

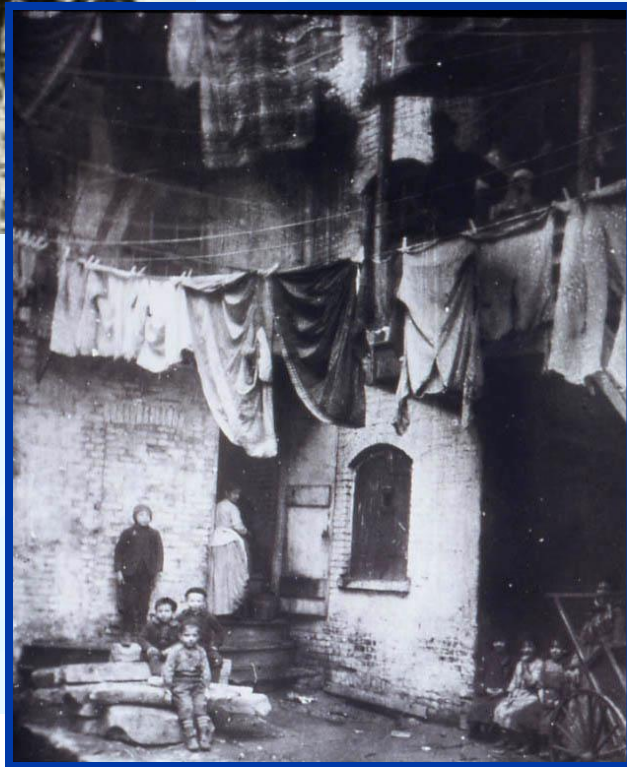
# Childhood Lead Poisoning in the 21<sup>st</sup> Century

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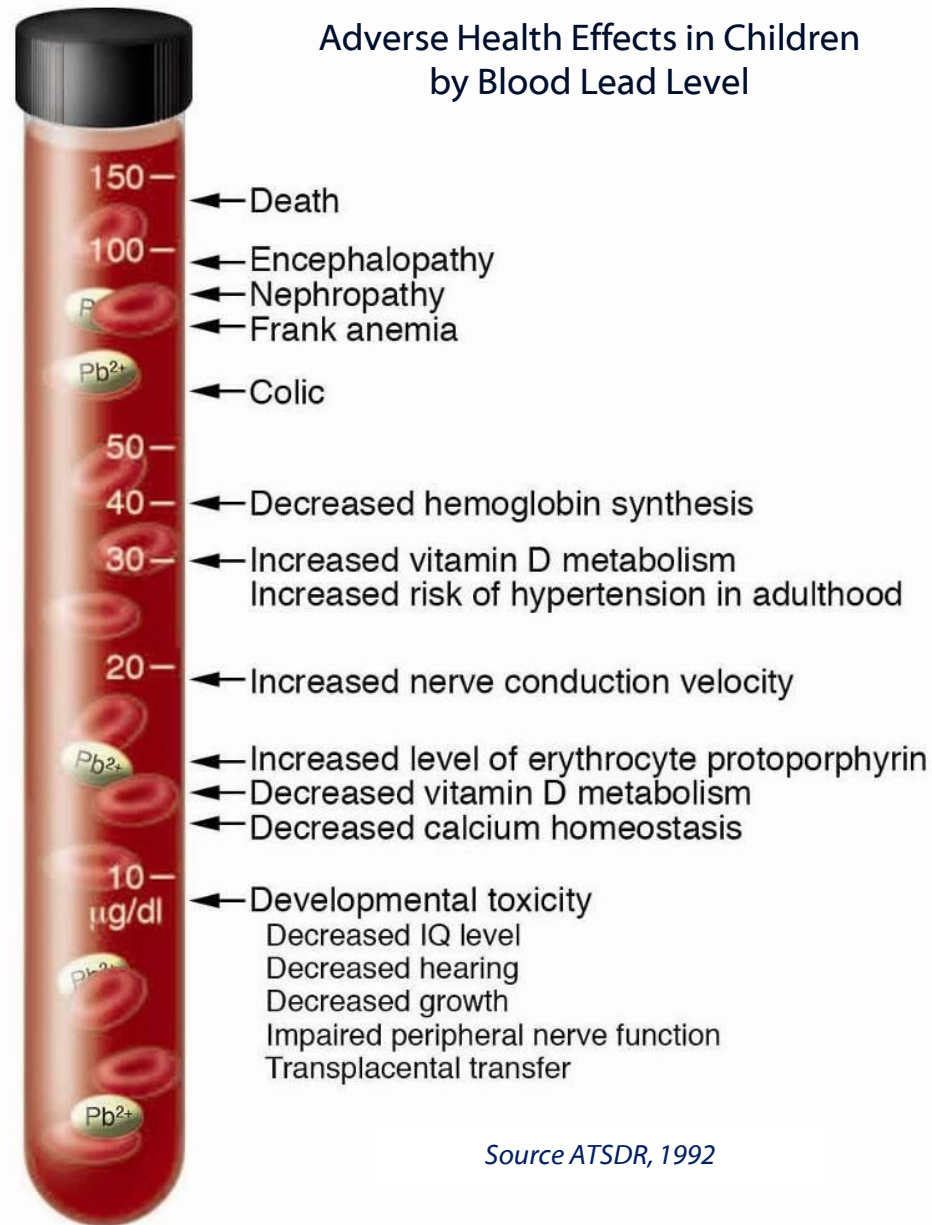
**“The connection between health and the dwelling of the population is one of the most important that exists”.**

***Florence Nightingale***



Cited in Lowry, S. BMJ, 1991, 303, 838-840

## Adverse Health Effects in Children by Blood Lead Level



Source ATSDR, 1992

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



Damage to the brain  
and nervous system



Slowed growth  
and development



Learning and  
behavior problems

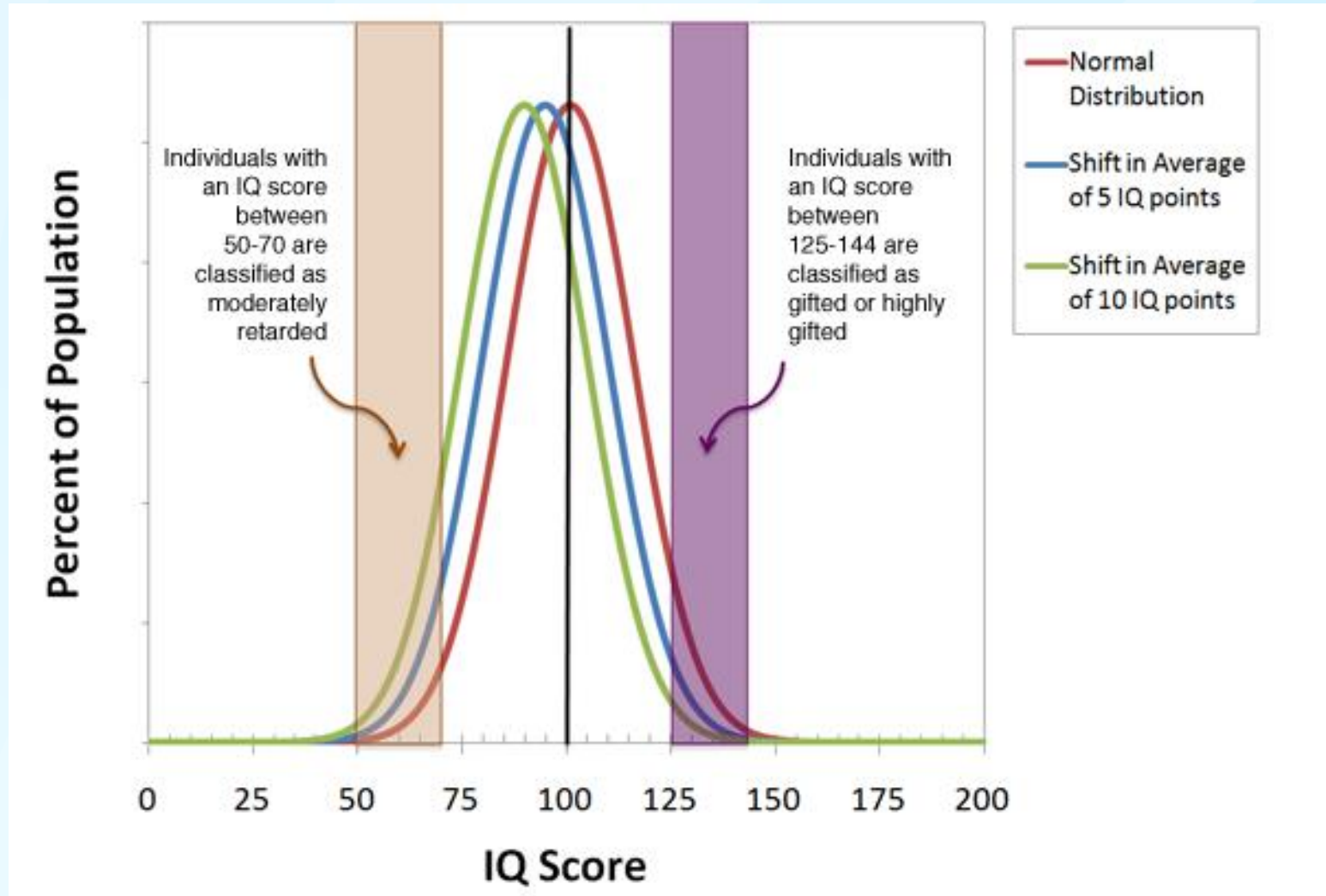


Hearing and  
speech problems

### This can cause:

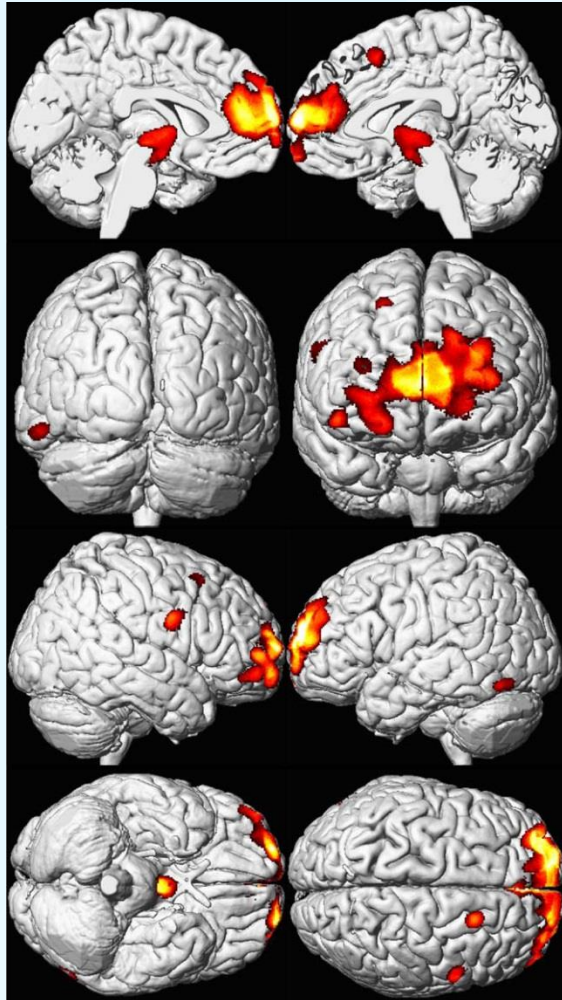
- Lower IQ
- Decreased ability to pay attention
- Underperformance at school





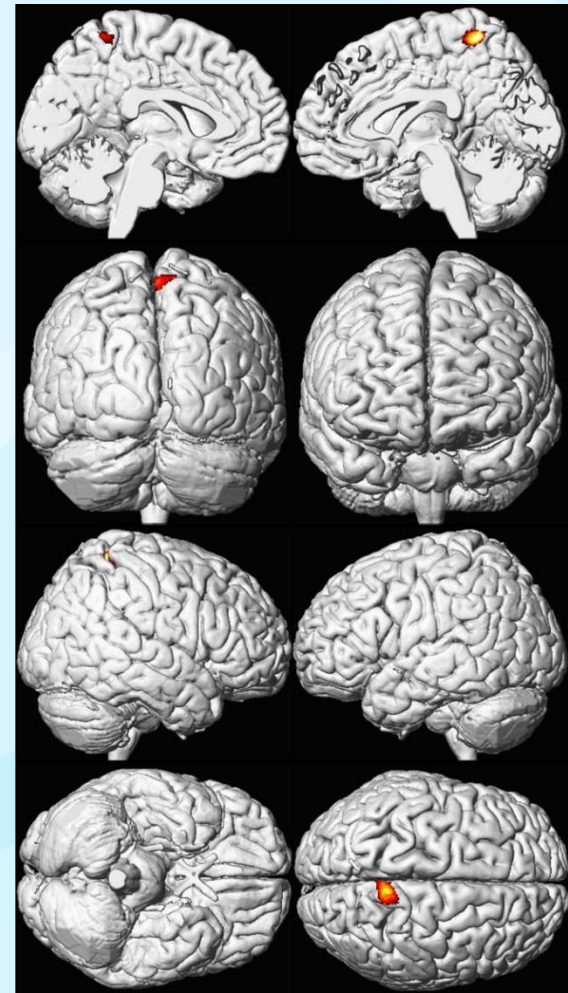
UCLA, 2009





Brain volume loss in males (n=83 )  
 mean blood lead level 13.6  $\mu\text{g}/\text{dL}$   
 highlighted over standard brain  
 template

Cecil et al. PLoS May 2008

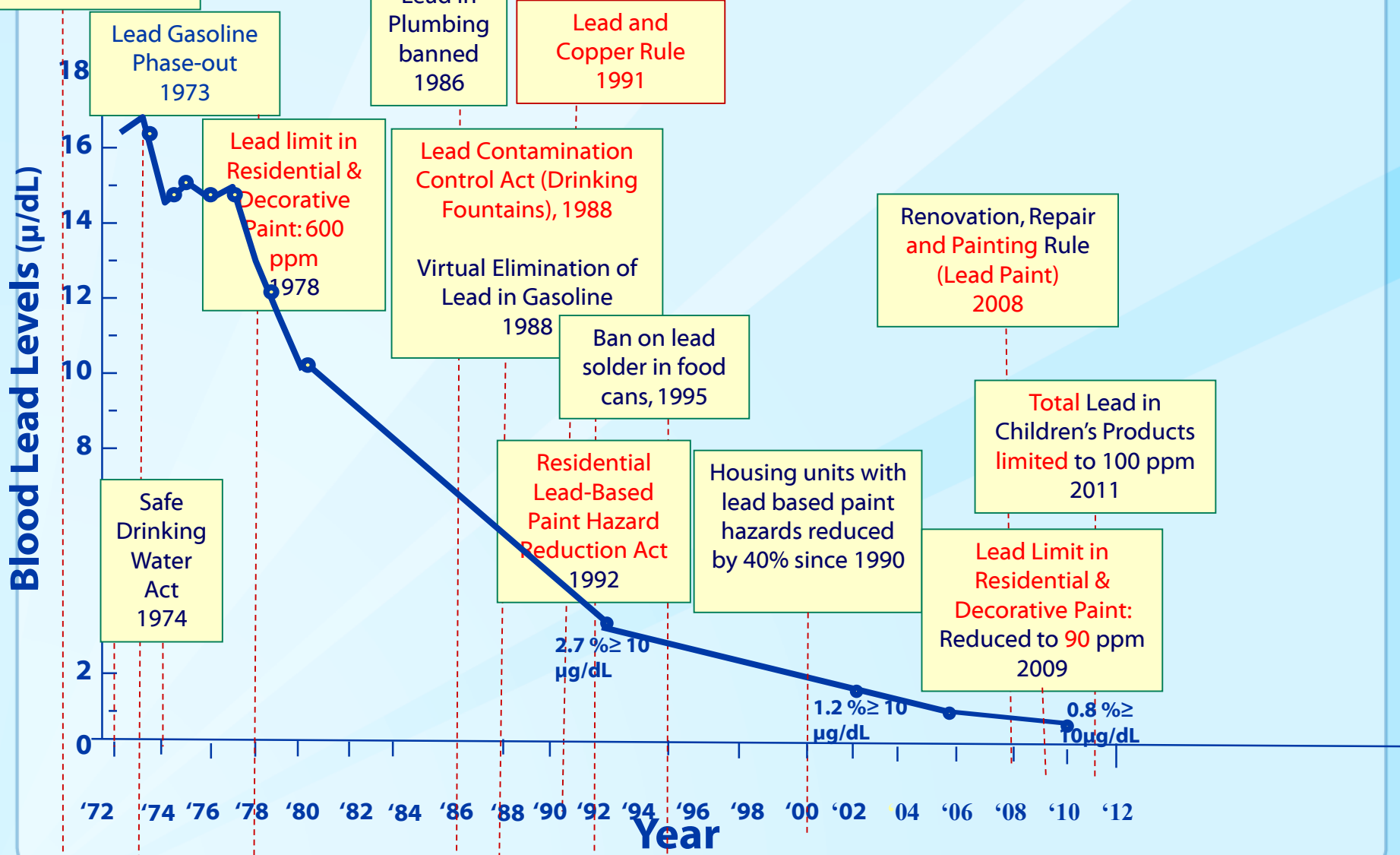


Brain volume loss in females (n=74 )  
 mean blood lead level 13.1  $\mu\text{g}/\text{dL}$   
 highlighted over standard brain  
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## Studies on Lead and Educational Outcomes

Blood Lead Levels	Educational Impact	Size of Study	Location of Study
≥ 2 µg/dL	Decreased end of grade test scores	More than 57,000 children	North Carolina (Miranda et al. 2009)
4 µg/dL at 3 years of age	Increased likelihood learning disabled classification in elementary school	More than 57,000 children	North Carolina (Miranda et al. 2009)
	Poorer performance on tests	35,000 children	Connecticut (Miranda et al. 2011)
5 µg/dL	30% more likely to fail third grade reading and math tests	More than 48,000 children	Chicago (Evens et al. unpublished data)
	More likely to be non-proficient in math, science, and reading	21,000 children	Detroit (Zhang et al. 2013)
5-9 µg/dL	Scored 4.5 points lower on reading readiness tests	3,406 children	Rhode Island (McLaine et al. 2013)
≥10 µg/dL	Scored 10.1 points lower on reading readiness tests	3,406 children	Rhode Island (McLaine et al. 2013)
10 and 19 µg/dL	Significantly lower academic performance test scores in 4th grade	More than 3,000 children	Milwaukee (Amato et al. 2012)
≥ 25 µg/dL	\$0.5 million in excess annual special education and juvenile justice costs	279 children	Mahoning County, Ohio (Stefanak et al. 2005)

# Impact of Lead Poisoning Prevention Policy on Reducing Children's Blood Lead Levels





## Where do lead hazards come from?

Most lead hazards come from lead paint chips that have been ground into tiny bits.

These tiny bits of lead become part of the dust and soil in and around our homes.









1. Keep it Clean



2. Put Barriers between Children and Lead Paint



PE-014-0528 © Robert Essel / The Stock Market

3. Find out about Foods that Help



SC-031-0148 © RDB & SAS / The Stock Market

4. Have your Child Tested for Lead

## Recommended actions based on BLL

<Reference Value	≥Reference Value ≤45	≥45 ≤69	≥70
Lead education -Dietary -Environmental	Lead education -Dietary -Environmental	Lead education -Dietary - Environmental	Hospitalize and commence chelation therapy (following confirmatory venous blood lead test) in conjunction with consultation from a medical toxicologist or a pediatric environmental health specialty unit
Environmental assessment* for pre - 1978 housing	Follow-up blood lead monitoring	Follow-up blood lead monitoring	Proceed according to actions for 45-69 µg/dL
Follow-up blood lead monitoring (see pages 23 - 24)	Complete history and physical exam	Complete history and physical exam	
	Lab work: - Iron status Consider Hemoglobin or hematocrit	Lab work: -Hemoglobin or hematocrit -Iron status -Free erythrocyte protoporphyrin	
	Environmental investigation Lead hazard reduction	Environmental investigation Lead hazard reduction	
	Neurodevelopmental monitoring	Neurodevelopmental monitoring	
	- Abdominal X-ray (if particulate lead ingestion is suspected) with bowel decontamination if indicated	Abdominal X-ray with bowel decontamination if indicated	
		Oral Chelation therapy Consider hospitalization if lead-safe environment cannot be assured	

\*The scope of an "environmental assessment" will vary based on local resources and site conditions. However, this would include at a minimum a visual assessment of paint and housing conditions, but may also include testing of paint, soil, dust, water and other lead sources. This may also include looking for exposure from imported cosmetics, folk remedies, pottery, food, toys, etc. which may be more important with low level lead exposure.



Brockton, Massachusetts  
July, 2001



# Prevent Childhood Lead Poisoning

## The Impact

**535,000**

U. S. children ages 1 to 5 years have blood lead levels high enough to damage their health.



**24 million**

homes in the U.S. contain deteriorated lead-based paint and elevated levels of lead-contaminated house dust.



**4 million** of these are home to young children.

It can cost

**\$5,600**

in medical and special education costs for each seriously lead-poisoned child.



Visit [www.cdc.gov/nceh/lead](http://www.cdc.gov/nceh/lead) to learn more.

# Prevent Lead Poisoning

Get your child tested  
Get your home tested  
Get the facts

<http://www.cdc.gov/nceh/lead>  
<http://www.cdc.gov/HealthyHomes/programs.html>



U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention  
National Center for Environmental Health

# Lead poisoning is a problem we can fix.



[www.cdc.gov](http://www.cdc.gov) | Contact CDC at: 1-800-CDC-INFO or [www.cdc.gov/info](http://www.cdc.gov/info)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

National Center for Environmental Health  
Division Of Emergency and Environmental Health Services

