

## CHILDHOOD LEAD POISONING

Lead is a toxic substance and lead poisoning in children under six years of age is associated with reduced learning ability and poor school performance in later years, and other problems with growth and development. Young children, especially one- and two-year olds, are at highest risk for lead exposure because of their hand-to-mouth behavior and their close proximity to lead contaminated surfaces (e.g., floors, windowsills) which leads to ingestion of lead-based paint dust and chips. Young children are also the most susceptible because their rapidly developing nervous systems are vulnerable to the effects of lead exposure.

High blood lead levels are considered one of the five top environmental threats to the health of children in the U.S.<sup>1</sup> Childhood lead poisoning is entirely preventable. In the U.S., reduced levels of lead in gasoline, air, food, and industrial sources have reduced exposure to lead. Currently, lead in the home environment is considered the foremost cause of lead exposure, especially in inner-city urban areas in which lead has been reduced only to a limited extent.

### **Risk in San Francisco**

The risk of lead poisoning is considered high in San Francisco because of the large concentration of housing built before 1950 which is assumed to contain lead-based paint and lead-contaminated dust and soil. San Francisco ranks first among California counties in the percentage of homes built before 1950 (68% of all housing units). In addition, 94% of the City's housing stock was built before 1978 when lead was banned from use in residential paint. Many properties in the City have contaminated soil due to deteriorating exterior paint surfaces or from construction and renovation. Lead exposure from ceramic ware and lead-containing home remedies are also relevant factors in San Francisco.

### **Data Source**

Since 1991, the San Francisco Department of Public Health's Childhood Lead Prevention Program (CLPP) has collected data on blood lead tests performed by various health care providers in the City.<sup>2</sup> Currently, no universal reporting system is in place to capture data on blood lead levels of children in San Francisco.<sup>3</sup> Therefore, all data reported to the CLPP is provided on a voluntary basis.<sup>4</sup> In addition, CLPP data disproportionately represents low income children as opposed to children from middle and upper income levels with private insurance coverage. Based on these limitations, the results of CLPP surveillance data cannot be generalized beyond the CLPP sample population.

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<sup>1</sup>Natural Resource Defense Council, *Are Our Children at Risk?*, 1997

<sup>2</sup> The two main sources of data are healthcare providers and labs. A large number of tests are received from San Francisco Department of Public Health Centers (Castro-Mission; Silver Avenue Family; Chinatown Public), San Francisco General Hospital, Mission Neighborhood Health Center, North East Medical Services, St. Mary's Hospital, St. Luke's Hospital, and Mt. Zion Hospital.

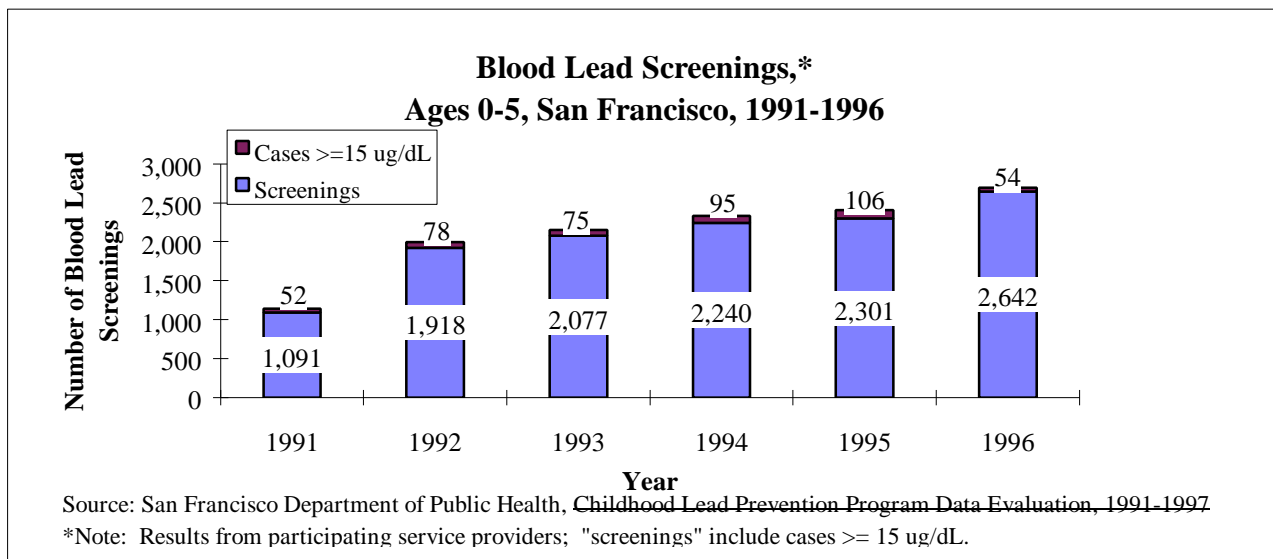
<sup>3</sup> In 1992, California established a legal requirement that publicly-funded health care providers test all children under 6 years old for lead poisoning; the number of children tested increased substantially following this legislation. The federal Center for Disease Control guidelines recommend that all children one and two years of age receive blood lead testing.

<sup>4</sup> "Universal reporting" refers to reporting of all blood lead levels for children under the age of six years.

CLPP has collected data on 12,269 children in San Francisco under the age of six who received initial blood lead testing between 1991 and 1996. CLPP estimates that these children represent at most only 5 to 15% of San Francisco children eligible for blood lead screening.<sup>5</sup>

### Blood Lead Screening Results

From 1991 to 1996, blood lead screening per year has more than doubled with increases observed every year. During this period, 8.4% of children screened had initial blood lead levels that were elevated at or above the federal Centers for Disease Control level of concern,  $\geq 10$  ug/dl. A total of 460 children (3.7%) were classified as “cases” with an initial blood lead level of greater than or equal to 15 ug/dl. The number of cases (greater than or equal to 15 ug/dL) peaked in 1995 at 106 children or 4.6% of screens, and dropped by half to 54 children or only 2.0% of screens in 1996. This decline follows national trends and suggests that extensive education and outreach efforts have had a positive impact on reducing lead exposure.



In addition, other factors maybe contributing to the decline in San Francisco in case findings including: 1) detection of only new (incident) cases rather than both new and previously existing (prevalent) cases, and 2) a drop in the number of children screened from high risk groups (specifically, Caucasian and African-American children).<sup>6</sup>

Based on these test results and the number of children eligible for blood lead screening but for whom test results have not been provided, CLPP estimated that in 1997 there were 897 children in San Francisco with undiagnosed elevated lead levels (greater than or equal to 15 ug/dL).<sup>7</sup>

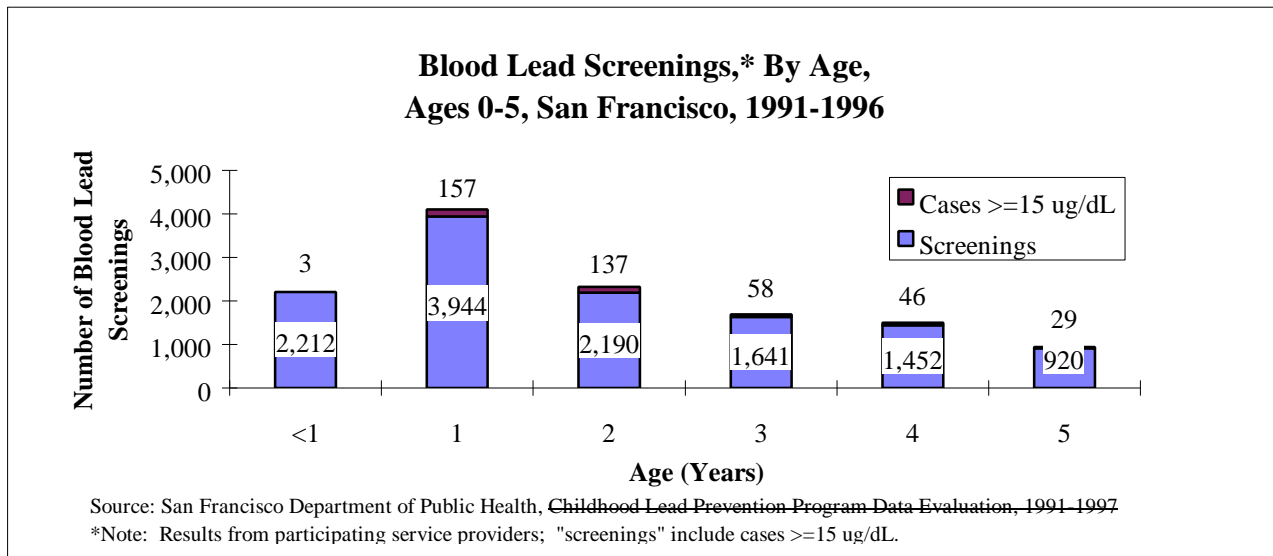
<sup>5</sup> An estimate by CLPP based on the number of annual births in San Francisco and estimates of the number of one and two-year olds eligible for lead testing.

<sup>6</sup> Healthy People 2000 objective regarding elevated blood lead levels refers to nation-wide prevalence goals. Objective 11.4 is to reduce the prevalence of blood lead levels greater than or equal to 15  $\mu$ g/dL and 25  $\mu$ g/dL among children aged 6 months through 5 years to no more than 500,000 and zero. Objective 11.4a is to reduce the prevalence of blood lead levels exceeding 15  $\mu$ g/dL and 25  $\mu$ g/dL among inner-city low-income black children aged 6 months through 5 years to no more than 75,000 and zero, respectively.

<sup>7</sup> San Francisco Department of Public Health, Childhood Lead Prevention Program Data Evaluation, 1991-1997.

The prevalence rate in San Francisco of blood lead levels greater than or equal to 10 ug/dL (the federal Centers for Disease Control's level of concerns) for the same time period was 8.4% (5% at 10 to 14 ug/dL; 2% at 15 to 19 ug/dL; 1% at 20+ ug/dL, close to the national estimate of 8%).<sup>8</sup>

**By Age.** A third (32%) of the screenings were for one-year olds (3,944), followed by two-year olds (2,190), and children under one year of age (2,122).<sup>9</sup> The highest proportion of elevated blood lead levels were found among two-year olds with 6.3% who had elevated lead levels (greater than or equal to 15 ug/dL), followed by 4.0% of one-year olds. These results indicate one- and two-year olds as the highest risk groups in San Francisco.

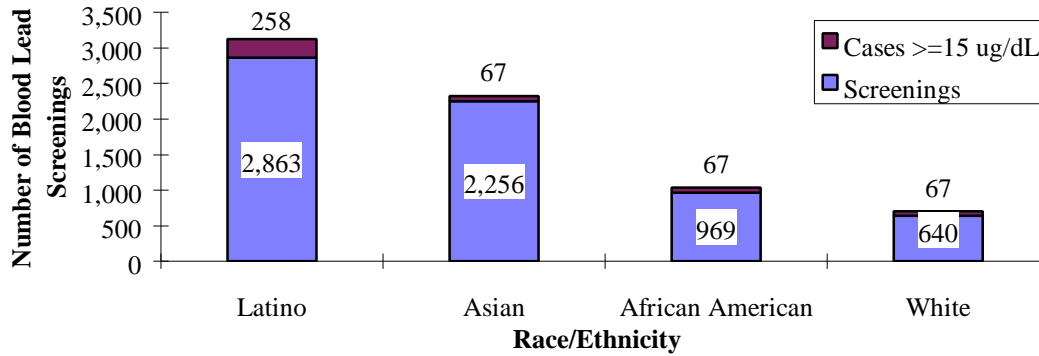


**By Race/Ethnicity.** Race/ethnicity information was available for about half of the children screened. The race/ethnicity of children screened reflects outreach efforts by CLPP to target specific communities considered at high-risk for lead poisoning. Among children whose race/ethnicity was known, Latinos comprised 42% of screens, followed by Asian (34%), African-American (14%), and white (10%). Latino children accounted for 55% (258) of children found with elevated lead levels, while additional elevated levels were evenly divided among African Americans (15%; 67 children), White (15%; 67), and Asians (15%; 67). Compared to other race/ethnic groups, White and African

<sup>8</sup> U.S. Department of Health and Human Services, Centers for Disease Control, Preventing Lead Poisoning in Young Children, October 1991.

<sup>9</sup> Thirty children 6 years of age who were screened were not included in these percentages.

**Blood Lead Screenings,\* By Race/Ethnicity,  
Ages 0-5, San Francisco, 1991-1996**

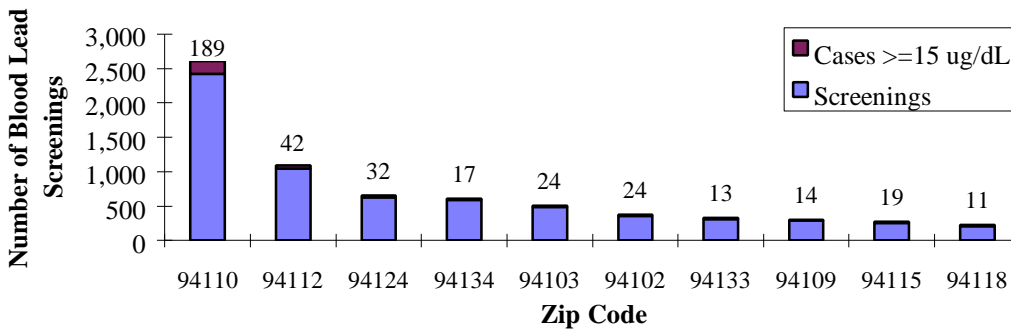


Source: San Francisco Department of Public Health, Childhood Lead Prevention Program Data Evaluation, 1991-1997  
 \*Note: Results from participating service providers; "screenings" include cases >=15 ug/dL.

American children appear to be most at risk, based on the proportion of screens with elevated blood lead levels, up to 26.5% for White and up to 17.3% for African Americans in 1995, although the number of children tested among both groups have significantly dropped in recent years.

By Neighborhood. Zip code information was available for 60% of the children screened. Children in 10 zip codes comprise 89% of children screened with known zip codes. The highest numbers of children were screened (2,421) and with elevated blood lead levels (7.8% of screens) were found in the Mission District (94110 zip code), where older housing is plentiful. Mission Neighborhood Health Clinic and San Francisco General Hospital, both situated in the Mission District, account for over half (53%) of the total screening tests reported. Two additional neighborhoods, Western Addition (94115) and Hayes Valley/portion of Tenderloin (94102) had high proportions of elevated levels (7.5% and 6.8%, respectively) although the numbers of children screened were small. CLPP concludes that the uneven distribution of screening tests make it difficult to draw conclusions about the geographic zones at risk in San Francisco.

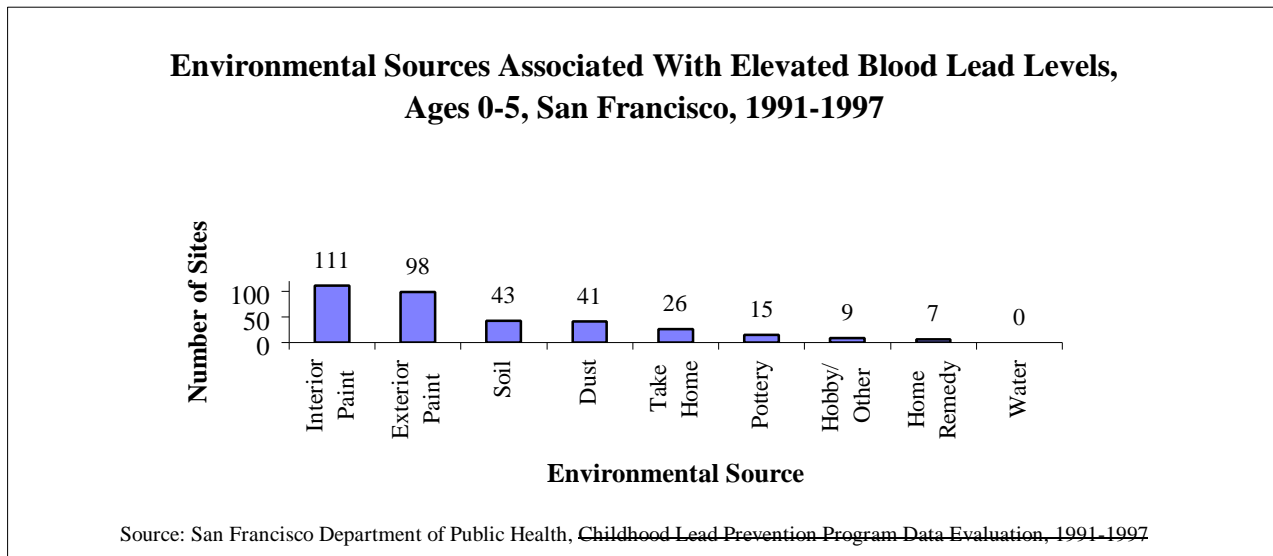
**Blood Lead Screenings,\* In "Top 10" Zip Codes,  
Ages 0-5, San Francisco, 1991-1996**



Source: San Francisco Department of Public Health, Childhood Lead Prevention Program Data Evaluation, 1991-1997  
 \*Note: Results from participating service providers; "screenings" include cases >= 15 ug/dL.

## Environmental Investigation Findings

From July 1991 to July 1997, CLPP visited 173 homes of 197 children with the highest levels of blood lead (greater than or equal to 20 ug/dL or persistent at 15-19 ug/dL) in order to conduct environmental investigations to determine the source of lead poisoning and to eliminate the hazard.<sup>10</sup> CLPP investigators confirmed that 90% of the residences investigated were built before 1950, when lead paint was in widespread use. CLPP identified at least one environmental lead source at 91% of the sites (158). An additional ten sites (6%) involved cases where the child was exposed to a source at a previous residence, in another country, or at an alternative site (such as a daycare provider). In only five sites (less than 3%), investigators were not able to identify any lead source.



The most common environmental sources identified in the 173 homes were lead-based paint, lead-contaminated soil, and lead dust, accounting for 84% of lead hazards found. These results confirm lead paint as the primary source of lead exposure for San Francisco children whose lead screening results were reported to CLPP.

<sup>10</sup> CLPP follows federal Centers for Disease Control guidelines recommending that children with blood lead levels of  $\geq 20$  ug/dL, or children with two blood lead levels 15-19 ug/dL at least three months apart, receive an environmental investigation. The Healthy People 2000 objective 11.1 is to perform testing for lead-based paint in at least 50% of homes built before 1950; data is not collected to verify San Francisco's performance on this objective.