

OREGON PUBLIC HEALTH DIVISION • OREGON HEALTH AUTHORITY

CHILDHOOD LEAD POISONING: GOING, BUT NOT GONE

The parents of a 1-year old Oregon boy began renovating their newly purchased 1907 home, living in a downstairs apartment during the remodeling work. Then they learned that this work might be creating a health hazard for their young son. They took him in for a blood test, which showed he had a blood lead level five times higher than the allowable upper limit.

The marked decline in childhood lead poisoning over the past 30 years is a great achievement for public health. From 1976–1980 an estimated 88% of children aged 1–5 years had a blood lead level (BLL) of  $\geq 10 \mu\text{g/dL}$ ; by 2007–2010, this had declined to 0.8% (data from the National Health and Nutrition Examination Survey; NHANES).<sup>1</sup> Despite the decline in BLLs among the U.S. population, each year thousands of children are still exposed to lead at levels associated with negative health consequences.

Unfortunately, there is no safe level of lead exposure for children. Even low levels of blood lead have been associated with IQ deficits, attention-related behaviors and poor academic achievement. Lead is also known to cause growth, speech and language delays and hearing loss. New findings suggest that the adverse health effects of BLLs  $< 10 \mu\text{g/dL}$  in children include cardiovascular, immunological, and endocrine effects.<sup>2</sup>

In May 2012, the Centers for Disease Control and Prevention (CDC) revised the level at which children are considered to have too much lead in their blood. Based on the absence of an identified BLL without deleterious effects, combined with the evidence that these effects appear to be irreversible, CDC eliminated the term “level of concern” and adopted a new BLL reference value of  $\geq 5 \mu\text{g/dL}$ . What does this mean for clinicians in Oregon? This CD Summary reviews national and Oregon data on childhood lead

poisoning, and provides resources for addressing elevated BLLs in your patients.

**NATIONAL DATA**

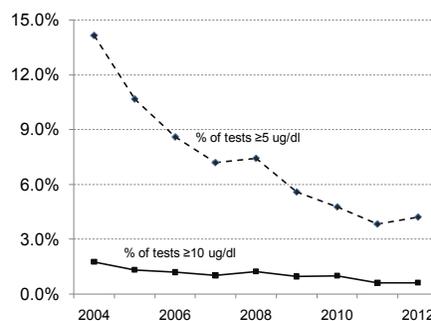
Nationally, childhood BLLs have been decreasing steadily since 1980. Nonetheless, in 2010, an estimated 535,000 U.S. children aged 1–5 years still had BLLs  $\geq 5 \mu\text{g/dL}$ .<sup>3</sup> BLLs in children aged 1–5 years remain much higher compared to all other age groups.<sup>1</sup> Blacks have double the rate of elevated BLLs compared to whites and Mexican Americans.<sup>1</sup>

**OREGON DATA**

Like many other states, the overall prevalence of childhood lead poisoning in Oregon is low. Therefore, targeted screening of children at high risk for having elevated BLLs is recommended. A lead risk assessment questionnaire is available on the state’s website.\* Currently, about 5–6% (~15,000) of Oregon children <6 years of age are screened for elevated BLL each year.†

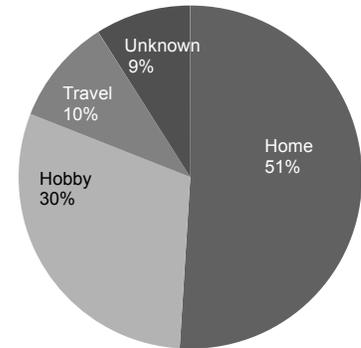
Figure 1 shows elevated childhood BLL in Oregon during the past decade. The percent of children with elevated

Figure 1. Percent of Oregon children tested who had an elevated blood lead levels



\* <http://public.health.oregon.gov/HealthyEnvironments/HealthyNeighborhoods/HealthyHomes/LeadPoisoning/MedicalProvidersLaboratories/Documents/screenprotocolschild.pdf>  
Oregon Lead Poisoning Prevention Program,  
† <http://public.health.oregon.gov/PHD/Directory/Pages/program.aspx?pid=73>

Figure 2. Source of lead in Oregon children 2011–2012



BLLs has gradually decreased over time. In 2010, 438 Oregon children had a BLL  $\geq 5 \mu\text{g/dL}$ , (the new reference value).

**SOURCES OF LEAD**

Both nationally and in Oregon, the most common source of lead exposure is deteriorated lead paint, or dust and debris created by renovation of homes built before 1978. Lead can also be found in lead solder or household plumbing, hobbies, toys and jewelry. Immigrant families may bring lead containing products to the U.S. including folk/home remedies, cosmetics, food and pottery.<sup>2</sup> Occupation and hobbies of parents can bring lead in the home on their clothing, exposing children to the hazard. Children may also swallow lead-containing objects such as lead shot, fishing sinkers, jewelry or other lead containing items, resulting in rapid lead poisoning.

From January 2011–October 2012, 144 (of 27,000 tests) Oregon children were reported with at least one BLL  $\geq 10 \mu\text{g/dL}$ . Of these 43% were found to be false positives, and 27% of reports had missing data.

Figure 2 shows identified sources for the remaining. For cases with a known source, one half were from the home (remodeling or disturbing lead based paint) and one third were from a hobby (of the parent), such as lead from firing bullets, or fishing weights.



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**Table. Confirmation & follow-up schedule for childhood blood lead results**

BLL (µg/dL)	Confirmation Testing (venous)	Follow-Up Testing (venous)
5–9	1–3 months	3 months
Clinician case management * Perform confirmatory testing * Confirm recent known exposures as soon as possible * Include history of EBLL in problem list of child's permanent medical record * Assist family in identifying possible exposure source. Provide source reduction and nutritional information. * Refer to WIC, social services and public assistance * No case management by public health, except Multnomah County		
10–19	1 month	3 months
Clinician case management * Above action, plus: * Monitor for developmental problems and discuss with caregiver the need for long-term developmental surveillance * Completion of environmental assessments by public health will be based on local resources		

**5 IS NOT THE NEW 10: THE NEW GUIDELINES**

In 2010, CDC's Advisory Committee on Childhood Lead Poisoning Prevention convened a workgroup to define the reference level for an elevated BLL among children.<sup>4</sup> Experts now use a reference level of  $\geq 5$  µg/dL to identify children with elevated blood lead levels. This new level is based on the U.S. population of children ages 1–5 years who are in the highest 2.5% of children when tested for blood lead †

**THE ROLE OF PUBLIC HEALTH?**

The irony is that while the committee adopted a new reference BLL for children, federal funding for childhood lead prevention was cut back. As a result, public health has to curtail the previously provided support for case

management, and in the future will monitor BLL data and provide information to clinicians via the web.

**THE ROLE OF CLINICIANS**

At this new blood lead level, clinicians will play a crucial role in preventing lead exposure and responding to BLLs <10 µg/dL.<sup>4</sup>

Primary prevention should start with counseling and education at prenatal and well child visits. Children between the ages of 1–3 years are at highest risk of lead poisoning due to hand to oral action during their development. Anticipatory guidance should provide information on lead exposures associated with the home, unsafe renovation practices, travel, potential occupational exposure, and exposure related to hobbies.<sup>4</sup>

For management of elevated BLLs between 5–9 µg/dL please refer to the table. For comprehensive guidelines

for all elevated BLL results see the disease guidelines on the Oregon Lead Prevention Program website ([www.healthoregon.org/lead](http://www.healthoregon.org/lead)).

**RESOURCES**

- CDC at [www.cdc.gov/nceh/lead/](http://www.cdc.gov/nceh/lead/)
- Northwest Pediatric Environmental Health Specialty Unit at 1-877-543-2436 or [www.depts.washington.edu/pehsu](http://www.depts.washington.edu/pehsu)
- Lead Line at 800-368-5060 or 503-988-4000 (Portland Metro Area)

**REFERENCES:**

1. Agency for Toxic Substances and Disease Registry. Toxicological profile for lead. Atlanta, GA: US Department of Health and Human Services, CDC, Agency for Toxic Substances and Disease Registry; 2007. Available at [www.atsdr.cdc.gov/toxprofiles/tp13.pdf](http://www.atsdr.cdc.gov/toxprofiles/tp13.pdf).
2. CDC Advisory Committee on Childhood Lead Poisoning Prevention. Recommendations of the Advisory Committee for Childhood Lead Poisoning Prevention. Atlanta, GA: US Department of Health and Human Services, CDC; 2012. Available at [www.cdc.gov/nceh/lead/ACCLPP/Final\\_Document\\_030712.pdf](http://www.cdc.gov/nceh/lead/ACCLPP/Final_Document_030712.pdf)
3. MMWR. Blood Lead Levels in Children Aged 1–5 Years — United States, 1999–2010. April 5, 2013 / 62(13);245–248. Available at [www.cdc.gov/mmwr/preview/mmwrhtml/mm6213a3.htm?cid=mm6213a3\\_e](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6213a3.htm?cid=mm6213a3_e)
4. CDC Advisory Committee on Childhood Lead Poisoning Prevention. Low-level lead exposure harms children: a renewed call for primary prevention. Atlanta, GA: US Department of Health and Human Services, CDC; 2012. Available at [www.cdc.gov/nceh/lead/acclpp/final\\_document\\_030712.pdf](http://www.cdc.gov/nceh/lead/acclpp/final_document_030712.pdf).

† This reference value is based on the 97.5th percentile of the NHANES's blood lead distribution in children. CDC will update the reference value every four years using the two most recent NHANES surveys.

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