this to conduct environmental investigations at levels ≥ 3.5 µg/dL; in fact, none of the states that responded regularly conduct environmental investigations at levels < 10 µg/dL. Half of the states acknowledged the need for additional resources for case management considering the increased caseloads associated with the lower BLRV. In that sense, Maryland's resource needs are likely to be similar or more significant than those states reporting additional resource needs, since Maryland intends to provide environmental investigations for levels ≥ 3.5 µg/dL, in addition to other case management needs.

VI. OUTREACH NEEDS

MDE evaluated whether there may be different or new outreach needs related to the lower EBL level. Currently, MDE works, along with MDH, DHCD, GHHI, and local health departments to conduct outreach to families, health care providers, lead abatement and inspection contractors, other relevant government agencies, and the public. There will be a continuing need to forge partnerships across state and local agencies as well as the private sector to educate communities on the lower EBL level. These partnerships are important to disseminate information on best practices and strategies in the prevention of childhood lead poisoning. Specific to the lower EBL level, the messaging outlined in Table 3 will be important.

Table 3: Outreach Needs Related to the New EBL Level

Message	Audience
General information about how Maryland law changed to incorporate the lower EBL level and the significance/purpose of an EBL level.	All audiences
Urging blood lead testing, and in particular follow up testing for children initially tested with levels at or above 3.5 µg/dL.	Parents, healthcare providers
Information about sources of lead exposure, including lead-based paint and other sources that may be observed more frequently with lower-level exposures (soil, products, etc.)	Parents, healthcare providers, local governments
Applicable screening levels in environmental media that may be sampled more frequently or subject to lower screening levels as a result of the lower EBL level.	Accredited abatement and inspection contractors, training providers

In order to communicate the above messages, the following outreach methods should be used:

- MDE, MDH, local health departments, GHHI, and other relevant stakeholders will create a multi-media, audience specific, outreach materials to educate families/caregivers, health care providers, local agencies, lead contractors and inspectors, and the general public on the new lower EBL level. This may include video shorts, social media posts, fact sheets etc.
- Use the CDC’s guidance <https://www.cdc.gov/nceh/lead/prevention/sources.htm> to develop source specific fact sheets, in multiple languages.
- Create tool kits for families whose children are exposed to lead. These toolkits may include cleaning supplies, a variety of educational materials as well information on grants/loans for lead-paint hazard remediation. These toolkits could be created and disseminated by local health departments while performing medical case management at EBLs $\geq 3.5 \mu\text{g/dL}$.

VII. ENVIRONMENTAL LEAD STANDARD

CDC’s October 2021 announcement to further reduce the BLRV to 3.5 µg/dL, and the incorporation of that level as the State’s EBL level, may impact a variety of screening and

clearance levels used by MDE to evaluate lead hazards and risk. Lead screening and clearance levels are used in Maryland for several purposes:

- To determine whether a lead hazard is present during an environmental investigation or risk assessment of a property.
- For dust, to determine whether an affected property has satisfied the full risk reduction or modified risk reduction standard.
- For dust, to determine whether completed lead abatement work has met the clearance standard.
- For water, to trigger obligations for schools under the State's lead testing in schools law and for public water supply systems under the Safe Drinking Water Act.
- For soil and water, to guide oversight of remediation of properties through MDE's Land Restoration Program.

Screening and clearance levels for the above purposes may be contained in state or federal regulations or guidance. Often these levels are developed taking into account a particular blood lead level that is considered elevated. Specifically, the standards seek to ensure that, for a typical child, exposure at or below the standard would not result in the child having an elevated blood lead level, taking into account various assumptions about exposure and other sources of lead in the environment.

Table 4 below shows the currently applicable State or federal standards for lead in various media. Note that while MDE has regulatory authority over some of these standards, for example post-abatement clearance standards for lead dust, other standards are within the authority of federal agencies or are only set in non-regulatory guidance.

Table 4: Applicable Guidance or Regulatory Standards for Lead Content in Products and Environmental Media

Media/Product	Standard	Source
Paint	To constitute a lead-based paint: 0.50 percent lead by weight calculated as lead metal in the dried solid, or more than 0.7 milligram per square centimeter	This level is set in Maryland regulations at COMAR 26.16.01.02B(7).
Dust	Dust lead standards are used for the purpose of determining whether a dust lead hazard exists during a risk assessment, determining whether a property satisfies the full or modified risk reduction standard, and for post-abatement clearance: Floors: 10 µg/ft ² Window sills: 100 µg/ft ² Window wells: 100 µg/ft ²	These levels are set in Maryland regulations at COMAR 26.16.02.02B(6).
Soil	Screening levels: 200 ppm in residential soil 550 ppm in commercial soil 1,050 ppm for industrial soil	These screening levels are set by MDE’s Land Restoration Program in guidance. ⁶ EPA’s current standards are 400 ppm bare residential and 1200 ppm in non-bare residential soil (federally funded projects) 40 CFR Part 745, 2001.
Water	FDA set a standard of 5 ppb lead for bottled water, WHO (World Health Organization) ⁷ has set a provisional guideline for drinking water of 10 ppb and EPA set an action level of 15 ppb. Maryland’s lead in school drinking water outlets was lowered to 5 ppb on June 1, 2021.	21 CFR Part 165.110-Bottled Water 40 CFR Part 141 Subpart I - Lead and Copper Rule Maryland’s Environment Article Section 6-1501
Candy	100 ppb	FDA guidance, Docket Number: FDA-2005-D-0481
Spices	There is currently no federal standard; MDE uses the FDA standard for lead in candy when determining a hazard during an environmental investigation	N/A

⁶ MDE, Lead Soil Screening Update Effective July 1, 2020, <https://mde.maryland.gov/programs/land/MarylandBrownfieldVCP/Documents/Lead%20Soil%20Standards%20Update%20FINAL.pdf>

⁷ Lead in drinking water, determination of its concentration and effects of new recommendations of the World Health Organization (WHO) on public and private networks management, Oct. 1995 <https://pubmed.ncbi.nlm.nih.gov/8556413/>

Juice	The current permissible limit for lead in juice is 50 ppb; it is recommended that the level be reduced to 10 ppb for apple juice and 20 ppb for all other juices.	These levels are set in the guidance document published by US Dept. of Health and Human Services FDA Center for Food Safety and Applied Nutrition ⁸
Cosmetics	10 to 20 ppm	Guidance provided in the “Color Additive and Cosmetics: Fact Sheet published by FDA ⁹ ”
Baby food	There is currently no federal standard in the U.S. The European Union has set the maximum lead level in infant formula to 20 ppb. ¹⁰ Manufacturers are free to set their own limits (e.g., Hain uses soft limits of 100 & 200 ppb for most of its ingredients.	Commission Regulation (EU) 2021/1317 of 9 August 2021, amending Regulation (EC) No 1881/2006 as regards maximum levels of lead in certain foodstuffs

A review of other states and municipalities revealed that Maryland has some of the most stringent standards for soil, water, dust, and lead-free certifications. Many states and municipalities continue to conform to EPA’s standards and the HUD Guidelines. New York City was the only jurisdiction identified with more stringent standards for lead-based paint or dust lead clearance:

- The NYC Department of Health, has posted new lead dust clearance standards effective June 1, 2021, which are:
 - Floors: 5 µg/ft² (Maryland’s standard is 10 µg/ft²)
 - Windowsills: 40 µg/ft² (Maryland’s standard is 100 µg/ft²)
 - Window Wells: 100 µg/ft² (same as Maryland’s standard)
- A new lead-based paint standard was passed citywide on Dec. 1, 2021, of:
 - 0.5 mg/cm², or 0.25% by weight (Maryland’s standard is 0.7 mg/cm² and 0.5%)

No states or jurisdictions were identified with more stringent soil lead standards than Maryland.

Considering the lower BLRV, states and federal agencies may need to revisit the current standards to determine if they are still sufficiently protective. For example, recent analysis of the National Health and Nutrition Examination Survey (NHANES) blood and dust lead data indicates that when floor dust lead is less than 12 µg/ft², the geometric mean BLL is 3.9 µg/dL. Both EPA and

⁸ Draft Supporting Document for Establishing FDA’s Action Levels for Lead in Juice

<https://www.fda.gov/food/chemical-metals-natural-toxins-pesticides-guidance-documents-regulations/draft-supporting-document-establishing-fdas-action-levels-lead-juice>

⁹ FDA, Color Additives and Cosmetics:Fact Sheet

<https://www.fda.gov/industry/color-additives-specific-products/color-additives-and-cosmetics-fact-sheet>

¹⁰ Commission Regulation (EU) 2021/1317 of 9 August 2021, amending Regulation (EC) No 1881/2006 as regards maximum levels of lead in certain foodstuffs

<https://eur-lex.europa.eu/eli/reg/2021/1317/oj>

Maryland have established a regulatory standard for dust lead of 10 µg/ft². More research may be needed to determine if this level is appropriate given the BLRV of 3.5 µg/dL.

Additionally, EPA has noted in its October 2022 Strategy to Reduce Lead Exposures and Disparities in U.S. Communities that it will review and revise both its soil lead hazard standards under the Toxic Substances Control Act (TSCA) and its Residential Soil Lead Guidance for Contaminated Sites.¹¹ Currently, EPA's screening levels for lead in under the Comprehensive Environmental Response, Compensation, and Liability Act and its soil lead hazard standards under TSCA are both less stringent than the screening levels and soil lead hazard standards established by MDE. However, MDE's standards were strengthened in 2020 to account for the EBL level of 5 µg/dL, and therefore both MDE and EPA will need to evaluate the continued appropriateness of these levels.

VIII. RESOURCE NEEDS TO IMPLEMENT THE NEW EBL LEVEL

Lowering the EBL level from 5 µg/dl to 3.5 µg/dl will result in an increase of confirmed cases requiring action by the Department. As described above, each additional case of EBL would require notifications, coordination with the local health department, and an environmental investigation. Additionally, a portion of these cases will result in follow up enforcement actions for noncompliance in rental properties. To handle the additional workload associated with the estimated extra 1,070 confirmed cases annually, MDE anticipates needing the following 17 additional staff and related equipment, vehicles, and laboratory sampling expenses. The description below relates to the resources necessary to handle the tasks associated with the additional 3.5-4.9 µg/dL cases.

A. Lead Health and Surveillance Division

As part of medical case management, staff will distribute laboratory reports for confirmed cases of EBL to the Maryland Department of Health (MDH) and the appropriate local health departments. The MDE Lead Health and Surveillance division mail advisory letters informing the person at risk, and if a minor, the parents/guardians, of their EBL status, and mail out outreach and education materials concerning childhood lead poisoning. Staff would identify whether the person at risk's primary residence is an owner-occupied or an affected property and confirm an address to send correspondences.

For the appropriately confirmed cases that were determined to be associated with an affected property, staff would issue a Notice of EBL to the property owner. Each of the confirmed cases

¹¹ EPA, Strategy to Reduce Lead Exposures and Disparities in U.S. Communities, pp.31-32 (Oct. 27, 2022), <https://www.epa.gov/system/files/documents/2022-10/Lead%20Strategy.pdf>;

could involve multiple affected properties (i.e., home and a residential daycare) and require various Notices of EBL mailings. The Department's expenditures will increase to hire new administrative staff and to cover postal expenses.

The following staff would be needed:

- Two Administrative Specialist I's to handle the increase in mailing and tracking of EBL notices sent to LHDs, MDH, parents/guardians of children, and affected property owners.

B. Lead Compliance Division

Staff will conduct environmental case management for all 1,070 confirmed cases of EBL and necessary compliance oversight for the confirmed cases involving affected properties. Environmental Compliance Specialists of different levels will be needed to conduct environment case management of children with an EBL of 3.5-4.9 µg/dL. It takes at least 15 months to train and accredit an entry-level Environmental Compliance Specialist to become a Lead Risk Assessor, qualified to conduct environmental investigations and to use the results of the investigation to develop abatement recommendations.

During an environmental investigation, a lead visual inspection is conducted to identify lead paint-based, dust, or debris hazards. Dust wipes, soils, species, toys, cosmetics, building materials, and other materials may be sampled and sent off for third-party laboratory analysis. One child could frequent multiple properties, which could require the Department to conduct numerous environmental investigations and associated sampling. If lead defects are identified at an affected property, an Environmental Compliance Specialist would need to issue a Notice of Defect (NOD) via certified mail with return restricted delivery service, conduct compliance oversight, and if warranted refer a case for enforcement to the Office of Attorney General.

The following staff will be needed:

- One Environmental Compliance Specialist Supervisor for the Statewide region to oversee, assign, and review the additional case referrals;
- One Environmental Compliance Specialist IV for the Statewide region to conduct and oversee environmental investigations and compliance activities within a region;
- Ten Environmental Compliance Specialist I's to assist inspectors of higher grades with environmental investigations and compliance activities while training to become risk assessors; and
- One Administrative Officer I to assist with handling all enforcement-related correspondences related to the environmental investigations.

C. Lead Accreditation and Oversight Division

Staff will be responsible for conducting quality assurance reviews of submitted modified risk reduction (MRR) certificates and audits of affected properties reported as satisfying the MRR Standard. This oversight is needed to verify work performed by lead inspection and abatement contractors. Also, the increase in MRR certificates will likely increase the volume of abatement "work practice" complaints against lead abatement contractors from tenants and citizens. The increased demand for lead inspections and abatements for MRR standards may encourage individuals to become accredited lead abatement professionals. This would increase the regulated community governed and accredited by the Lead Accreditation and Oversight Division.

The following staff will be needed:

- Two Environmental Compliance Specialist, I's to perform lead inspector and abatement contractor oversight and to conduct certificate review of submitted MRR certificates.

To address the lower EBL, it is estimated the Department will need to expend approximately \$985,000 in the first fiscal year of environmental investigations. These expenditures will exceed available special funds from the Lead Poisoning Prevention Fund and additional general funds will be required.

IX. RECOMMENDATIONS

Based on the above considerations, MDE recommends the following for the state to incorporate the lower EBL level into its lead poisoning prevention programs:

- The State should identify additional resources and hire additional staff to support the increased workload for case management and related compliance activities for the additional cases of EBL. Note that because environmental investigations for the lower EBL levels begin under the statute January 1, 2024 and given the length of time to hire additional staff, this item should be started immediately.
- Recognizing that case management is most effective when state agencies and local health departments are well-coordinated, the State should identify additional resources to assist local health departments in fully participating in in-person case management of children with lower EBLs.
- MDE should determine whether changes to standards for lead in environmental media or products are needed to incorporate the new EBL level. While sufficient information was not available at the time of this report to support specific recommended changes in standards, MDE should evaluate and incorporate, as appropriate, EPA changes to its lead in soil standards, which are anticipated in 2023. MDE should also continue to evaluate new research and/or changes to federal or other state standards related to lead.
- MDE and its partners should address the broad variety of sources that may increasingly influence exposures at lower EBL levels.

- MDE should create a fact sheet for residential property owners on how to mitigate lead hazards in soil.
- Legislation should be enacted that requires soil lead hazards to be mitigated as part of the MRR standard when an environmental investigation reveals a soil hazard.
- Legislation should be enacted to address exterior defective paint observed during an environmental investigation of a property certified limited lead free. Limited lead-free properties are free of lead paint on the interior, but have lead based paint on the exterior. Currently, for a property to be certified limited lead free, the exterior must be free of chipping, peeling, or flaking paint at the time of certification and upon exterior reinspection every two years. However, the law does not currently require a property owner to immediately correct chipping, peeling, or flaking exterior paint observed during an environmental investigation.
- MDE should continue to offer families sampling of water as part of the environmental investigation process.
- MDE should work with local health departments to track any new trends in sources of lead exposure identified through case management, to continuously evaluate the need for additional outreach, case management strategies, or regulatory requirements.
- MDE should continue to evaluate the need for changes in the existing environmental investigation protocols. While no changes to the current protocol set in regulation are being recommended at this time, MDE should:
 - After the first year of environmental investigations performed at the lower EBL level, compare the prevalence of lead-based paint and other hazards identified in lower EBL cases to those identified in higher EBL cases. Use the outcome of this evaluation to determine whether environmental investigation protocols need to be adjusted.
 - Review and incorporate into state regulations and procedures any updates to the HUD guidelines based on the lower BLRV.
- Conduct targeted and audience-specific outreach, in coordination with state and local agencies and nonprofits, to focus on testing, sources of lead exposure, and the lower EBL level, as described in Section VI.