

Green Chemistry Solutions for Preventing Hazardous Materials Exposure in Children's Environments

Perspective from Lead Poisoning Prevention

Valerie Charlton, M.D., M.P.H.

Childhood Lead Poisoning Prevention Branch

California Department of Public Health

October 18, 2010





Why Discuss Lead?

Considerable experience working to prevent lead exposure

- Example of an ubiquitous hazardous exposure, which affects all ages but particularly the young

Efforts have largely been successful

- Exposure and blood levels have decreased
- Lessons learned may be useful in formulating green chemistry policies

❖ Components in Reducing Exposure

Recognition that lead harms (toxic example)

- Varies with level and stage of development

Use of Public health programs

- Identify and eliminate exposures

Outreach, education, and publicity

- Reach public and industry to reduce use

Public and government will

- Laws and regulations on use and disposal

❖ Recognition Lead Does Harm

Lead enters the body in multiple ways, e.g.:

- Gastrointestinal- foods, hand to mouth
- Respiratory- inhaled
- Transplacental- mother to fetus

Remains in the body, half life 30-70 days in soft tissues and in bone decades; released from bone during pregnancy

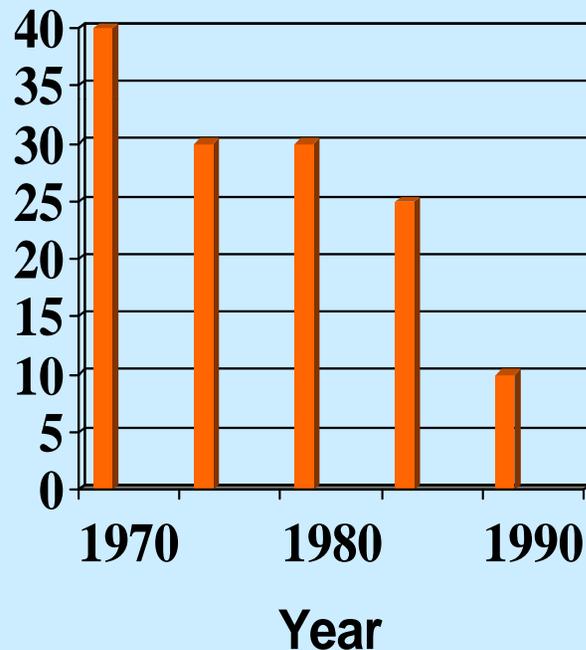
Adverse Effects of Lead in Children

Blood levels, micrograms per deciliter (mcg/dL)

100- 150	Death
50- 100	Encephalopathy, Seizures, Kidney disease, Anemia
10- 50	Developmental effects- hearing, learning, Vitamin D, growth (subclinical, must test)
< 10	Increasing awareness of problems, e.g. IQ, school performance, hyperactivity, puberty delay

Unmasking of Effects Over Time

Blood Lead Levels
Considered Elevated



Levels considered elevated fell as lead use declined

- Current CDC* “level of concern” 10 mcg/dL
- Recent studies show steepest rate of decline in IQ at levels < 10
- No safe lower level known

* Centers for Disease Control and Prevention

Recognition Lead Does Harm

Lessons:

- Despite extensive use, range of effects not initially apparent
- Once taken up persists in body
- Goal should be prevention of exposure

❖ Use of Public Health Programs

California Childhood Lead Poisoning

Prevention Program (CLPPP) 1980s;

Expanded 1990s. At State and local levels:

- Work to prevent lead exposure
- Promote blood testing, since lead already in the environment
- Those with highest levels receive investigations of behaviors and homes
- Identification and removal of exposures

Blood Lead Testing

Over 700,000 California children were blood lead tested in 2009

- Results are reported to CLPPP
- Testing identifies populations and areas at increased risk and individuals who are exposed (surveillance/ monitoring)
- Targeted toward those at risk

CLPPP Identified Exposures

Analysis from 2000-2002 poisonings:

- Source of lead was identified in and around housing in 69-90% (varying levels used to define lead contamination in paint and soil)
- Non-housing potential exposures found in 36%, include take home, remedies, hobbies, pottery, candy, etc.

Public Health Programs

Lessons:

- For lead, there are multiple potential sources of exposure in daily life of individual children
- Since exposure is cumulative, need to minimize all potential sources
- (Relevant to other chemicals and chemical interactions)

❖ Outreach, Education, Publicity

Through multiple venues including CLPPP, educate, empower, reduce use, and make children's environments safer. Reaching:

- Communities- multiple languages
- Childcare- behaviors and facilities
- Schools- students with teaching activities
- Media- generating further dissemination
- Industry- safer alternatives

Achieved Through Collaboration

Many programs address lead issues, e.g:

- Health, Developmental, and Environmental Programs
- Public- Community and advocacy groups
- Government – federal, state, and local

Outreach, Education, Publicity

Lessons:

- Wide range of groups have knowledge and interest in issues relating to toxic exposures
- All should be partners in disseminating information and working towards prevention
- Lead week collaboration is example

❖ Public and Government Will

Concerns resulted in federal and California laws and regulations limiting lead use, e.g.:

- Paint
- Gasoline
- Water
- Tableware
- Children's products
- Jewelry
- Plumbing
- Packaging
- Candy

Lead Laws and Regulations

Additional limits:

- Wheel weights
- Ammunition
- Daily exposure limits
- Worker training

Lessons:

- Will exists to minimize and prevent exposures
- Multiple agency roles are sometimes confusing
- Coordination between agencies challenging but key

❖ Success With Lead

Fewer young children with lead ≥ 10 mcg/dL

- 6 to 14% of those tested in 1988-92
(studies in Sacramento and Santa Cruz)
- Statewide, less than 0.4% in 2009

Fewer with blood lead ≥ 5 mcg/dL

- 26% in 1988-94 (U.S. data)
- Statewide, 3.9% in 2009

Even With Reduced Levels

In California in 2009, in children under age 6 years, we identified:

- 2,400 with blood lead ≥ 10 mcg/dL
- 25,000 with lead ≥ 5 mcg/dL

Final Lessons From Lead

Toxic exposures may persist in the environment and in children's bodies

- Hard to eradicate
- New sources must be addressed

Continuing public and government will is essential to fully achieve prevention and health goals

