

# Bunker Hill Superfund Site 2019 Blood Lead Levels

Panhandle Health District  
Idaho Department of Environmental Quality  
United States Environmental Protection Agency

November 20, 2019

# **Lead Health Intervention Program (LHIP) Annual Blood Lead Surveys**

- **Public health service offered by the State**
- **Not a study or experiment**
- **Box since 1974/1985**
- **Basin since 1996**

# Panhandle Health District Lead Health Intervention Program

- **Public health service offered to those that live within the Box or the Coeur d'Alene River Basin and are between 6 months and 6 years of age.**
- **\$30.00 cash incentive for participants.**
- **Prior to blood draws, the parent/legal guardian or adult participant must sign a Consent Form and complete the appropriate Questionnaire.**

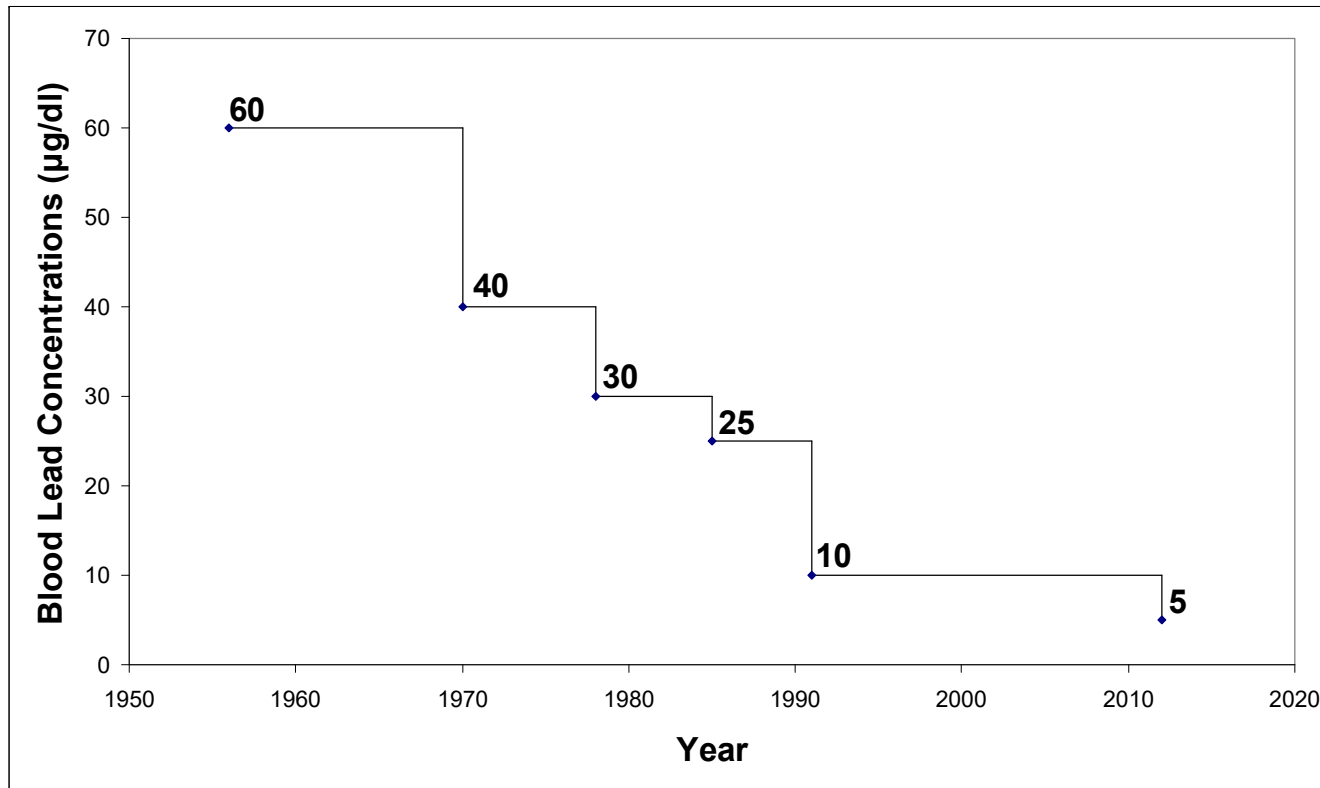
# Panhandle Health District LHIP Procedures

- **Screening blood test is done by skin puncture (capillary or fingerstick - FS)**
- **Results of capillary test are provided to the participant or parent immediately after analysis**
- **All FS results over 5  $\mu\text{g}/\text{dL}$  are followed up with a venous draw conformation test**
- **Offer consultations and follow-up with all children who test over 5  $\mu\text{g}/\text{dL}$**

“ The health effects associated with lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in the body, especially the nervous system. No safe level of lead exposure has been identified.”

– Centers for Disease Control and Prevention

# Decreasing “elevated” blood lead levels



Blood Lead Concentrations Considered to be Elevated by the Centers for Disease Control and Prevention.

\*N Engl J Med 2003; 348: p1517-26 (1950 – 1991)

\*CDC. Recommendations in “*Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention*”. (2012)

# Route of Exposure

- Ingestion – Most common exposure route. Absorption rate of 20-60% (ATSDR 2007)
- Inhalation – Almost all lead that is deposited in the lungs is absorbed into the body (ATSDR 2007)
- Blood serves as the initial receptacle of absorbed lead and essentially distributes throughout the body. Making it available to all soft tissue organs.

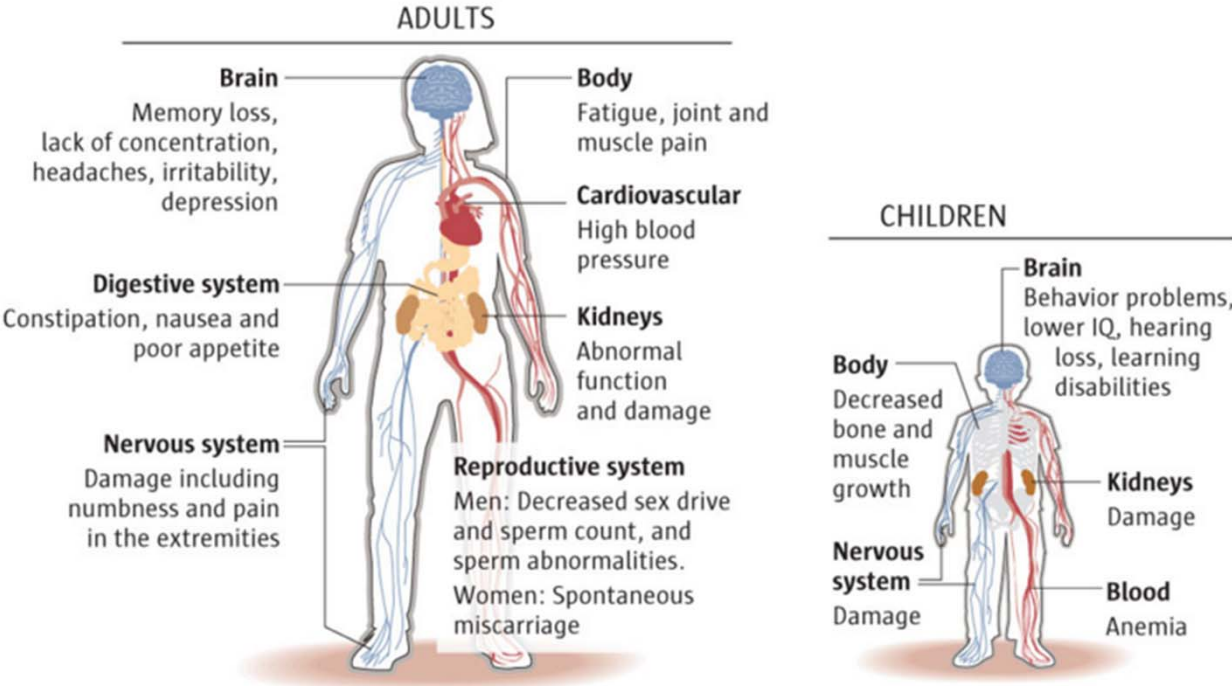
Reference: Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological profile for Lead. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

# At Risk Populations

- Children – more affected by lead due to behavior & physiology
- Pregnant women – Readily crosses the placenta adversely affecting fetus
- Adults with cumulative exposure – Generally occupational or hobby related
- Genetically pre-disposed individuals



# Health Effects



## Health Effects – Children vs. Adults

- Children suffer effects from lead exposure at much lower levels
- No safe blood lead threshold for the adverse effects of lead on infant or child neurodevelopment has been identified
- Latent effects of lead exposure during childhood for adults
- Because lead exposure often occurs with no obvious symptoms, it frequently goes unrecognized
- A blood lead test is the best tool for identifying lead exposure



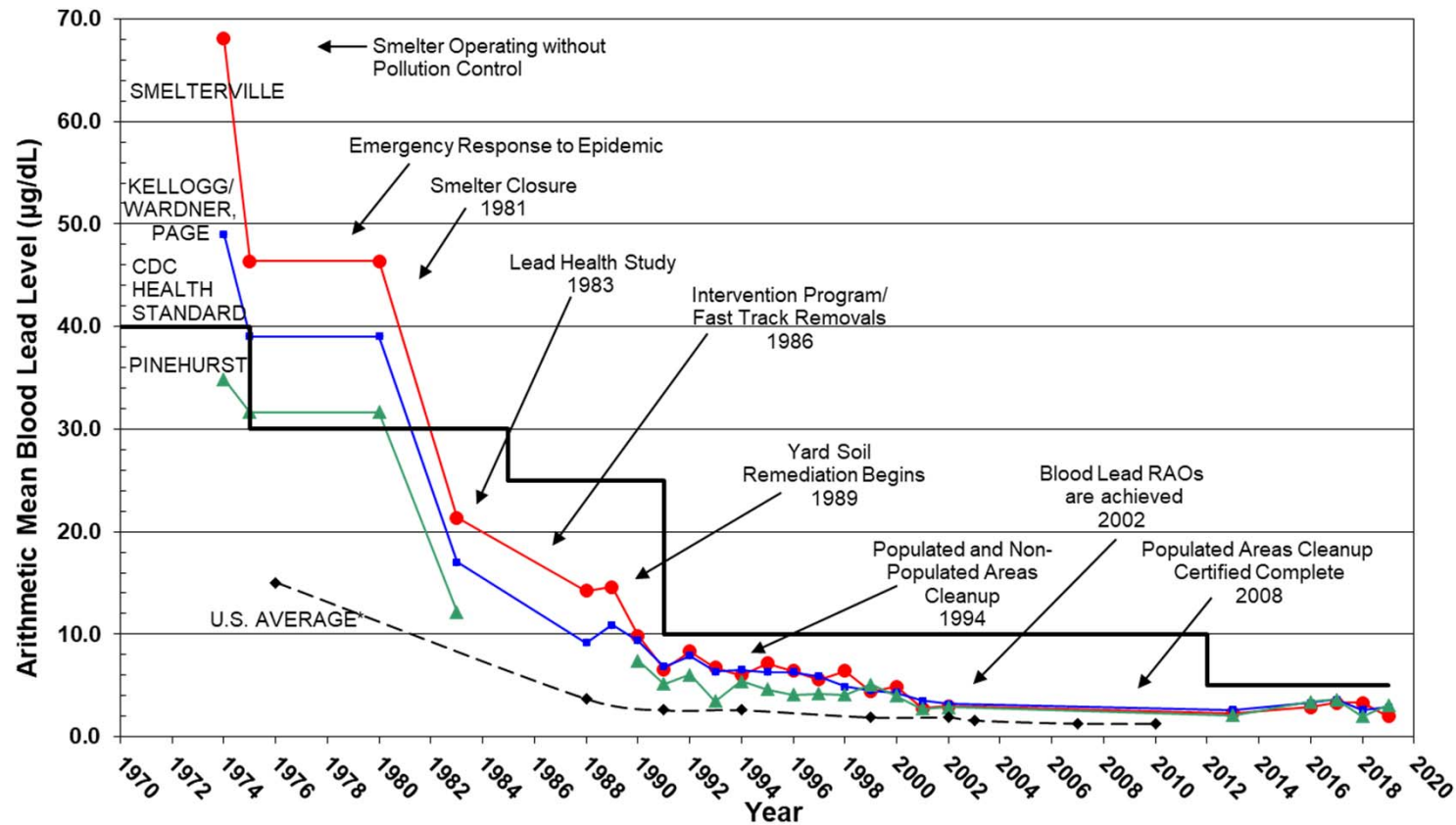
**Box**

# Box

## Remedial Action Objectives

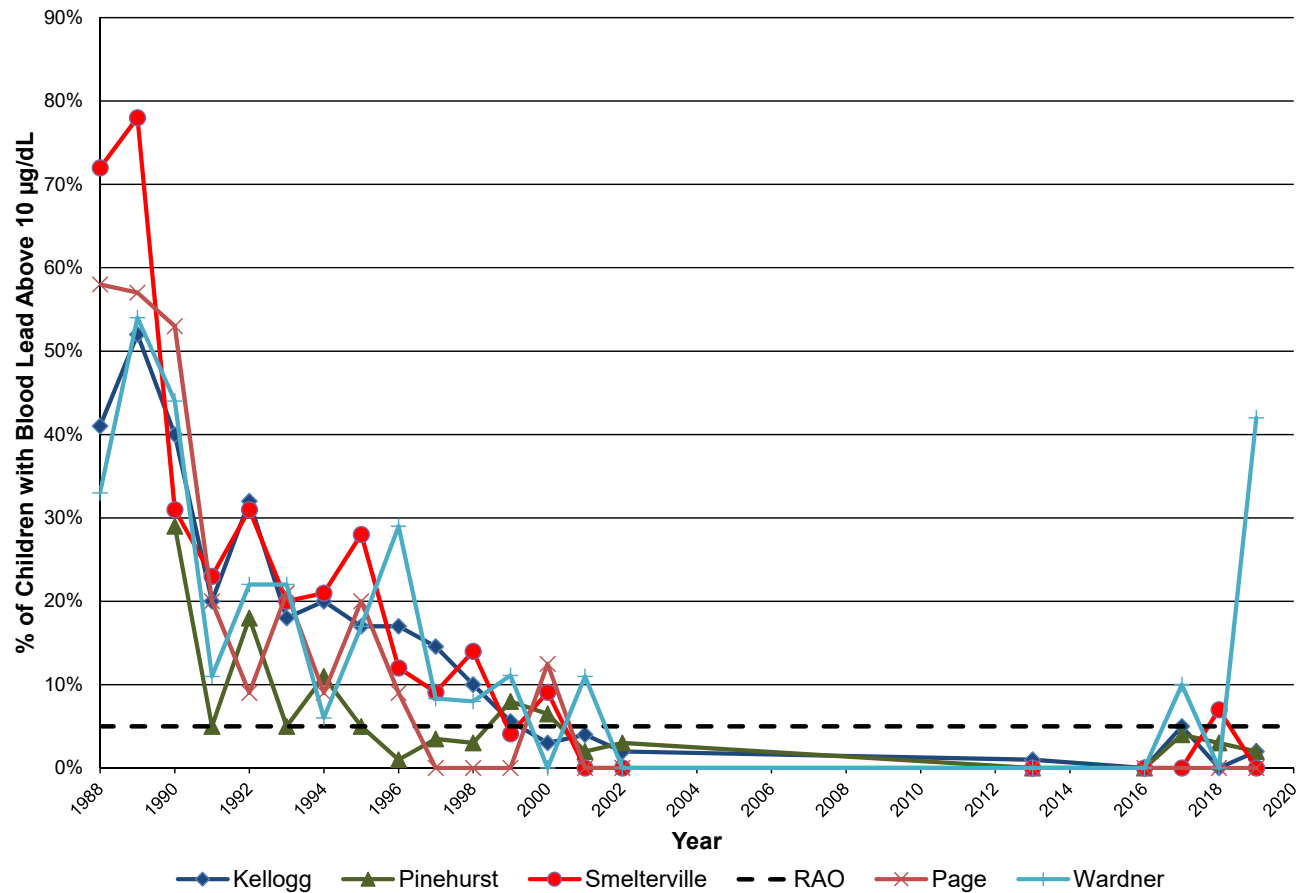
- No more than 5% of children in each community have blood lead levels  $\geq 10 \mu\text{g/dL}$
- Less than 1% with blood lead levels  $\geq 15 \mu\text{g/dL}$

# Bunker Hill Box Average Blood Lead: 1974-2019



\*Ref.=(Mahaffey et al. 1982; Pirkle et al. 1994; Pirkle et al. 1998; Lofgren et al. 2000; CDC 2013)

# Percent of Box Children with Blood Lead Levels $\geq 10$ $\mu\text{g}/\text{dL}$ by City, 1988-2019



Note: Data from 2003 through 2012, 2014, and 2015 are not displayed because there were few participants. Since 1998, there have been  $\leq 10$  participants per year from Page and Wardner.

## 2019 Blood Lead Summary Statistics: Box (age 0-6)

|                                     |     |
|-------------------------------------|-----|
| Total Number of Children (N)        | 169 |
| Minimum ( $\mu\text{g/dL}$ )        | 1.0 |
| Maximum ( $\mu\text{g/dL}$ )        | 29  |
| Average ( $\mu\text{g/dL}$ )        | 2.8 |
| Standard Deviation                  | 3.0 |
| Geometric Mean ( $\mu\text{g/dL}$ ) | 2.2 |
| Geometric Standard Deviation        | 1.8 |

|  | <b>Number</b> | <b>Percentage</b> |
|--|---------------|-------------------|
| Children's blood lead $\geq 5 \mu\text{g/dL}$  | 16            | 9%                |
| Children's blood lead $\geq 10 \mu\text{g/dL}$ | 6             | 4%                |
| Children's blood lead $\geq 15 \mu\text{g/dL}$ | 1             | 1%                |

## 2019 Blood Lead Summary Statistics: Box (other non-eligible participants\*)

|                                     |      |
|-------------------------------------|------|
| Total Number of Participants (N)    | 63   |
| Minimum ( $\mu\text{g/dL}$ )        | <1.9 |
| Maximum ( $\mu\text{g/dL}$ )        | 24.2 |
| Average ( $\mu\text{g/dL}$ )        | 2.4  |
| Standard Deviation                  | 3.3  |
| Geometric Mean ( $\mu\text{g/dL}$ ) | 1.8  |
| Geometric Standard Deviation        | 1.8  |

|  | <b>Number</b> | <b>Percentage</b> |
|--|---------------|-------------------|
| Children's blood lead $\geq 5 \mu\text{g/dL}$  | 3             | 5%                |
| Children's blood lead $\geq 10 \mu\text{g/dL}$ | 2             | 3%                |
| Children's blood lead $\geq 15 \mu\text{g/dL}$ | 1             | 2%                |

\*ages <6 months, 7-68 years, includes 3 pregnant women



A scenic landscape featuring a calm lake in the foreground, reflecting the surrounding environment. The lake is bordered by a dense forest of evergreen trees. In the background, there are several layers of mountains, with the closest ones being more detailed and the further ones appearing hazy and blue-tinted. The sky is a pale, clear blue. The word "Basin" is written in a large, bold, black sans-serif font, centered horizontally and positioned in the middle of the image.

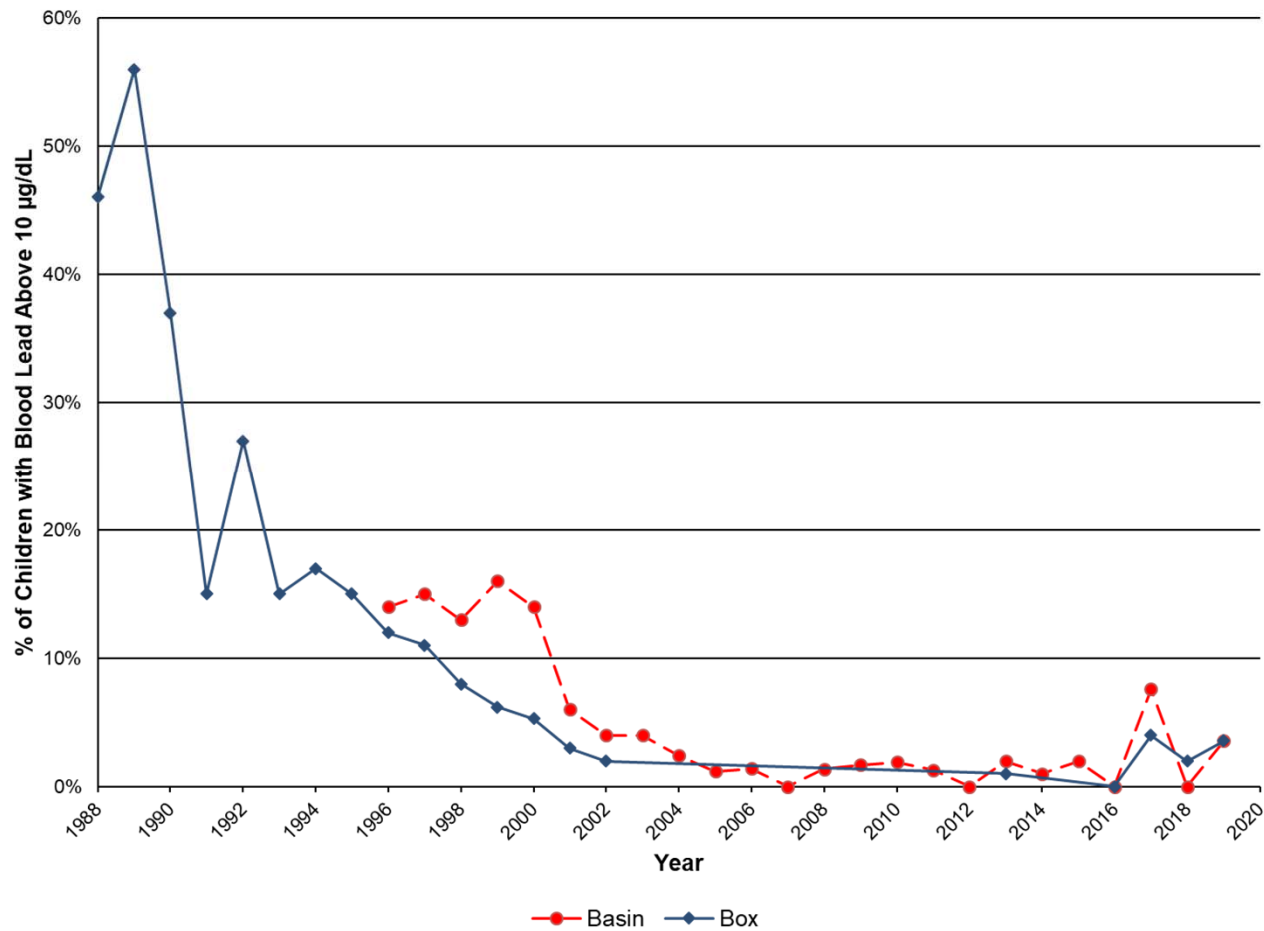
# Basin

# Basin

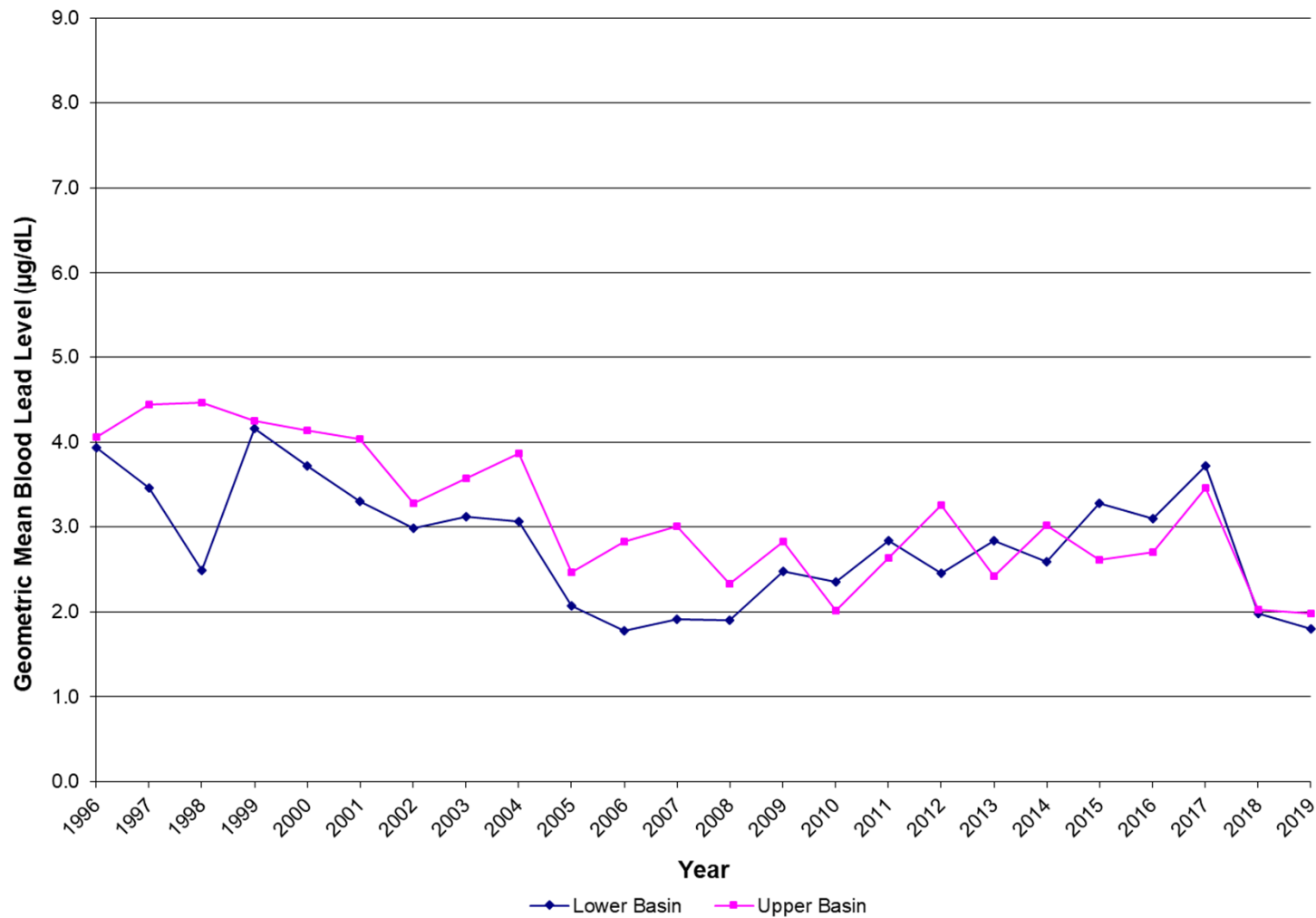
## Remedial Action Objectives

- Reduce exposures to soils with concentrations greater than risk-based levels
  - Lead:  $\geq 700$  mg/kg
  - Arsenic:  $\geq 100$  mg/kg
- Reduce exposures to lead in house dust
- Cumulative exposures do not exceed USEPA's health risk goals
  - Lead: <5% chance that a typical child at an individual residence does not exceed 10  $\mu\text{g}/\text{dL}$

# Percent of Children with Blood Lead Levels $\geq 10 \mu\text{g/dL}$ , Box and Basin, 1988-2019



# Basin Blood Lead Levels by Year, 1996-2019



# 2019 Blood Lead Summary Statistics: Basin (age 0-6)

|                                     |      |
|-------------------------------------|------|
| Total Number of Children (N)        | 84   |
| Minimum ( $\mu\text{g/dL}$ )        | <1.9 |
| Maximum ( $\mu\text{g/dL}$ )        | 14   |
| Average ( $\mu\text{g/dL}$ )        | 2.5  |
| Standard Deviation                  | 2.5  |
| Geometric Mean ( $\mu\text{g/dL}$ ) | 1.9  |
| Geometric Standard Deviation        | 1.8  |

|  | <b>Number</b> | <b>Percentage</b> |
|--|---------------|-------------------|
| Children's blood lead $\geq 5 \mu\text{g/dL}$  | 6             | 7%                |
| Children's blood lead $\geq 10 \mu\text{g/dL}$ | 3             | 4%                |
| Children's blood lead $\geq 15 \mu\text{g/dL}$ | 0             | 0%                |

## 2019 Blood Lead Summary Statistics: Basin (other non-eligible participants\*)

|                                     |      |
|-------------------------------------|------|
| Total Number (N)                    | 22   |
| Minimum ( $\mu\text{g/dL}$ )        | <1.9 |
| Maximum ( $\mu\text{g/dL}$ )        | 3.8  |
| Average ( $\mu\text{g/dL}$ )        | 1.6  |
| Standard Deviation                  | 0.6  |
| Geometric Mean ( $\mu\text{g/dL}$ ) | 1.6  |
| Geometric Standard Deviation        | 1.3  |

|                                     | <b>Number</b> | <b>Percentage</b> |
|-------------------------------------|---------------|-------------------|
| Blood lead $\geq 5 \mu\text{g/dL}$  | 0             | 0%                |
| Blood lead $\geq 10 \mu\text{g/dL}$ | 0             | 0%                |
| Blood lead $\geq 15 \mu\text{g/dL}$ | 0             | 0%                |

\*age 7 - 68 years, includes 3 pregnant women

# Participation rate

## Estimated 2018 LHIP Participation Rates

|   | Basin | Box |
|---|-------|-----|
| Estimated Eligible Population <sup>a,b</sup>                            | 493   | 330 |
| Total No. of Eligible Population Providing Samples in 2018 <sup>a</sup> | 84    | 169 |
| Estimated Percentage of Population Providing Samples                    | 17%   | 51% |

<sup>a</sup> Eligible population is from 6 months through 6 years old for both Box and Basin.

<sup>b</sup> Estimated population based on 2018 enrollment data for School Districts 392, 393, and 274 and 391. Assumes 6.5% of children are not enrolled in school (2017 Census) and an even distribution in each age group. Calculation method is explained in TerraGraphics, et al., 2001, TerraGraphics and IDEQ, 2010, and Alta 2019.

# Follow-ups Conducted

- 161 households participated, 17 with an elevated individual
- 9 In-homes and 1 phone consultation conducted
  - Identified sources:
    - Disturbed barriers
      - Work with ICP to re-establish
    - Recreating in un-remediated areas
      - Additional outreach & follow safety tips to reduce exposure
    - Occupational related
      - PHD will attempt to work with industries to provide education
  - Lead based paint
    - Conduct assessment & address if needed