



Childhood Lead Poisoning Prevention

Office of Environmental Public Health Sciences



PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND
HEALTHIER COMMUNITY

Lead

- Soft, blue-gray heavy metal
- Occurs naturally but much of its presence in the environment stems from historic use in paint and gasoline and from industry
- The most widespread source of lead exposure for children is in lead-based paint and dust that remains in older buildings



How **lead** affects childrens' health

Brain

Any exposure is linked to lowered **IQ, ADHD, hearing loss, and damaged nerves**. Acute exposures can cause convulsions, **loss of body movement, coma, stupor, hyperirritability, & death**.

Heart

Studies suggest that adults who endured lead poisoning as children had significantly higher risks of **high blood pressure** 50 years later.

Hormones

Lead disrupts levels of vitamin D, which can **impair cell growth, maturation, and tooth and bone development**.

Blood

Lead inhibits the body's ability to make hemoglobin, which can lead to anemia. This reduces oxygen flow to organs, causing **fatigue, lightheadedness, rapid heartbeat, dizziness, & shortness of breath**.

Stomach

Severe lead exposure can create intense **abdominal pain and cramping**.

Kidneys

Chronic exposures can cause chronic inflammation, which can lead to **kidney failure, bloody urine, fever, nausea, vomiting, drowsiness, coma, weight gain, confusion, rash, and urinary changes**.

Reproductive System

A moderate exposure can not only **lower sperm count**, but also **damage them**. Chronic exposures can diminish the concentration, total count, and motility of sperm, though it's unclear how long these effects last after the exposure ends.

Bones

Lead may impair development and the health of bones, which can **slow growth in children**.

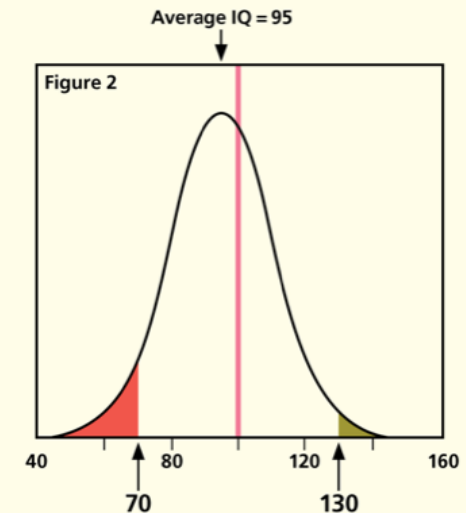
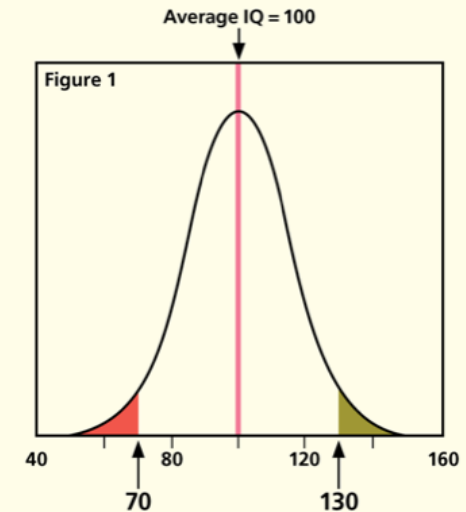
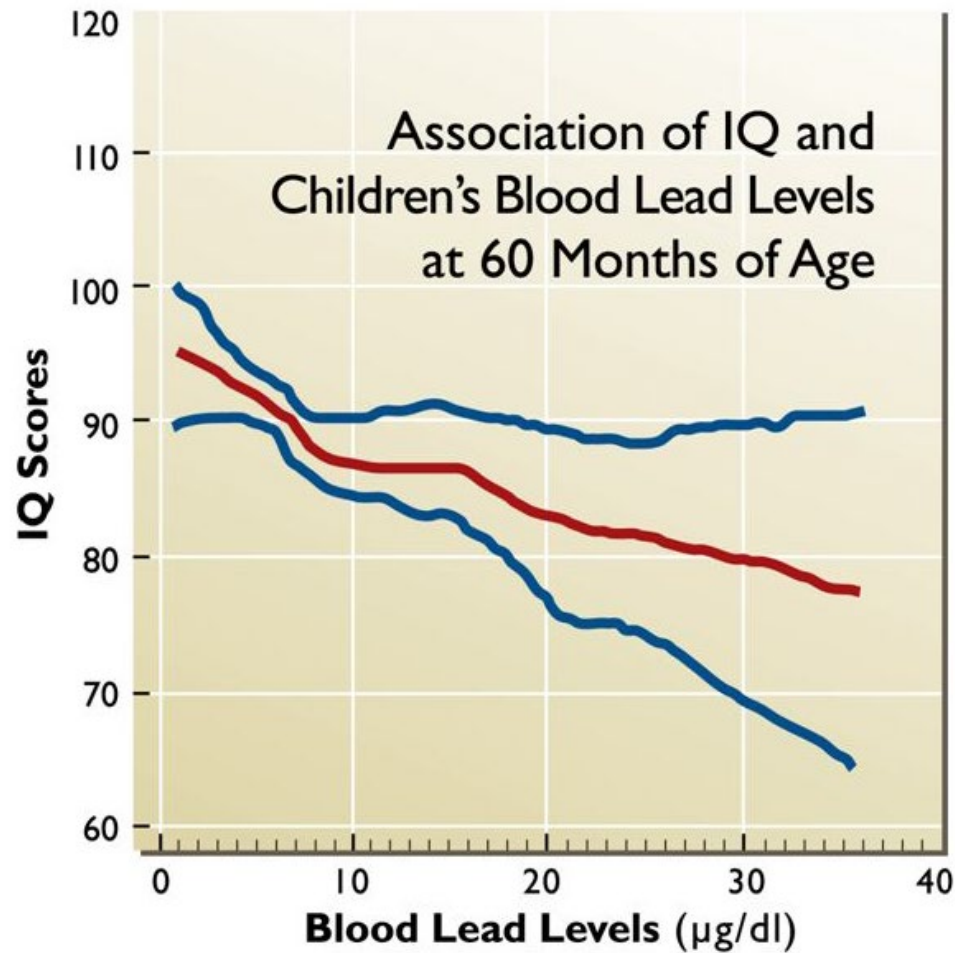


Children are the most vulnerable

Young developing children are much more sensitive to the adverse effects of lead.

- Especially harmful to developing brains and nervous systems
- Children absorb more of the lead they are exposed to
- Young children exhibit more hand-to-mouth behavior, increasing their exposure and intake
- Most often there are no symptoms

Lead toxicity



Source: Canfield R, et al. NEJM 2003;348:1517-1526

Potential sources of lead exposure



Paint in Pre-1978 Homes



Lead Dust



Soil



Drinking Water



Job Exposures



Traditional Remedies



Costume Jewelry



Recalled Toys



Imported Spices



Imported Pottery

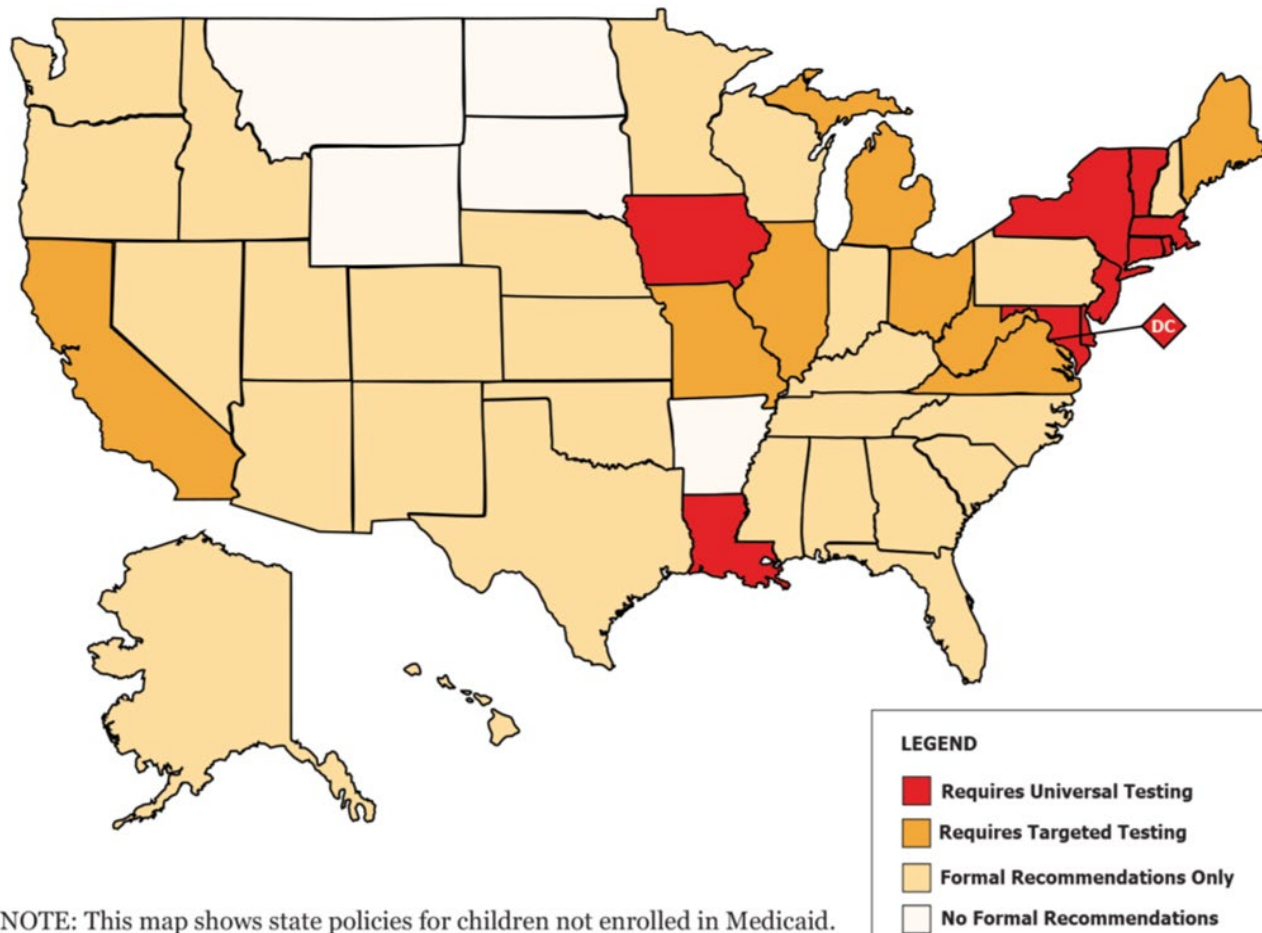


Hobbies



Hobbies

Testing practices across the U.S., 2017



Source: Safer Chemicals, Healthy Families. 2017

RECOMMENDATIONS FOR BLOOD LEAD TESTING OF CHILDREN IN WASHINGTON STATE

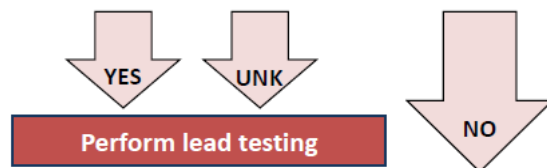
The Department of Health recommends screening children using the below algorithm at 12 and 24 months of age.

Does the child have any of the following risk factors:

- Lives in or regularly visits any house built before 1950.*
- Lives in or regularly visits any house built before 1978 that has recent or ongoing renovations or remodeling.
- From a low income family (defined as incomes <130% of the poverty level.)**
- Known to have a sibling or frequent playmate with elevated blood lead level.
- Is a recent immigrant, refugee, foreign adoptee, or child in foster care.
- Has a parent or principal caregiver who works professionally or recreationally with lead. (See sidebar for examples.)
- Uses traditional, folk, or ethnic remedies or cosmetics (such as Greta, Azarcon, Ghasard, Ba-baw-san, Sindoor or Kohl.)

* Screening may not be indicated if the home has previously undergone lead abatement or tested negative for lead after remodeling.

** Federal law mandates testing for all children covered by Medicaid.



Healthcare providers should consider testing additional children per clinical judgment, such as:

- Child whose parents have concern or request testing (including older children that have risk of exposure.)
- Child living within a kilometer of an airport or lead emitting industry or on former orchard land.
- Child with pica behavior.
- Child with neurodevelopmental disabilities or conditions such as autism, ADHD, and learning delays.

LEAD RISK EXPOSURE EXAMPLES:

Occupations and Hobbies:

- Remodeling and demolition
- Painting
- Work or visit gun range
- Mining, smelting, battery recycling
- Making lead fishing weights or ammunition
- Stained glass
- Soldering and welding

Consumer Products:

- Pottery or porcelain with lead glaze
- Informally imported foods, candies and spices
- Antique furniture and inexpensive jewelry

Healthcare providers are encouraged to use the [Department of Health's Lead Risk Index Map](https://fortress.wa.gov/doh/wtn/WTNIBL/) to better understand which areas in their community are at higher risk for lead exposure. See <https://fortress.wa.gov/doh/wtn/WTNIBL/>

Interpretation and Medical Management of Blood Lead Levels:

If blood lead level is ≥ 5 mcg/dL: See [PEHSU Recommendations on Medical Management of Childhood Lead Poisoning](#)



DOH 334-382
Sept 2018 (rev)

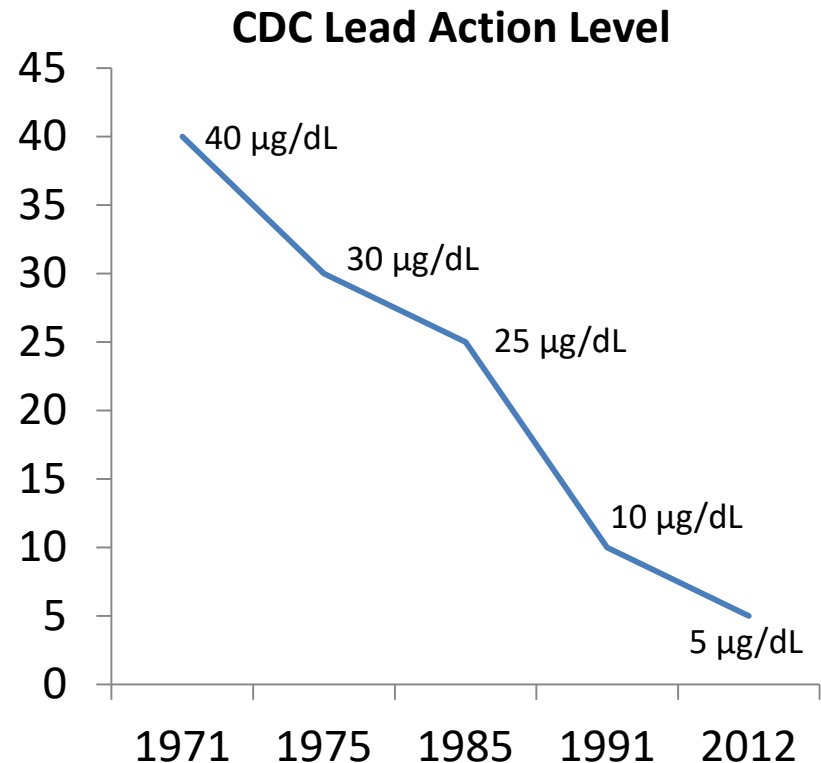
History of action levels

There is no safe level of lead in blood

In January 2012, the Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP) recommended:

- Language change from “*level of concern*” to “*reference level*”
- Reference level set at $\geq 5 \mu\text{g/dL}$ *

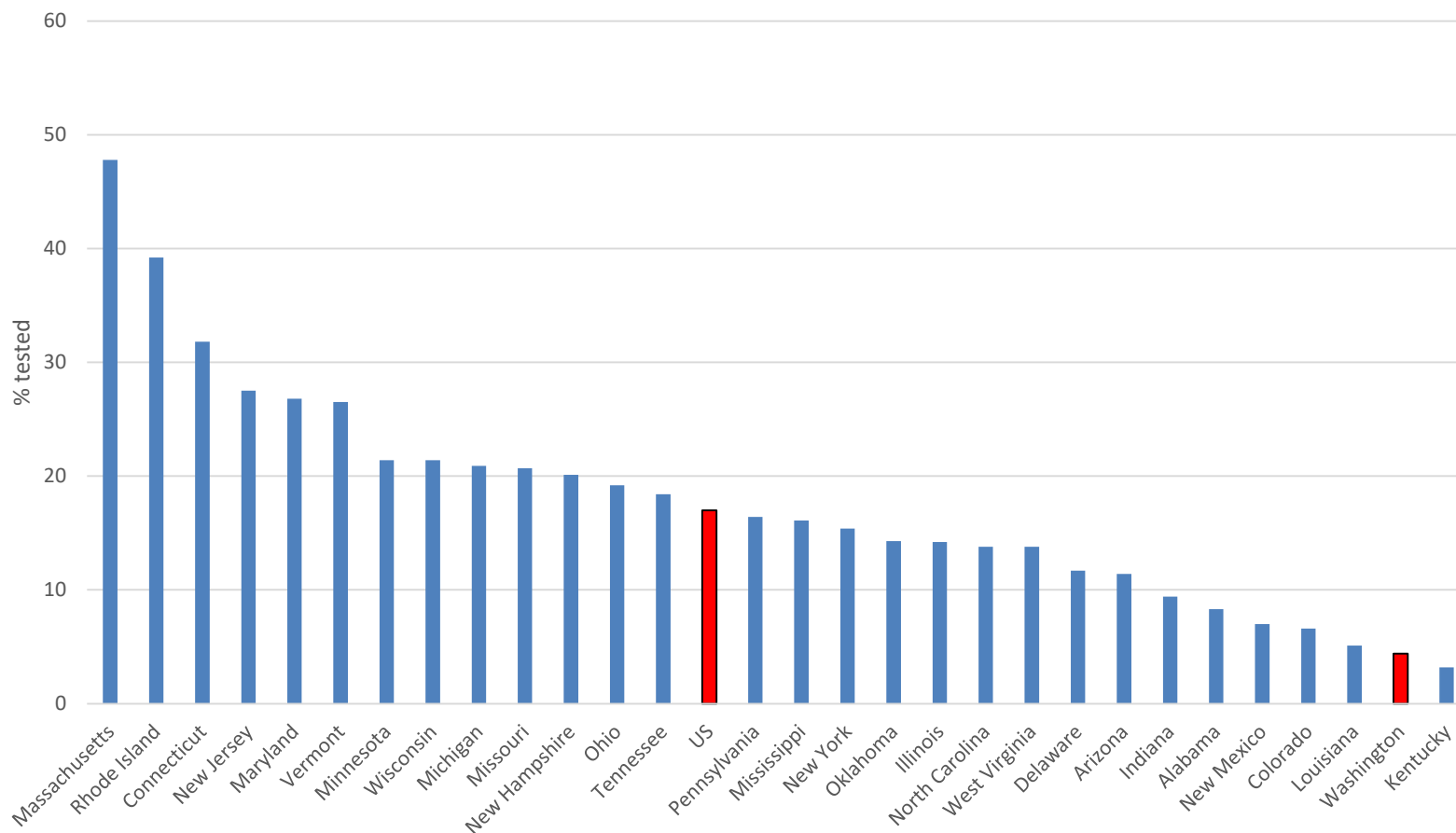
CDC adopted recommendation and WA State changed rules accordingly



* Represents the 97.5 percentile from NHANES data

Testing rates by states, 2016

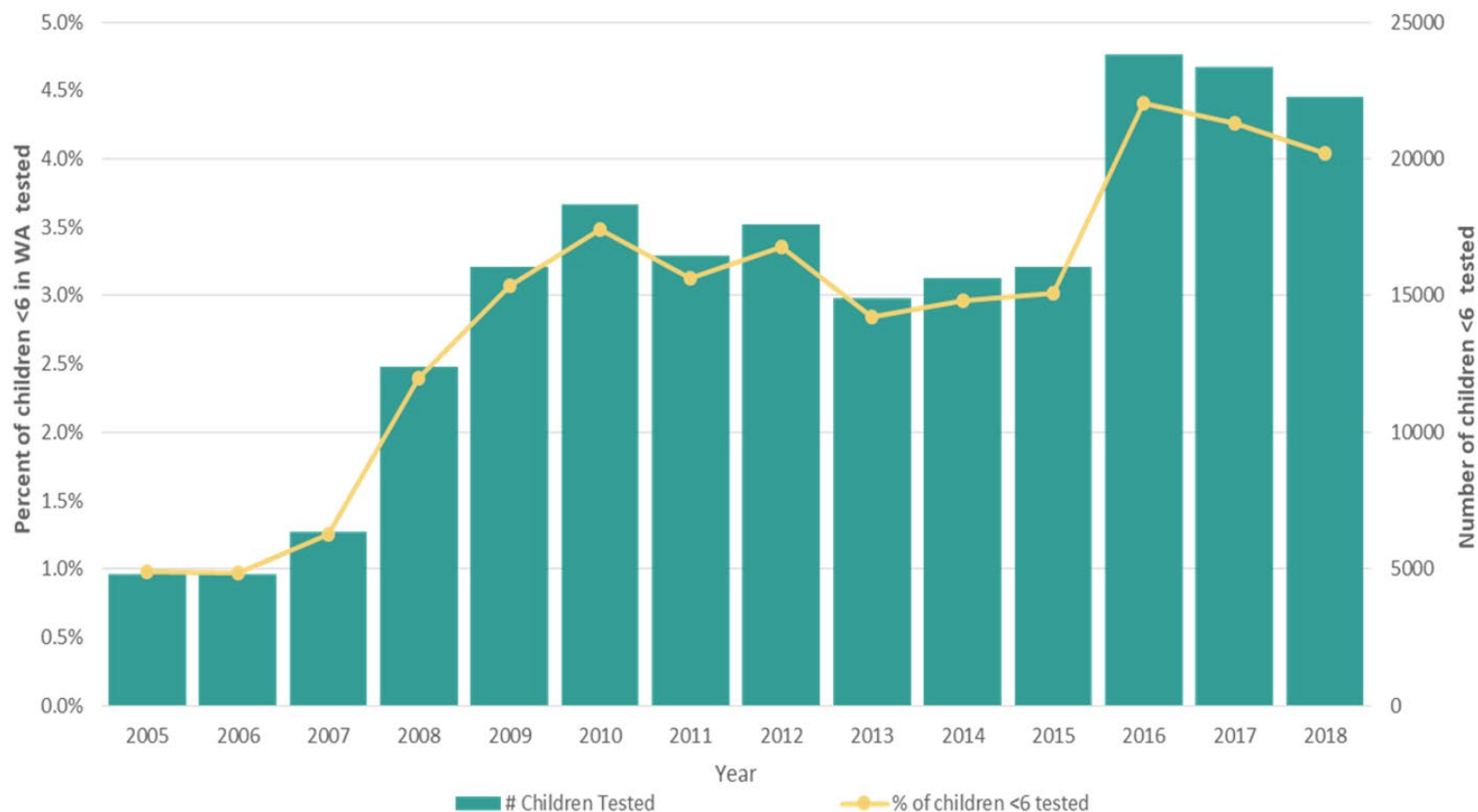
Annual Testing Rate of Children Under 72 Months of Age, 2016
in states reporting annually to CDC



Source: CDC National Childhood Blood Lead Surveillance Data
<https://www.cdc.gov/nceh/lead/data/national.htm>

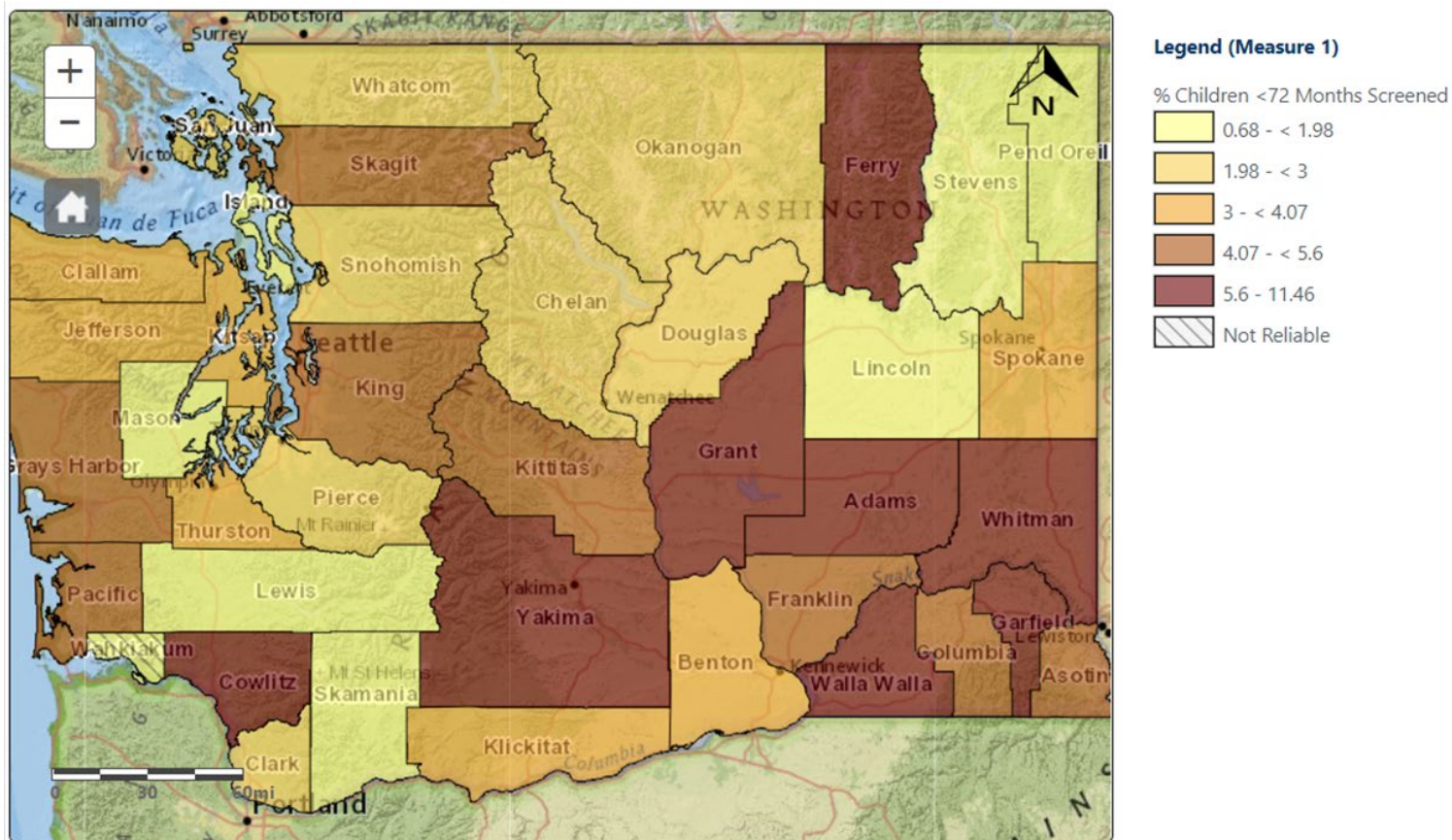
Blood lead testing rates

Blood lead testing rates of children <72 months of age in Washington



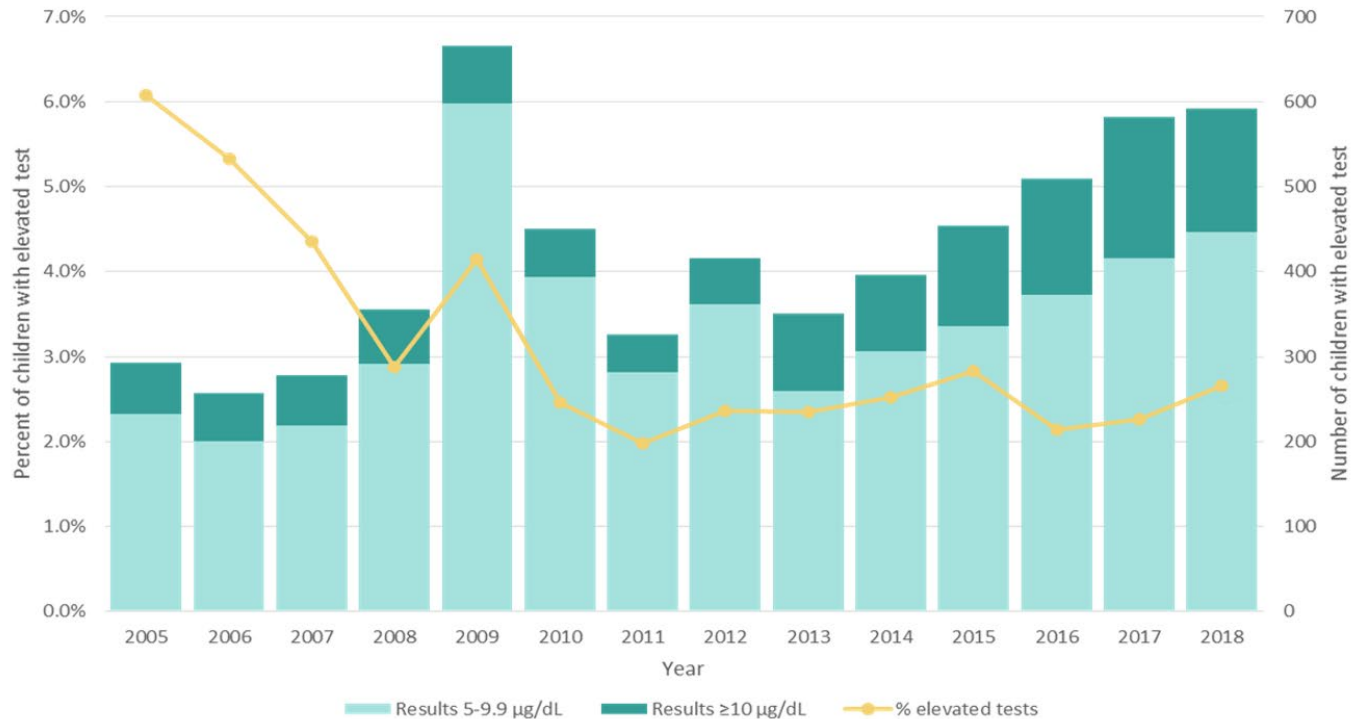
Blood lead testing rates

Blood lead testing rates by county (2014-2018)



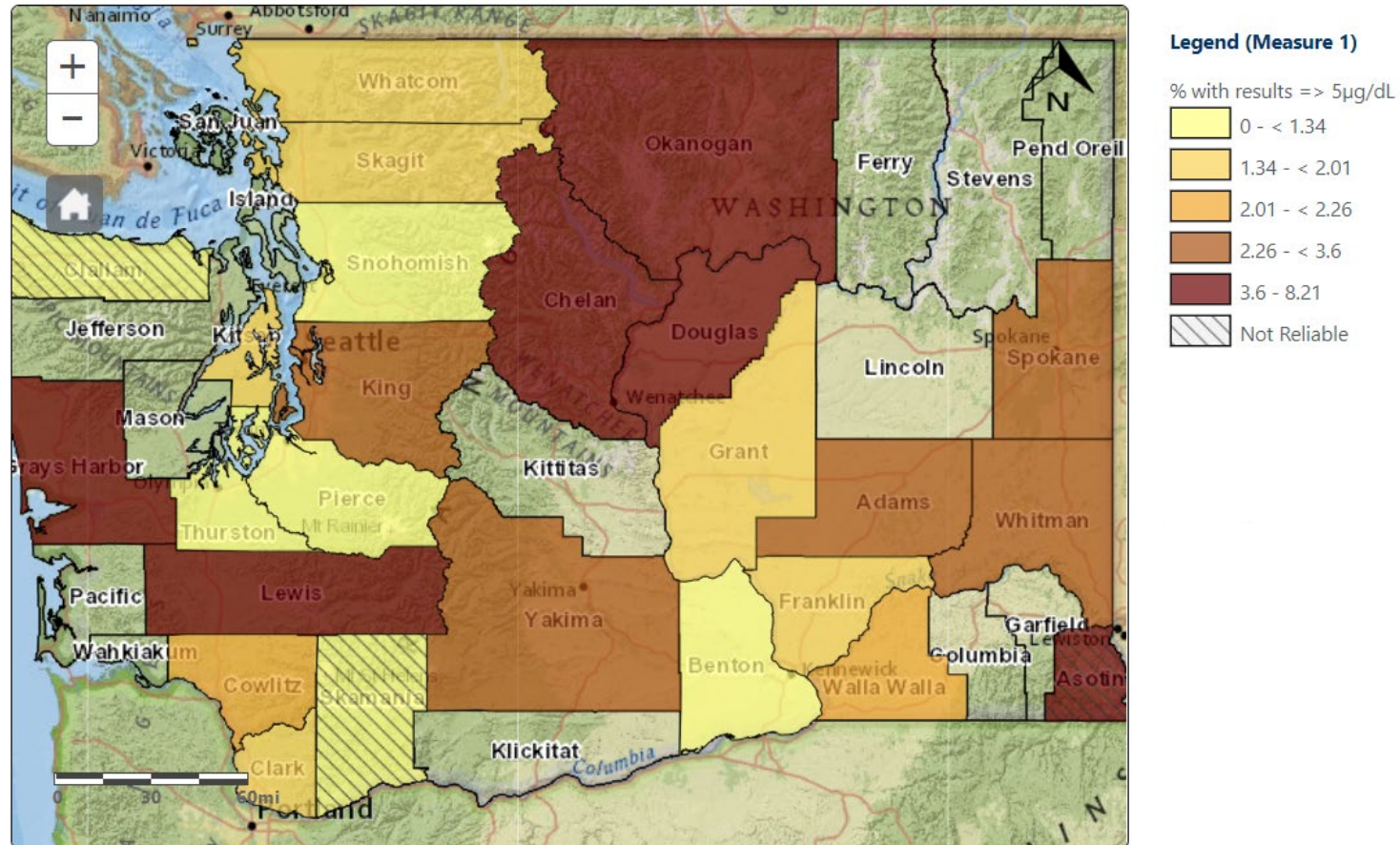
Elevated blood lead levels

Elevated blood lead level rates of children <72 months of age in Washington



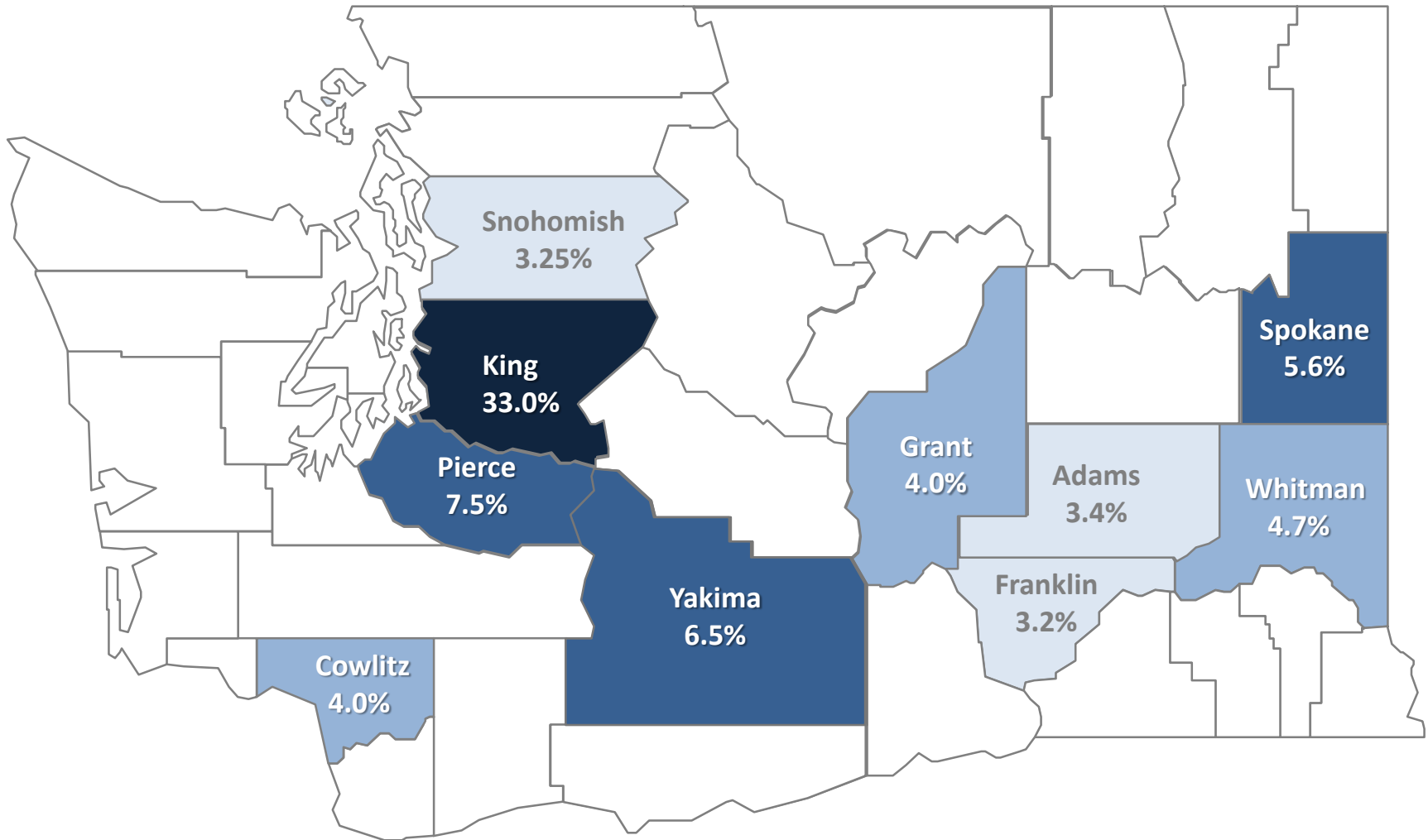
Elevated is defined as $\geq 5\mu\text{g/dL}$

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

Distribution of the percent of cases $\geq 5 \mu\text{g/dL}$ assigned to Local Health Jurisdictions in a 10 year period (2006-2015)





Prevention: Keep it clean and maintained

- Damp dust and change water frequently
- Inspect home regularly and fix chipping, flaking, peeling and deteriorated paint using lead-safe work practices
- Remove shoes before entering the house
- Take care of minor problems before they become major



Prevention: Healthy diet

- Eat regular meals
- Eat foods rich in iron, calcium and vitamin C



Effects on children

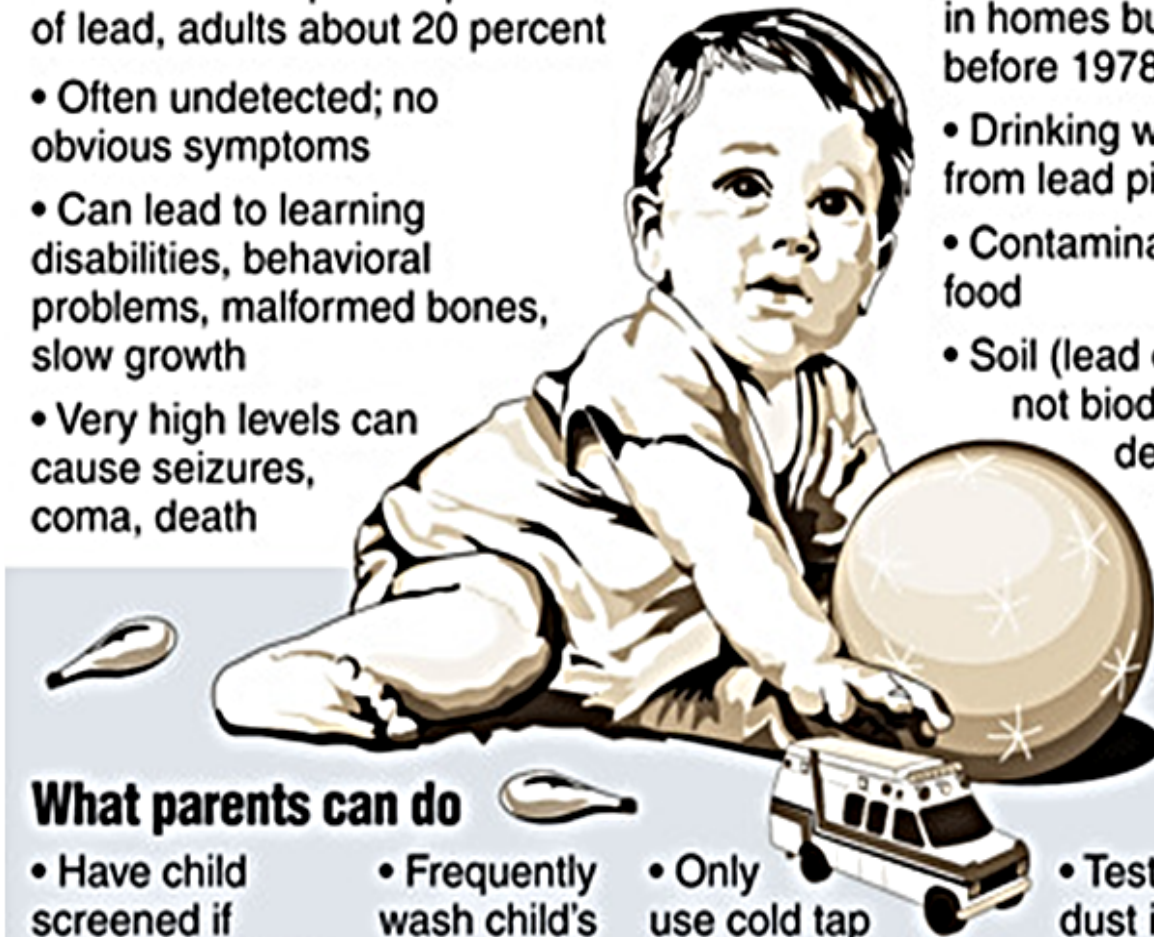
- Kids absorb up to 70 percent of lead, adults about 20 percent
- Often undetected; no obvious symptoms
- Can lead to learning disabilities, behavioral problems, malformed bones, slow growth
- Very high levels can cause seizures, coma, death

Sources

- Lead-based paint, contaminated dust in homes built before 1978
- Drinking water from lead pipes
- Contaminated food
- Soil (lead does not biodegrade, decay)
- Toys*

What parents can do

- Have child screened if there is concern of lead exposure
- Frequently wash child's hands, toys, pacifiers
- Only use cold tap water for drinking, cooking
- Test paint, dust in home if it was built before 1978



Resources

Clinical screening algorithm

<http://www.doh.wa.gov/Portals/1/Documents/Pubs/334-394.pdf>

WA lead exposure risk map

<https://fortress.wa.gov/doh/wtn/WTNIBL/>

PEHSU medical management guidelines

<http://www.pehsu.net/ChildhoodLeadExposure.html>

DOH lead website

www.doh.wa.gov/lead

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www.doh.wa.gov/lead