

**CHILD BLOOD LEAD  
TESTING AND CARE  
MANAGEMENT:  
GUIDELINES, STRATEGIES  
AND FAQs FOR  
PENNSYLVANIA PRIMARY  
CARE PROVIDERS**



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# CHILD BLOOD LEAD TESTING AND CARE MANAGEMENT: GUIDELINES, STRATEGIES AND FAQs FOR PENNSYLVANIA PRIMARY CARE PROVIDERS

## THE PA LEAD FREE PROMISE PROJECT – AUGUST 2022

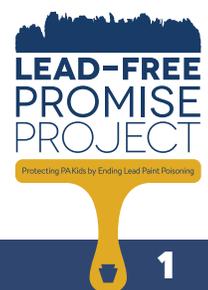
**INTRODUCTION:** This paper is for Pennsylvania primary care providers who care for young children to provide: 1) clarification about the new blood lead reference level of 3.5 mcg/dL, 2) rationale for recommending universal blood lead testing for all children at ages one and two, and 3) specific resources to efficiently test all children and care manage children with elevated blood levels.

### PURPOSE OF THIS PAPER:

Disparate blood lead testing recommendations from various government and private entities make it difficult for primary care providers to determine which children to test, when to test them, and the effectiveness of blood lead testing versus the use of paper screening questionnaires. Further, the Pennsylvania Department of Health (PA DOH)<sup>1</sup> and the Department of Human Services<sup>2</sup> that oversee the Medicaid and CHIP programs recently adopted the Centers for Disease Control and Prevention (CDC) change in Blood Lead Reference Level Value (BLRV) from 5.0 micrograms per deciliter (mcg/dL) to 3.5 mcg/dL which has substantial implications for primary care provider (PCP) practices and the children and families they serve. *Namely, the PA DOH expects the number of children testing positive for lead to nearly double in 2022 from approximately 7,000 to 13,300 children. PCPs across the state in rural, suburban, and urban areas will play an even more critical role in preventing children from ever being exposed to lead hazards and identifying and assisting more children who test positive.*

This paper is for Pennsylvania PCPs who care for young children with the goals to:

1. Publicly promote the PA DOH adoption of the CDC change in the BLRV from 5.0 mcg/dL to 3.5 mcg/dL,
2. Clarify existing blood lead testing requirements,
3. Make a case for conducting blood lead testing for all PA children,
4. Provide PCPs with information and tools to test children, including use of capillary testing particularly when obtaining venous blood is difficult, and
5. Provide PCPs with resources to manage the care of children who test positive for lead, and resources to share with parents to do the same.



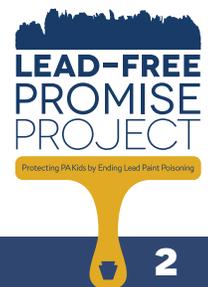
## BACKGROUND:

Entities such as the CDC<sup>3</sup>, the United States Preventative Services Taskforce (USPSTF)<sup>4</sup>, the American Academy of Pediatrics (AAP)<sup>5</sup>, and the federal Medicaid and CHIP programs<sup>6</sup> make different recommendations about which children should receive blood lead tests.

Simply stated, Pennsylvania children with Medicaid and CHIP coverage are required to receive blood lead tests at ages one and two as are all children in Allegheny and Philadelphia counties because of local ordinances. These are the only children required to be tested in Pennsylvania.

At the same time, data shows that children across the state are at higher risk for exposure to lead hazards.

- Deteriorated lead paint in homes and apartments is the number one source of lead exposure for children in the state. Seventy percent of PA houses were built prior to 1978 around the time lead was banned for use in residential paint, so most homes have lead-based paint in them.<sup>7</sup>
- The percentage of children in Pennsylvania with elevated blood lead levels (EBLL) is almost twice the national rate: 4.65% of children in Pennsylvania have EBLLs compared to 2.6% of children nationally.<sup>8</sup>
- Pennsylvania ranks number one in the country (tied with Wisconsin) for the percentage of children with EBLLs among states who report data to the CDC.<sup>9</sup>
- Pennsylvania ranks number two in the country (behind New York) for total number of children with EBLLs.<sup>10</sup>
- Only 18% of children under the age of six were screened for lead across the Commonwealth in 2020. Pennsylvania's screening rate is among the lowest in the country.<sup>11</sup>
- The rate of children with EBLLs is the same in rural and urban/suburban areas of the state, 4.57% and 4.54% respectively.<sup>12</sup>
- Lead poisoning can cause permanent brain damage to children – especially babies and children under the age of six. Lead can cause learning, behavior, hearing, and speech problems, sometimes requiring special education services.



## FREQUENTLY ASKED QUESTIONS:

### FAQ #1: WHAT ARE THE CURRENT GUIDELINES FOR CHILD BLOOD LEAD TESTING?

Based on federal guidelines, Pennsylvania children with Medicaid and CHIP coverage are required to receive blood lead tests at ages one and two, and based on local ordinances, all children in Allegheny and Philadelphia counties (regardless of their insurance status) are likewise required to receive blood tests. Specifically, Allegheny County requires all children to be tested for lead exposure at approximately nine to 12 months old and then again at approximately 24 months old.<sup>13</sup> Children who have not had their blood tested at either of those required intervals must be tested as soon as possible before age six or prior to entering kindergarten, whichever comes first. The Philadelphia Board of Health Regulations clarifies the city ordinance and states: “The Department recognizes that it is best practice for primary care providers to ensure that a child’s blood lead level is tested at, or near, 12 months of age and is tested at, or near, 24 months of age.”<sup>14</sup>

Private insurance companies do not require blood lead testing, yet most private insurance companies in the state pay for blood lead tests when ordered.

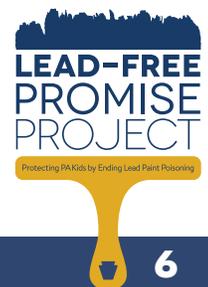
### FAQ #2: SHOULD PCPS SCREEN EVERY CHILD AT AGES ONE AND TWO?

Consistent with CDC and AAP guidelines for children at high risk of lead exposure, the Lead-Free Promise Project recommends that all Pennsylvania children get a blood lead test at ages one and two.

The CDC recommends focusing testing efforts when developing public health plans for communities at higher risk based on local data on housing age and social and demographic risk factors.<sup>15</sup> Both the CDC and the AAP recommend universal blood lead testing for children living in communities with more than 27% of housing built before 1950.<sup>16</sup>

Most Pennsylvania communities do not have public health plans to prevent and address childhood lead poisoning because there are only 10 local health departments in the state. Across the Commonwealth, 33% of housing was built before 1950 and 70% was built before 1980, about the time when lead was finally banned for use in residential paint.<sup>17</sup> The PA DOH also reports that children in rural and suburban/urban areas of the state are poisoned at the same rate (4.57% and 4.54% respectively).<sup>18</sup>

The AAP Bright Futures Guidelines call for all children with Medicaid or in high-prevalence areas to be tested for lead at 12 and 24 months old.<sup>19</sup> The CDC recommends that if no community public health plans are in place, universal blood lead testing should be done.<sup>20</sup>



Because of the higher, uniform risk among young children in the Commonwealth to be exposed to lead paint hazards and the CDC and AAP recommendations for universal testing under these conditions, the Lead-Free Promise Project encourages PA primary care providers to follow universal blood testing protocols, not as a means to an end, but to help with primary prevention efforts across the Commonwealth. PCPs play a key role in improving public health. The combined efforts of individual PCPs screening the children in their care will add up to higher screening rates and the ability to better identify high-risk areas for EBLs in the state, target public health efforts, and ultimately lead to better protection of children from the irreversible harm incurred by lead hazards.

### **FAQ #3: WHY SHOULD PCPS SCREEN EVERY CHILD TWICE AT AGES ONE AND TWO?**

Young children are most at risk for lead exposure. If a child was not exposed at age one, they could still be exposed at age two. Children are potentially exposed to lead in different ways and at different stages of their development. One-year-old children are typically less mobile and move closer to the ground. Children move around a lot more at age two and can reach more surfaces and grab more objects.

### **FAQ #4: WHY DID THE BLOOD LEAD REFERENCE LEVEL CHANGE FROM 5.0 MCG/DL TO 3.5 MCG/DL?**

In 2012, the CDC introduced the concept of a blood lead “reference value” to clarify that lead has no biological properties in the human body, and to identify children with higher levels of lead in their blood compared to most children, based on the 97.5th percentile of the blood lead distribution in U.S. children ages one to five from the most recent two cycles of data from the National Health and Nutrition Examination Survey (NHANES). At that time, the BLRV for children corresponding to the 97.5th percentile was established at 5.0 mcg/dL. CDC reviewed the most recent data derived from the 2015-2018 NHANES cycles and determined that the current 97.5th percentile is 3.5 mcg/dL. The Lead Exposure and Prevention Advisory Committee (LEPAC) unanimously voted in May 2021 to update the reference value to 3.5 mcg/dL, and the PA DOH adopted the new reference level in January 2022.<sup>21</sup>

The BLRV is not a clinical reference level defining an acceptable range of blood lead levels in children nor is it a health-based toxicity threshold. The BLRV is used as a screening tool to identify children who have higher levels of lead in their blood compared with most children, and assess the effectiveness of prevention efforts. By lowering the BLRV to 3.5 mcg/dL, children with blood lead levels between 3.5 and 5.0 mcg/dL will now be identified as having blood lead levels higher than most other children. Updating the reference value allows the CDC, federal partners, and health departments to focus resources on primary prevention, which is preventing children from being exposed in the first place. By paving the way for early intervention and the prevention of additional exposure and associated harm, updating the BLRV demonstrates a commitment to health equity and addressing environmental justice.<sup>22</sup>



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## **FAQ #5: IS IT EFFECTIVE TO ASK SCREENING QUESTIONS TO HELP ME ASSESS WHETHER TO TEST A CHILD'S BLOOD FOR LEAD?**

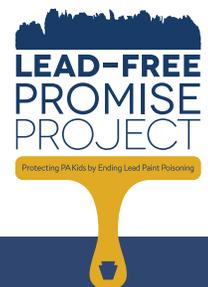
USPSTF “found adequate evidence that questionnaires and other clinical prediction tools to identify asymptomatic children with elevated blood lead levels are inaccurate.”<sup>23</sup> For this reason we recommend that PCPs do not use screening questionnaires and instead do a blood lead test.

## **FAQ #6: HOW CAN I INCREASE THE NUMBER OF CHILDREN I TEST BY USING CAPILLARY TESTING? AND WHAT ARE STRATEGIES FOR SMALL INDEPENDENT PRACTICES AND LARGE HEALTH-SYSTEM-OWNED PRACTICES? AND WHAT ABOUT PRACTICES THAT HAVE A HIGH NUMBER OF CHILDREN WITH MEDICAID AND CHIP?**

While a venous blood test is preferred, there can be sizeable barriers to families and practices to secure venous blood – largely because a practice does not have on-site phlebotomy or the added step of families needing to go to the off-site lab to get their children tested.

Capillary blood is acceptable for testing and it has the advantage of being collected on-site at a practice. (PA DOH also accepts a capillary blood test to confirm an initial elevated capillary blood test. See FAQ #8 for more information.)

Capillary blood can be collected in a capillary tube and sent to an off-site lab for analysis, or it can be used for immediate analysis and results using a point of care machine. Though capillary tests are convenient and ensure the patient's sample is analyzed, capillary tests are more prone to contamination than venous tests.



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# CAPILLARY COLLECTION ADVANTAGES & DISADVANTAGES

Test Type	Advantages	Disadvantages
Capillary Tube	Child gets a blood test (versus child never gets a blood test because they never go to an off-site lab for venous test)	Many PCPs do not know about the opportunity to perform and bill for on-site capillary testing, so wider-spread education is necessary
	Capillary tests trend towards false positive <sup>24</sup> , so more kids are likely to be identified with elevated levels (vs. missing kids with false negatives)	Capillary tests trend towards false positive, so may cause unintentional stress to families with kids who do not actually have EBLs
	If capillary test is elevated, parents are likely more motivated to follow up at off-site lab to secure venous confirmatory test – or come back to PCP office for confirmatory capillary test	
Filter Paper	Relatively easy to establish an account with labs for filter paper testing materials	Filter paper has multiple issues of possible contamination that are well documented. Filter paper can have unequal blood distribution which can result in false positives or false negatives when the paper is punched for analysis <sup>25</sup>
Point of Care (POC) Machine	POC machines allow parents and providers to immediately obtain results of test in office	POC machines require personnel to run the test
	POC machines are recommended for smaller practices	Medicaid and CHIP do not completely cover the cost
	Extensive validation studies are not required before CLIA-waived POC instruments are used	Use of CLIA-waived POC instruments does not eliminate the PA regulatory requirement for on-going participation in the DOH BOL proficiency testing program

Below is more information about and resources to conduct capillary testing.



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## CAPILLARY TESTING RESOURCES

Company	Type(s) of Capillary Tests	Free Testing Materials	Reimbursed by Medicaid and CHIP	Transport Options	Contact Info to Set Up an Account
Kirby Labs	Filter Paper and Capillary Tube	Yes	Yes (All Medicaid, UPMC, IBX CHIP)	Mail-In Services	Angeline Elizabeth Kirby Memorial Health Center Environmental Laboratory (570) 823-5450 ext. 353 <a href="mailto:kirbyhc@epix.net">kirbyhc@epix.net</a>
Medtox (LapCorp member)	Filter Paper and Capillary Tube	Yes	Yes	Pick-Up & Mail-In Services	800-832-3244
Quest Labs	Capillary Tube (Note: Recently discontinued Filter Paper)	Yes	Yes	Pick-Up & Mail-In Services	855-737-3887 Or log in to create an account: <a href="https://hcapenroll.questdiagnostics.com">https://hcapenroll.questdiagnostics.com</a>
Magellan LeadCare II	Point of Care machine	Yes – with some packages	Yes	N/A	Mackenzie Maso Regional Point of Care Specialist 513-453-2832 <a href="mailto:mackenzie.mason@meridianbioscience.com">mackenzie.mason@meridianbioscience.com</a> <a href="https://www.magellandx.com/leadcare-products/leadcare-ii/">https://www.magellandx.com/leadcare-products/leadcare-ii/</a>

### FAQ #7: HOW DO I DO A CAPILLARY TEST PROPERLY?

Steps for Collecting Finger Stick Capillary Blood Using a Microtainer:<sup>26</sup>

1. Place all collection materials on top of a disposable pad. Open the lancet, alcohol swabs, gauze, bandage, and other items. Have all items ready for blood collection.
2. Put on powder-free gloves. Turn the patient's hand upward. Massage patient's hand and lower part of the finger to increase blood flow.
3. Scrub the patient's middle finger, ring finger, or heel of foot with an alcohol swab. Dry with gauze.



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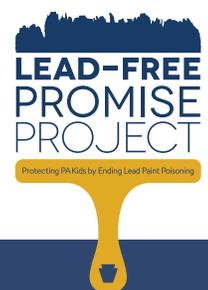
4. Hold the finger in an upward position and lance the palm side surface of the finger with proper-size lancet (adult/child). Press firmly on the finger when making the puncture. Doing so will help you to obtain the amount of blood you need.
5. Apply slight pressure to start blood flow. Blot the first drop of blood on a gauze pad and discard pad in appropriate biohazard container.
6. Keep the finger in a downward position and gently massage to maintain blood flow. Hold the Microtainer® at an angle of 30 degrees below the collection site and use the scoop on the Microtainer® to fill it to the 250-500 µL level.
7. Cap the Microtainer® and gently invert it 10 times to prevent clots from forming. Properly discard all used materials and refrigerate the specimen until shipment or analysis.
8. Apply a sterile adhesive bandage over the puncture site.

**FAQ #8: CAN I USE A CAPILLARY TEST RESULT AS A CONFIRMATORY TEST FOR AN INITIAL ELEVATED CAPILLARY RESULT?**

Yes. If a capillary blood test result is elevated, the PA DOH directs health care providers to secure a confirmatory blood test, and a confirmatory test can be done two ways, either with a venous blood test or another capillary blood test conducted within 12 weeks (84 days) of the original capillary test.<sup>27</sup>

The CDC recommends confirming EBLLs with blood draw by venipuncture. Confirmatory testing is not required when an initial screening test is performed using a venous sample. See table below for Recommended Schedule for Obtaining a Confirmatory Venous Sample.<sup>28</sup> Note: Though it varies by Medicaid health plan, some health plans will conduct the free environmental lead investigation based on two capillary tests or one venous test or one capillary and one venous.

Blood Lead Level (µg/dL)	Time to Confirmation Testing
≥3.5-9	Within 3 months *
10 - 19	Within 1 month *
20 - 44	Within 2 weeks *
≥45	Within 48 hours *
* The higher the BLL on the initial screening capillary test, the more urgent the need for confirmatory testing using a venous sample.	



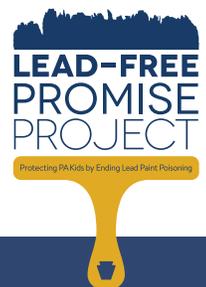
## FAQ #9: HOW DO I REPORT CAPILLARY TEST RESULTS TO THE PA DOH?

PCPs are required to report all lead test results regardless of lead level through PA's National Electronic Disease Surveillance System (PA-NEDSS) website, including all venous and capillary results inclusive of results secured via a point of care lead testing machine. All laboratories that analyze blood for lead are also required to report all lead test results regardless of lead level to PA-NEDSS. PA-NEDSS is a web-based application that establishes a near real-time, secure communication link between laboratories, hospitals, individual medical practices, and DOH. PCPs who already submit data on cases of influenza and other reportable diseases likely already have an account. If you do not have an account, visit the PA-NEDSS website to register; instructions for reporting are on the website. Contact the PA DOH Help Desk with questions at 717-783-9171 or by email [ra-dhNEDSS@pa.gov](mailto:ra-dhNEDSS@pa.gov).

## FAQ #10: HOW ARE CHILDREN IN PENNSYLVANIA EXPOSED TO HARMFUL LEVELS OF LEAD?

The number one way that children in Pennsylvania and across the country are lead poisoned is by paint in older homes and apartments. Lead based paint on friction and impact surfaces such as windows and doors get pulverized into tiny, sometimes microscopic lead particles that contaminate regular household dust. Lead paint that is chipping, peeling, flaking, and in dust is hazardous to children. The main source is not water or paint in schools. Almost all children are poisoned as babies and toddlers, well before they are old enough to attend school.

- Children can be exposed to lead paint by inhaling lead dust, swallowing lead dust, and eating lead paint chips. Children get elevated blood lead levels primarily by ingestion of lead- contaminated household dust due to normal hand-to-mouth contact and toy-to-mouth contact.
- Children under the age of six – particularly kids under three – are at the greatest risk. Young children grow rapidly, particularly their central nervous system, and they tend to put their hands or other objects into their mouths. If their hands or toys have lead dust on them, children can be injured.
- Key areas of the home are friction and impact surfaces – windows, doors, railings, bannisters, baseboards, and floors.
- Other sources of lead:
  - o Lead-based paint from the exterior of a home, which can contaminate the soil
  - o Lingering industrial emissions that continue to pose a threat long after the site is cleared
  - o Drinking-water that may be contaminated with lead as water flows through old lead pipes or faucets, or if the pipes begin to break down



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- o Some toys, jewelry, cosmetics, and spices imported from other countries
- o Food stored in bowls glazed or painted with lead
- o Making or recycling of automobile batteries, which can transfer lead on clothing or shoes
- o Residential, commercial, or industrial painting, which can transfer lead on clothing or shoes
- o Home renovations which disturb lead-based paint and are not done using lead-safe work practices

## **FAQ #11: WHERE CAN I TURN FOR HELP TO MANAGE THE CARE OF CHILDREN WHO TEST POSITIVE FOR LEAD?**

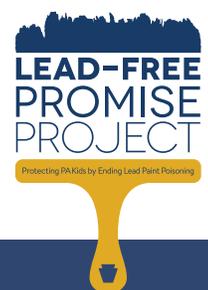
The Lead-Free Promise Project published a [Resource Guide: Care Management of a Child with Elevated Blood Lead Levels](#) with 10 steps to treat children with elevated blood lead levels. The guide includes:

- Names and phone numbers of Care Management staff at the child’s health plan
- How to refer children to obtain free home lead tests (e.g., environmental lead investigation/ ELLs)
- Names and phone numbers to 20+ FREE programs across Pennsylvania that remove lead paint hazards from homes

Step #10 in the Resource Guide informs parents about the [Parent Toolkit](#) with county-specific resources they can access, such as FREE lead remediation programs, WIC, Early Intervention services, and more.

If you have clinical questions about the care management of a child with an elevated blood lead level, you can contact:

- Laura Anderko, PhD, RN ([lander35@villanova.edu](mailto:lander35@villanova.edu)) at the Pediatric Environmental Health Specialty Unit (PESHU), Mid-Atlantic Center for Children’s Health and the Environment (MACCHE) at Villanova University.
- The Poison Control Center 800-222-1222 for assistance with treatment and case management of children with EBLs > 45 mcg/dL.



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## ABOUT THE AUTHOR:

The [PA Lead-Free Promise Project](#) (LFPP) is a statewide initiative dedicated to reducing/eliminating childhood lead poisoning. The three major aims of LFPP are to 1) get lead paint hazards out of homes, 2) get children tested, and 3) get children who test positive referred to Early Intervention services. More than 50 organizations, businesses, and government departments across Pennsylvania participate.

Your participation is needed and welcomed! Contact Colleen McCauley to get involved at 215-298-2027 or [colleenm@childrenfirstpa.org](mailto:colleenm@childrenfirstpa.org).

LFPP is part of a larger effort to improve the health and well-being of pregnant women and children ages 0-3 called the PA Prenatal to Age Three Collaborative (PN3). Pennsylvania is one of eleven states funded by the Pritzker Foundation to do this work. As part of our effort to screen all children for lead in Pennsylvania, a group of physician coalition members across the state joined together to create this paper. It is their hope that Pennsylvania physicians will adopt these recommendations and join them in eliminating childhood lead poisoning.

<sup>1</sup>PA Department of Health. January 27, 2022. PA DOH adopts the lower CDC's blood lead reference value of 3.5ug/dl. <https://www.health.pa.gov/topics/Documents/HAN/2022-623-01-27-ADV-Lead%20Blood%20Level.pdf>

<sup>2</sup>PA Department of Human Services. June 6, 2022. Updates to Blood Lead Reference Value and Environmental Lead Investigation (ELI) Provider Qualifications Requirements. <https://www.health.pa.gov/topics/Documents/HAN/2022-623-01-27-ADV-Lead%20Blood%20Level.pdf>

<sup>3</sup>Centers for Disease Control and Prevention. Guidelines and Recommendations. <https://www.cdc.gov/nceh/lead/resources/guidelines.html>

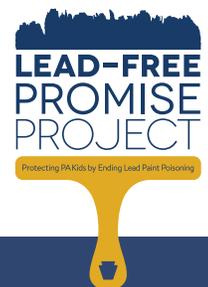
<sup>4</sup>United States Preventative Services Task Force. April 16, 2019. Elevated Blood Lead Levels in Childhood and Pregnancy Screening. <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/elevated-blood-lead-levels-in-childhood-and-pregnancy-screening>

<sup>5</sup>American Academy of Pediatrics. July 1, 2016. Prevention of Childhood Lead Toxicity. Pediatrics, 138(1). <https://publications.aap.org/pediatrics/article/138/1/e20161493/52600/Prevention-of-Childhood-Lead-Toxicity?autologincheck=redirected>

<sup>6</sup>Department of Health and Human Services, Centers for Medicaid and CHIP Services. November 30, 2016. Coverage of Blood Lead Testing for Children Enrolled in Medicaid and the Children's Health Insurance Program. <https://www.medicaid.gov/federal-policy-guidance/downloads/cib113016.pdf>

<sup>7</sup>Lead-Free Promise Project. 2021. Lead-Free Promise Project Pennsylvania Lead Poisoning Fact Sheet. <https://secureserver-cdn.net/104.238.68.196/zky.ea4.myftpupload.com/wp-content/uploads/2021/06/LFPP-3-pager.pdf>

<sup>8</sup>Centers for Disease Control and Prevention. 2021. Blood Lead Levels ( $\mu\text{g}/\text{dL}$ ) among U.S. Children, 72 Months of Age, by State, year, and Blood Lead Level (BLL) Group. <https://www.cdc.gov/nceh/lead/docs/cbls-national-data-table-508.pdf>



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- <sup>9</sup>Centers for Disease Control and Prevention. 2021. Blood Lead Levels (µg/dL) among U.S. Children ,72 Months of Age, by State, year, and Blood Lead Level (BLL) Group. <https://www.cdc.gov/nceh/lead/docs/cbls-national-data-table-508.pdf>
- <sup>10</sup>Centers for Disease Control and Prevention. 2021. Blood Lead Levels (µg/dL) among U.S. Children ,72 Months of Age, by State, year, and Blood Lead Level (BLL) Group. <https://www.cdc.gov/nceh/lead/docs/cbls-national-data-table-508.pdf>
- <sup>11</sup>Pennsylvania Department of Health. January 2022. 2020 Childhood Lead Surveillance Annual Report. <https://www.health.pa.gov/topics/Documents/Environmental%20Health/2020%20Childhood%20Lead%20Surveillance%20Annual%20Report.pdf>
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- <sup>13</sup>Allegheny County Health Department. July 5, 2017. Universal blood lead level testing ordinance. [https://www.allegheny-county.us/uploadedFiles/Allegheny\\_Home/Health\\_Department/Article-23-Blood-Lead-Level-Testing.pdf](https://www.allegheny-county.us/uploadedFiles/Allegheny_Home/Health_Department/Article-23-Blood-Lead-Level-Testing.pdf)
- <sup>14</sup>Philadelphia Board of Health. February 24, 2022. A Regulation Regarding Blood Lead Level Testing in Children. [http://regulations.phila-records.com/pdfs/Regulation%20Regarding%20Blood%20Lead%20Level%20Testing%20in%20Children\\_Aproved%202.24.2022.pdf](http://regulations.phila-records.com/pdfs/Regulation%20Regarding%20Blood%20Lead%20Level%20Testing%20in%20Children_Aproved%202.24.2022.pdf)
- <sup>15</sup>Centers for Disease Control and Prevention. Recommended Actions Based on Blood Lead Level. <https://www.cdc.gov/nceh/lead/advisory/acclpp/actions-blls.htm>
- <sup>16</sup>American Academy of Pediatrics. July 1, 2016. Prevention of Childhood Lead Toxicity. Pediatrics, 138(1). <https://publications.aap.org/pediatrics/article/138/1/e20161493/52600/Prevention-of-Childhood-Lead-Toxicity?autologincheck=redirected>
- <sup>17</sup>United States Census Bureau. 2019. ACS 1-Year Estimates Detailed Tables.
- <sup>18</sup>Pennsylvania Department of Health. January 2022. 2020 Childhood Lead Surveillance Annual Report. <https://www.health.pa.gov/topics/Documents/Environmental%20Health/2020%20Childhood%20Lead%20Surveillance%20Annual%20Report.pdf>
- <sup>19</sup>In alignment with Bright Futures recommendations for children at high risk of lead exposure: “Perform risk assessments or screenings as appropriate, based on universal screening requirements for patients with Medicaid or in high prevalence areas.” Bright Futures/American Academy of Pediatrics. 2021. Recommendations for Preventative Pediatric Health Care. [https://downloads.aap.org/AAP/PDF/periodicity\\_schedule.pdf](https://downloads.aap.org/AAP/PDF/periodicity_schedule.pdf)
- <sup>20</sup>Centers for Disease Control and Prevention. Recommended Actions Based on Blood Lead Level. <https://www.cdc.gov/nceh/lead/advisory/acclpp/actions-blls.htm>
- <sup>21</sup>Pennsylvania Department of Health. January 27, 2022. PA DOH adopts the lower CDC’s blood lead reference value of 3.5ug/dl. <https://www.health.pa.gov/topics/Documents/HAN/2022-623-01-27-ADV-Lead%20Blood%20Level.pdf>
- <sup>22</sup>Text almost verbatim from: South Carolina Department of Health and Environmental Control. November 4, 2021. Update to CDC’s Blood Lead Reference Value for Children. <https://scdhec.gov/sites/default/files/media/document/10504-DHU-11-04-2021-LEAD.pdf>



<sup>23</sup>Five fair-quality studies (n=2265) using the threshold of 1 or more positive answers on the CDC screening questionnaire reported a pooled sensitivity of 48% (95% CI, 31.4%-65.6%) and pooled specificity of 58% (95% CI, 39.9%-74.0%) for identifying children with a venous blood lead level of 10 µg/dL or greater. Four fair-quality studies (n=4608) using versions of the CDC questionnaire modified for specific populations or settings did not demonstrate improved accuracy (sensitivity range, 25%-68%; specificity range, 49%-58%. From: United States Preventive Services Task Force. April 16, 2019. Elevated Blood Lead Levels in Children and Pregnant Women: Screening. <https://www.uspreventiveservicestaskforce.org/uspstf/document/%20%20%20%20%20RecommendationStatementFinal/elevated-blood-lead-levels-in-childhood-and-pregnancy-screening>

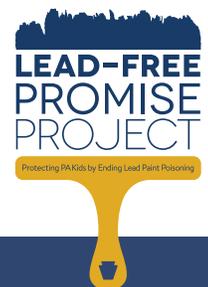
<sup>24</sup>Wang A, Rezania Z, Haugen KMB, Baertlein L, Yendell SJ. Screening for Elevated Blood Lead Levels: False-Positive Rates of Tests on Capillary Samples, Minnesota, 2011-2017. J Public Health Manag Pract. 2019 Jan/Feb;25 Suppl 1, Lead Poisoning Prevention: S44-S50.

<sup>25</sup>Parsons P.J., Glusha AL, Cui Y., Faustman E.M., Falman J.C., Meeker J.D., Kannan K. (2020). A critical review of the analysis of dried blood spots for characterizing human exposure to inorganic targets using methods based on analytical atomic spectrometry. Journal of Analytical Atomic Spectrometry, Issue 10. <https://pubs.rsc.org/en/content/articlelanding/2020/ja/d0ja00159g>

<sup>26</sup>Centers for Disease Control. Steps for Collecting Finger Stick Capillary Blood Using a Microtainer®. [https://www.cdc.gov/nceh/dls/pdf/Poster\\_Capillary\\_Blood.pdf](https://www.cdc.gov/nceh/dls/pdf/Poster_Capillary_Blood.pdf)

<sup>24</sup>Pennsylvania Department of Health. January 2021. 2019 Childhood Lead Surveillance Annual Report <https://www.health.pa.gov/topics/Documents/Environmental%20Health/2019%20Childhood%20Lead%20Surveillance%20Annual%20Report.pdf>

<sup>28</sup>Centers for Disease Control and Prevention. Recommended Actions Based on Blood Lead Level. <https://www.cdc.gov/nceh/lead/advisory/acclpp/actions-blls.htm>



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