



Cost-Benefit Analyses of Policies to Prevent & Remediate Childhood Lead Exposure

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Presentation Plan



- ▲ Introductions
- ▲ National-Level Analyses (published August 2017)
- ▲ State and City Analyses (ongoing project)
- ▲ Questions and Discussion

Introductions



▲ Altarum Institute

- Health-focused research and consulting institute, headquartered in Ann Arbor, Michigan
- Aim is to advance health for vulnerable and publicly-insured populations through research, analytics, technology solutions, and program implementation

▲ Corwin (Corey) Rhyan, MPP

- Senior Analyst, Center for Value in Health Care

▲ George Miller, PhD

- Senior Fellow and Research Team Leader, Center for Value in Health Care

National Policy Analyses



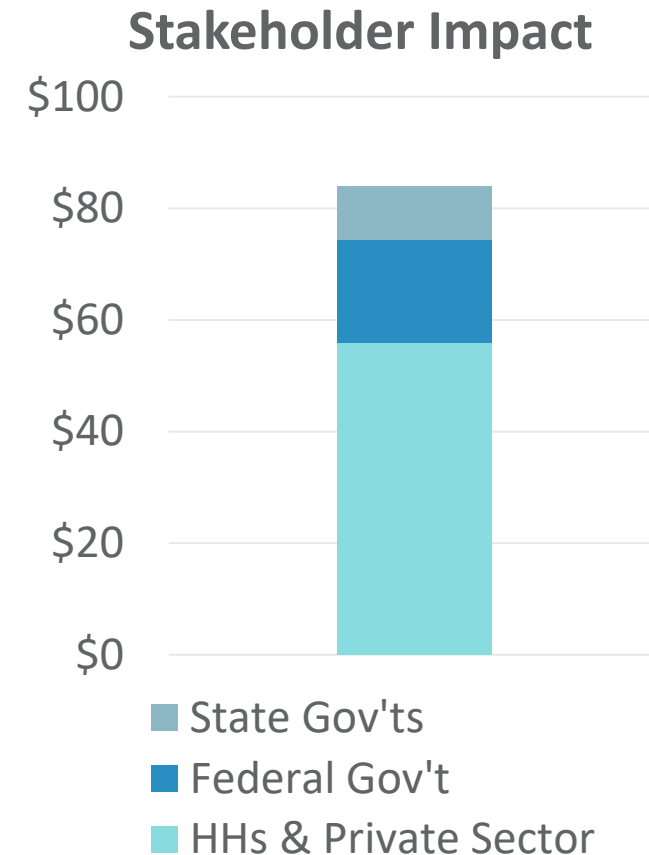
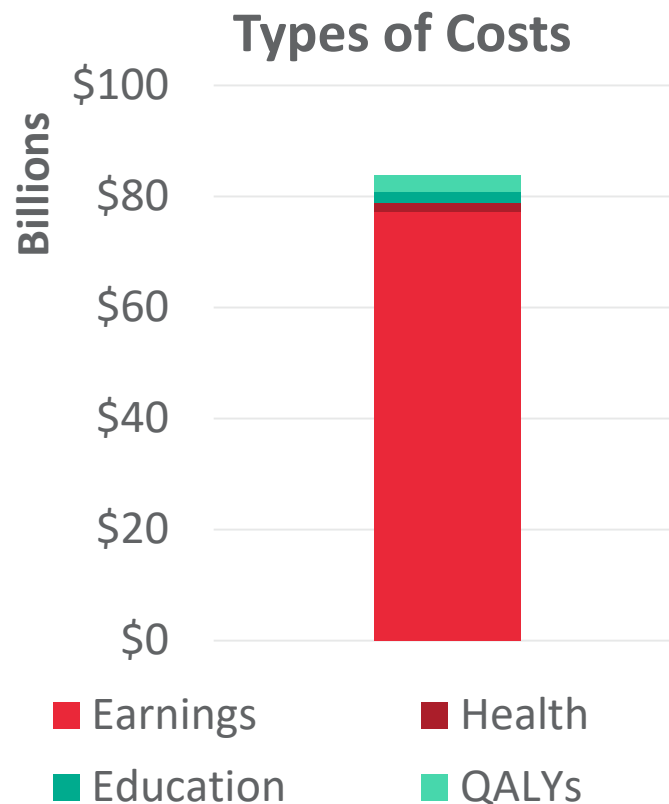
▲ Partnership of:

- Robert Wood Johnson Foundation
- The Pew Charitable Trusts
- Health Impact Project
- Child Trends
- Altarum Institute
- Urban Institute
- Trust for America's Health
- National Center for Healthy Housing
- External Experts and Reviewers

National Policy Analyses - Results



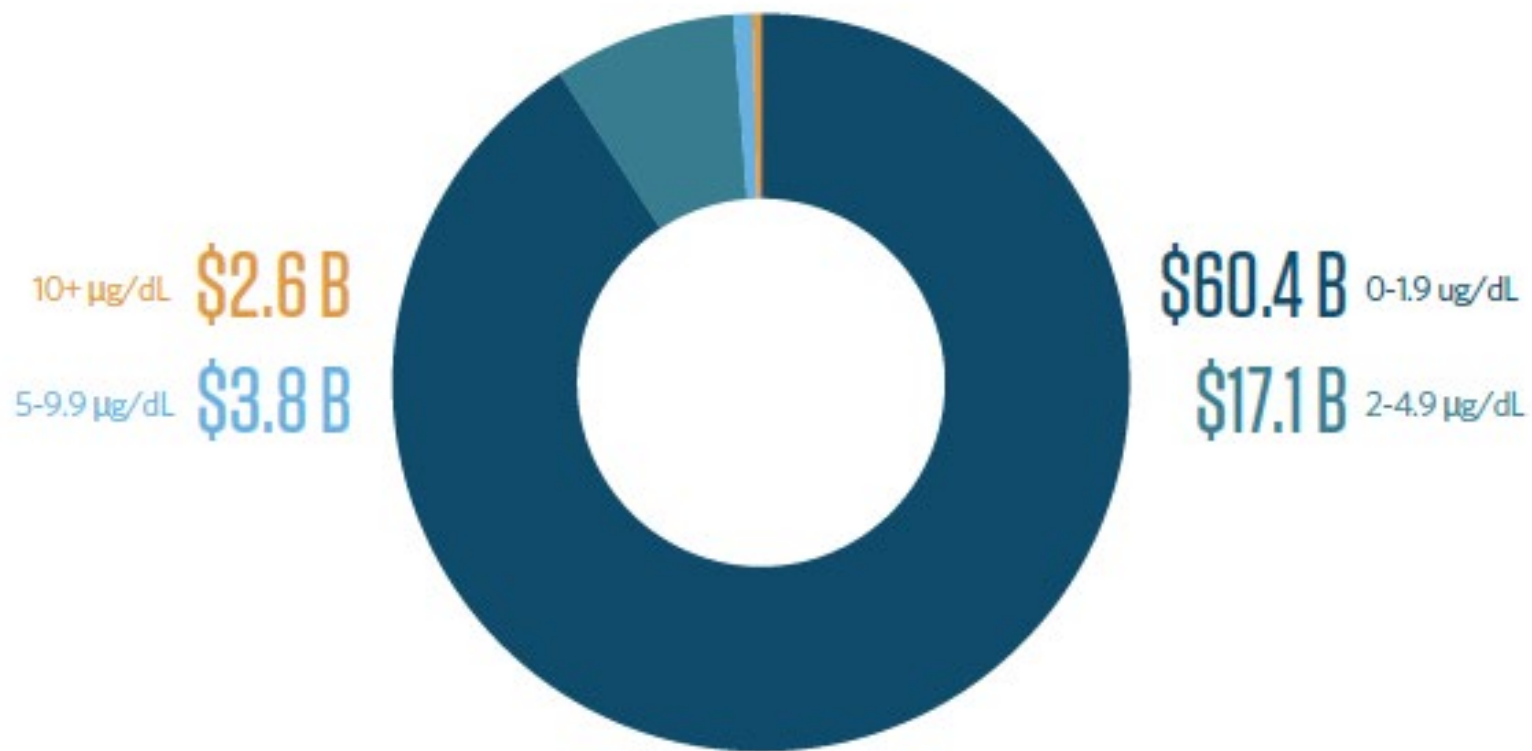
- ▲ Estimated Economic Impact of Lead Exposure for Children born in 2018:
 - \$84.0 billion dollars



National Policy Analyses - Results



- ▲ Estimated Economic Impact of Lead Exposure for Children born in 2018:
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National Policy Analyses – Results



- ▲ Policy #1: Residential Lead Service Line Replacement
 - *Protect 350,000 children and yield \$2.7B in benefits (\$1.33 per dollar invested)*
- ▲ Policy #2: Residential Lead Hazard Control
 - *Protect 311,000 children and yield \$2.8B in benefits (\$1.39 per dollar invested)*
- ▲ Policy #3: Enforcement of the federal lead-safe renovation, repair, and painting rules
 - *Protect 211,000 children and yield \$4.5B in benefits (\$3.10 per dollar invested)*
- ▲ Policy #4: Eliminating lead from all airplane fuel
 - *Protect 226,000 children and generate \$262 million in future benefits*

National Policy Analyses – Results



▲ Modeling Choices

- Focused on primary prevention of lead exposure
- Limited interventions to a single-year birth cohort (2018)
- Benefits limited to initial child and future residents for ten years
- Policy “costs” limited to intervention costs
- Multiple model runs for different assumptions
 - Scale of the intervention
 - Lead Exposure assumptions

Lead Service Line Replacement – Results



Table 3

Every Dollar Invested in Full Lead Service Line Replacement Would Generate \$.42 to \$1.33 in Benefits

Cost-benefit analysis, for two initial water lead levels

Gross future benefits	Initial cohort	Earnings	\$2.0 billion	\$640 million
		Health savings	\$40 million	\$10 million
		Education savings	\$50 million	\$20 million
		Quality-adjusted life years benefits	\$80 million	\$30 million
	Future cohorts (through year 10)	\$550 million	\$170 million	
	Total gross future benefits	\$2.7 billion	\$860 million	
	Share to federal government	\$480 million	\$150 million	
	Share to state and local governments	\$250 million	\$80 million	
Share to households, the private sector, and other nongovernmental entities	\$2.0 billion	\$630 million		

Lead Service Line Replacement – Results



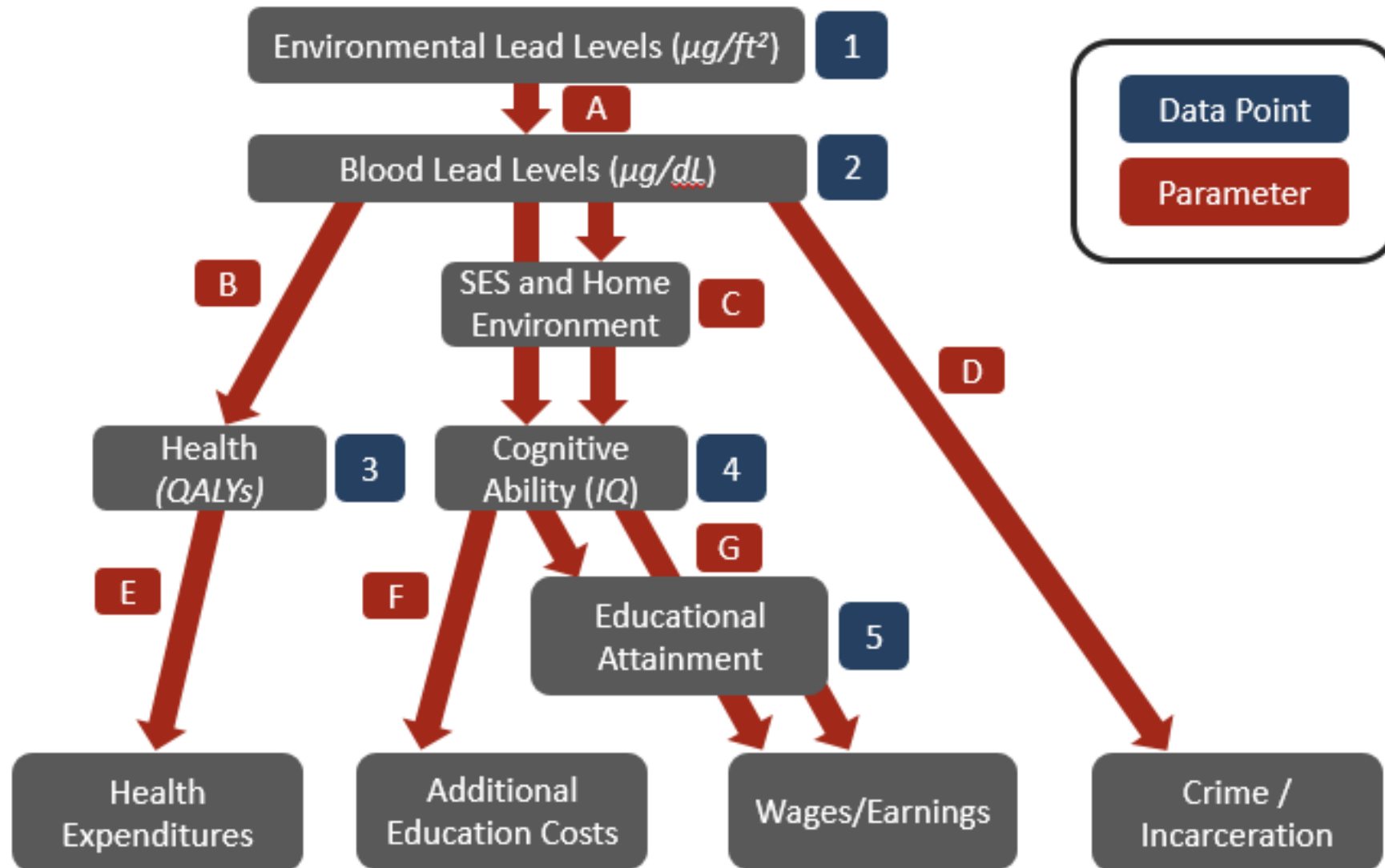
Table 3

Every Dollar Invested in Full Lead Service Line Replacement Would Generate \$.42 to \$1.33 in Benefits

Cost-benefit analysis, for two initial water lead levels

Costs	Testing cost per potential lead service line	\$175	
	Total testing cost	\$410 million	
	Full lead service line replacement cost per home	\$6,000	
	Full lead service line replacement cost for all homes	\$1.6 billion	
	Total costs	\$2.0 billion	
Net	Net future benefits	\$680 million	-\$1.2 billion
	Cost-benefit ratio	1.33	0.42

National Analyses - Methods



Key Model Inputs



- ▲ Lead Exposure Risk Predictors
 - Housing Stock Age
 - Lead Service Line Count Estimates
 - Water and Dust Lead Concentrations
 - Lead Exposure Health and IQ Impacts
- ▲ Population Characteristics
 - Baseline Blood Lead Levels
 - Earnings, Health Care Insurance/Costs
- ▲ Policy Data
 - Intervention Effectiveness Data
 - Intervention Cost Data

Typical Data Sources

- ▲ National Estimates
 - National Surveys and Statistics
- ▲ State Estimates
 - State Data and Imputation
- ▲ City Estimates
 - City-Specific Data

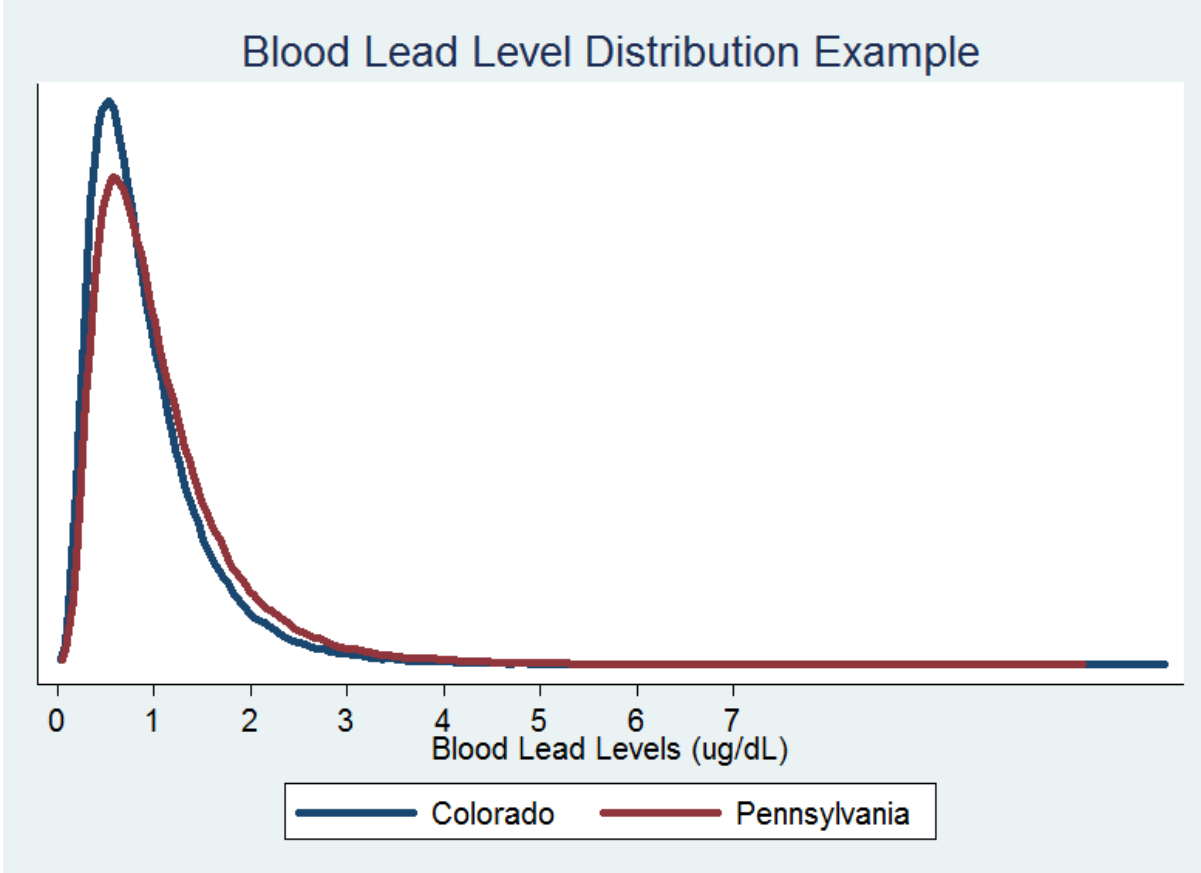
State-Level Estimates



▲ Imputation of Blood Lead Levels

Intercept	0.3514
Average Child Age - Months	0.0113
Year of Sampling	-0.049
Percentage Below Poverty Line	0.6765
Percentage of Pre-1960 Housing	0.3999
Percentage of Pop that is Non-Hispanic Black	0.2277

	Colorado	Pennsylvania
Avg. Age (Months)	23.53	23.56
Year	2018	2018
% Below Pov. Line	11.0%	12.9%
% Pre-60 Housing	18.2%	47.2%
% Non-Hisp. Black	4.7%	11.6%

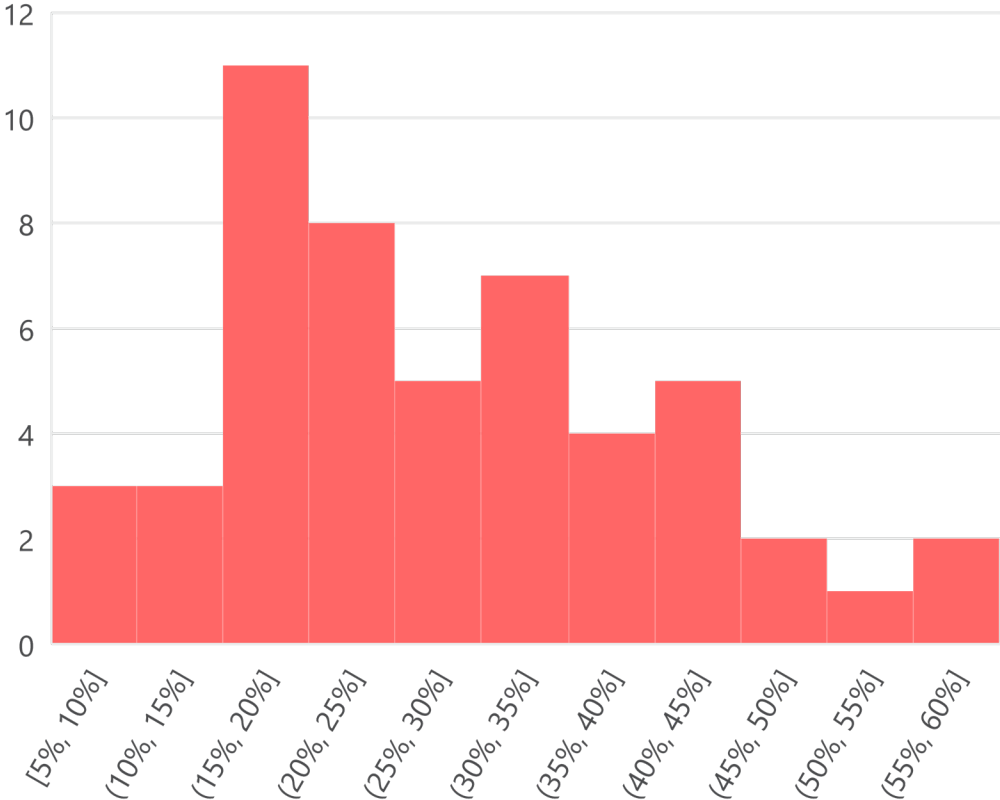


State-Level Estimates

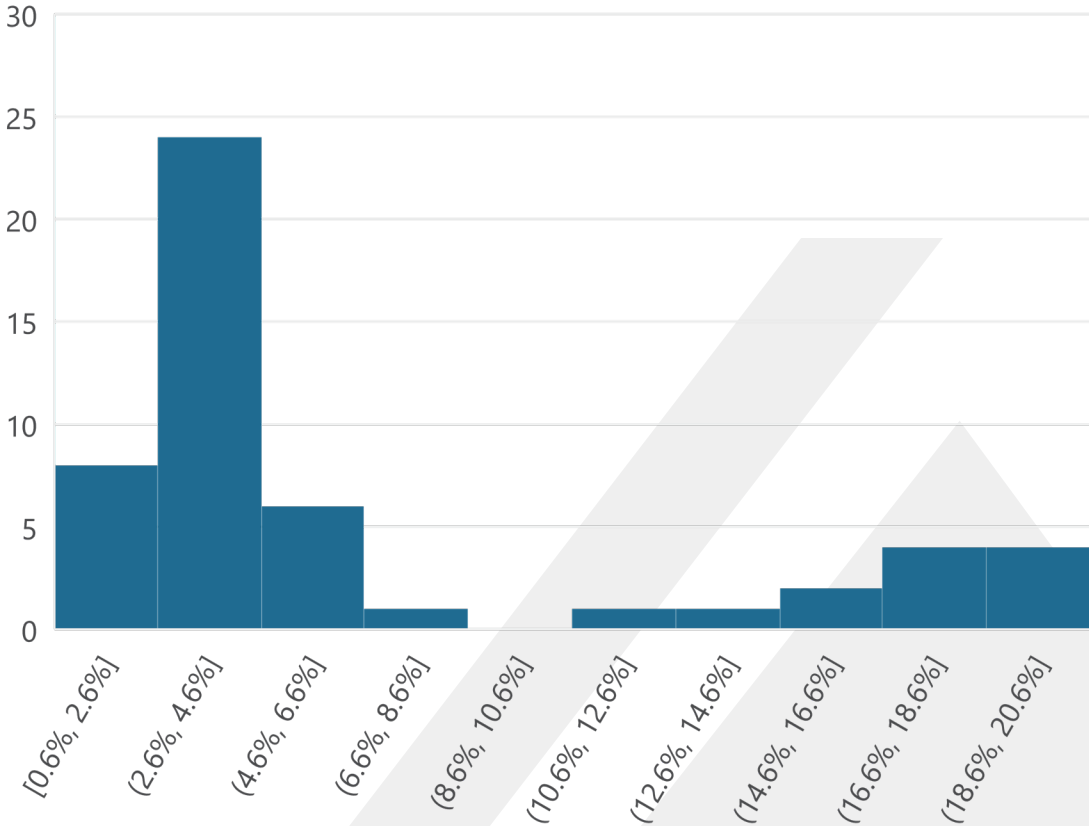


▲ State Risk-Factor Variation

Percent of Homes Built Before 1960 (# of States)



Percent of Population with a LSL (# of States)



State-Level Estimates



Colorado	
% of children above 2 ug/dL	5.9%
Keep all BLLs at Zero	
Total Benefits	\$1.5 B
Earnings	\$1.3 B
QALYs	\$30 M
Health	\$40 M
Education	\$30 M
Federal Gov't Benefits	
	\$410 M
State Gov't Benefits	
	\$190 M
Lead Service Line Replacement	\$23 M (2,500 homes)
Lead Hazard Control (Pre-1960)	\$110 M (9,300 homes)
Renovation, Repair and Painting Rule Enforcement	\$62 M

Pennsylvania	
% of children above 2 ug/dL	9.2%
Keep all BLLs at Zero	
Total Benefits	\$2.9 B
Earnings	\$2.7 B
QALYs	\$100 M
Health	\$80 M
Education	\$60 M
Federal Gov't Benefits	
	\$880 M
State Gov't Benefits	
	\$400 M
Lead Service Line Replacement	\$50 M (6,200 homes)
Lead Hazard Control (Pre-1960)	\$539 M (51,400 homes)
Renovation, Repair and Painting Rule Enforcement	\$252 M

Ongoing Development



▲ Current Activities

- State-specific intervention cost estimates
- Estimation of program and administration costs
- Website construction and publication of results
- User customization of modeling
- Additional policy findings: removal of lead from schools and childcare centers
- City-level estimates once specific cities have been selected

Ongoing Development



▲ Website Development

- Results
 - Descriptive Statistics
 - Potential Economic Benefits of Lead Prevention Policies
 - Expected Cost-Benefit Ratio of those Interventions
 - Timeline and Distribution of those returns
- Customization
 - Intervention Size
 - Populations Impacted
 - Intervention and Program Costs
 - Underlying Model Assumptions

Questions and Discussion



▲ Questions?

▲ Discussion

- How can we maximize the usefulness of these analyses for advocates and policymakers?
- What results/findings are most important to report?
- What types of user customization are most important to include?

▲ Contact

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