

California Management Guidelines on Childhood Lead Poisoning for Health Care Providers



No level of lead in the body is known to be safe. In 2012, the Centers for Disease Control and Prevention (CDC) established a new “reference value” of 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>< 5 mcg/dL</p> <p>Initial BLL and routine retest may be capillary (CBLL) or venous (VBLL)^{3,4}</p> <p>Retest for identified risk must be venous³</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> <ul style="list-style-type: none"> California regulations require testing at ages 1 and 2 years (up to 6 years if not tested at 2 years) 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 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. See federal guides for Head Start⁶ or refugees.⁷ 	<ul style="list-style-type: none"> Comply with California 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.⁵ Discuss hand to mouth activity, hand washing, and sources of lead: e.g. lead-contaminated paint, dust, and soil (particularly near busy roads), plumbing, a household member’s lead-related work, bullets, fishing sinkers; and also some: remedies, cosmetics, food, spices, tableware, cookware, batteries, jewelry, toys and other consumer products. 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 activities. Chelation is not recommended in this BLL range.
<p>5-9 mcg/dL</p> <p>Initial BLL may be capillary or venous</p> <p>Every retest must be venous³</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). 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"> Retest in 1-3 months to be sure BLL is not rising. Then retest in 3 months and thereafter based on VBLL trend. If retest is in another range, retest per that range. 	<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 AAP 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 www.cdph.ca.gov/programs/CLPPB for state and local contact information. Chelation is not recommended in this BLL range.
<p>10-14 mcg/dL</p> <p>Initial BLL may be capillary or venous</p> <p>Every retest must be venous³</p>	<p>General – Evaluate as above</p> <p>Blood Lead Levels</p> <ul style="list-style-type: none"> Retest in 1-3 months to be sure BLL is not rising. To determine eligibility for full public health case management, retest after interval of 30 days (eligible if persistent in or above this range). If BLLs are stable or decreasing, monitor initially with VBLLs every 3 months and thereafter based on VBLL trend. If retest is in another range, retest per that range. 	<p>Manage as above AND</p> <ul style="list-style-type: none"> If BLL is persistent in or above this range (30 days or more), contact the local CLPPP (or, if no local program, the state CLPPB) for full case management services, without charge or means test, for children aged birth to 21 years (nurse case management, environmental investigation, and recommendations for remediation of lead sources). The state CLPPB is available for further consultation: (510) 620-5600. See footnote for other lead-knowledgeable agencies.⁸ Chelation is not recommended in this BLL range.

¹ CDC, www.cdc.gov/nceh/lead/acclpp/blood_lead_levels.htm, accessed 09/2017. This reference level is to be periodically reevaluated.

² BLLs are rounded to the closest whole integer. (5 includes 4.5 mcg/dL, 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 ≥ 5 mcg/dL should be venous. Consider arterial or umbilical cord specimens as if venous. A heelstick may be used to obtain a capillary specimen in children under one year. LeadCare® analyzers should not be used for VBLLs. <https://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm558733.htm>

⁴ Analyzing laboratories must report results of all BLLs drawn in California to the state. California Health and Safety Code, section 124130.

⁵ California Code of Regulations, Title 17, sections 37000-37100.

⁶ Head Start, <https://eclkc.ohs.acf.hhs.gov/physical-health/article/lead-poisoning-prevention>, accessed 09/2017.

⁷ CDC, <http://www.cdc.gov/immigrantrefugeehealth/guidelines/lead-guidelines.html>, accessed 09/2017.

⁸ Pediatric Environmental Health Specialty Unit Network, (888) 347-2632. CDC, www.cdc.gov/nceh/lead/default.htm. Poison Control Center, (800) 222-1222.



For additional information about lead poisoning, contact:
California Department of Public Health Childhood Lead Poisoning Prevention Branch
Tel. (510) 620-5600 www.cdph.ca.gov/programs/CLPPB

BLL	EVALUATION AND TESTING	MANAGEMENT
<p>15–19 mcg/dL</p> <p>Initial BLL may be capillary or venous</p> <p>Every retest must be venous³</p>	<p>General – Evaluate as above AND</p> <ul style="list-style-type: none"> Consider abdominal X-ray if possible ingestion of leaded materials or history of pica/excessive mouthing. <p>Blood Lead Levels</p> <ul style="list-style-type: none"> Retest in 1-4 weeks to be sure BLL is not rising. Then, if stable or decreasing, monitor initially with VBLLs every 1-3 months and thereafter based on VBLL trend. If retest is in another range, retest per that range 	<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) for full case management services for children aged birth to 21 years. Any treatment of BLLs in this range should be provided in consultation with the state CLPPB: (510) 620-5600. See footnote 8 for other lead-knowledgeable agencies. Chelation is not recommended in this BLL range.
<p>20–44 mcg/dL</p> <p>Initial BLL may be capillary or venous</p> <p>Every retest must be venous³</p>	<p>General - Evaluate as above</p> <p>Blood Lead Levels</p> <ul style="list-style-type: none"> Retest in 1-4 weeks to be sure BLL is not rising (the higher the BLL, the sooner the retest). Then, if stable or decreasing, monitor initially with VBLLs every 2-4 weeks and thereafter based on VBLL trend. If retest is in another range, retest per that range 	<p>Manage as above AND</p> <ul style="list-style-type: none"> Consider referral to California Children Services (CCS). Requires confirmed venous BLL equal to or greater than 20 mcg/dL.⁹ Consider referral for medical nutrition therapy.¹⁰ Chelation is not typically initiated in this BLL range.
<p>45–69 mcg/dL</p> <p>Initial BLL may be capillary or venous</p> <p>Every retest must be venous³</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 45-59 mcg/dL. WITHIN 24 HOURS if BLL is 60-69 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 retest is in another range, retest per that range. 	<p>URGENT</p> <p>Manage as above AND</p> <ul style="list-style-type: none"> Consider chelation. Evaluate whether hospitalization is needed to reduce lead exposure and achieve compliance with treatment protocols. Immediately notify local CLPPP or state CLPPB. <p>Chelation Therapy</p> <ul style="list-style-type: none"> Consult with a physician experienced in managing chelation. 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.¹¹ 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.¹² Repeat treatment cycles may be needed due to blood lead rebound.
<p>≥ 70 mcg/dL</p> <p>Initial BLL may be capillary or venous</p> <p>Every retest must be venous³</p>	<p>MEDICAL EMERGENCY</p> <p>General – Evaluate as 45-69 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 retest is in another range, retest per that range 	<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. <p>Chelation Therapy</p> <ul style="list-style-type: none"> Consult with a physician experienced in managing chelation. 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.¹¹ 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.¹² Repeat treatment cycles may be needed, due to blood lead rebound.

⁹ California Code of Regulations, Title 22, section 41518.9.

¹⁰ Academy of Nutrition and Dietetics, <http://www.eatrightpro.org/resource/practice/getting-paid/who-pays-for-nutrition-services/mnt-vs-nutrition-education>

¹¹ CDC-MMWR, Deaths Associated with Hypocalcemia from Chelation Therapy—Texas, Pennsylvania, and Oregon, 2003-2005, March 3, 2006, 55(08):204-207. www.cdc.gov/mmwr/preview/mmwrhtml/mm5508a3.htm, accessed 09/2017.

¹² Preventing Lead Poisoning in Young Children: A Statement by the Centers for Disease Control, October 1991, US Department of Health and Human Services, Pharmacology of Chelating Agents, Chapter 7, pg 56 <https://www.cdc.gov/nceh/lead/publications/books/plpyc/Chapter7.htm>

