Evaluating the Effectiveness of State-Level Policies and Strategies on Childhood Blood Lead Testing Rates

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Prevention

Primary prevention – the removal of lead hazards in the environment before children are exposed – is crucial to ensuring that children do not experience adverse health effects

Secondary prevention – conducting childhood blood lead testing – is vital to eliminating continued exposures and reducing adverse health effects

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Childhood Blood Lead Testing

The American Academy of Pediatrics (AAP) recommends awareness of jurisdiction-specific and professional guidance and requirements for childhood blood lead testing

A 2017 report* found that no states achieved full compliance with the Medicaid or state requirement of blood lead testing requirements

Implementing blood lead testing policies is inconsistent and not closely monitored

*Dickman J. Children at risk: Gaps in state lead screening policies. Safer Chemicals, Healthy Families. Available: saferchemicals.org_children-at-risk-report.pdf

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Background

- Providers may let inherent biases dictate which children to test and so may miss identifying a child with a high blood lead level
- There are barriers to blood lead testing at the local level
- Public health policies can be effective at encouraging providers to increase BLL testing

References:
Kemper AR, Clark SJ. Physician barriers to lead testing of Medicaid-enrolled children. *Ambul Pediatr* 2005;5(5):290-293. https://doi.org/10.1367/a05-008r.1
Keeshan B, Avener C, Abramson A, et al. Barriers to pediatric lead screening: Implications from a web-based survey of Vermont pediatricians. *Clin Pediatr* 2010; 49(7):656-663.

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Economic Benefits of Preventing Lead Exposure

- Increased lifetime earnings
- Reduced productivity losses
- Reduced tax revenue losses
- Lower incarceration and judicial system costs
- Lower special education costs

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Purpose

- Evaluate which childhood lead testing policies are associated with higher childhood blood lead testing rates

Metrics	Incentives	Managed Care Organization (MCO) guidance	Provider guidelines	Data sharing	Mandatory Reporting	Proof of testing for school enrollment

Reference: National Academy for State Health Policy (NASHP) & Maternal Child Environmental Health Collaborative Improvement Innovation Network (MCEH COIIN). State health care delivery policies promoting lead screening and treatment for children and pregnant women. Available: https://nashp.org/wp-content/uploads/2018/05/NASHP-Lead-Policy-Scan-5-21-18_updated.pdf

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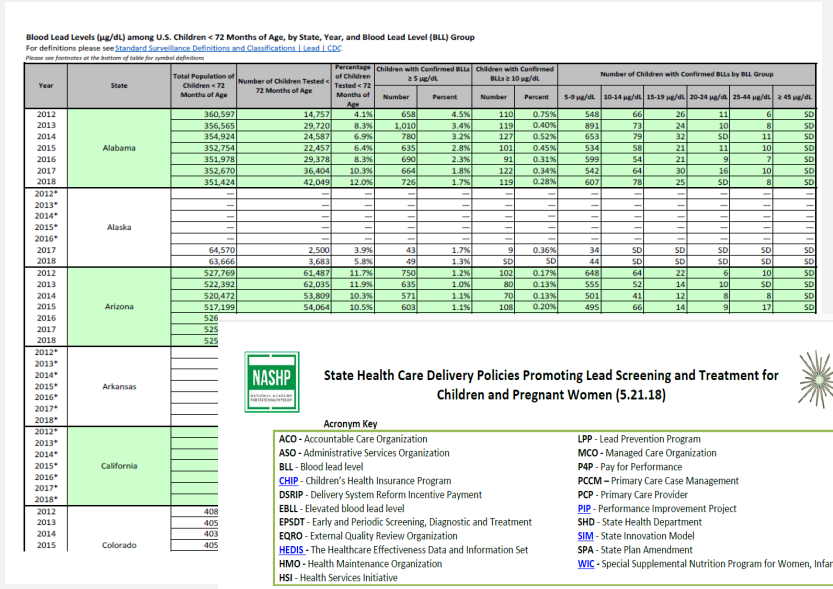
Datasets



Blood Lead Levels (µg/dL) among U.S. Children < 72 Months of Age, by State, Year, and Blood Lead Level (BLL) Group

For definitions please see Standard Surveillance Definitions and Classifications | Lead | CDC

Please see footnotes at the bottom of table for symbol definitions

Year	State	Total Population of Children < 72 Months of Age	Number of Children Tested < 72 Months of Age	Percentage of Children Tested < 72 Months of Age	Children with Confirmed BLLs ≥ 5 µg/dL		Children with Confirmed BLLs ≥ 10 µg/dL		Number of Children with Confirmed BLLs by BLL Group					
					Number	Percent	Number	Percent	5-9 µg/dL	10-14 µg/dL	15-19 µg/dL	20-24 µg/dL	25-44 µg/dL	≥ 45 µg/dL
2012	Alabama	360,597	14,757	4.1%	658	4.5%	110	0.75%	548	66	26	11	6	SD
2013		356,565	29,720	8.3%	1,010	3.4%	119	0.40%	891	73	24	10	8	SD
2014		354,924	24,587	6.9%	780	3.2%	127	0.52%	653	79	32	SD	11	SD
2015		352,754	22,457	6.4%	635	2.8%	101	0.45%	534	58	21	11	10	SD
2016		351,978	29,378	8.3%	690	2.3%	91	0.31%	599	54	21	9	7	SD
2017		352,670	36,404	10.3%	664	1.8%	122	0.34%	542	64	30	16	10	SD
2018		351,424	42,049	12.0%	726	1.7%	119	0.28%	607	78	25	SD	8	SD
2012*	Alaska	--	--	--	--	--	--	--	--	--	--	--	--	--
2013*		--	--	--	--	--	--	--	--	--	--	--	--	--
2014*		--	--	--	--	--	--	--	--	--	--	--	--	--
2015*		--	--	--	--	--	--	--	--	--	--	--	--	--
2016*		--	--	--	--	--	--	--	--	--	--	--	--	--
2017		64,570	2,500	3.9%	43	1.7%	9	0.36%	34	SD	SD	SD	SD	SD
2018		63,666	3,683	5.8%	49	1.3%	SD	SD	44	SD	SD	SD	SD	SD
2012	Arizona	527,769	61,487	11.7%	750	1.2%	102	0.17%	648	64	22	6	10	SD
2013		522,392	62,035	11.9%	635	1.0%	80	0.13%	555	52	14	10	SD	SD
2014		520,472	53,809	10.3%	571	1.1%	70	0.13%	501	41	12	8	8	SD
2015		517,199	54,064	10.5%	603	1.1%	108	0.20%	495	66	14	9	17	SD
2016		526												
2017		525												
2018		525												
2012*	Arkansas													
2013*														
2014*														
2015*														
2016*														
2017*														
2018*														
2012*	California													
2013*														
2014*														
2015*														
2016*														
2017*														
2018*														
2012	Colorado	408												
2013		405												
2014		403												
2015		405												

State Health Care Delivery Policies Promoting Lead Screening and Treatment for Children and Pregnant Women (5.21.18)

Maternal Child Environmental Health — Collaborative Improvement & Innovation Network

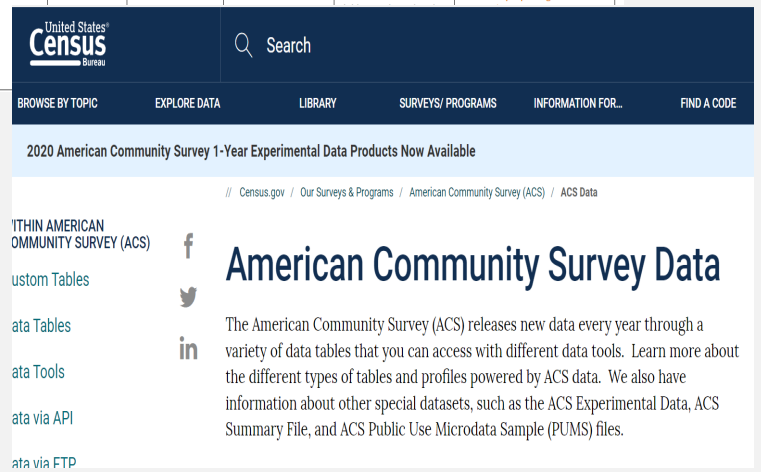
Acronym Key

ACO - Accountable Care Organization
ASO - Administrative Services Organization
BLL - Blood lead level
CHIP - Children's Health Insurance Program
DSRIP - Delivery System Reform Incentive Payment
EBLL - Elevated blood lead level
EPSDT - Early and Periodic Screening, Diagnostic and Treatment
EQRO - External Quality Review Organization
HEDIS - The Healthcare Effectiveness Data and Information Set
HMO - Health Maintenance Organization
HSI - Health Services Initiative
LPP - Lead Prevention Program
MCO - Managed Care Organization
P4P - Pay for Performance
PCCM – Primary Care Case Management
PCP - Primary Care Provider
PIP - Performance Improvement Project
SHD - State Health Department
SIM - State Innovation Model
SPA - State Plan Amendment
WIC - Special Supplemental Nutrition Program for Women, Infants, and Children

The Centers for Medicare & Medicaid Services require blood lead tests for all children with Medicaid coverage at ages 12 months and 24 months. In addition, any child between ages 24 and 72 months with no record of a previous blood lead test must receive one.

Information not specific to Medicaid or CHIP is identified in orange.

State	Metrics	Incentives	Other MCO Guidance or Requirements	Medicaid/CHIP Eligibility and Coverage for Abatement	Provider Guidelines in Addition to Federal Medicaid Requirements	Other: Non-Medicaid Except When Noted (e.g., lead registry, reporting requirements, home assessment)
Alabama					Risk assessment for	-Mandatory reporting of blood lead



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American Community Survey Data

The American Community Survey (ACS) releases new data every year through a variety of data tables that you can access with different data tools. Learn more about the different types of tables and profiles powered by ACS data. We also have information about other special datasets, such as the ACS Experimental Data, ACS Summary File, and ACS Public Use Microdata Sample (PUMS) files.

References: Childhood lead poisoning prevention state and local programs. https://www.cdc.gov/nceh/lead/programs/default.htm; State health care delivery policies promoting lead screening and treatment for children and pregnant women https://nashp.org/wp-content/uploads/2018/05/NASHP-Lead-Policy-Scan-5-21-18_updated.pdf; Explore census data. https://data.census.gov/cedsci/

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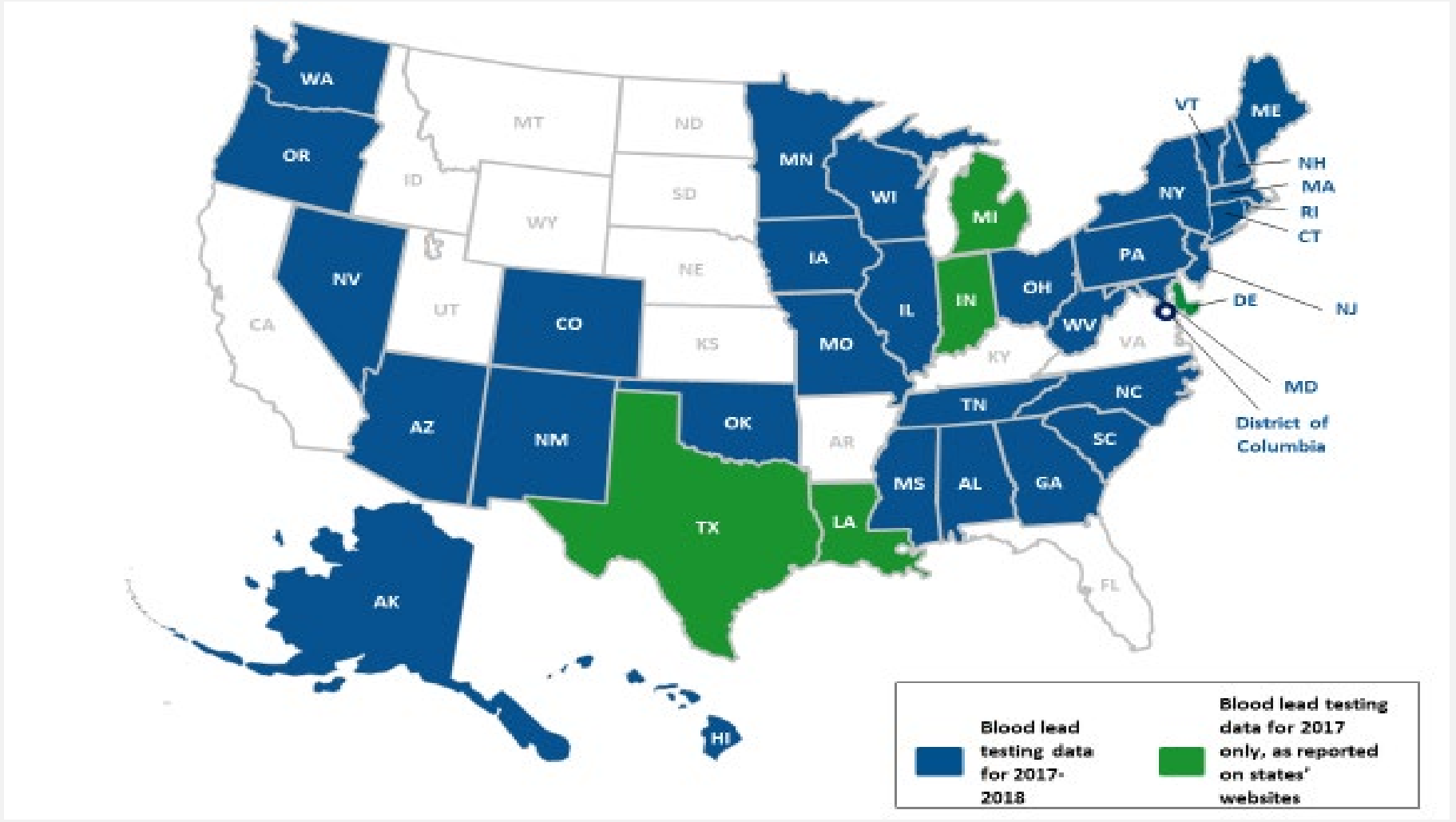
States Included in the Analysis



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Data Analysis

Lead testing rates modeled as a continuous dependent variable

Linear regression

Assessed collinearity

Confounding was evaluated

Fully adjusted models

Descriptive Statistics

Variable*	Range	Average
Percent of children <6 years of age tested for BLLs	0.04-0.48%	0.17%
Percent African American/Black	1.8-47.5%	9.4%
Percent persons ages ≥25 years with at least a high school diploma	84.4-93.1%	89.9%
Percent <6 years of age with Medicaid coverage	33.8-62.2%	42.2%
Percent living in housing built before 1980	24.0-77.3%	54.6%
Percent foreign-born	1.6-22.9%	8.7%

*2017 US Census; 33 states analyzed

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Unadjusted Associations Between State Policies and Proportion of Children Tested for Blood Lead Levels (BLLs) within the 33 States in 2017-2018

Policy	Regression coefficient	95% Confidence Intervals	P-value
Proof of testing required for school enrollment	0.12	0.01, 0.23	0.03
Other MCO guidance	0.10	0.01, 0.18	0.03
Metrics	0.07	0.00, 0.21	0.06
Provider guidelines	0.06	-0.07, 0.19	0.34
Incentives	0.05	0.00, 0.13	0.18
Data sharing between Medicaid and other state agencies	0.04	-0.06, 0.15	0.40
Mandatory reporting to state health departments	0.03	-0.03, 0.12	0.22

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Adjusted Associations Between State Policies and Proportion of Children Tested for BLLs within the 33 States in 2017-2018

Policy	Regression coefficient	95% Confidence Intervals	P-value
Proof of testing required for school enrollment	0.01	-0.08, 0.10	0.84
Other MCO guidance	0.04	-0.03, 0.11	0.28
Metrics	0.06	0.01, 0.11	0.01
Provider guidelines	0.02	-0.07, 0.11	0.69
Incentives	0.02	-0.03, 0.07	0.47
Data sharing between Medicaid and other state agencies	0.00	-0.07, 0.08	0.93
Mandatory reporting to state health departments	0.04	-0.01, 0.09	0.08

*adjusted for age of housing, population <6 years of age with Medicaid coverage, and foreign-born

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Policies Associated with Higher Childhood Blood Lead Testing Rates

- Proof of testing for school enrollment
- Metrics
- Other MCO guidance

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CDC Efforts to Improve Testing

- Epidemiology/surveillance activities
- Communication & Outreach
- Partnerships
- Lead Exposure Risk Index (LERI)

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Thanks!

To all of you, to our colleagues across NCEH/ATSDR, and to everyone in the fight against childhood lead exposure.

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Discussion

- What can CDC do to encourage increased testing among providers?
- What can CDC do to address barriers to testing?
- How should CDC promote results of this analysis?

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For more information:

CDC's Childhood Lead Poisoning Prevention Program

https://www.cdc.gov/nceh/lead/

For more information, contact NCEH/ATSDR
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