

Childhood Lead Poisoning Prevention

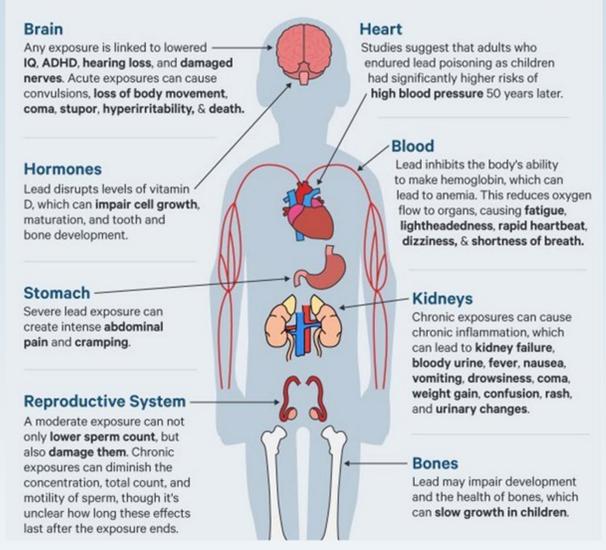
Elisabeth Long, MPH; Surveillance Epidemiologist and Lenford O'Garro, MS, RS; Toxicologist
Washington State Department of Health, Office of Environmental Public Health Sciences

HEALTH EFFECTS

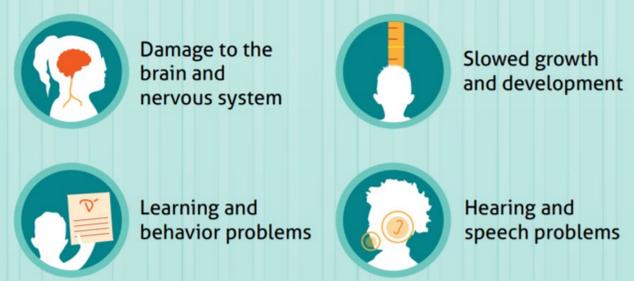
There is no known safe blood lead level. Many parts of the body can be damaged by lead. Young children are particularly vulnerable to lead because lead interferes with the developing brain.

Even low levels of lead exposure can have neurobehavioral development effects (an IQ reduction.)¹

How lead affects children's health



Exposure to lead can seriously harm a child's health.



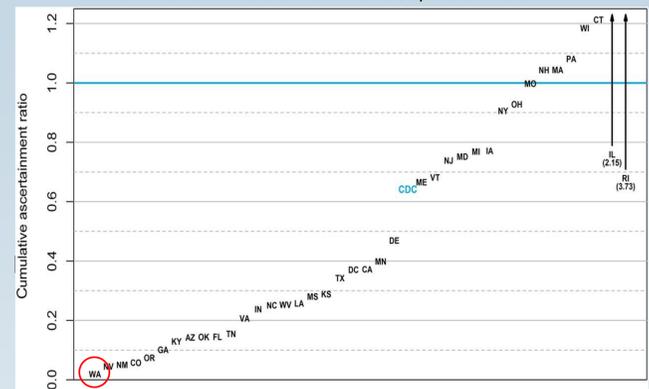
This can cause:
Lower IQ
Decreased ability to pay attention
Underperformance in school



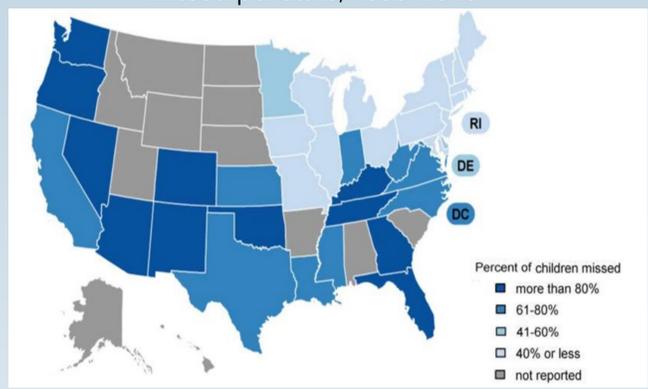
BLOOD LEAD TESTING RATES

Most lead exposure in children goes undetected due to low blood lead testing. Washington state has the greatest proportion of missed cases (89%) in the US.

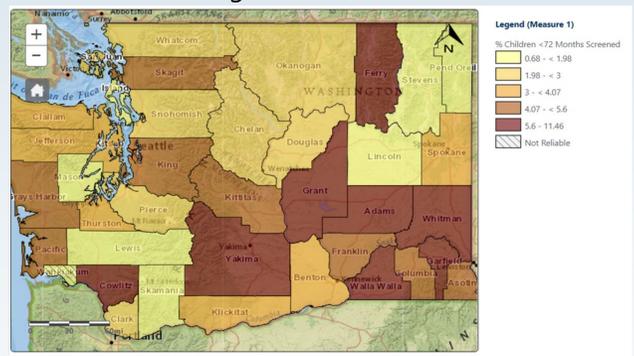
Ratios of reported-to-predicted elevated blood lead cases, 1999-2010²



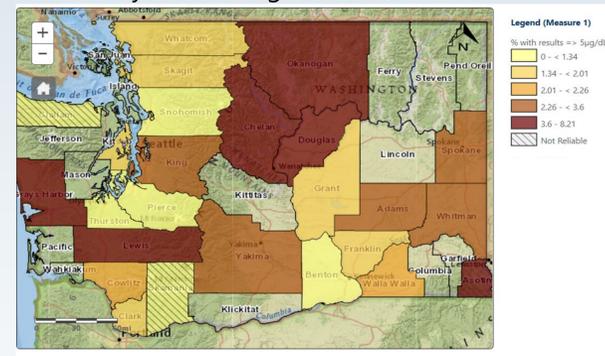
Percent of lead-poisoned children missed per state, 1999-2010²



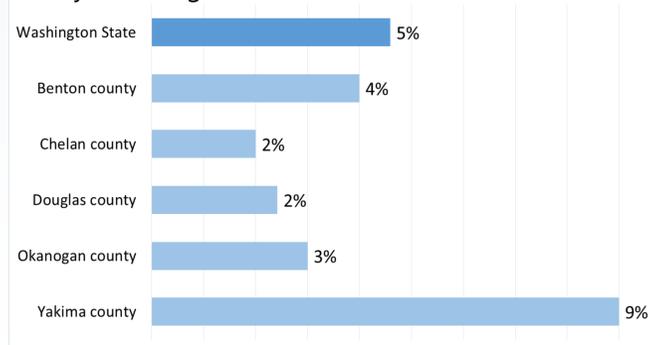
Blood lead testing rates by county in Washington State, 2014-2018



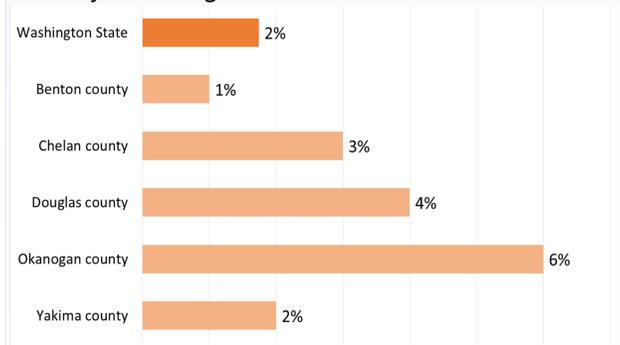
Elevated* blood lead level rates by county in Washington State, 2014-2018



Blood lead testing rates of children 3 years of age and under, 2014-2018



Elevated* blood lead level rates of children 3 years of age and under, 2014-2018



* Elevated is defined as a result $\geq 5\mu\text{g/dL}$

EXPOSURE TO LEAD IN SOIL

The most common ways people are exposed to lead in soil are through inhaling and swallowing.

- Young children often put hands, toys, pacifiers, and other things in their mouths, and these may have dirt or dust on them that can be swallowed.
- Soil on homegrown vegetables may be swallowed when the produce is eaten.
- Adults may swallow or inhale soil and dust while gardening, mowing, dusting, and doing construction work.

MODELING THE RISK

The Integrated Exposure Uptake Biokinetic (IEUBK) Model for lead in children is used to predict the risk (probability) that a typical child, under 7, exposed to specified media lead concentrations will have an elevated blood lead level.

IEUBK modeling for typical child 12-36 months of age exposed to various levels of lead concentration in soil

Lead concentration in soil	Blood lead geometric mean ($\mu\text{g/dL}$)	Predicted risk that a child will have a blood lead level $\geq 5\mu\text{g/dL}$ (%)	Predicted risk that a child will have a blood lead level $\geq 10\mu\text{g/dL}$ (%)
250 mg/kg	3.9	29.9	2.3
500 mg/kg	6.5	71.6	18.3
700 mg/kg	8.4	86.7	35.8
1000 mg/kg	10.9	95.3	57.9

1. Canfield RL, Henderson CR, Cory-Slechta DA, Cox C, Jusko TA, Lanphear BP. Intellectual impairment in children with blood lead concentrations below 10 $\mu\text{g/dL}$. *N Eng J Med*. 2003;348:1517-26.
2. Eric M. Roberts, Daniel Madrigal, Jaqueline Valle, Galatea King, Linda Kite. Assessing Child Lead Poisoning Case Ascertainment in the US, 1999-2010. *Pediatrics*, May 2017, 139 (5).