TWO DECADES
PROTECTING SAN FRANCISCO CHILDREN FROM LEAD EXPOSURE

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San Francisco Department of Public Health
Population Health Division
Environmental Health Branch
Children's Environmental Health Promotion Program

POPULATION HEALTH DIVISION
SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH

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QUICK FACTS

85

Percent of homes in San Francisco built before 1978, the year lead paint was banned from residential use

<6

Age group most at risk for lead poisoning, due to hand-to-mouth exposure pathway

0

Blood lead level (BLL) above which can harm a child's development

(BLL is measured in micrograms per deciliter, mcg/dL or µg/dL)

PREFACE

No matter where children live, learn and play, they all need and deserve healthy environments that promote their optimal development. However, many young children may be exposed to the toxic metal, lead, in the very environments meant to nurture them: homes, yards, child care, schools and public settings.

Lead exposure can cause irreversible harm to children's health, behavior and learning potential. No level of lead in the body is known to be safe. *Any* lead exposure to a fetus or young child creates the risk of causing cognitive and health impacts. The landmark epidemiologic study, "Intellectual impairment in children with blood lead concentrations below 10 mcg per deciliter" published in *The New England Journal of Medicine* in 2003 first established this finding, leading to a major shift in pediatric medical policy and guidance on childhood lead poisoning.

The San Francisco Department of Public Health (DPH) Childhood Lead Prevention Program (CLPP) was launched in February 1993 to protect children from the harmful effects of lead exposure. The work of the CLPP is to eliminate lead paint hazards before children are exposed. This report provides the story of how the CLPP has been effective in achieving that mission and what work remains to be done.

A. Knowledge of Lead Toxicity Since Antiquity

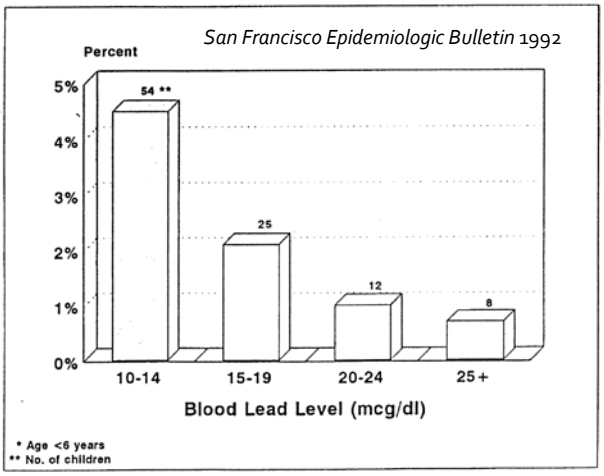
Lead was one of the first metals humans learned to use due to its ease of extraction from the earth, its malleability and its chemical association with silver. Consequently, lead poisoning has been known since antiquity, with the first descriptions of lead toxicity dating back to the second century B.C. The Hellenistic physician Nicander of Colophon identified the acute effects associated with high-dose exposure to be paralysis and saturnine colic.

B. Origins of the Childhood Lead Prevention Program

1st Milestone: Scope of the Problem Becomes Evident

DPH began responding to individual lead poisoning cases in the 1970's and then again, in 1990. That year was the beginning of mandatory laboratory reporting of blood lead levels of 20 micrograms per deciliter (mcg/dL or µg/dL) or greater to the California Department of Public Health (CDPH), who then referred cases to City and County Health Departments for investigation. As a result of those referrals, DPH began an epidemiologic study of how lead poisoning was affecting children in San Francisco: The *San Francisco Epidemiologic Bulletin*

published in March/April 1992 provided justification for DPH to conduct community-based lead screening of high risk children, due to the insufficient number receiving blood lead testing through routine health care (see Figure 1). A second *San Francisco Epidemiologic Bulletin* published in January/February 1995 provided a case control study, which demonstrated that children who lived in homes built before 1950 were almost nine times as likely to have a blood lead level greater than or equal to 20 mcg /dL, compared to children who lived in newer homes.



San Francisco Epidemiologic Bulletin 1992

San Francisco Epidemiologic Bulletin 1995

Case Control Study. Results of the case-control study indicated that 97.8 percent (n=89) of the cases (PbB ≥20 ug/dL) lived in houses built before 1950 compared to 83.5 percent (n=152) of the controls (PbB <10 ug/dL). Children who lived in older houses (built before 1950) were almost nine times as likely to have EBL ≥20 ug/dL than children who lived in newer houses (built in or after 1950) {MH age-adjusted OR = 8.7, 95% C.I. (1.90<OR<52.8)].

FIGURE 1 Childhood Lead Poisoning Prevalence by Lead Level, San Francisco, 1991

San Francisco Homes Built Pre-1950

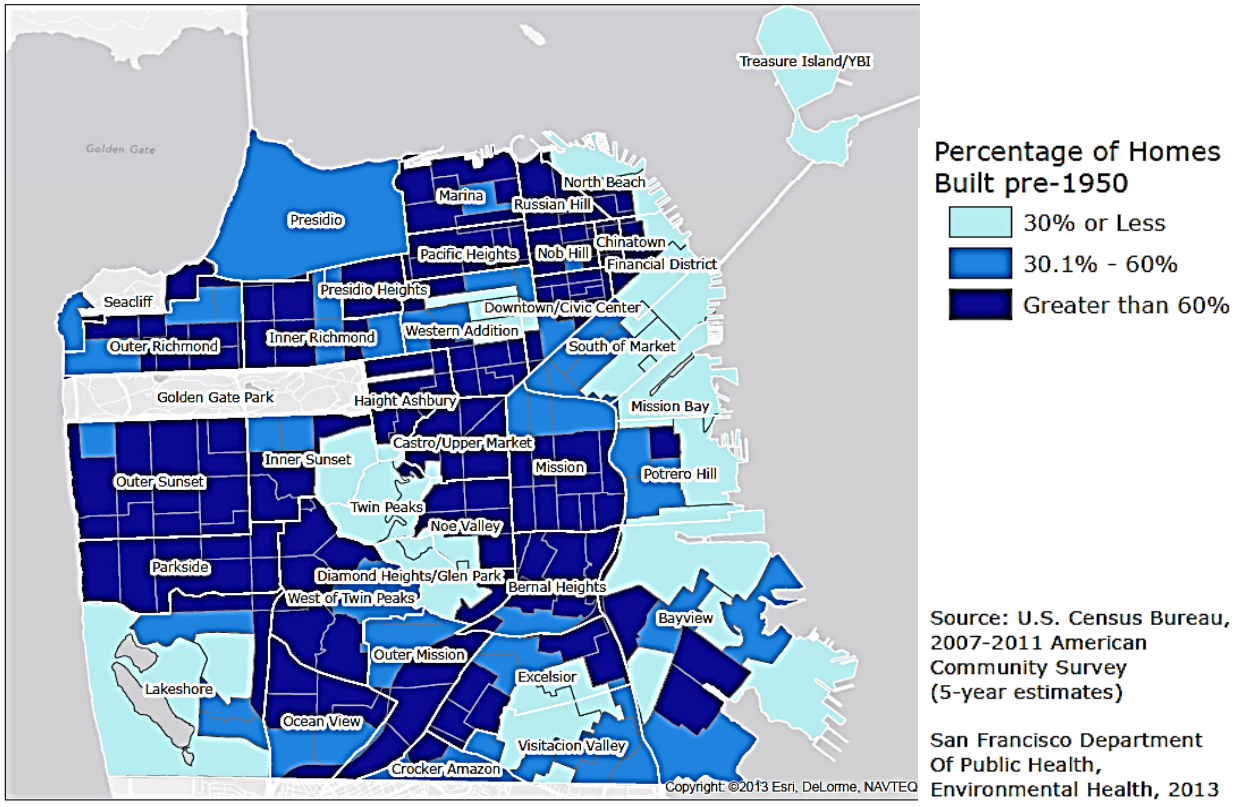


FIGURE 2 San Francisco Homes Built Before 1950

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2nd Milestone: Community Coalition Provides Impetus for Local Legislation

The new lead surveillance law also led to renewed community concerns regarding exposure. A community coalition led by the Healthy Children Organizing Project successfully advocated for a December 1992 Ordinance passed by San Francisco's Board of Supervisors. As a result, Article 26 of the San Francisco Health Code was created and a comprehensive lead poisoning prevention program was defined. The Ordinance provided findings that children's lead exposure caused irreversible impacts on learning and development which justified granting authority to the DPH to prevent such exposures through establishing the Director of Health's authority to provide surveillance, medical and environmental response to children's documented lead exposures. Once signed into law, Article 26 required the DPH to develop lead hazard reduction regulations, conduct case management and reporting, educate the community and ensure that children are screened for lead poisoning.

3rd Milestone: The CDPH Funds Local CLPPs Outreach, Screening, Case Response and Surveillance

At the same time, in 1992, the CDPH began to fund local health departments for contractual services that included lead poisoning case identification and direct case management, along with educational outreach to communities, families and health care providers. As the DPH gained local statutory authority to prohibit environmental lead hazard exposure to children, the CLPP developed more programmatic efforts with property owners, tenants, home improvement stores, contractors and construction workers. In 1998, the CLPP broadened its mission and adopted "Children's Environmental Health Promotion Program" as its broader program name, while maintaining the CLPP as a core component.

4th Milestone: The CLPP Gains Regulatory Authority to Prohibit Lead Hazards

In July 1995, the Director of Health gave the CLPP authority to cite public health nuisance code in response to lead hazards identified during child lead poisoning case investigations. In 2001, the Board of Supervisors passed legislation amending the prohibited public health nuisances in the San Francisco Health Code to include "lead hazard", which definitively expanded the CLPP's authority to protect all children less than six years of age from potential lead exposure sources, regardless of blood testing status.

5th Milestone: City and County of San Francisco Participates in Successful CA Multi-Jurisdiction Lawsuit against Lead Paint Manufacturers

Ten California jurisdictions ("The People"), including the City and County of San Francisco, sought a Court Order to abate the alleged public nuisance created by lead paint manufactured or sold by five Defendants in ten California cities and counties. Filed thirteen years ago, the matter proceeded to bench trial in July-August of 2013, in the Superior Court of California and the Court found in favor of the public entities representing the People in those jurisdictions. The Court based the decision solely on the issue of lead paint produced, promoted, sold, and used for interior home use. This decision is now on appeal.

I. PROBLEM STATEMENT

A. Local Risk of Children's Lead Exposure

At least 85 percent of San Francisco housing units were built before lead was banned for use in residential house paints in 1978; (see Figures 3 and 4). The most prevalent source of lead exposure to children in San Francisco is from lead paint hazards that are ubiquitous in this overwhelmingly older housing stock, including residential buildings as well as other sites used for child care and schools. Lead paint hazards in homes and other pre-1978 buildings are defined as those having paint in poor condition, paint dust and debris, paint contaminants deposited in soil, paint on friction and impact surfaces, or paint coatings that were disturbed through repair, renovation and painting surface preparation activities.

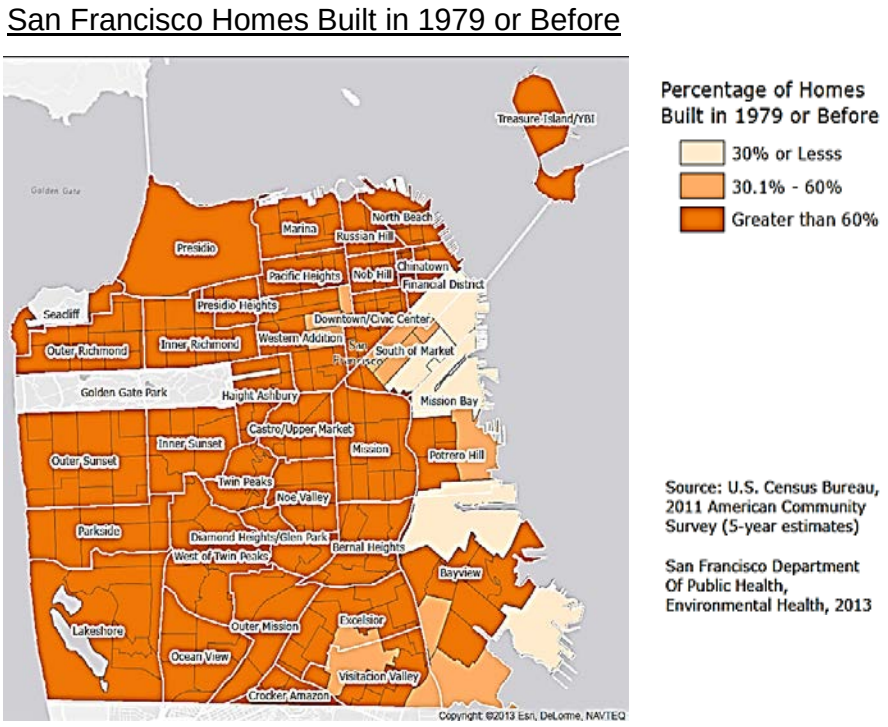
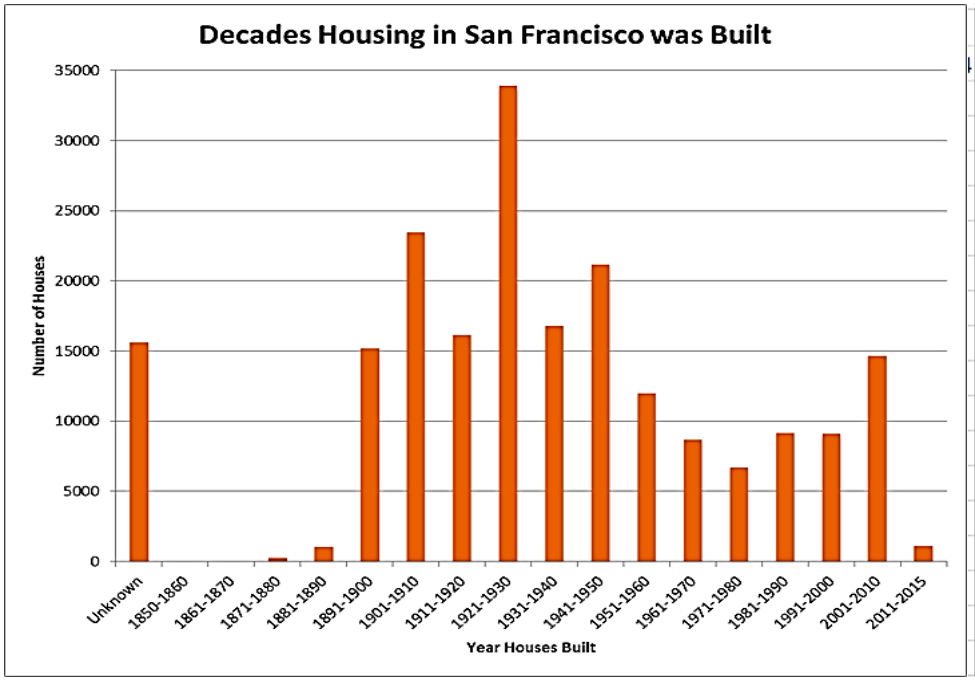


FIGURE 3 San Francisco Homes Built in 1979 or Before



Housing Year	# Houses
Unknown	15625
1850-1860	6
1861-1870	32
1871-1880	285
1881-1890	1093
1891-1900	15217
1901-1910	23478
1911-1920	16170
1921-1930	33907
1931-1940	16821
1941-1950	21198
1951-1960	11996
1961-1970	8694
1971-1980	6740
1981-1990	9180
1991-2000	9104
2001-2010	14687
2011-2015	1121

FIGURE 4 Decades Homes in San Francisco Were Built

B. Local Evidence of Children's Lead Exposure

From 2007-2012, an average of 449 San Francisco children per year were reported as lead-exposed based on their blood lead testing (see Figure 5). Notably, while certain City districts have a greater burden of lead sources based on age of housing, children with lead exposure have been identified in every census tract of San Francisco (see Figure 6). According to the US Centers for Disease Control and Prevention (CDC), children under the age of six are most susceptible to the dangers of lead exposure and lead poisoning, and are often asymptomatic. The only reliable way to verify if a child has been exposed to lead is to have a blood lead test. Although all blood lead testing data is now captured by CDPH, the true incidence of lead exposure in San Francisco children has yet to be measured because children are not universally tested. State regulations apply to all physicians, nurse practitioners, and physician's assistants, and require them to order blood lead testing of:

- All children enrolled in publicly supported programs at both 12 months and 24 months, (examples of publicly supported programs include Medi-Cal, Child Health Disability Prevention Program, Health Families, and Women, Infants and Children Supplemental Nutrition Program);
- All children ages 24 months to 6 years enrolled in publicly supported programs who were not tested previously;
- All children not enrolled in publicly supported programs if the children live in, or spend significant time in, a place built before 1978 that has peeling or chipped paint or that has been recently remodeled, or if there has been a change in circumstances that has put the child at risk of lead exposure. Medical providers must ask parents and guardians questions that identify these risks, and a parent/guardian's "Yes" or "Don't Know" response requires the provider to order lead testing.

SF children <age 21	2007	2008	2009	2010	2011	2012
# Tested	9,794	9,086	9,115	11,138	9,621	9,079
BLL ≥9.5 µg/dL	66	66	35	37	22	25
BLL 4.5- <9.5 µg/dL	528	260	281	1,009	174	189
Total # lead-exposed at current CDC reference level of BLL ≥4.5 µg/dL, with corresponding average = 449/year	594	326	316	1,046	196	214

FIGURE 5 State Health Department Surveillance of Child Lead-Exposure (BLL = Blood lead level);
Source: CDPH Childhood Lead Poisoning Prevention Branch

Annual Rate of Children Aged 0-5 with a Blood Lead Level > 5 µg/dL by Census Tract (2008-2012)

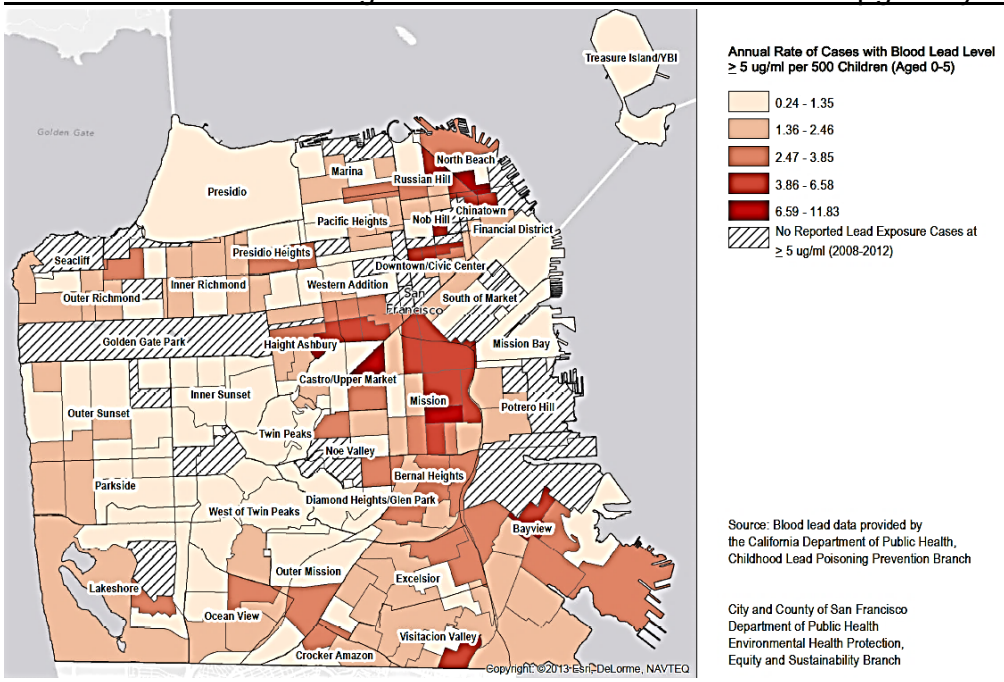


FIGURE 6 Annual Rate of Children Aged 0-5 with a Blood Lead Level Greater or Equal to 5 Micrograms/Deciliter by Census Tract (2008-2012)

C. Lead Exposure Pathways

Organic lead compounds, tetraethyl lead and tetramethyl lead, were once used in the United States as gasoline additives to increase octane rating. However, their use was phased out in the United States in the 1980s, and lead was banned for use in gasoline for motor vehicles beginning January 1, 1996, three years after the inception of the CLPP. Tetraethyl lead is still used in gasoline for off-road vehicles and airplanes. Although all sources of lead are toxic to humans, in San Francisco the CLPP has consistently found that lead paint which has deteriorated or been pulverized into dust and debris, and the subsequent migration of that dust and debris, is of greatest concern as a lead exposure source to children.

When lead-based paint deteriorates, it produces a lead-containing dust which is not always visible. When children touch this dust and put their hands to their mouths, they are poisoning themselves with lead. Young children have an increased risk of poisoning because of:

- Time spent closer to the ground;
- Normal explorative brain development activities for young children such as touching and mouthing surfaces as well as hand-to-mouth contact; and
- Ready absorption of metals perceived as nutrients.

Unfortunately, lead absorption occurs because lead mimics iron and calcium, replacing these essential minerals in children's growing bodies, disrupting the normal functioning of numerous body systems.

Program investigations of the homes of lead-exposed children in San Francisco reveal that these are the environmental lead sources almost universally identified during home inspections:

- Damaged paint conditions in the interior or exterior of the home that result in lead-contaminated dust and debris;

- Renovation and repair practices that create paint dust and debris;
- Friction and impact of door and window surfaces that generate paint dust and debris;
- Lead-contaminated bare soil, found in yards or tracked into the home; and
- Take-home exposure of adults employed in construction-related trades.

Stained glass windows and cabinet doors, where the metal holding the glass pieces together contain elemental lead, a common architectural feature in Victorian and Edwardian buildings. This soft metal source of lead is easily transferred to skin oils on children's hands.

In contrast, very rarely does the CLPP encounter children who have been exposed to or directly ingested lead from a consumer source, even though those consumer sources are frequently covered in mass media. In twenty-two years of following State-defined cases, the CLPP has never identified a lead in water source of exposure.

D. Evidence of Cognitive and Health Impacts from Lead Exposure

Lead is a systemic poison affecting people of all ages. There is no known safe level of lead exposure. Lead exposure in children has been well documented to cause cognitive and health impacts over the life span, and has been associated with neuropsychiatric disorders such as attention deficit hyperactivity disorder (ADHD) and antisocial behavior. One of the most dangerous consequences of lead neurotoxicity for children is interference with brain development, resulting in lower IQ scores, learning disabilities, behavioral health problems, and hearing impairment.

In May 2012, the U.S. Centers for Disease Control (CDC) accepted the recommendation of their Scientific Advisory Panel on Lead and changed their reference value to identify children who have been exposed to lead and who require case management:

- Experts now use a "reference value" of 5 micrograms per deciliter (mcg/dL) to identify children with blood lead levels that warrant attention. This new level is based on the U.S. population of children ages 1-5 years who are in the highest 2.5% of children when tested for lead.

- This reference value is based on the 97.5th percentile of the ongoing National Health and Nutrition Examination Survey (NHANES) blood lead distribution in children. CDC will update the reference value every four years, using the two most recent NHANES surveys.

- Until recently, children were identified as having a blood lead "level of concern" if the test result was 10 or more micrograms per deciliter of lead in blood. CDC no longer uses the term "level of concern" and instead uses the "reference value" to identify children who have been exposed to lead and who require case management.

- In the past, blood lead level tests below 10 micrograms per deciliter of lead in blood may, or may not, have been reported to parents. The new lower reference value means that more children will likely be identified as having lead exposure allowing parents, doctors, public health officials, and

communities to take action earlier to prevent children's lead exposure.

The following is taken from the web-posted *CDPH Standard of Care Guidelines on Childhood Lead Poisoning for California Health Care Providers*: http://www.cdph.ca.gov/programs/THE THE CLPPB/Pages/provideroutreach-the THE CLPPb.aspx

"No level of lead in the body is known to be safe."

"Evidence continues to accrue that commonly encountered blood lead concentrations, even those less than 10 mcg/dL, may impair cognition, and there is no threshold yet identified for this effect. Most U.S. children are at sufficient risk that they should have their blood lead concentration measured at least once." (Lead Exposure in Children: Prevention, Detection, and Management, American Academy of Pediatrics Policy Statement, Committee on Environmental Health, *Pediatrics* 2005; 116: 1036-1046)

"Blood lead concentrations, even those below 10 mcg per deciliter, are inversely associated with children's IQ scores at three and five years of age, and associated declines in IQ are greater at these concentrations than at higher concentrations. These findings suggest that more U.S. children may be adversely affected by environmental lead than previously estimated." (Intellectual Impairment in Children with Blood Lead Concentrations below 10 mcg per Deciliter, Richard L. Canfield, Charles R. Henderson, Jr., Deborah A. Cory-Slechta, Christopher Cox, Todd A. Jusko, and Bruce P. Lanphear, *The New England Journal of Medicine* 2003; 348: 1517-1526)

"Evidence from this cohort indicates that children's intellectual functioning at 6 years of age is impaired by blood lead concentrations well below 10 mcg/dL, the Centers for Disease Control and Prevention definition of an elevated blood lead level." (Blood Lead Concentrations < 10 mcg/dL and Child Intelligence at 6 Years of Age, Todd A. Jusko, Charles R. Henderson, Jr., Bruce P. Lanphear, Deborah A. Cory-Slechta, Patrick J. Parsons, and Richard L. Canfield, *Environmental Health Perspective* 2008; 116: 243-248)

In November 2010, the Get the Lead Out Coalition published a document, *Systematic Review of Low Blood Lead Levels and Associations with Cognitive and Neuro-behavioral Outcomes in Children*, summarizing the past two decades of scientific evidence regarding the harm to children from low level lead exposure. The document was created by Amy M. Padula, Ph.D., M.Sc. Post-Doctoral Fellow at the University of California, Berkeley, in collaboration with the Get the Lead out Coalition and funded by the Kresege Foundation.

Key excerpts of this report, found at: http://getleadout.org/parents-pregnant-women-and-kids/ include:

"It has been well established that high levels of blood lead can result in adverse neuro-cognitive and behavioral consequences in children *(Juberg 1997, Schwartz 1994, Wakefield 2002)*.....In the past 15 years, studies have found cognitive deficits associated with blood lead levels (BLL) below 10 µg/dL. A threshold value below which lead has no apparent adverse developmental effect has not been identified *(Bellinger, 2004)*. It is widely accepted that no "safe" level of lead has yet been established *(WHO, 1995; Wigle & Lanphear, 2005)*."

"This is a summary from a review of scientific literature on the association between low blood lead levels (<10 μg/dL) and: 1) overall cognitive function, 2) Attention Deficit Hyperactivity Disorder (ADHD), 3) anti-social behavior, and 4) other neuro-behavioral effects in children. The researcher selected relevant studies from a PubMed search of articles from 1994 to 2010. The studies included were evaluated on criteria based on methodological design, control of co-variates and relevance to the study question. Of the 157 studies reviewed only 26 were included in the review. The majority of studies were prospective cohort studies, though well-designed cross-sectional case-control and one retrospective cohort were included. Most of these studies focused on children up to 72 months of age and used a variety of cognitive and behavioral assessment tools."

Data Synthesis

"The results from the cohort studies provide sufficient evidence that the associations between BLL in children <72 months and cognitive outcomes are significant, consistent and robust, particularly among those with BLL between 5 and 10 μg/dL. Of the 9 cohort studies all the relationships with cognitive deficits were inversely associated and 8 were statistically significant after adjustment for confounder. In summary adverse outcomes, including reduced IQ and academic deficits are associated with BLL below 10 μg/dL; the association is not linear, the strongest effects are noted at lower levels. Some studies suggest that the rate of decline in performance is greater at levels below 10 than above 10. *(Lanphear, 2000, 2005; Kordas, 2006; Tellez-Rojo, 2006; Hu, 2006; Schnaas, 2006).*

"A large study of children from the National Health and Nutrition Examination Survey found that those in the highest quintile of BLL had more than 4 times the odds of having ADHD compared to the lowest quintile of BLL, even among those <5 μg/dL (*Braun, 2006*)."

"Cohort studies found associations with verbal intelligence *(Walkowiak, 1998),* inability to sustain attention *(Walkowiak, 1998),* deficits in reading *(Lanphear, 2000)* arithmetic *(Lanphear, 2000; Kordas, 2006)*, short-term memory *(Lanphear, 2000; Kordas, 2006),* Peabody Picture Vocabulary Test (PPVT) *(Kordas, 2006),* cognitive function *(Solon, 2008)* and perceptual scores *(Hubbs-Tait, 2009)*."

Conclusion Summary and Discussion

"The studies presented in this systematic review indicate there is no threshold that can be considered a safe BLL. The 1991 CDC 10 μg/dL BLL guideline was intended to serve as a risk guidance and management tool at the community level. It has commonly—and incorrectly—been considered acceptable for the individual child (*Bellinger, 2004*). Clinicians should attempt to reduce a child's BLL even when it is below 10 μg/dL. The "clinically acceptable" level should be no detectable amount. At this time, most laboratories are able to detect BLL as low as 2 μg/dL."

II. WHAT HAS THE CLPP DONE TO PREVENT LEAD EXPOSURE?

The CLPP uses comprehensive education and outreach, source reduction and regulatory code enforcement strategies to prevent children's exposure to lead hazards in all settings where children under six years old can be exposed. The CLPP has Health Code authority to use these interventions regardless of whether a child's exposure has been documented by blood lead testing.

Under contract to the Childhood Lead Poisoning Prevention Branch (CLPPB) of CDPH, the San Francisco CLPP coordinates lead-related activities of local agencies and organizations, alerts the CLPPB to new sources of lead exposure and barriers in the continuum of care and prevention, and helps develop creative new strategies towards realizing a mutual vision of a healthy lead-safe environment, in which all children can achieve their full potential. Additionally, the CLPP is responsible for case management of children where lead exposure above a certain threshold has already been detected by blood lead testing.

An overview of the CLPP's lead exposure prevention strategies follows.

A. Lead Hazard Prevention Public Awareness and Targeted Outreach

1. Targeted outreach to promote public awareness of childhood lead poisoning, including outreach to parents, child care providers and community-based family-serving agencies

The CLPP's health education team is multilingual, with the capability to provide in-person services in English, Spanish, Cantonese and Mandarin, as well as access to phone-based language interpreters. The CLPP routinely produces all written educational materials in English, Spanish and Chinese, along with Filipino, recently adopted by the City and County of San Francisco as a 4th primary language.

The CLPP uses surveillance data to identify high-risk communities or neighborhoods to focus community education or proactive code enforcement campaigns. The CLPP health educators provide lead hazard prevention and healthy housing presentations to many target audiences: child care providers, parents and family caregivers, school staff, community-based agency staff and clients, pediatric and family health clinics, and food supplement programs. The CLPP health educators provide training via parent education classes and workshops sponsored by community agencies, through community college classes and job development programs, through court-mandated parenting education classes and at health fairs, and via in-home client education.

In addition to interactive presentations, the CLPP health educators create educational print and promotional materials, accept agency referrals for in-home client or patient education, participate in street-level outreach and community health fairs, and work with child-serving professionals to educate about lead hazard prevention. The CLPP team looks for new and creative ways to spread the word about childhood lead hazard prevention to the community, including distributing lead-free promotional items to community members. The CLPP even established a purchasing protocol to prevent vendors from using lead-based inks or materials in purchased promotional materials.

The CLPP media campaigns, such as trilingual MUNI interior bus ads and bilingual cable TV public service announcements promote healthy housing conditions, free of lead hazards, pests and mold.

2013 MUNI bus ad

The CLPP works with DPH Birth Records to provide a trilingual brochure free-of-charge for all new parents in response to all in person or by mail applications for birth certificates. The brochure encourages new parents to use either San Francisco's grant-based remediation services if eligible or the CLPP's lead hazard assessment and code enforcement services.

The CLPP publishes a thematic information bulletin, *The Word on Lead Prevention,* twice a year, widely distributing copies to family and child-serving agencies. The bulletin is designed to engage and inform parents and the public about lead-safe practices, policy updates regarding lead hazards, and the dangers associated with lead exposure. The CLPP also developed a resource-rich website with English, Spanish and Chinese materials on lead poisoning prevention, http://www.sfdph.org/dph/EH/CEHP/Lead/default.asp.

All of these activities are quantified in twice-yearly reports to CDPH funders. For example, in the second half of 2014, the CLPP reached 960 people at 4 health fairs, distributing 831 educational materials and presented to 212 child care providers, distributing 428 educational materials. In an additional 30 presentations, 1033 parents and residents received lead education, including distribution of 2054 educational materials. In these settings, 91% of post-tests were answered correctly. In two other literature distribution events, 7518 people received 8211 educational materials.

2. Targeted outreach to gardening supply stores (2014-current)

The CLPP staff supply trilingual brochures and brochure holders to approximately 20 gardening supply stores citywide. The brochure directs readers to its web-posted Lead-Safe Urban Gardening Guidance. https://www.sfdph.org/dph/EH/CEHP/Lead/InfoGardeners.asp

3. Targeted outreach to construction industry contractors, laborers and do-it-yourself home owners

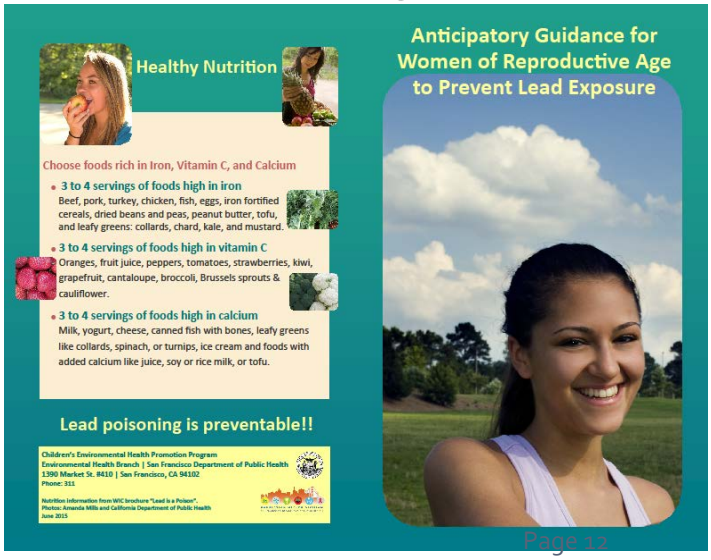
Audit of home improvement stores for required lead hazard warning signage (1997-current)

Annually, CLPP staff audit approximately 90 home improvement stores citywide, with an emphasis on paint supply and hardware stores. The goal is to ensure this mandated trilingual warning sign is posted, and provide the store management with an adequate supply of the CLPP literature for customers, in the languages most frequently used at that location. This activity reaches those working in the construction and painting trades, as well as many do-it-yourself residents.

4. Targeted outreach to medical providers and clinics

The State contracts with the CLPP to inform medical providers of their legal responsibilities with respect to screening and testing for lead poisoning and of available case management services. The CLPP is also responsible to communicate with medical providers the importance of supplying complete patient information to laboratories when sending samples out for blood lead analysis or when referring children for blood lead analysis.

The CLPP conducts presentations at various hospital Pediatric Grand Rounds and Medical Resident continuing education forums. The CLPP also sends an annual letter updating Pediatric and Family Medical Providers citywide on current issues in lead poisoning prevention and resources for helping patient families access CLPP services and educational materials. See Appendix IV for the CLPP-designed factsheet "*Blood Lead Levels-What Do They Mean?*" intended to help medical providers explain blood lead testing results to patients' families.



POPULATION HEALTH DIVISION
SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH

Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women. In 2015, CLPP was asked to prepare this anticipatory guidance for women of child-bearing age.

B. Lead Hazard Code Enforcement and Source Reduction

1. Using SF Health Code authority to order remediation of lead hazards

San Francisco Health Code Article 11, Section 581b defines lead hazards to children less than six years of age as "prohibited public health nuisances", and therefore the Director of Health is granted the authority to issue Notices of Violation for such hazards and to order the property owner to correct the hazard using lead-safe methods. The CLPP uses this authority whenever environmental investigations identify lead hazards, regardless of whether a child at that location has been tested for lead exposure.

Environmental investigators use visual assessment of paint conditions and sample surfaces for dust or yards with bare soil to identify lead hazards in homes. The Code allows the Health Director to presume that all pre-1979 buildings have lead-based paint, adding a year of precaution beyond the 1978 ban on lead paint due to lead paint inventory still being sold. If a property owner wishes to rebut this legal presumption, they must present the CLPP evidence established by a State-certified lead inspector/risk assessor.

During investigations, investigators also educate tenants about the sources and risks associated with lead exposure. From 2008 through 2012, the CLPP conducted over 800 lead investigations and issued over 700 Notices of Violation for lead hazards (see Figure 7). In calendar year 2013, the CLPP inspected 287 homes for lead hazards and issued 187 Notices of Violation based on findings.

Percent of Homes Built Pre-1950 Compared to Number of Lead Hazard Notices of Violation (2008-2012)

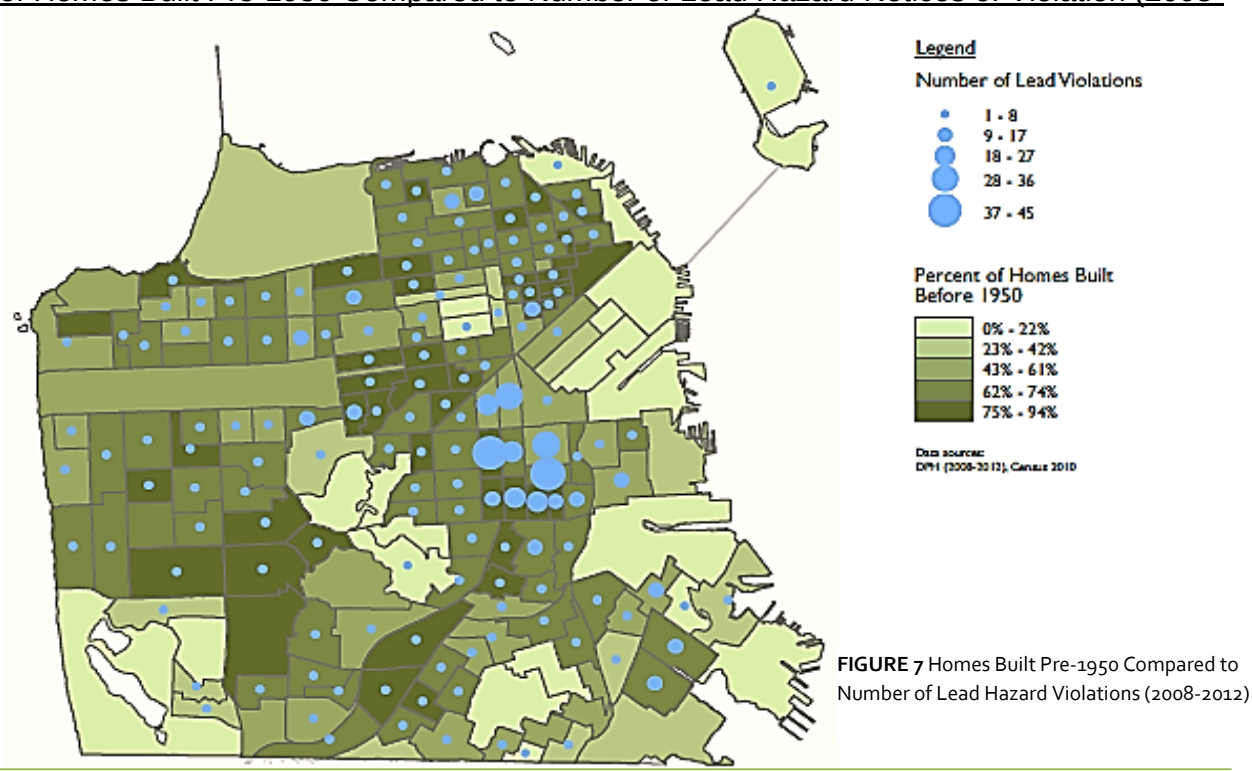


FIGURE 7 Homes Built Pre-1950 Compared to Number of Lead Hazard Violations (2008-2012)

2. Partnering with the DPH Maternal Child Adolescent Health Branch (MCAH) to offer comprehensive healthy housing assessment and code enforcement

The MCAH Branch includes the Nutrition Supplement Program for Women, Infants and Children (WIC), as well as two Public Health Nursing (PHN) field-based programs working with low-income women and their newborn infants. Because the families of these infants and young children often live in housing with the greatest prevalence of housing hazards and deferred maintenance, they may be at risk of lead exposure as well as other code-defined housing habitability issues.

The CLPP provides comprehensive home assessment services to these families, identifying not only lead hazards, but also mold, pest, sanitation, lack of heat and other issues, and issues Notices of Violation to property owners requiring them to eliminate the cited hazards (see Figure 8 for types of hazards). This service allows the CLPP to proactively protect children at risk from lead exposure, and not wait for them to have exposures detected by blood lead testing.

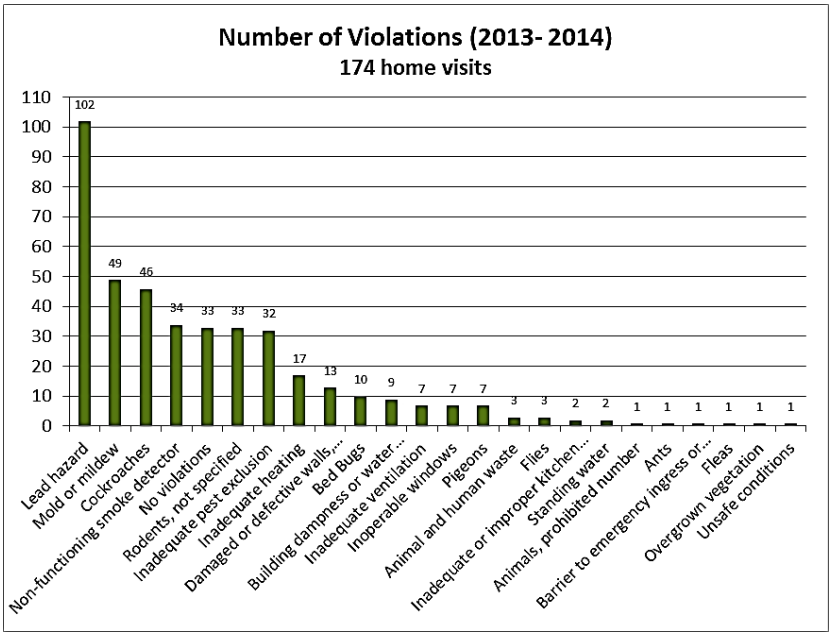


FIGURE 8 Violations from Home Assessments for Wic-Enrolled Families (2013-2014)

3. Partnering with the Mayor's Office of Housing & Community Development (MOHCD) to make effective use of Lead Hazard Remediation Grants

The MOHCD Lead Hazard Control Grant Program provides grants to homeowners to remediate lead hazards on their property. The Lead Program is funded by a periodic federal grant from the U.S. Department of Housing and Urban Development's (HUD). To be eligible for a lead grant, the property owner must apply, and the tenant-occupied household units must meet HUD's Low Income Limit and must have a child under the age of 6 who resides on the property or uses the property on a regular basis. If the property is vacant and is determined eligible, preference must be given to low and moderate income tenant families with children age 6 or younger.

4. Partnering with San Francisco Department of Building Inspection (DBI) to aid DBI's enforcement of lead-safe work practice requirements

Safe work practices are required for paint-disturbing work in pre-1979 buildings. This provision of the San Francisco Building Code, effective January 1998, governs work that disturbs or removes lead-based paint on the exterior of any steel structure or pre-1979 building, and allows the Building Director to presume that all steel structures and pre-1979 buildings have lead-based paint. Property owners must present DBI evidence provided by a State-certified lead inspector/risk assessor if they wish to rebut this legal presumption.

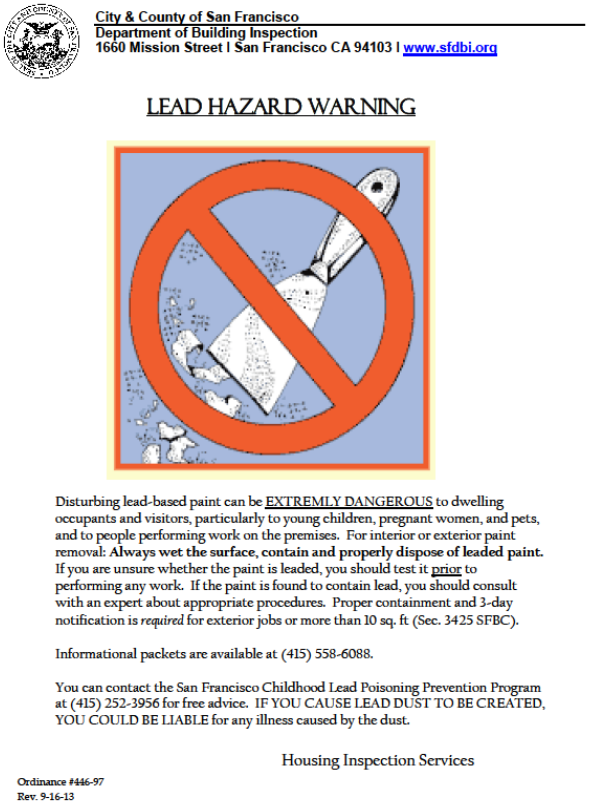
Effective July 4, 2004, SFBC Section 3425 was amended to include safe practices for work that disturbs or removes lead-based paint in the interior of pre-1979 buildings, including child care facilities, hotels and motels, multi-unit housing and other dwellings.

Prior to renovating the interior and/or exterior of a building, the owner or contractor must:

1. Notify affected parties before work begins;
2. Restrict access to the regulated area (except regulated areas that are required for access
3. or egress during the course of the work, see SFBC 3425 Restrict Access for requirements);
4. Use containment and/or barrier systems to prevent migration of lead-based paint chips and dust;
5. Remove all visible lead-based paint chips and dust before completing work or when access to the regulated area is required (see SFBC 3425 Clean Up Standards);
6. Post a "Lead Work In Progress" sign before work begins if containment is needed to prevent lead-based paint from migrating to another property. Remove the sign when work is complete. Where signage is not possible, provide a letter to your neighbors.

In addition, the following work practices are prohibited:

1. Open flame burning or torching;
2. Heat guns without containment and barrier systems, or operating above 1,100 o F or causing the charring of paint;
3. Hydro-blasting or high-pressure washing without containment and barrier systems; and,
4. Dry manual sanding or scraping, machine sanding or grinding, or abrasive blasting or sandblasting without containment and barrier systems or a HEPA vacuum local exhaust tool.



City & County of San Francisco
Department of Building Inspection
1660 Mission Street | San Francisco CA 94103 | www.sfdbi.org

LEAD HAZARD WARNING

Disturbing lead-based paint can be EXTREMLY DANGEROUS to dwelling occupants and visitors, particularly to young children, pregnant women, and pets, and to people performing work on the premises. For interior or exterior paint removal: **Always wet the surface, contain and properly dispose of leaded paint.** If you are unsure whether the paint is leaded, you should test it prior to performing any work. If the paint is found to contain lead, you should consult with an expert about appropriate procedures. Proper containment and 3-day notification is *required* for exterior jobs or more than 10 sq. ft (Sec. 3425 SFBC).

Informational packets are available at (415) 558-6088.

You can contact the San Francisco Childhood Lead Poisoning Prevention Program at (415) 252-3956 for free advice. IF YOU CAUSE LEAD DUST TO BE CREATED, YOU COULD BE LIABLE for any illness caused by the dust.

Housing Inspection Services

Ordinance #446-97
Rev. 9-16-13

C. Advocacy, Policy and Legal Strategies to Reduce Lead Exposure

The CLPP partners with local government and community-based agencies to support and advocate for the development of policy and legislation that helps reduce lead hazards. Additionally, the CLPP works with the San Francisco City Attorney's office to pursue litigation against property owners who have not complied with Notices of Violation.

1. Advocacy for prevention of lead hazards in urban gardens and farms

a. CLPP develops *Lead Hazard Guidance for Urban Gardening* (May 2011)

In 2011, the CLPP identified a significant lead paint hazard on a building adjacent to a recently developed DPH-sponsored community garden, and worked with MOHCD to get the building remediated so that peeling paint would not contaminate the edibles garden being constructed. In our investigations of the homes of lead-exposed children, over 50% of homes having yards with bare soil were found to have code-defined lead in soil hazards (greater or equal to 400 parts per million lead), and over 86% of those yards had lead in soil levels high enough to cause a child's blood lead level to increase by one microgram per deciliter (more details provided below).

As urban gardening became a growing part of San Francisco's local sustainability efforts, the CLPP recognized the need for lead exposure prevention guidance to protect urban gardeners, farmers and school children working on or visiting urban gardens and farms. This led to the CLPP's consultation to several community farms (the Alemany, Hayes Valley and Potrero Hill Texas Street urban farms) to either evaluate their soils and composts or assess prior soil testing results and to advise on safe work practices, particularly for child or school-aged visitors. To guide similar community efforts, the CLPP published a *Lead Hazard Guidance for Urban Gardening* document based on these experiences, which is posted at: https://www.sfdph.org/dph/EH/CEHP/Lead/InfoGardeners.asp

The CLPP collaborates with the City's newly established Urban Gardening Program to prioritize community gardens which could benefit from the CLPP's education and soil sampling consultation. The CLPP urban gardening project goal is to learn from the actual experiences of urban farmers as the basis of developing best practices that prevent lead exposure. The CLPP intentionally avoids using code enforcement authority for this project, instead giving community gardens in San Francisco access to soil testing and guidance on precautions that will prevent lead exposure.

b. Community collaboration to develop Lead-Safe Gardening Best Practices Workshop and Outreach Brochure (September 2012)

Subsequently, the CLPP collaborated with a local community non-profit, Garden for the Environment, in developing and teaching a community-based lead-safe urban gardening workshop, developing a lead-safe

urban gardening outreach brochure, and sharing these resources with the regional Get the Lead Out Coalition.

c. CLPP to propose change in the legal definition of "lead-in-soil hazards" (2015)

In 2012, the CLPP modified its Urban Gardening Guidance to provide caution about California's regulatory-allowable level of 300 parts per million (ppm) lead in retail soil and compost products, which is 75% of the bare soil level (400 ppm) that will generate a CLPP Notice of Violation. Clearly, that level is not health protective. The CLPP's more protective guidance is for gardeners to use soil and compost at 80 ppm of lead or less, based on modeling by the CalEPA Occupational and Environmental Health Hazard Assessment program (OEHHA). The OEHHA report indicates that a young child playing daily in bare soil with 80 ppm lead would have a blood lead level increase of 1 μg/dL. As a means of achieving that goal, the CLPP advises the public to only purchase soil and compost products certified by OMRI, the Organic Materials and Research Institute, which requires representative product testing to ensure lead levels of 90 ppm or less. In 2015, the CLPP will advocate for a change in San Francisco Health Code definition of lead in soil hazards.

2. Advocacy with the regional "Get the Lead Out" Coalition

The CLPP is a founding member of the Bay Area regional Get the Lead Out Coalition (GTLO), working since 2010 to protect the public from lead poisoning and to facilitate the pooling of regional CLPP resources for lead exposure prevention. GTLO's website (*getleadout.org*) is a clearinghouse for lead poisoning prevention knowledge and resources, and links to more in-depth information about lead exposure prevention, local groups combatting lead poisoning, and the Bay Area's county-based websites.

GTLO's focus is on vulnerable populations: young children, pregnant women, and workers. GTLO holds special events and campaigns to encourage members of the public and other environmental organizations to join us on specific actions to reduce lead exposures. For example, on behalf of GTLO, San Francisco CLPP hosted two public showings of the documentary film, *MisLead*, during Lead Poisoning Prevention Week in 2013.

3. Litigation by ten California local governments vs. five U.S. lead paint manufacturers

Ten California jurisdictions ("The People"), including the City and County of San Francisco, sought a Court Order to abate the alleged public nuisance created by lead paint manufactured or sold by five Defendants in ten California cities and counties. Filed thirteen years ago, the matter proceeded to bench trial in July-August of 2013, in the Superior Court Of California, County Of Santa Clara, Department 1 (Complex Civil Litigation), the Honorable James P. Kleinberg presiding. San Francisco CLPP's Coordinator spent many hours gathering evidence for legal counsel and was called to testify during the trial.

The Court found in favor of the ten public entities representing the People in those jurisdictions. The Court based the decision solely on the issue of lead paint produced, promoted, sold, and used for interior home use. The Court ruled that Defendants ConAgra, NL, and SW were substantial factors in causing the injury alleged. Defendants ARCO and DuPont were found not liable, and exempted from this ruling.

In January 2014, Judge Kleinberg issued his Final Statement of Decision naming NL, Sherwin Williams, and ConAgra jointly liable to contribute $1.15 billion to an abatement fund, of which up to $80.5 million is allocated to the City and County of San Francisco. The judge ordered the institution of the abatement plan and establishment of the Fund to be administered by the CDPH Childhood Lead Poisoning Prevention Branch (CLPPB), and that the Cities and Counties should apply to the CLPPB for remediation grants.

This decision is currently being appealed by the defendants, so the legal outcomes will not be determined for several years. For further information, see Case No.: 1-00-CV-788657: "The People of the State of California, Plaintiff, vs. Atlantic Richfield Company (Arco), Conagra Grocery Products Company (Conagra), E.I. Du Pont De Nemours and Company (Dupont), NL Industries, Inc. (NL), and The Sherwin-Williams (SW) Company, Defendants and Related Cross-Action."

III. HAVE CLPP'S PREVENTION EFFORTS BEEN EFFECTIVE?

A. Code-Defined Lead Hazard Prohibition Independent of Clinical Status

The CLPP uses the San Francisco Health Code-defined lead hazard prohibition as an effective tool to require that property owners remediate lead hazards in any environment where a child under six spends significant time. The CLPP's policy is that children should not bear the burden of lead hazard detection. By analogy to other environmental health programs, inspectors do not wait for food poisonings or hazardous materials spills to provide environmental regulatory inspections.

The CLPP can enforce this lead hazard prohibition regardless of whether a child's blood has been tested and, if tested, regardless of a child's blood test findings.

B. Lead Abatement Funds for Permanent Removal of Lead Sources

If and when San Francisco's litigation settlement from the lead paint industry defendants becomes available, San Francisco will be able to provide even greater protection for children and benefit for property owners, as there will settlement funds allocated to permanent abatement of lead sources, such as the removal and replacement of lead-painted windows and doors.



C. San Francisco and U.S. Lead-Exposure Finding Has Been Reduced

The lead exposure profile for San Francisco's children has improved over time, similarly to the rest of the country, as airborne and foodborne lead sources decreased in the United States. The Clean Air Act Amendments of 1990 mandated the elimination of lead from all U.S. motor fuel by January 1, 1996. This was the final step in a gradual reduction of lead in gasoline since the early 1970s. "Regular" gasoline typically contained approximately 4.0 grams of lead per gallon; average lead content was reduced to 0.5 gram/gallon in 1985 and still further to 0.1 gram/gallon in 1986. Since 1996, the U.S. population as a whole has not had a "background" source of lead exposure. Therefore, all detected lead exposures indicate that a child has a current exposure pathway to a specific lead source.

D. Reframing the CLPP's Response to Detected Lead Exposures

Even in the context of an overall decrease in lead-exposed children, the CLPP has been effective in reducing the incidence of higher blood lead levels through its policy of responding to all detected lead exposures, initiated in 2005. By responding at the earliest detection of exposure, rather than waiting for a clinically-defined poisoning, the CLPP can identify and order the remediation of environmental lead hazards, thereby preventing ongoing exposure which can lead to higher blood lead levels.

The CLPP has provided justification to local medical providers that the provision of environmental investigation services at the lowest limit of lead exposure detection is an effective measure for the prevention of continued lead exposure to their patients. This policy allows the program to focus on lead exposure prevention versus lead poisoning response.

E. Measurement of Effectiveness

The CLPP measures the effectiveness of this approach by comparing the proportion of higher blood lead levels found earlier in the program, when the CLPP only responded to high CDPH-case defined blood lead levels (≥15 twice or ≥20 µg/dL once) to now, when the CLPP responds to all detected blood lead levels, offering home inspection for lead hazards and subsequent code enforcement (see Figures 9 and 10).

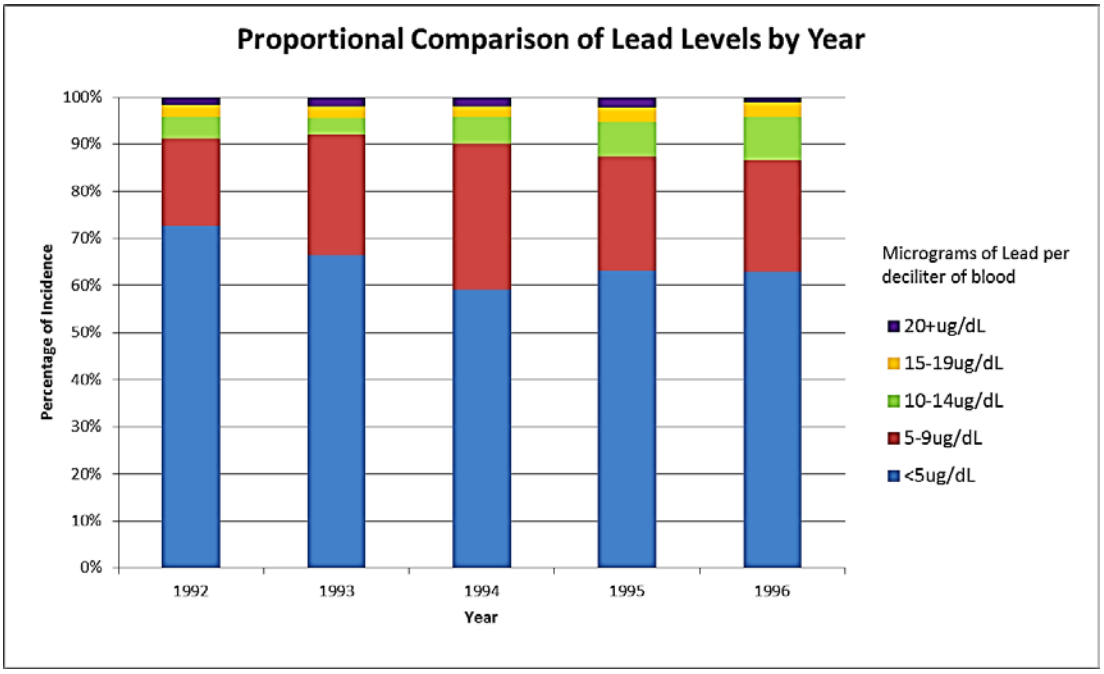


FIGURE 9 Proportional Comparison of Lead Levels by Year (1992-1996)

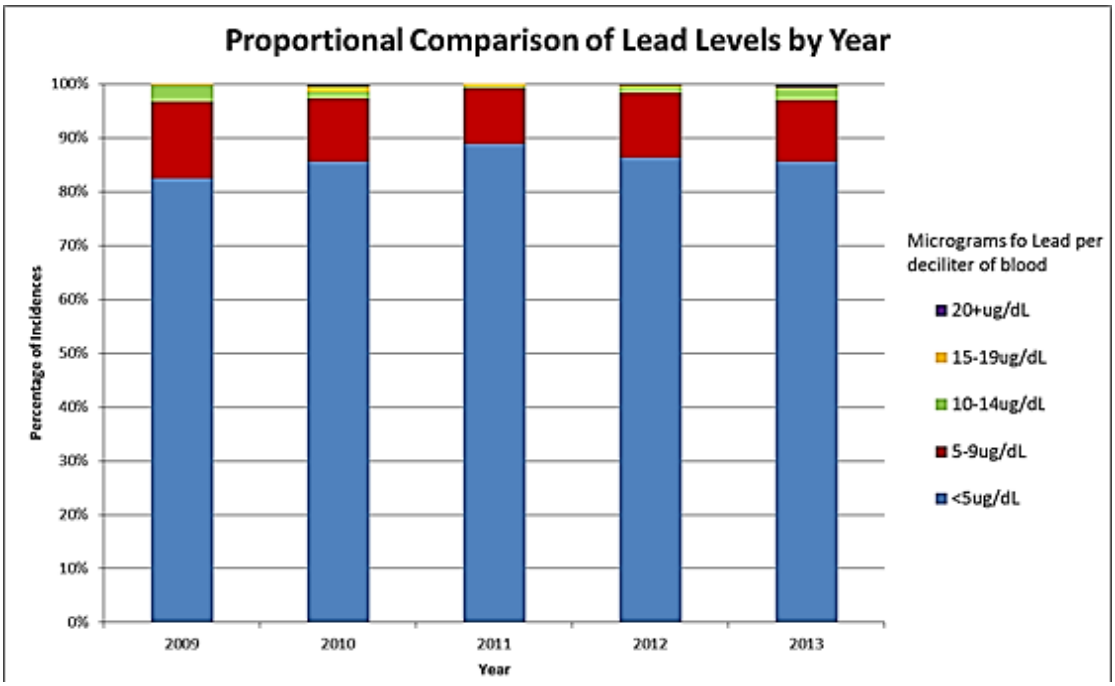
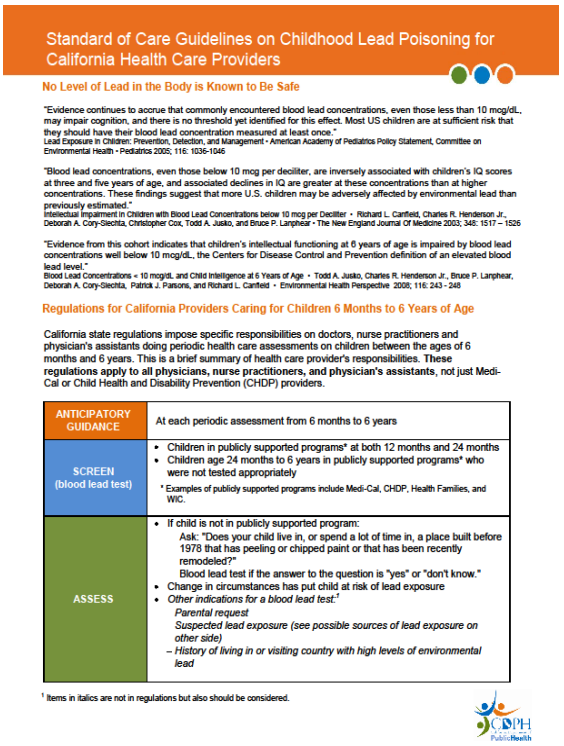


FIGURE 10 Proportional Comparison of Lead Levels by Year (2009-2013)

IV. HOW DOES THE CLPP RESPOND TO LEAD-EXPOSED CHILDREN?

A. CLPP Blood Lead Testing Surveillance and Response

The CLPP receives blood lead testing data from many laboratories serving local hospitals, clinics and medical offices, as well as the California Department of Public Health (CDPH) surveillance system. Program surveillance of blood lead testing allows the CLPP to offer families of children with detectable lead exposure environmental investigation of lead sources in their home or child care setting and at a certain threshold of exposure, also offer nurse case management and nutritionist services. The CLPP offers environmental investigation in response to children with *any level* of lead exposure detected, with the goal of identifying and eliminating lead exposure sources to prevent further exposure from occurring.



Standard of Care Guidelines on Childhood Lead Poisoning for California Health Care Providers

No Level of Lead in the Body is Known to Be Safe

"Evidence continues to accrue that commonly encountered blood lead concentrations, even those less than 10 mcg/dL, may impair cognition, and there is no threshold yet identified for this effect. Most US children are at sufficient risk that they should have their blood lead concentration measured at least once."
Lead Exposure in Children: Prevention, Detection, and Management • American Academy of Pediatrics Policy Statement, Committee on Environmental Health • Pediatrics 2005; 116: 1036-1046

"Blood lead concentrations, even those below 10 mcg per deciliter, are inversely associated with children's IQ scores at three and five years of age, and associated declines in IQ are greater at these concentrations than at higher concentrations. These findings suggest that more U.S. children may be adversely affected by environmental lead than previously estimated."
Intellectual Impairment in Children with Blood Lead Concentrations below 10 mcg per Deciliter • Richard L. Canfield, Charles R. Henderson Jr., Deborah A. Cory-Slechta, Christopher Cox, Todd A. Jusko, and Bruce P. Lanphear • The New England Journal Of Medicine 2003; 348: 1517 – 1526

"Evidence from this cohort indicates that children's intellectual functioning at 6 years of age is impaired by blood lead concentrations well below 10 mcg/dL, the Centers for Disease Control and Prevention definition of an elevated blood lead level."
Blood Lead Concentrations < 10 mcg/dL and Child Intelligence at 6 Years of Age • Todd A. Jusko, Charles R. Henderson Jr., Bruce P. Lanphear, Deborah A. Cory-Slechta, Patrick J. Parsons, and Richard L. Canfield • Environmental Health Perspective 2008; 116: 243 - 248

Regulations for California Providers Caring for Children 6 Months to 6 Years of Age

California state regulations impose specific responsibilities on doctors, nurse practitioners and physician's assistants doing periodic health care assessments on children between the ages of 6 months and 6 years. This is a brief summary of health care provider's responsibilities. **These regulations apply to all physicians, nurse practitioners, and physician's assistants**, not just Medi-Cal or Child Health and Disability Prevention (CHDP) providers.

ANTICIPATORY GUIDANCE	At each periodic assessment from 6 months to 6 years
SCREEN (blood lead test)	• Children in publicly supported programs* at both 12 months and 24 months • Children age 24 months to 6 years in publicly supported programs* who were not tested appropriately * Examples of publicly supported programs include Medi-Cal, CHDP, Health Families, and WIC.
ASSESS	• If child is not in publicly supported program: Ask: "Does your child live in, or spend a lot of time in, a place built before 1978 that has peeling or chipped paint or that has been recently remodeled?" Blood lead test if the answer to the question is "yes" or "don't know." • Change in circumstances has put child at risk of lead exposure • *Other indications for a blood lead test:*† *Parental request* *Suspected lead exposure (see possible sources of lead exposure on other side)* – *History of living in or visiting country with high levels of environmental lead*

† Items in italics are not in regulations but also should be considered.

CDPH Public Health

B. Anticipatory Guidance and Blood Lead Testing

To aid compliance with state health code requirements for medical providers to conduct anticipatory guidance and order blood lead testing, the clpp conducts outreach and provides tools to ensure that all medical providers:

1. Provide State-mandated Anticipatory Guidance to parents and guardians about the potential for lead exposure to children from 6-72 months of age; and
2. Order State-mandated Blood Lead Testing of all children at one and at two years of age living in San Francisco who meet any of these criteria:
   - Recipients of State-subsidized health care;
   - Live or spend time in housing built before 1978 (85% of SF housing units);
   - Under 72 months old, but were not tested at one and two years of age.

HEALTH HAZARD ADVISORY

衛 生 署 忠 告

AVISO SOBRE RIESGOS DEL PLOMO A LA SALUD

Damaged lead paint on pre-1979 homes and lead-contaminated soil can harm your children's health and brain development.

If you see chipping, peeling, or flaking paint inside or outside your house, or paint chips on the soil, contact the City for help.

We can:

- Help conduct free lead hazard inspections.
- Work with your landlord to fix the damaged paint and lead-contaminated soil.

1979 年以前建築的樓房若出現破爛油漆和泥土受鉛污染的情況，這可能會危害孩子的健康及影響他們的腦部發展。

如果你看見家居內、外有破裂或剝落的油漆，或泥土上有油漆碎片，請聯絡市政府尋求幫助。

我們可以：

- 提供免費的鉛危害檢查。
- 協助你的業主致力解決破爛油漆和受鉛污染泥土的問題。

La pintura a base de plomo que está dañada en casas construidas antes de 1979 o en la tierra pueden ser peligrosos a la salud y el desarrollo del cerebro de sus niños.

Si tiene pintura que está pelándose, astillándose, o despegándose adentro o afuera de su casa, o pedacitos de pintura en la tierra, llame a la Ciudad para ayuda.

Nosotros Podemos ayuda a:

- Hacer inspecciones gratis de los riesgos al plomo.
- Trabajar con el dueño de su casa para reparar la pintura dañada y la tierra contaminada con

SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH • CHILDREN'S ENVIRONMENTAL HEALTH PROMOTION

三 藩 市 公 共 衛 生 署 • 兒 童 環 境 衛 生 促 進 計 劃

DEPARTAMENTO DE SALUD PUBLICA DE SAN FRANCISCO • PROGRAMA DE SALUD AMBIENTAL PARA NIÑOS

311

http://www.sfdph.org/dph/EH/Complaints2EH/default.asp

CLPP provides medical settings with this trilingual *Health Hazard Advisory* as a primary prevention tool. Available both as a wall poster and a flyer, the *Health Hazard Advisory* serves as an anticipatory guidance tool informing patient families what lead hazards look like, how the CLPP can help fix these hazards, and why they should have their child tested for lead. Pediatric and

family practice clinics and medical offices are encouraged to refer parents and guardians who recognize such lead hazards in their homes for the CLPP's home assessment and code enforcement services.

V. WHAT ARE BARRIERS TO ELIMINATING LEAD EXPOSURES?

A. Overarching Challenges

- The inadequate number of state-certified lead professionals in the San Francisco Bay Area who are qualified to identify and correct lead hazards.

- The inability of government-provided financial incentives to property owners for fixing lead hazards, such as the MOHCD lead hazard remediation grant program, to compete with market forces, due to San Francisco's tight rental market.

- The prevalence of lead poisoned children associated with the percentage of San Francisco housing built prior to 1950 (see Figure 11).

Percent of Homes Built Before 1950 Compared to the Average Annual Rate of BLL Cases per 100 Children Aged 0-5 by Census Tract (2008-2012)

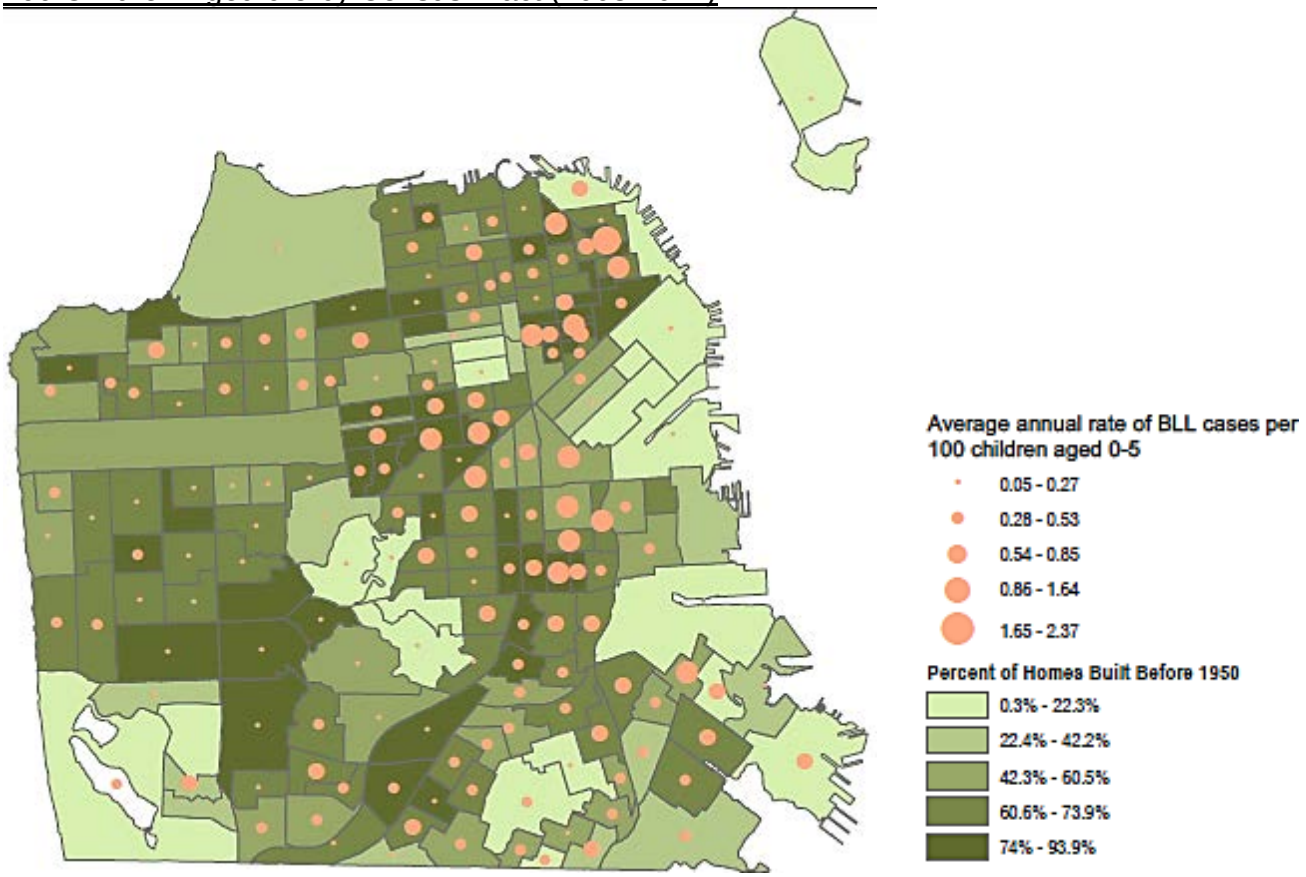


FIGURE 11 Percent of Homes Built Pre-1950 Compared to the Average Annual Rate of BLL Cases ≥ 5ug/dL in Children (0-5) by Census Tract (2008-2012)

- The extreme lack of affordable quality housing makes our 65% rental tenant population fearful of reporting code violations (see Figure 12).

Rent Affordability Gap

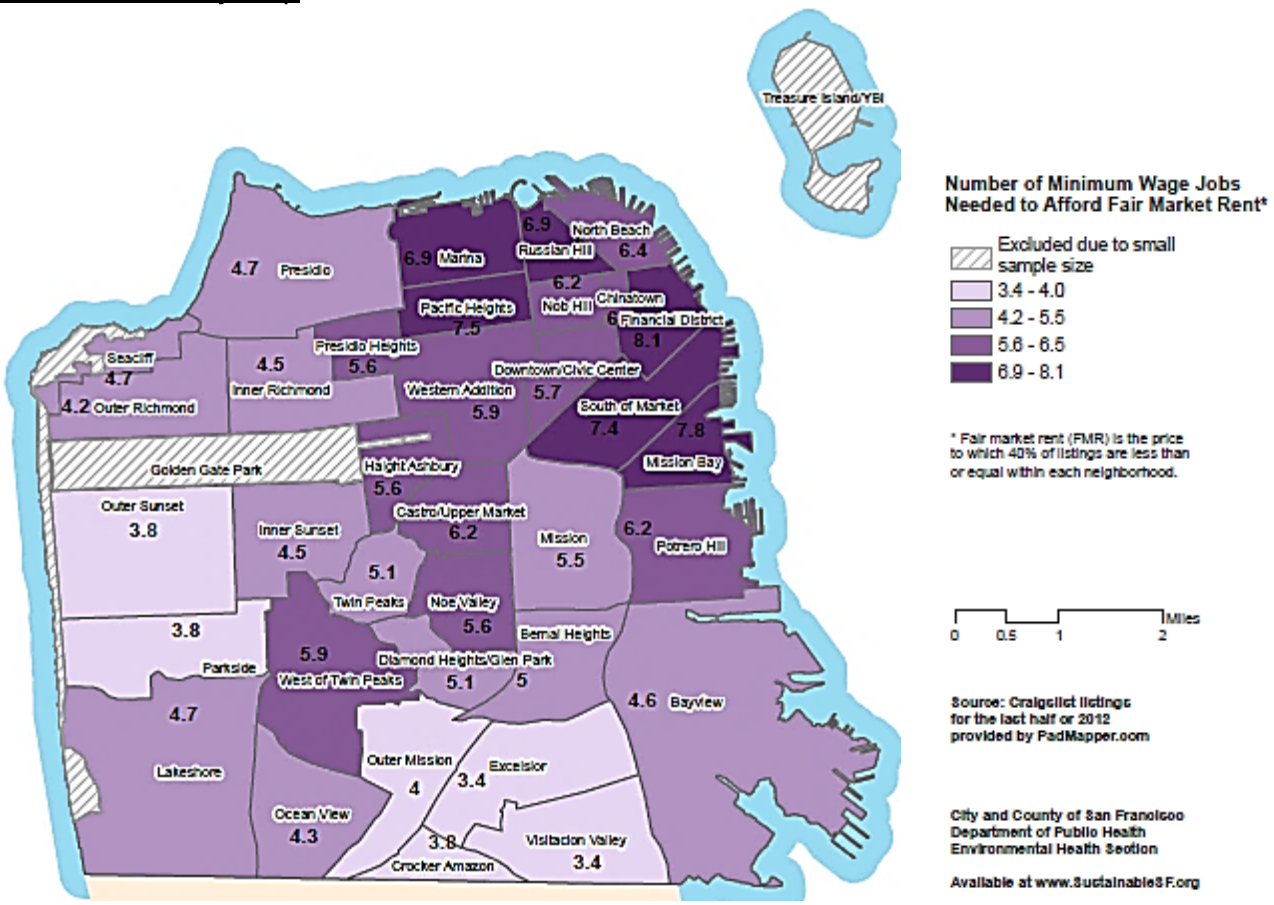


FIGURE 12 Rent Affordability Gap

B. Public Perception Influenced by Media

Lead paint is crushable by thumb pressure and thus able to release milligram-to-gram levels of lead dust into the environment. Lead dust does not biodegrade, but persists in the environment. The enormity of this lead burden to our society is difficult to perceive and acknowledge.

In contrast, the public is subjected to competing mass media messages about the potential for lead exposure from more exotic lead sources (e.g. edible grasshoppers from Mexico) and consumer products (e.g. lipsticks and women's purses), sources not typically available to or ingested by children.

The lead hazard exposures that happen several hundred times a year in San Francisco are not deemed newsworthy. In this environment of 85% older housing, children have a constant potential for exposure to lead from normal hand-to-mouth behavior after touching damaged or disturbed paint, lead-containing dust or soil. These stories are omitted, even when media outlets feature home repair and renovation projects that disturb lead paint and create copious dispersion of lead dust.

C. Consumer Awareness of Lead-Safe Renovations

Despite EPA-required lead training and certification for contractors and renovators being required since 2010, San Francisco's increasingly affluent population is not guaranteed to receive lead-safe specifications from contractors hired to do renovations. Consequently, the CLPP continues to have a growing caseload of children from upper middle class and middle class homes being renovated.

D. Competing Survival Needs of Families

With the high cost of rent in San Francisco, many tenants fear losing the unit in which they are residing. Many tenants have expressed concern that they fear their landlord or master tenant will harass them, evict them or raise the rent if they found out that lead hazard assessment had occurred on their property. Our environmental investigators do their best to alleviate these concerns, informing tenants of their housing rights and connecting them to resources such as the SF Rent Board and tenant advocacy organizations. Nevertheless, tenants still have fears that sometimes make cooperation with the CLPP staff more difficult.

For the majority of the CLPP caseload, an increase in poverty and lack of affordable housing has led to families prioritizing of survival needs. For the vast majority of WIC-enrolled families that voluntarily used the CLPP's comprehensive healthy homes assessment and code enforcement services, their motivation for enlisting our services was the hope that we could provide them healthier housing.

E. Challenges in Policy and Legal Strategies

1. Alignment of City agencies to require lead-safe training of contractors

The CLPP has not been able to align other permit-issuing City agencies to require proof of a permit applicant's federally-required (USEPA) Repair, Renovation and Painting (RRP) training certification as a pre-requisite to obtaining a City permit for activities that would disturb lead-based paint. The San Francisco Department of Building Inspection did not want to take on this policy unless it was specifically written into local law.

2. Insufficient resources to require permanent abatement of lead hazards

In the enforcement of SF Health Code lead hazard prohibition, the CLPP cannot require the permanent abatement of lead hazards such as replacement of lead painted windows, instead allowing for less permanent lead hazard remediation techniques such as paint stabilization. Similarly the USHUD grant funds administered by MOHCD must use a combination of permanent abatement and interim lead hazard remediation measures based on the expenditure cap allowed per housing unit.

In many homes and facilities, such as those maintained by SF Housing Authority or SF Recreation and Park Department, the interim control of lead hazards has not been sustainable, as stabilized paint surfaces will again deteriorate over time. With greater resources, permanent abatement of building components with lead hazards would be a better solution.

3. Outdated lead-in-soil hazard code definition

Our SF Health Code lead in soil hazard definition of 400 parts per million lead is out of date. Current health-based modeling conducted by the Cal/EPA Office of Environmental Health Hazard Assessment demonstrates that 80 parts per million of lead exposure can cause an increase in a child's blood lead level.

F. Challenges Due to Lead Poisoning's Clinical Paradigm

The most significant challenge to primary, secondary and tertiary prevention of lead exposure to children has been the clinical rather than environmental framing of this issue and how it affects children. An environmental framework seeks to reduce risk, even allowing for the Precautionary Principle Policy adopted by San Francisco, which seeks to limit all exposures that may cause harm. While there have been many champions in preventing lead exposure, more than a few medical providers have told the CLPP that they believe we are unnecessarily concerning families by offering home environmental assessments for children who have been detected with low blood lead levels.

During the slow progress of epidemiologic science to prove that any level of lead exposure causes deficits in learning and behavior for children, many, many children had lead exposures that were considered medically acceptable, not causing harm and not warranting "treatment". Chelation therapy is relevant only to significantly higher lead exposures and has its own inherent risks. The only true treatment for lead exposure is removing the lead source, and the only way to find the lead source is by environmental assessment.

G. Challenges in Anticipatory Guidance and Blood Testing

While we have provided the SF medical community with resources for anticipatory guidance, required by state law, we have no way of assessing whether or not anticipatory guidance occurs at ages one and two, and for all children under six who have not yet received a blood lead test. Due to the age of our housing stock, it is probable that all young children in San Francisco reside in, spend time at, receive child care or play in locations that have significant lead sources and potential for lead exposure, and should therefore be offered a lead test.

Anecdotally, the CLPP has been informed by middle class parents with higher education levels that some medical providers have told them that only lower-income families need to be concerned about lead exposure. In the CLPP's experience, it is these more well off and educated parents that have most berated themselves when finding out that their child has been lead exposed. They read the internet, find out that no level of lead is considered harmless, and spend considerable time waiting for lead levels to go down and worrying about their child's future learning impacts.

VI. WHAT MORE CAN CLPP DO TO END CHILDREN'S LEAD EXPOSURE?

A. Advocate for New Affordable Housing for Families with Children

The CLPP Program Manager is participating in the five-year strategic planning effort of the SFDPH Maternal Child Adolescent Health Branch, leading efforts to promote quality affordable housing placements for low-income families with children. Though the Mayor and the City have committed to aggressive development of affordable housing for families, need still greatly outpaces production.

B. Advocate for and Incentivize All Contractors Disturbing Lead Paint to Receive CDPH Lead Certification Training

No State legislative mandate exists at this time, although the Federal mandate requires all contractors disturbing lead paint through renovation, repair or painting work to receive an 8-hour EPA certification training. In San Francisco, we have local Building Code requirements for lead-safe work practices. However, not all contractors and those paying for their services are aware of these requirements. Due to at least fifty thousand San Francisco residential properties having been constructed in the years when lead paint was still widely in use, the need for a contracting work force knowledgeable of lead-safe work practices is enormous, and CDPH certification is the gold standard for that knowledge.

C. Modify the San Francisco Health Code Lead-In-Soil Hazard Definition to be More Protective

The CLPP is committed to changing the SF Health Code definitions of lead hazards, in particular to lower the lead in soil hazard definition to reflect the findings of the child lead exposure modeling study. A revised California Human Health Screening Level for Lead (Review Draft) was made public by the CalEPA Office of Environmental Health Hazard Assessment in May 2009. According to the study, a child's daily hand-to-mouth exposure from playing in bare soil with a lead content of 80 parts per million will cause the child's blood lead levels to rise by 1 microgram per deciliter.

D. Link Lead Hazard Home Assessment to Universal Preschool

As San Francisco commits to providing free universal preschool to all San Francisco children, the CLPP will explore whether this enrollment can be linked to offering or requiring lead hazard home assessments for all participating children citywide.

E. Prepare for Litigation Settlement Implementation

Lead paint industry defendants have appealed the Court decision awarding a litigation settlement to plaintiffs such as the City and County of San Francisco. That Court appeal must be heard and judged, which may take until mid-2017. Assuming the litigation settlement is upheld, it will be distributed via a Request for Proposal process administered by the CDPH Childhood Lead Poisoning Prevention Branch, with designated amounts to be received by each of the ten plaintiff jurisdictions. San Francisco is due to receive $77 million for the permanent abatement of lead hazards in high risk housing to be expended over a mere four-year period. It is urgent that all 10 participating jurisdictions be immediately poised to deliver services authorized by the litigation settlement, involving the following:

- **Proactive Inspection of High-Risk Homes with Young Children**
  San Francisco must continue outreach efforts to identify qualified consultants and offer incentives to those who can become state-certified to conduct proactive lead hazard inspections and assessments that qualify homes for abatement funded by the litigation settlement. Certified Industrial Hygienists were notified of this upcoming opportunity at the December 2014 California Industrial Hygiene Conference.

- **Family and Property Owner Incentives**
  Community-based organizations must be enlisted and incentivized to provide access to families with young children who live in these high-risk homes and to motivate and support rental property owners who currently rent to families to participate in the subsidized abatement program.

- **Workforce Development**
  San Francisco must do outreach and offer incentives to qualified contractors who can become state certified to provide permanent abatement of interior lead hazards, the main activity that will be funded by the litigation settlement. The lead supervisor and worker certifications must be integrated into all City-funded construction job training programs, as there is currently a significant shortage of these personnel.

- **Permanent Abatement of Interior Lead Hazards and Friction Surfaces**
  San Francisco must begin working with local window and door suppliers to anticipate the need for inventory as the replacement of windows and doors is one of the main features funded by the litigation settlement. Furthermore, the CLPP must work with Planning, Building Inspection and the Mayor's Office of Housing and Community Development to ensure that the public encounters a smooth permitting process for this work.

CONCLUSION

All children deserve healthy environments to develop healthy brains and bodies, regardless of the neighborhood they live in and the type of housing their family occupies. In order to protect children from the harmful effects of lead exposure, the CLPP will continue its emphasis on primary prevention of lead exposure through the elimination of lead sources. City policymakers have been extremely helpful in passing legislation that defines the hazards, establishes protocols for ordering the remediation of lead hazards found in the environments where children spend time, and regulating lead-safe work practices on pre-1979 buildings. The future lead paint industry litigation settlement, if sustained in court, will provide the financial resources and infrastructure to permanently remove many interior lead sources.

It is clear that the CLPP has been successful in many areas: Health educators providing multilingual education and outreach have made "lead" a household word in San Francisco. The majority of WIC-enrolled families receiving CLPP services stated they were motivated to request a home assessment due to their concern about their child's risk of exposure to lead. Environmental investigators continue to successfully identify many sources of lead exposure that have resulted in remediation of those lead hazards.

Despite all that the CLPP has accomplished, the pervasiveness of lead hazards in San Francisco's environment and the continuing scientific revelations of lead's ability to damage health and cognition, both demonstrate that there is still work to be done. Given that lead sources exist in 85% of San Francisco homes and that approximately 500-600 children are found to be lead-exposed each year, we need to do more.

APPENDICES

APPENDIX I. San Francisco Health Code Article 26 Comprehensive Environmental Lead Poisoning Prevention Program Mandates

Once signed into law in late 1992, Article 26 required DPH to develop lead hazard reduction regulations, conduct case management and reporting, educate the community and ensure that children are screened for lead poisoning. Other Article 26-mandated activities included:

- Three Advisory Committees: the City Agency Task Force on Lead Issues, the Lead Poisoning Prevention Citizen Advisory Committee, and the Lead Hazard Reduction Citizen Advisory Committee, which met regularly over the first decade of the program.

- The two Citizen Advisory committees were charged with: a) drafting consensus-based legislation to define the scope of DPH regulatory authority, and b) providing oversight to each City and County agency that could potentially control or eliminate lead hazards in its facilities and that could provide lead hazard prevention education to client families with young children.

- The Citizen Advisory Committees successfully became a collaborative effort between community-based organizations, professionals, and several City agencies to prevent children's lead poisoning and provided legislation for Board of Supervisors adoption over a 14-year span, strengthening the City's ability to prevent childhood lead exposure.

- DPH Guidelines, issued in 1995, instructing City agencies how to assess for lead hazards at City-owned or operated sites.

- In a related mandate, Section 1609 provided the opportunity for DPH to issue a Director's Report on the Comprehensive Environmental Lead Poisoning Prevention Program to the San Francisco Board of Supervisors regarding overall progress and the progress of each City agency in addressing lead hazard control of its facilities and lead prevention education with its family clients.

- The Director of Health issued such reports to the Board in 1998 and December 2003, with subsequent hearings at the Board. One of these hearings on the Director's Report resulted in the Director of Health advocating for and the Board of Supervisors establishing an annual $200,000 capital project allocation for proactive lead hazard assessment and control of public facilities in the Recreation and Park Department budget.

- Mandated Public Awareness Strategies:
    - A periodic lead poisoning prevention information bulletin (the *Word on Lead* newsletter);
    - A six-language pre-1978 Lead Hazard Notice in the Tax Collector's billing mandating property owners to warn residents that dwelling units constructed before 1978 may contain lead hazards and providing phone numbers to call for additional information;

- A trilingual lead hazard warning sign mandated for posting in all retail stores selling home improvement products, which indicates that painting and remodeling can expose one's family to lead, and encourages members of the public to ask for a free pamphlet on lead-based paint hazards. DPH audits home improvement stores for the presence of this posting on a semi-annual basis.

- DPH-designated High Priority Lead Reduction Areas so that City departments could direct their resources for primary prevention services, screening, lead hazard reduction efforts, inspections, loans, loan guarantees or grants to properties in these areas. Prioritization was to be based on factors such as: (1) the number and severity of cases of elevated blood lead level children; (2) the age and condition of dwelling units; (3) the results of any inspections carried out in the homes of children with lead poisoning; (4) income levels; and (5) the historic and current presence of known sources of lead such as highways or industrial facilities. This mandate was the basis for the CLPP's proactive survey of exterior paint conditions in the Mission District from 2010-2011, the neighborhood with the greatest number of lead-poisoned children.

APPENDIX II. Two Decades of CLPP Strategies and Achievements

Since February 1993, over a 22-year period, the Childhood Lead Prevention Program (CLPP) has implemented lead hazard prevention strategies to protect San Francisco's children from lead exposure. The following is a summary of key strategies used throughout the program's history and related achievements.

A. Public Awareness and Targeted Outreach Strategies

Needs Assessment and Program Evaluation to Promote Public Awareness of Lead Poisoning Prevention (1992-1999)

At the outset of this program, from 1992-1996, the CLPP collaborated on a US Centers for Disease Control (CDC) grant with the State CLPPB and Alameda County CLPP, which included an educational campaign with the Safeway grocery chain and mass media coverage of lead issues and local campaigns by English, Spanish and Chinese-language TV, radio and print outlets. Local media coverage included blood lead screening conducted at the Geneva Towers public housing site and door-to-door in the Mission District, the Safeway campaign, lead in construction training, a HEPA vacuum loaner program, focus on lead in mini-blinds, ceramics, public housing and playgrounds, and the general promotion of lead hazard prevention and blood lead testing of children under six years old.

The CDC grant allowed the CLPP to fund two community-based initiatives in San Francisco: 1) The CLPP issued mini-grants to 12 community-based partners in San Francisco, and 2) in 1993, the CLPP conducted door-to-door lead screening outreach in the Mission District, the district with greatest case finding, in an effort to identify young children with lead poisoning and to overcome barriers to blood lead testing. The

CLPP provided home-based and special event blood lead testing for 418 children and provided parents with lead prevention education and referrals to comprehensive health care services for their children. The screening project found 8.5% of screened blood lead levels were >10 µg/dL. It was also found that the greatest occurrence of elevated lead levels was in one year-olds.

In 1995, the CLPP initiated a major marketing campaign on the dangers of lead with a public relations and advertising firm, utilizing commercial tools such as light pole banners, labels on paint cans sold at home improvement stores, and commercial direct mail offers for lead-safe work supplies. The first phase of the campaign involved notifying property owners, managers, and contractors about the upcoming campaign by conducting focus group sessions and workshops, sending out letters and articles, and developing informational materials for landlords, property owners, and supply stores. The second phase involved reaching out to the general public through press conferences, bus advertisements, print materials, and public service announcements on television and radio. The Marketing Campaign successfully increased the general public's awareness of lead poisoning, as indicated by the next year's evaluative survey.

In 1996, the CLPP conducted a survey to determine what Hispanic, African American and Asian/Pacific Islander adults know about child lead poisoning, what preventive actions they have taken and whether those surveyed at family-serving community agency sites offered lead prevention education had a different level of knowledge or prevention practice from respondents surveyed in public locations. Bilingual health educators interviewed a total of 607 adults in English, Spanish or Cantonese, in neighborhoods where children faced increased risks for lead poisoning. Half of the respondents were interviewed in family-serving community agencies where the CLPP provides lead prevention education, and the rest in public places, including street corners, bus stops and laundromats. The majority of respondents (72%) had heard of lead poisoning, with the general public most frequently mentioning television (33%) and newspapers (18%), while community agency respondents mentioned doctors (31%), WIC programs (26%) and television (26%).

Paint was named as a source of lead in the home more frequently than any other source (58%). Lead in water was the next most frequently mentioned source (33%). One significant finding was that individuals within all three groups erroneously believed that lead in water was one of the main sources of lead exposure in San Francisco.

Community agency respondents were more likely than public respondents to have taken steps to prevent lead poisoning such as keeping paint intact (26% vs. 10%) and testing children (28% vs. 7%). The results of the survey assisted in improving the educational component of the CLPP's scope of services.

In 1999, the CLPP hired a program evaluator to identify through surveys and interviews where the program was effective or needed increased effort to meet community needs, particularly in the seven zip codes with the highest incidence of reported childhood lead poisoning. The evaluator conducted 597 household phone surveys, which included 210 parents, 414 tenants, 29 rental property owners or managers, and 30 contractors doing business in San Francisco. Among tenants, a significant finding was that most reported not receiving the mandated notification on lead hazards from their landlords (66%). Most of the contractors were aware of the new San Francisco law requiring safe work practices when disturbing lead-

based paint, with most construction workers learning about lead-safe work practices through their union. Non-union contractors learned about lead safety through job sites and the newspaper.

Overall, findings from the household survey indicate the majority of the sampled residents, both parents and non-parents, are familiar with the problem of lead poisoning among children (89%), have a basic understanding of how children are exposed to lead, and generally understand that lead poisoning can cause brain damage, learning disorders or affect the nervous system of children (46%). Many had taken precautions to prevent lead exposure in their homes (61% of parents or child caregivers and 27% of non-parents), and tenant respondents overall were willing to ask their landlord to fix a lead problem in their home (83% of parents and 90% of non-parents). Among tenants surveyed, 84% said the city should require landlords to fix lead hazards in rental properties. In this same time period, the Mayor's Office of Housing (MOH) was awarded its first of several grants from USHUD to conduct lead hazard remediation in the homes of children under six, including private housing and family-based child care settings. The CLPP developed both cable TV ads and MUNI bus ads to promote the public's awareness of lead hazards and access to the CLPP and MOHCD services.

Milestones in Promoting Property Owner and Resident Knowledge of Regulatory Requirements (2000-2009)

From 2005 through 2007, the CLPP created the Youth Civic Engagement Project (YCEP), training small groups of high school students to promote healthy neighborhoods in San Francisco. The second cohort of the YCEP created a cable TV public service announcement to promote property owner window replacement in pre-1979 buildings.

In January 2007, the CLPP issued and mailed the *Property Owner Quick Guide: Lead Paint Hazards on Your Property* to the Tax Assessor's entire database of Residential Rental Property Owners. A second mailing provided this same audience access to Spanish and Cantonese language versions of the *Quick Guide*. The CLPP worked with the SF Apartment Association to survey their members on whether they remembered receiving the guide and whether they found it helpful. A nearby jurisdiction on the peninsula asked if they could copy and adapt the guide for property owners in their City. Remaining copies were made available to the public through the SF Public Library.

In 2007, the CLPP staff conducted the Pharmacy Outreach Project to educate residents about the health effects of lead poisoning and the importance of lead screening for young children. The program targeted adults and parents who were customers of retail pharmacies because it was thought that consumers at these locations would be receptive to preventive health information. The program focused on the neighborhoods of Excelsior, Outer Mission, and Bernal Heights, which are at high risk for lead exposure. Those who we spoke with learned about screening resources, services available through the DPH, sources of lead and the risks of lead poisoning.

In 2010, the CLPP helped lead a regional campaign promoting awareness of the new federal Environmental Protection Agency (EPA) Renovation, Repair and Painting Rule (RRP). Effective April 22, 2010, the EPA RRP Rule requires contractor training and certification in specific work practices to prevent lead contamination for any work that disturbs lead-based paint in homes, child care facilities and schools built before 1978. The DPH participated in a multi-county awareness campaign coordinated by the Get the Lead Out Coalition to inform consumers that they should ask to see a contractor's EPA RRP certification before hiring their services. The RRP rule also requires contractors to provide the EPA pamphlet, *Renovate Right*, to homeowners, owners and operators of child care facilities and schools built prior to 1978 and provide information to parents or guardians of children under age six that attend.

The CLPP amplified this outreach locally by placing a three-language insert (English, Chinese and Spanish) into the San Francisco Department of Election's Voter Information Pamphlet. The CLPP also translated the EPA *Renovate Right* pamphlet into Chinese for the benefit of San Francisco's significant Chinese-reading population.

Primary Prevention Outreach Focus (2010-2014)

In 2010, the CLPP established outreach facilitated by the DPH Birth Records office, providing trilingual brochures to each family applying for a San Francisco birth certificate, whether in person or by mail. This outreach method continues currently.

In 2013, the CLPP worked with partner Mayor's Office of Housing and Community Development (MOHCD) to promote the HUD Grant resources to all state-licensed family child care providers in San Francisco, including trilingual presentations via a childcare umbrella agency, the San Francisco Children's Council. In addition, the CLPP and MOHCD reached out to all Section 8 property owners under the oversight of the San Francisco Housing Authority to offer HUD grant services.

In 2013, the CLPP created Chinese-language translations of multiple Federal and State educational materials aimed at training contractors and laborers in the EPA Renovation, Repair and Painting (RRP) Rule, with the aim of assisting MOHCD to conduct Cantonese-language RRP worker trainings.

In October 2013, the CLPP hosted two showings of the documentary film, *MisLEAD*, for the public and for Northern California-based CLPP programs.

B. Policy and Legislative Strategies for Lead Hazard Source Reduction

Establishing Regulatory Authority to Conduct Environmental Investigation in the Homes of Lead-Poisoned Children (1995)

In 1991, San Francisco DPH began investigating homes of children with BLLs ≥20 µg/dL. Once the CLPP was established, from 1995 the protocol was revised to include environmental investigations for cases persistently ≥15 µg/dL. From January 1992 to December 1995, 154 cases at 125 residences received environmental investigation, which represented 86% of identified cases. Those lost to investigation were usually due to the child moving outside of San Francisco before the investigation could be initiated. Samples were collected from interior and exterior paint, dust, soil and water. Of these samples, 44% of interior paint has hazardous lead levels, 68% of exterior paint, 63% of soil, 36% of dust and 0% of water sampled.

In July 1995, the Director of Health gave the CLPP the authority to cite lead hazards identified during lead poisoning case investigation as public health nuisances. As a result, the CLPP began issuing Notices of Violation (NOV) requiring owners of investigated properties to remediate identified lead hazards and to use prescribed lead-safe work practices. Each case was required to pass the CLPP clearance testing before the owner's obligations were met. The ability to issue NOVs resulted in greater property owner compliance in lead hazard remediation.

In October 1996, the Lead Hazard Reduction Citizen Advisory Committee's draft legislation was passed by the Board of Supervisors, strengthening the Health Director's authority to respond to lead hazards in the homes of lead-poisoned children beyond issuing NOVs. This includes legal penalties for non-compliant owners, authority to order temporary relocation during remediation paid for by the rental property owner, and prohibition of rent increases related to lead hazard remediation.

Data analysis indicated that the CLPP's lead hazard findings included many friction and impact surfaces, namely windows and doors. The replacement of these components became a priority, using the MOHCD HUD grant and other City incentives.

Establishing regulatory authority to prevent lead hazards during the disturbance of lead-based paint (1997&2004)

The greatest number of complaint calls to DPH involved unsafe repair, renovation and paint prepping activities. Furthermore, the CLPP investigations of lead-poisoned children's settings had repeatedly demonstrated how renovation activities have contributed to case children's lead dust exposure. In 1997 and again in 2004, the Board of Supervisors passed legislation proposed by the Lead Hazard Reduction Citizen Advisory Committee, granting the San Francisco Department of Building Inspection (DBI) authority to regulate lead-safe work practices in pre-1979 buildings. The 1997 law concerned only building exteriors and steel structures, while the 2004 amendment expanded lead-safe work practice requirements to residential rental and child care uses. The DBI has the authority to presume the presence of lead-based

paint in all pre-1979 buildings. San Francisco was the first California jurisdiction to pass such a law, and it remains in effect despite later state laws intended to mandate lead-safe work practices.

Pilot and policy establishing lead testing of tap water for WIC-enrolled families (1998-1999)

From May 1998-April 1999, the CLPP collaborated with the Public Utilities Commission (PUC) Water Quality Bureau and the DPH Women, Infants and Children (WIC) Supplemental Nutrition Program, to offer free tap water testing for lead to over 5,000 WIC-enrolled families. This offer was accepted by approximately 1,400 WIC-enrolled families, and resulting water tests demonstrated that lead in San Francisco tap water was not of concern. Currently, WIC-enrolled families may still request to have their water lead-tested free of charge, courtesy of PUC Water Department vouchers provided to the WIC program.

Health Code amendment to define lead hazards as a prohibited public health nuisance (2001)

In 2001, Article 11, Section 581b of the San Francisco Health Code was amended to include Lead Hazards as a prohibited public health nuisance, providing the CLPP proactive lead hazard code enforcement authority. This amendment for the first time gave the CLPP authority to issue notices of violation to settings where children under six could be exposed to lead hazards, independent of whether a specific child had been tested for lead exposure. The CLPP has authority to presume the presence of lead-based paint in all pre-1979 buildings, and to define poor paint conditions and lead dust findings as lead hazards in a Notice of Violation. Furthermore, the CLPP orders such lead hazards to only be remediated by State-certified workers and then inspected at completion by State-certified lead risk assessor/inspectors.

Working to remove lead-contaminated candies from retail locations (2005-2008)

In 2005, after Southern California's *Orange County Register* published a series of articles about lead-contamination of Mexican candies, particularly those containing chili powder, the CLPP conducted community surveys of Mission District residents about their consumption of Mexican chili-containing condiments and candies and found such food products were consumed on a regular basis. The CLPP also worked with a community-based organization, La Raza Centro Legal, to survey 414 retail stores with candy or food licenses issued by DPH Environmental Health from March-May of 2005. Survey findings were that 106 of the 414 stores (26%) sold candy that had been identified as potentially containing lead. Survey data within the two zip codes (94110 and 94112) that were likely to have residents consuming chili condiments and candies found that 87 of 172 stores contacted (51%) sold candy that may contain lead.

Following this survey, the CLPP mailed a letter to all vendors in San Francisco with a candy or food license warning them of the identified lead-containing candies and requesting that store owners and managers remove the candies from their shelves and refrain from selling them.

The CLPP made a follow-up survey to determine if vendors had removed these candies in response to our letter warning about the potential hazard of these candies. The follow-up survey indicated that 61 stores removed the candies (a 57 % reduction). In the zip codes of greatest concern (94110 and 94112), 41 stores removed the candies (a 52 % reduction). The CLPP program staff distributed 18,840 posters and flyers describing these candies and explaining the potential hazards that they pose to children. This information was given to schools, childcare providers, dentists, and medical providers.

Subsequently, the State passed regulations requiring the ongoing testing of imported candies, with website and hazard alert disclosure of lead findings. In 2008, in conjunction with a Public Health Trust grant awarded to the Get the Lead Out Coalition, the CLPP worked with La Raza Centro Legal, a San Francisco non-profit community law center, to again visit candy retailers in the districts of greatest concern. In this round of outreach, the goals were to have stores agree to post a bilingual English-Spanish window sticker stating their pledge to only sell lead-free candies.

Retailers were also given tools for identifying which candies had been tested by the State lab and found either lead-free or lead-contaminated. Additionally, a bilingual English-Spanish factsheet was developed to inform the public how to access State candy lead testing data online, and this factsheet was also distributed as part of the grant project.

Incorporating lead hazard inspections into proactive comprehensive healthy home visits for WIC-enrolled families (2008-current)

In 2008, the CLPP initiated a Healthy Homes Environmental Assessment and Education Project offered to approximately 6,000 WIC-enrolled families. This provided a proactive approach to identifying lead and other hazards in the homes of low-income families at greatest risk of environmental health hazards. Through 2010, 64 families received services and 75% of the participating families had a total of 137 hazards identified, including damaged lead paint, pests, mold, water leaks, second-hand smoke migration, clutter, humidity, inoperable windows, bare soil, bird waste, excessive use of insecticide, offensive odors and exposed wiring. All hazards were referred to code enforcement agencies as needed, and the CLPP follow up was conducted to ensure that hazards were corrected.

In the CLPP's published report of findings, the neighborhoods of the assessed homes were also analyzed for healthy community built

environment indicators such as overcrowding, outdoor air pollution, access to positive resources such as elementary schools, food markets and parks, as well as access to a negative resource, fast food establishments. The GIS analyses validated the CLPP observations that low-income families are subject to worse neighborhood conditions in addition to worse housing conditions that families of higher income.

For example, as compared to areas outside the WIC recipient neighborhoods, there was an increase of 7.12% of households found living in overcrowded conditions. Also 82% of WIC participants lived in a traffic hazard zone as compared to 68% citywide, providing the WIC population greater exposure to pedestrian injuries, and less healthy air quality and ambient noise conditions.

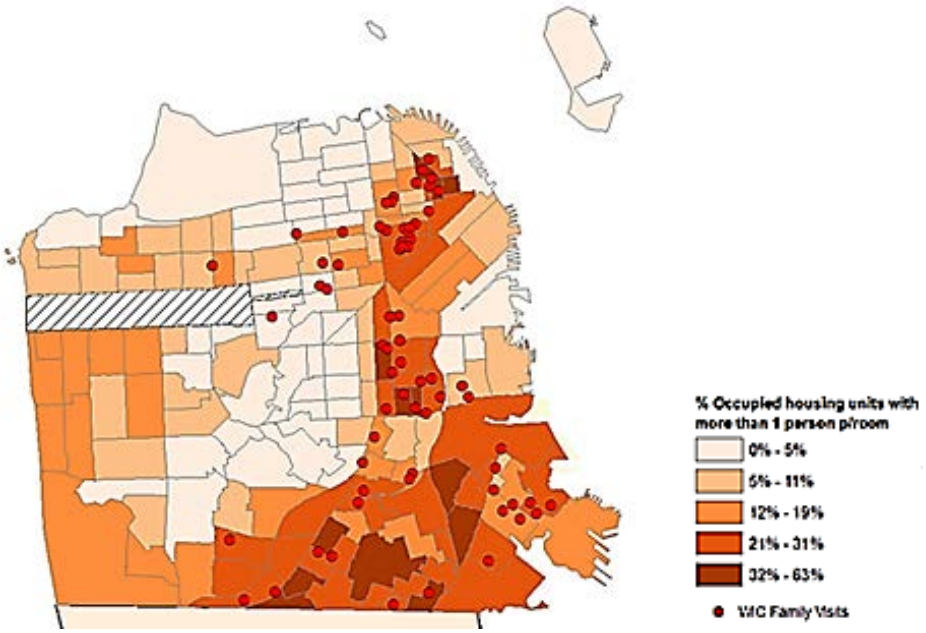


FIGURE 13 Percent of Occupied Housing Units with More Than 1 Person per Room

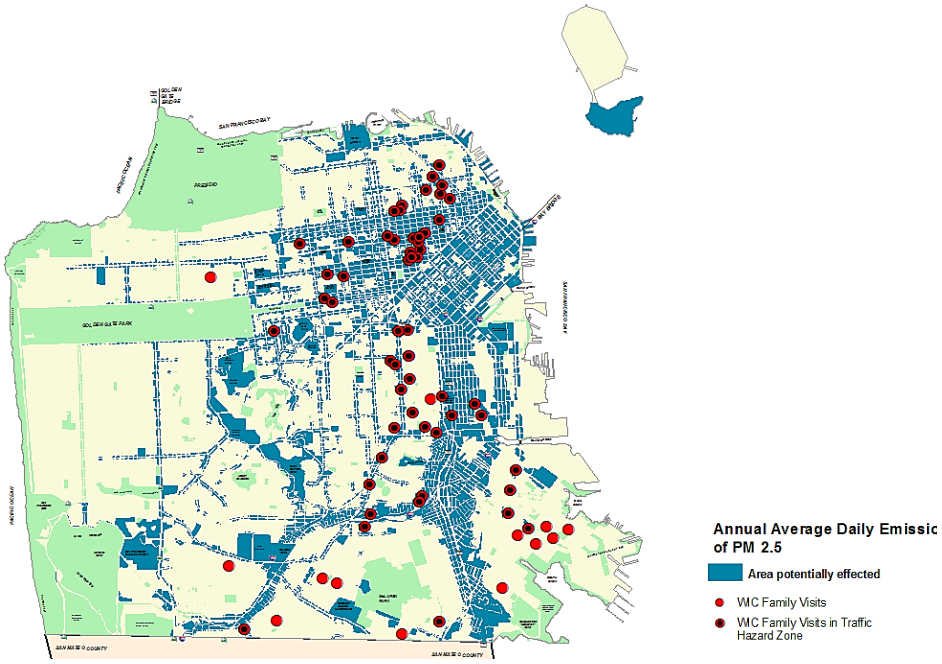


FIGURE 14 Annual Average Daily Emissions of Fine Particulate Matter

Policy established to proactively assess exterior paint conditions in High Priority Lead Reduction Areas (2010-current)

From 2010-2012, the CLPP staff assessed exterior paint conditions in all Mission District census tracts, issuing 96 Notices of Violation for lead hazards. The CLPP implemented the Mission District Project due its standing as the location with the highest rate of lead exposed children, as well as the district's high percentage of multi-unit housing as well as significant child population. More recently, the CLPP staff assessed a North Beach census tract based on the same criteria, resulting in 16 Notices of Violation.

C. Secondary Prevention Strategies

Individual providers educated about lead and direct reporting from blood testing labs established (1994)

The CLPP began educating individual providers about CDC lead screening guidelines and case management policies and procedures. The program specifically targeted pediatricians who treated patients in high risk, low income eligible areas, and who were eligible for MediCal or Child Health & Disability Prevention (CHDP) benefits.

Physician education and outreach project conducted (1995)

The CLPP's Public Health Nurse began systematically visiting every San Francisco CHDP-enrolled medical provider and contacted every major medical group providing pediatric care. The project aimed to discover what amount of screening was being done by physicians, what the opinions of physicians regarding lead screening were, and building a personal relationship between physicians and the CLPP. Furthermore, the project aimed to encourage more effective use of CHDP screening guidelines, improve screening reporting to the CLPP, and ensure physicians were aware of the CLPP case management services. Through this program the CLPP succeeded in increasing screening rates and building a closer personal relationship with physicians in the city.

Evaluation of CLPP environmental investigation data and blood lead surveillance (1991-1997)

The 1998 *SF Childhood Lead Prevention Program Data Evaluation* report presented the findings of a comprehensive analysis of blood lead screening/surveillance and environmental data captured by the Childhood Lead Prevention Program from 1991 to 1997. The purpose of the evaluation was to:

- Fulfill the mandates of the Comprehensive Lead Poisoning Prevention Ordinance (SF Health Code, Article 26, Sections 1620-1622).
- Analyze screening and case finding trends over time.
- Create a report to fulfill data requests.
- Assist with the development of the City's blood lead screening policy.
- Provide evidence of lead-paint hazards in the City.
- Promote policy and legislation that reduce sources of lead hazards.

Environmental Findings:

Between July 1991 and May 2004, more than 2500 environmental samples were collected as part of the SFDPH routine responses to lead complaints and blood lead testing reports. Environmental lead sources identified include: lead-based paint, lead contaminated dust, lead contaminated soil, home remedies, pottery, take home exposure, hobbies/other, and in one sample, lead in water.

A high percentage of homes had at least one interior lead-based paint hazard (54%) and/or an exterior lead-based paint hazard (40%). A lead dust hazard was identified in 29% of the homes investigated. Other hazards identified by percentage of homes include: soil (19%), take home (14%), hobby/other (8%), home remedies (5%) and pottery (3%).

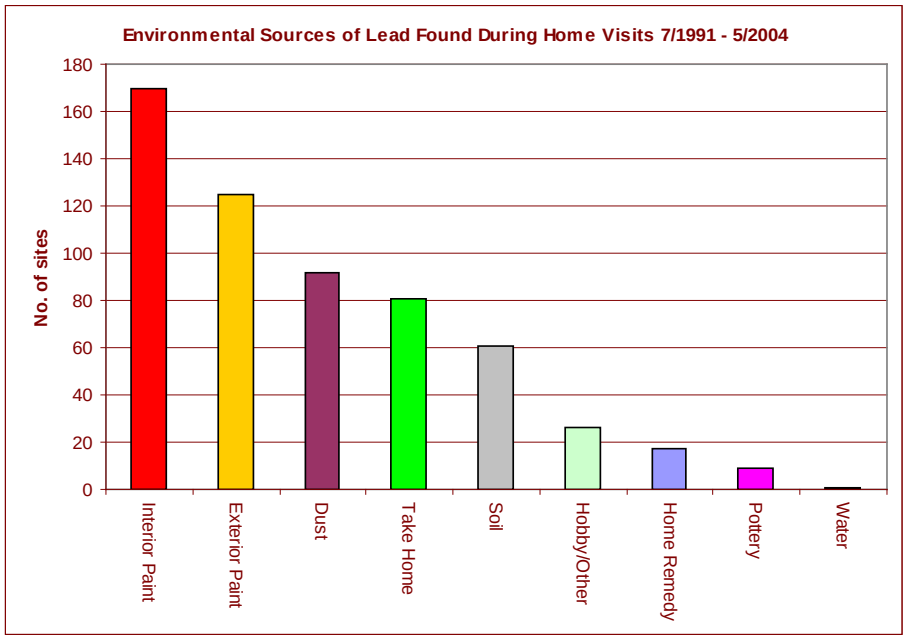


FIGURE 15 Environmental Sources of Lead Home Visits 1991-2004

A particular site may be represented in more than one bar of this graph.
For example, if a site had both a soil hazard and a pottery source it would appear in both the bar for soil and the bar for pottery.

Child Lead Exposure Findings:

Blood lead screening in San Francisco had increased every year since the program's inception, and after witnessing an increase of over 100% in case findings from 1991 to 1995, the number of cases decreased significantly for the first time in 1996. The 1998 CLPP report stated:

"A cursory look at our screening and case finding data might lead people to assume that we are solving the lead poisoning problem and making it go away. However, such an assumption is dangerously misleading, especially here in San Francisco, for the following reasons:"

"The source of the problem still exists, and will always exist, because lead is ubiquitous in the environment. The primary source of lead for children under six years of age is lead-based paint, which can be found in most homes built before 1978. Fully 94% of SF housing was built before 1978, and two-third of the housing

(68%) was built before 1950 when lead-based paint, containing up to 50% lead, was in widespread use. A common misconception is that the removal of lead from household paint and gasoline in the United States has been so successful that lead is no longer a health threat. Once lead is mined and introduced to the surface environment it does not go away. When lead paint deteriorates, peels, or is disturbed, lead dust is produced. Lead-dust hazards are frequently created when homes are repainted, remodeled, or renovated using unsafe work practices, such as dry scraping or sanding of surfaces with lead-based paint. Exterior paint tends to have a much higher lead content than interior paint and is often in worse condition; therefore it poses a greater threat to children than interior paint. For these reasons, lead-based paint, dust, and soil hazards are prevalent in the City due to the age and extreme density of our housing stock."

"Although screening numbers have increased, a significant number of eligible children have not been screened. Screening in San Francisco increased 145% from 1991 to 1996 due to education and outreach efforts by the CLPP to individuals, community-based organizations, and health care providers. Although this increase is significant, there is still a huge gap between the number of children eligible for testing and the number of children screened. Only 5-15% of one and two year olds estimated to be eligible for blood lead testing had test results reported to the CLPP between 1991 and 1996."

Anticipatory Guidance Campaign with Medical Providers (2003)

Anticipatory Guidance promotes parental knowledge of lead as a systemic poison with long-term health consequences, as well as potential lead sources and exposure pathways in their child's environment. The guidance should also stress how oral exploration common to infant and toddler developmental stages may lead to lead exposure. Finally, anticipatory guidance motivates parents to seek lead testing, particularly for their one and two-year-olds, and the Director urged providers to order blood lead testing according to State requirements, emphasizing that because 63% of San Francisco's housing units were built and painted pre-1950 and 91% built and painted pre-1980, when residential lead paint became discontinued, virtually *all* children in SF are at risk of lead exposure.

Because medical providers are an important resource for parents, and often can encourage healthy behaviors back home, the Director of Health assisted the CLPP to conduct an Anticipatory Guidance Campaign during Public Health Week of 2003. In his letter to all San Francisco pediatric and family practice medical providers, the Director summarized recent State law requiring that medical providers give anticipatory guidance on lead poisoning prevention at each periodic assessment from six to 72 months of age. The letter also served to assist medical providers with

this requirement, by enclosure of English/Spanish and English/Chinese bilingual posters which can be used in treatment and waiting rooms, as well as other patient education resources.

Lead Care Analyzers distributed to community clinics (2008-2010)

In 2008, the CLPP's public health nurse worked with several community clinics to place Lead Care II Analyzers at their site. As a State-approved portable lab, the Lead Care II allows these clinics to draw finger stick samples that can be analyzed immediately onsite with the Lead Care II and its reagents. These clinics desired that capability to help families who would otherwise have to travel to a remote lab or were unlikely to follow through with the doctor's order to visit the phlebotomy lab. In addition, the Lead Care II finger stick method is more acceptable to those who culturally do not accept venous blood draws as it is perceived as less invasive.

APPENDIX III: Consumer Products with Lead Content

Direct ingestion of lead sources, whether a lead paint chip or a consumer source, may cause a distinctly high blood lead level. An X-ray may be ordered to look for a swallowed object. For blood lead levels detected greater than 45 ug/dL, the child may be referred for chelation therapy by their primary medical provider.

In 2004, a child in Oregon had a BLL of 123 μg/dL after ingesting a necklace with high lead content. The most recent U.S. fatality from acute lead poisoning, in 2006, was that of a Minnesota child who swallowed a heart-shaped metallic charm containing lead; the charm had been attached to a metal bracelet provided as a free gift with the purchase of shoes manufactured by Reebok International Ltd., later recalled from the market by Reebok and the Consumer Product Safety Commission.

Three such websites for consumer product lead alerts include: CDPH Food and Drug Branch Recalls for "Lead in Candy", CDTSC "Lead in Jewelry" Advisory, and US Consumer Product Safety Commission Recalls for "Hazard:Lead".

CLPP's lead source investigations occasionally reveal consumer products with lead content, and CLPP provides educational material highlighting these lead sources:

- The CLPP programs are alerted by State and Federal agencies to the existence of imported lead-contaminated consumer sources such as traditional home remedies, non-Western medicines, cosmetics and spices, and on occasion, these lead sources have been identified in our caseload.
- Another semi-frequent source found by the CLPP investigations has been brass objects and artifacts mouthed by children, where the lead component of brass is leached out by the child's saliva.
- The CLPP has not encountered food cooked in lead-glazed ceramic pots, but once found infant formula stored in a lead-glazed ceramic pot.
- Although the CLPP has found children who ate suspect import candies and chili powders, mouthed lead-leaching soft plastic cables or handled lead-painted toys, none of these sources has been an isolated cause of lead poisoning in our caseload.
- Lead in water has been a non-existent source of lead exposure for our caseload.

- On a single investigation, the CLPP encountered a child whose sole hand-to-mouth exposure came from touching the soft leaded features decorating a glass cabinet, and another single investigation identified a child who had access to touching and mouthing lead bullets.

LEAD is a Poison!

The most common sources of lead are pre-1979 house paint, dust, soil, and take-home exposure from lead-related jobs and hobbies.

Nevertheless, some consumer products can also contain lead.
To learn about recalled items, visit the Consumer Product Safety Commission at www.cpsc.gov

Common sources of child lead poisoning

Damaged paint in homes built pre-1979

Cracked or peeling paint creates paint chips and lead dust that can be accessible to children in the home and through contact with bare soil.

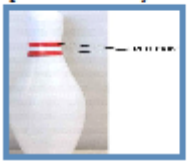

Lead dust from work and hobbies

Working in construction, painting, gardening or recycling centers as well as doing activities like fishing or making jewelry, pottery or stained glass can track lead dust back to the house. Shower as soon as getting home.



Children's Toys

Lead has been found in the paint, glaze & metal parts of various toys.



Children's Clothing

Coatings, jewelry & decals on some children's clothing.

Home Remedies

Some remedies from foreign countries contain lead.

Unsafe Work Practices

Homes can become contaminated with lead due to improper remodeling. Always hire a lead-certified contactor to do home repairs. Requiring lead safe work practices in your home will protect children, pets and the environment.



Children's Art Items

Some children's arts and crafts products are recalled due to violation of paint standard. Unless labeled "Meets ASTM D-4236".

Handmade & Imported Ceramic Ware

May have lead glaze. Do not purchase if item has Prop. 65 Warning.

Makeup

Some lipsticks have been found to have lead, as well as eyeliners from the Middle East.

Metallic Jewelry & Keys

Some necklaces, rings, bracelets, charms and keys contain lead. Swallowing an item can be fatal.

Imported Candies

Numerous foreign candies have been found to contain lead. Consider fruit instead of candy.

Soft Cables & Cords

Lead in the plastic coatings may be swallowed when cables/cords are sucked on or chewed.

For more information, contact:
Children's Environmental Health Promotion Program
SF Department of Public Health
1390 Market Street, Suite 410,
San Francisco, CA 94102
311
www.sfdph.org/dph/eh/cehp/lead

Lead Poisoning

- Affects learning & behavior
- Damages organs
- Causes dental cavities
- Decreases hearing ability
- Decreases intelligence

Take Action!

- Ask your doctor to test your child for lead at 1 & 2 years of age or once before the age of 6
- Avoid sources of lead
- Give your child vitamin C, calcium & iron rich food
- If your home has damaged paint tell your landlord to fix it or call our program for a free home inspection

It's your child's health–protect it!

POPULATION HEALTH DIVISION
SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH

APPENDIX IV. Medical Management Guidelines

CDPH contracts with the CLPP to provide public health nurse (PHN) case management and registered environmental health specialist (REHS) environmental investigation for blood lead levels (BLL) of 15 ug/dL and above, which is contrary to current US Centers for Disease Control guidance. As stated earlier in this report, systematic review of childhood lead poisoning studies have indicated there is no threshold that can be considered a safe BLL and therefore the clinically acceptable level of lead exposure is "non-detected." At this time, most laboratories have a limit of detection equal to 2 micrograms per deciliter.

When the CLPP is notified of blood testing results, the Program's follow up response is based on the severity of the blood lead level (BLL), corresponding to State mandated minimum follow up:

- A BLL ≥70µg/dL: An emergency value requiring immediate hospital or emergency room attention. The CLPP contacts the primary care provider (PCP) immediately and the state CLPPB as soon as possible. The CLPP assigns the PHN case manager and REHS environmental investigator to visit the patient's home within 24 hours of referral. Based on the CLPP referral, a Nutritionist consult with the family will follow.
- A BLL 45-69 µg/dL: Requires immediate medical follow up and potential chelation therapy to be ordered by patient's health care provider in consult with the CLPPB-designated SF-based chelation expert. The CLPP contacts the PCP and the CLPPB as soon as possible. The CLPP assigns the PHN case manager and REHS environmental investigator to visit patient's home within 48 hours of referral. Based on the CLPP referral, a Nutritionist consult with the family will follow.
- BLL 20-44 µg/dL: PHN will ensure retesting every month until the child's BLL is ≤20 µg/dL, recommend the child to California Children's Services if he/she has no health insurance or needs chelation therapy. The CLPP assigns the PHN case manager and REHS environmental investigator to visit the patient's home within one week of referral. Based on the CLPP referral, a Nutritionist consult with the family will follow.
- BLL 15-19 µg/dL: The CLPPB designates this response if the BLL is persistent for several months, but the CLPP will assign resources at the first BLL finding in this range. The CLPP assigns the PHN case manager and REHS environmental investigator to visit the patient's home within two weeks of referral. The PHN will ensure the affected child has medical evaluation and management and discuss the option of iron therapy with medical provider. Based on the CLPP referral, a Nutritionist consult with the family will follow.
- BLL 10-14 µg/dL: The CLPP assigns an environmental investigator to visit the patient's home within two weeks of referral. The investigator also provides nutrition counseling.
- BLL 5-9 µg/dL: The child's parents are called by one of our program's environmental investigators to offer the family an environmental inspection to identify lead hazard sources and to order remediation of lead hazards by the property owner.
- BLL 2-4 µg/dL: A letter indicating the child's BLL finding is sent to the child's parents offering the CLPP's environmental investigation to identify lead hazard sources and order their remediation by the property owner. Educational materials in English, Spanish or Chinese are included.

Blood Lead Levels

What Do They Mean?

The blood lead test gives an idea of how much lead your child has been recently exposed to in the environment. Children with lead in their blood may not look or act sick, but learning and behavior problems may show up years later when they go to school.

Blood Lead Test Result in micrograms per deciliter (mcg/dL)	**What Does It Mean?**	**When To Get Another Blood Test?**	**What Can You Do?**
0 	**Your child has no detectable lead in their body.**	Ask your doctor to test your child for lead at 1 & 2 years of age or once before the age of 6.	☐ Avoid sources of lead ☐ Give your child vitamin C, calcium & iron rich food ☐ Wash hands and face before eating ☐ Keep home paint intact and dust free ☐ Use a wet sponge or mop to clean floors and windows
1-4 	**No amount of lead in the body is normal or safe.** Your child has been exposed to small amounts of lead.	Retest if your child's risk of lead exposure changes. For example: If you move to an older home with chipped or peeling paint, if someone in your home works in construction, gardening, etc.	☐ All the above, and... ☐ See back of this form for information on lead hazards around your home (Lead is a Poison) ☐ Find lead hazards in your home ☐ Follow best practices if someone in your household works in construction, landscaping, etc. ☐ Our program will provide information and offer a home visit to help you look for lead hazards around your home ☐ For any questions or concerns please call your home inspectors
5-9 	Your child has been exposed to some amount of lead in their environment.	**6 months** (Call your doctor to have your child tested for lead again)	
10-19 	Your child has been exposed to moderate amounts of lead in their environment.	**3 months** (Call your doctor to have your child tested for lead again)	☐ All the above, and... ☐ At a Blood Lead Level of 15 and above a Public Health Nurse will make a home visit to provide follow-up care
20-44 	Your child has been exposed to large amounts of lead in their environment.	**2-3 months** (Call your doctor to have your child tested for lead again)	☐ All the above, and... ☐ Lead exposures must be identified and reduced. Our Program will test your home for lead hazards
45-69 	Your child has been exposed to very large amounts of lead in their environment.	**As Soon As Possible** (Call your doctor to have your child tested for lead again)	☐ All the above, and... ☐ Your child may require specialized medical treatment in the hospital. Call your doctor ASAP for a confirming blood test and lead poisoning checkup
Above 70 	**Medical Emergency:** Your child has been exposed to dangerously high amounts of lead in their environment.	**Seek IMMEDIATE medical attention**	☐ All the above, and... ☐ Your child requires specialized treatment in the hospital NOW!

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http://www.cdc.gov/nceh/lead/acthe THE CLPP/blood_lead_levels.htm

http://www.cdc.gov/nceh/lead/publications/LeadandPregnancy2010.pdf

California Department of Public Health Childhood Lead Poisoning Prevention Branch
http://www.cdph.ca.gov/programs/THE THE CLPPB/Pages/default.aspx

San Francisco Department of Public Health Childhood Lead Prevention Program
https://www.sfdph.org/dph/EH/CEHP/Lead/default.asp

CREDITS

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