

California Management Guidelines on Childhood Lead Poisoning for Health Care Providers



No level of lead in the blood is known to be safe. The US Centers for Disease Control and Prevention (CDC) established in 2021 a new reference value of 3.5 micrograms per deciliter (mcg/dL) for blood lead levels (BLLs), thereby lowering the level at which evaluation and intervention are recommended.¹ Contact the California Department of Public Health, Childhood Lead Poisoning Prevention Branch (CLPPB), (510) 620-5600, www.cdph.ca.gov/programs/CLPPB, for additional information about childhood lead toxicity.

BLL ²	EVALUATION AND TESTING	MANAGEMENT
<p>< 3.5 mcg/dL</p> <p>Screening BLLs may be either a capillary (CBLL) or a venous (VBLL).^{3,4}</p> <p>Filter paper blood lead tests are not accepted by the State of California.</p> <p>Retest for identified risk must be venous.³</p> <p>If VBLL increases to higher range, retest and manage per that range.</p>	<p>General</p> <ul style="list-style-type: none"> Perform routine history and assessment of physical and mental development. Assess nutrition and risk for iron deficiency. Consider lead exposure risks. <p>Blood Lead Levels</p> <p>California regulations require testing at ages 12 months and 24 months (up to 72 months if not tested at 24 months) if child is in a publicly funded program for low-income children, spends time at a pre-1978 place with deteriorated paint or recently renovated, or has other lead exposure risks.⁵</p> <ul style="list-style-type: none"> If screened early (before 12 months), retest in 3-6 months as risk increases with increased mobility. Test anyone birth to 21 years when indicated by changed circumstances, identification of new risks, or at the request of a parent or guardian. Follow up with VBLL in 6-12 months if indicated. <p>See federal guidelines for Head Start⁶ or refugees.⁷</p>	<p>Comply with California statutes and regulations mandating a standard of care under which the health care provider, at each periodic health care visit from age 6 months to 72 months must give oral or written anticipatory guidance to a parent or guardian, including at a minimum that children can be harmed by lead, are particularly at risk for lead poisoning from the time they crawl until 72 months old, and can be harmed by deteriorating or disturbed paint and lead-contaminated dust, and that children enrolled in Medi-Cal receive blood lead tests, and children not enrolled in Medi-Cal who are at high risk of lead exposure receive blood lead tests.⁵</p> <p>Discuss hand to mouth activity, pica, hand washing, and sources of lead such as lead-contaminated paint, dust, and soil (particularly near busy roads), plumbing, bullets, fishing sinkers; and also lead-contaminated remedies, cosmetics, food, spices, tableware, cookware, batteries, jewelry, toys and other consumer products, a household member's lead-related work or hobbies, recent time spent in another country.</p> <ul style="list-style-type: none"> Discuss BLLs with family. Counsel on any risk factors identified. Encourage good nutrition, especially iron, vitamin C, and calcium. Consider referral to Supplemental Nutrition Program for Women, Infants, and Children (WIC). Encourage participation in early enrichment programs and activities. <p>Chelation is not recommended in this BLL range.</p>
<p>3.5-9.4 mcg/dL</p> <p>Screening BLLs may be capillary or venous.</p> <p>Every retest must be venous.³</p> <p>If VBLL increases to higher range, retest and manage per that range.</p>	<p>General – Evaluate as above AND</p> <ul style="list-style-type: none"> Take an environmental history to identify potential sources of exposure and provide preliminary advice on reducing/eliminating them. Test for iron sufficiency (CBC, Ferritin, and CRP).⁸ Perform structured developmental screening evaluations at periodic health visits as lead effects may manifest over years. Evaluate risk to other children and pregnant and lactating women in the home. <p>Blood Lead Levels</p> <ul style="list-style-type: none"> If initial BLL is capillary, obtain confirmatory venous test within 3 months. Retest based on range of confirmatory venous test. For venous result in this range, obtain 2-4 follow-up VBLLs. First venous retest within 3 months. Then 1-3 subsequent venous retests every 3 months. After VBLL declining, retest with VBLLs every 6-9 months and thereafter based on VBLL trend. 	<p>Manage as above AND</p> <ul style="list-style-type: none"> Counsel on nutrition, iron, vitamin C, and calcium. Encourage taking high-iron and high-vitamin C foods together. Refer to WIC. Treat iron insufficiency per American Academy of Pediatrics guidelines. Consider starting a multivitamin with iron. Add notation of elevated BLL to child's medical record for future neurodevelopmental monitoring. Refer to an early enrichment program, e.g., Early Start or Head Start. Consider medical referral and testing for other children and pregnant and lactating women in the home. Coordinate with local Childhood Lead Poisoning Prevention Program (CLPPP) or state CLPPB for outreach, education, and other services. See CLPP Program contacts for state and local contact information. (tinyurl.com/CLPPPs) <p>Chelation is not recommended in this BLL range.</p>
<p>9.5-14.4 mcg/dL</p> <p>Screening BLLs may be capillary or venous.</p> <p>Every retest must be venous.³</p> <p>If VBLL increases to higher range, retest and manage per that range.</p>	<p>General – Evaluate as above</p> <p>Blood Lead Levels</p> <ul style="list-style-type: none"> If initial BLL is capillary, obtain confirmatory venous test within 1 month. Retest based on range of confirmatory venous test. For venous result in this range, obtain 2-4 follow-up VBLLs. First venous retest within 1-3 months. Then 1-3 subsequent venous retests every 1-3 months. After VBLL declining, retest with VBLLs every 3-6 months and thereafter based on VBLL trend. To determine eligibility for full public health case management, a follow-up venous test in this range is needed (eligible if persistent in or above this range). 	<p>Manage as above AND</p> <ul style="list-style-type: none"> If BLL is persistent in or above this range with at least the second test being venous, contact the local CLPPP (or, if no local program, the state CLPPB) (tinyurl.com/CLPPPs) for full case management services (nurse case management, environmental investigation, and recommendations for remediation of lead sources), provided at no cost to the family, for children aged birth to 21 years. The state CLPPB is available for further consultation: (510) 620-5600. See footnote for other lead-knowledgeable agencies.⁹ <p>Chelation is not recommended in this BLL range.</p>

Reformatted summary table from: Department of Health Care Services, [Blood Lead Testing and Anticipatory Guidance](#). (tinyurl.com/DHCS-LEAD-2023)

¹ Centers for Disease Control and Prevention, [Blood Lead Reference Value](#). (tinyurl.com/CDC-BLRV-21)

² For levels other than 3.5 mcg/dL, CDC uses whole integers. California rounds BLLs to the closest whole integer (10 includes 9.5 mcg/dL, 15 includes 14.5 mcg/dL, etc.).

³ Capillary lead specimens are easily contaminated. They are acceptable for screening but all retests on BLLs ≥ 3.5 mcg/dL should be venous. Consider arterial or umbilical cord specimens as if venous. A heel stick may be used to obtain a capillary specimen in children under one year. LeadCare® analyzers should not be used for VBLLs. [Information on Magellan LeadCare®: 2021 Blood Lead Test Kit Recall and 2017 FDA Safety Communications, and Recommendations](#). (tinyurl.com/CLPPB-MAG)

⁴ Analyzing laboratories must report results of all BLLs drawn in California to the state. [California Health and Safety Code, §124130](#) (tinyurl.com/HSC-S-124130)

⁵ [California Code of Regulations, Title 17, §37000-37100](#) (tinyurl.com/CCR-17-37000) / Health and Safety Code, [§105285](#) (tinyurl.com/HSC-S-105285), [§105286](#) (tinyurl.com/HSC-S-105286)

⁶ [Head Start | Early Childhood Learning & Knowledge Center \(ECLKC\)](#). (tinyurl.com/HS-ECLKC-LEAD)

⁷ [Screening for Lead during the Domestic Medical Examination for Newly Arrived Refugees](#). (tinyurl.com/CDC-REF-LEAD)

⁸ [Diagnosis and Prevention of Iron Deficiency and Iron-Deficiency Anemia in Infants and Young Children \(0–3 Years of Age\)](#). (tinyurl.com/AAP-IRON)

⁹ [Pediatric Environmental Health Specialty Unit Network](#) (pehsu.net) and [Centers for Disease Control and Prevention](#) (tinyurl.com/CDC-CLPP), (800) 232-4636.

BLL ²	EVALUATION AND TESTING	MANAGEMENT
<p>14.5-19.4 mcg/dL</p> <p>Screening BLLs may be capillary or venous.</p> <p>Every retest must be venous.³</p> <p>If VBLL increases to higher range, retest and manage per that range.</p>	<p>General – Evaluate as above AND</p> <ul style="list-style-type: none"> Consider abdominal X-ray if suspected ingestion of leaded materials or history of pica/excessive mouthing. <p>Blood Lead Levels</p> <ul style="list-style-type: none"> If initial BLL is capillary, obtain confirmatory venous test within 1 month. Retest based on range of confirmatory venous test. For venous result in this range, obtain 2-4 follow-up VBLLs. First venous retest within 1-3 months. Then 1-3 subsequent venous retests every 1-3 months. After VBLL declining, retest with VBLLs every 3-6 months and thereafter based on VBLL trend. 	<p>Manage as above AND</p> <ul style="list-style-type: none"> Consider gut decontamination if foreign bodies consistent with lead are visualized on X-ray. If a single VBLL in this range, contact the local CLPPP (or, if no local program, the state CLPPB) (tinyurl.com/CLPPPs) for full case management services for children aged birth to 21 years or for questions about clinical management in this range. Any treatment of BLLs in this range should be provided in consultation with the state CLPPB: (510) 620-5600. See footnote for other lead-knowledgeable agencies.⁹ <p>Chelation is not recommended in this BLL range.</p>
<p>19.5-44.4 mcg/dL</p> <p>Screening BLLs may be capillary or venous.</p> <p>Every retest must be venous.³</p> <p>If VBLL increases to higher range, retest and manage per that range.</p>	<p>General - Evaluate as above</p> <ul style="list-style-type: none"> Consider abdominal X-ray to check for lead-based paint chips and other radiopaque foreign bodies. <p>Blood Lead Levels</p> <ul style="list-style-type: none"> If initial BLL is capillary, obtain confirmatory venous test within 2 weeks. Retest based on range of confirmatory venous test. For venous result in this range, obtain 2-4 follow-up VBLLs. First venous retest within 1-4 weeks to be sure BLL is not rising (the higher the BLL, the sooner the retest). Then 1-3 subsequent venous retests every 2-4 weeks. After VBLL declining, retest with VBLLs every 1-3 months and thereafter based on VBLL trend. 	<p>Manage as above AND</p> <ul style="list-style-type: none"> Consider referral to California Children's Services (CCS). Requires confirmed VBLL equal to or greater than 20 mcg/dL.¹⁰ Consider referral for medical nutrition therapy.¹¹ <p>Chelation is not typically initiated in this BLL range.</p>
<p>44.5-69.4 mcg/dL</p> <p>Screening BLLs may be capillary or venous</p> <p>Every retest must be venous³</p> <p>If VBLL increases to higher range, retest and manage per that range.</p>	<p>URGENT</p> <p>General – Evaluate as above AND</p> <ul style="list-style-type: none"> OBTAIN ABDOMINAL X-RAY. <p>Blood Lead Levels</p> <ul style="list-style-type: none"> Confirm initial BLL with repeat VENOUS BLL*: <ul style="list-style-type: none"> WITHIN 48 HOURS if BLL is 44.5-59.4 mcg/dL. WITHIN 24 HOURS if BLL is 59.5-69.4 mcg/dL. Confirmatory venous BLL and other medically appropriate actions must occur BEFORE initiating chelation. Monitor response to chelation with VBLLs. Follow up with VBLLs every 2-4 weeks (more frequently if status requires) until trend is downward or stable or as trend indicates. Consider modifying protocol if VBLLs are not decreasing as expected or remain chronically elevated, e.g. from a retained bullet. If venous retest is in another range, retest per that range. * If initial capillary BLL \geq 44.5 mcg/dL and confirmatory VBLL $<$ 3.5 mcg/dL, repeat VBLL in 2-4 weeks is recommended. Sooner if symptomatic or probable lead exposure, in order to rule out possible false negative. 	<p>URGENT</p> <p>Manage as above AND</p> <ul style="list-style-type: none"> Consider chelation. Refer to CCS. Evaluate whether hospitalization is needed to reduce lead exposure and achieve compliance with treatment protocols. If admitted, child must be discharged to a lead-safe environment. Immediately notify local CLPPP or state CLPPB. (tinyurl.com/CLPPPs) <p>Chelation Therapy</p> <ul style="list-style-type: none"> Consult with a physician experienced in managing chelation. If admitted and chelation therapy is recommended, consult with hospital pharmacist to obtain medication. Perform gut decontamination, if indicated, BEFORE chelation. Consider one of two chelating agents: <ul style="list-style-type: none"> Succimer per outpatient protocol; give on inpatient basis if compliance or exposure reduction cannot otherwise be assured, OR CaNa²EDTA per hospital protocol. * CAUTION: USE ONLY CALCIUM Na²EDTA.¹² Very high BLLs have been associated with renal tubular dysfunction. If using potentially nephrotoxic chelating agents (e.g., CaNa²EDTA), TEST RENAL FUNCTION BEFORE AND DURING TREATMENT.¹³ Repeat treatment cycles may be needed due to blood lead rebound.
<p>\geq 69.5 mcg/dL</p> <p>Screening BLLs may be capillary or venous</p> <p>Every retest must be venous³</p>	<p>MEDICAL EMERGENCY</p> <p>General – Evaluate as 44.5 - 69.4 mcg/dL range.</p> <ul style="list-style-type: none"> OBTAIN ABDOMINAL X-RAY. <p>Blood Lead Levels</p> <ul style="list-style-type: none"> IMMEDIATELY confirm initial BLL with repeat VENOUS BLL*. Confirmatory venous BLL and other medically appropriate actions must occur BEFORE initiating chelation. Monitor response during chelation with VBLLs. Follow up with VBLLs every 2-4 weeks (more frequently if status requires) until trend is downward or stable or as trend indicates. Consider modifying protocol if VBLLs are not decreasing as expected or remain chronically elevated, e.g., from a retained bullet. If venous retest is in another range, retest per that range. * If initial capillary BLL \geq 44.5 mcg/dL and confirmatory VBLL $<$ 3.5 mcg/dL, repeat VBLL in 2-4 weeks is recommended. Sooner if symptomatic or probable lead exposure, in order to rule out possible false negative. 	<p>MEDICAL EMERGENCY</p> <p>Manage as above AND</p> <ul style="list-style-type: none"> If BLL is confirmed, hospitalize to stabilize, chelate, reduce lead exposure, and monitor progress. Immediately notify local CLPPP or state CLPPB. (tinyurl.com/CLPPPs) Child must be discharged to a lead-safe environment. <p>Chelation Therapy</p> <ul style="list-style-type: none"> Consult with a physician experienced in managing chelation. Depending on BLL and clinical status, initiating chelation prior to receiving confirmatory result may be indicated. Perform gut decontamination, if indicated, BEFORE chelation. CAUTION: If using CaNa²EDTA with dimercaprol (BAL) for chelation: <ul style="list-style-type: none"> Use only CALCIUM Na²EDTA.¹² Assess for peanut allergy (BAL is suspended in peanut oil). Very high BLLs have been associated with renal tubular dysfunction. If using potentially nephrotoxic chelating agents (e.g., CaNa²EDTA), TEST RENAL FUNCTION BEFORE AND DURING TREATMENT.¹³ Repeat treatment cycles may be needed, due to blood lead rebound.

10 Overview of CCS Medical Eligibility, [California Code of Regulations, Title 22, section 41518.9\(h\)](#). (tinyurl.com/CCR-22-41518-9)

11 Academy of Nutrition and Dietetics, eat right PRO, MNT Versus Nutrition Education.

12 [Deaths Associated with Hypocalcemia from Chelation Therapy](#). (tinyurl.com/MMWR-CHEL)

13 [Preventing Lead Poisoning in Young Children: A Statement by the Centers for Disease Control and Prevention](#). (tinyurl.com/CDC-LEAD-05)