

B. Background on Lead Poisoning

Lead is a heavy metal that has been used industrially and in products for thousands of years. Lead also, however, is a potent developmental neurotoxin. Lead's effects are most prevalent in young children under 6 – their sensitivity is due to the unique combination of their developing brain and their normal behavior of exploring their surroundings with their mouth. That behavior leads to toys and other objects which may be contaminated with lead dust being placed in their mouth.

Most exposure to children in Maine comes from exposure through dust from lead paint. Lead was added to paint to improve durability. Lead in paint was most common prior to 1950 although it was found in paint up until 1978. Most lead paint was used on exterior surfaces, baseboards and trim, windows and doors, and floors. Dust from lead paint can come from opening and closing windows and doors, poorly maintained chipping and peeling paint, worn painted stairs and floors and repair projects or renovations.

Other less common exposures to dust from lead paint include soil surrounding old buildings (from lead paint degradation), occupations involved with lead paint (e.g., house painters, renovators, etc), antiques or old painted furniture or toys. Lead, however, is also used in other products, so hobbies, such as stained glass making, making fishing sinkers or reloading ammunition can also cause lead paint exposure. Drinking water can sometimes be a lead exposure source from lead solder or brass fixtures, especially when there have been changes in water chemistry due to treatment systems, for example. Finally, some consumer products have been found to contain lead – both in the form of lead paint or as a contaminant – for example, toys, cheap jewelry, and herbal remedies. Lead also has been used in pottery glaze and hence sometimes dishes and plates contain lead.

However, Maine has a very old housing stock, and in Maine, childhood lead poisoning has been predominantly linked to exposure to dust from lead paint from housing. Figure 3 shows the percent of pre-1950 housing by public health district.

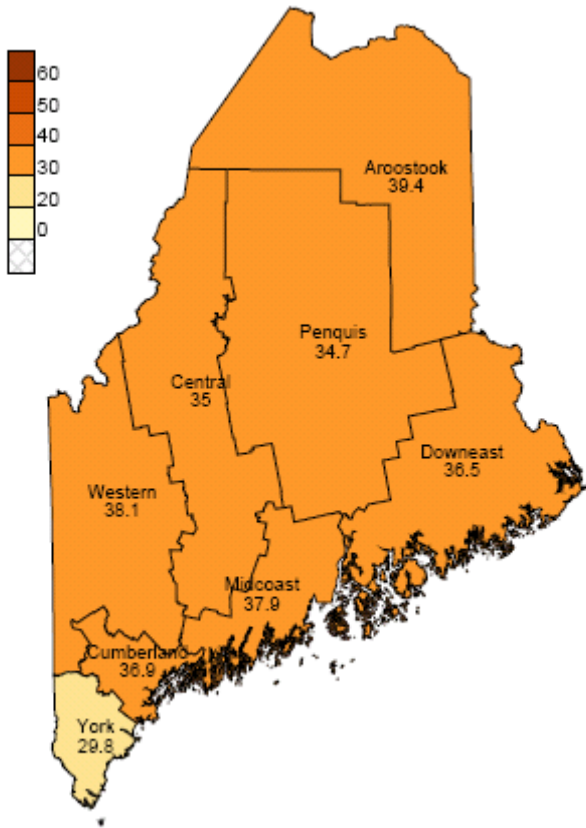


Figure 1 Percent of pre-1950 housing by Public Health District as of the 2000 census.

Elevated Blood Lead Levels

There is no “safe” level of lead in blood for children. Currently, a blood lead level of 10 ug/dl and above is considered an Elevated Blood Lead Level (EBLL) for children and triggers public health action by CDC. Although it is recognized that BLLs above 0 could be unsafe, at blood lead levels <10, studies have found that interventions are not likely to be successful in lowering blood lead levels.

State law in Maine requires parents of 1 and 2 year olds to be administered a questionnaire about potential lead exposure. Based on the results of the questionnaire, a blood lead test may be required. All blood lead tests are analyzed at the Maine Health and Environmental Testing Laboratory and form the basis of the following surveillance information.

There is clearly a decrease in both the number and the rate of elevated blood lead levels in Maine over the last 5 years (Figure 5).

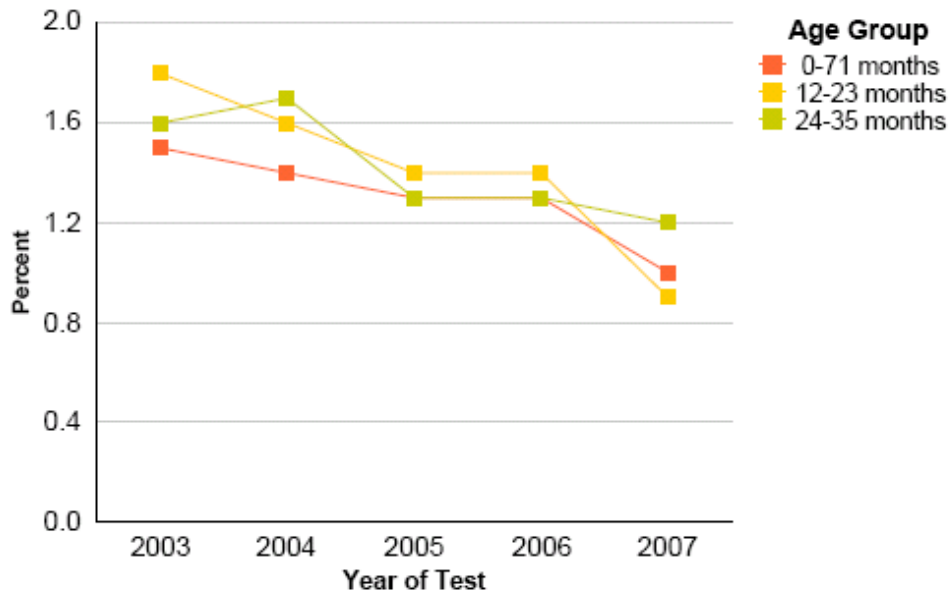


Figure 2: Percent of children (who have been screened) in different age groups with EBLL by year

Additionally, the distribution of elevated blood levels in children in Maine is not geographically homogenous. Figure 6 maps the EBLLs by town, where the orange dots mark the center of each town with an EBLL child or children. The size of the dot indicates the number of children in the town found to have EBLLs (see legend). Of the 913 cases from 2003 to 2007, 348 (38%) occurred in the five areas of Sanford, Biddeford/Saco, Auburn/Lewiston, Portland/Westbrook, and Bangor. Conversely, while roughly 40% of our elevated blood leads occur in these 5 regions, a majority (60%) do not.

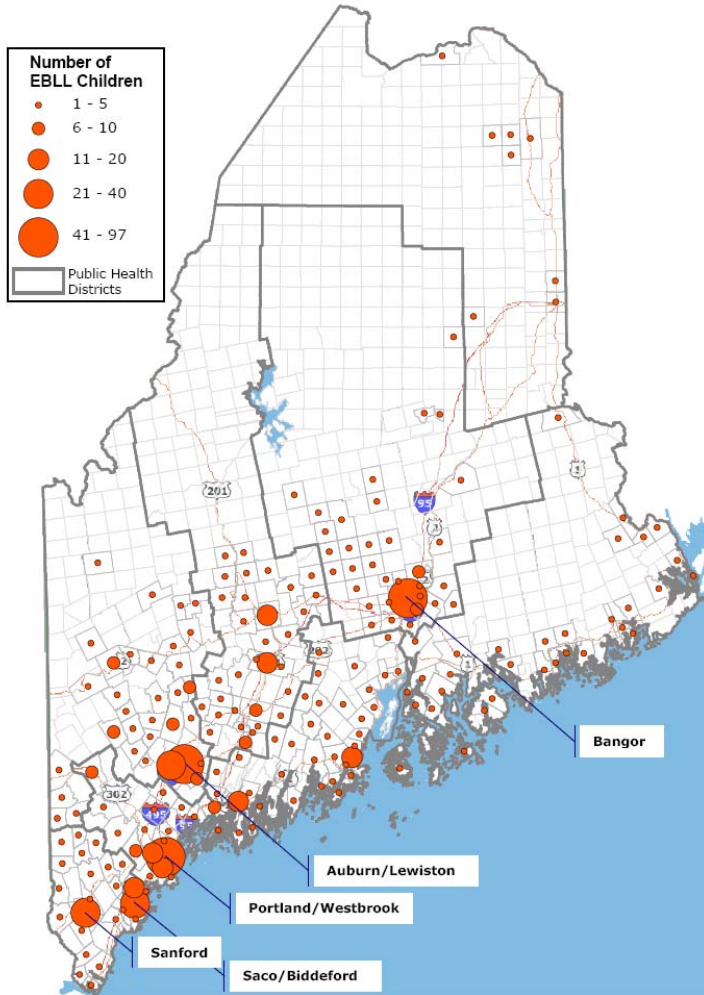
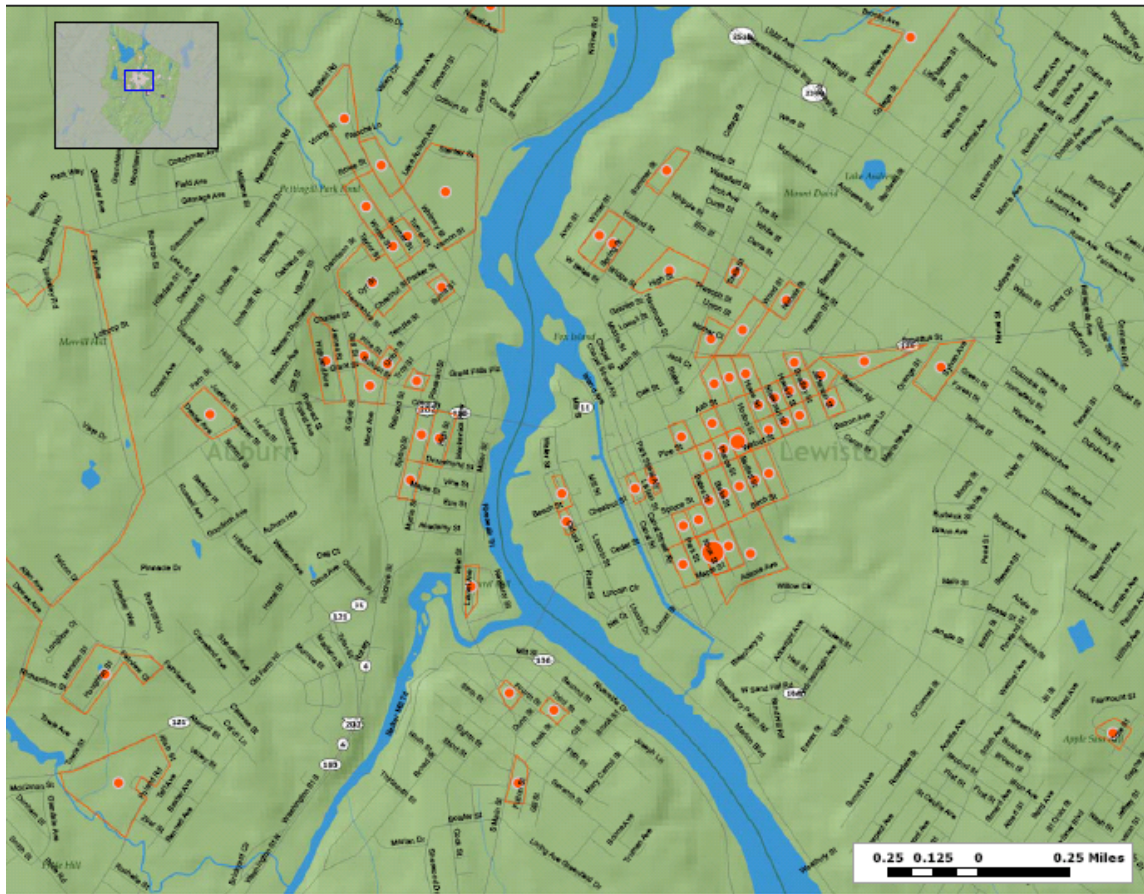


Figure 3: Number of newly identified children under 6 years of age with an elevated blood lead level, by town for the years 2003- 2007

Further this data has been narrowed down to the 5 high density areas to identify regions within the cities that are at high risk (figure X)

Number of children with an elevated blood lead test, among those screened, age 0-71 months, by Census Block in Auburn and Lewiston, Maine 2003-2007



Characteristics of these regions are that they are typically associated with rental properties (80 to 90% rental properties). In Lewiston/Auburn in particular, these neighborhoods are areas where high percentages of Somali refugees have settled.

Characteristics of Environmental Inspections

Once a child is found through blood lead screening to have an EBLL, the MCLPPP (Maine Lead Poisoning Prevention Program) has the authority to order an Environmental Inspection if the location is a rental property. If the location is a private home, the family can opt for an inspection (it is not required). Generally speaking, families in private homes opt for an inspection (Figure 7).

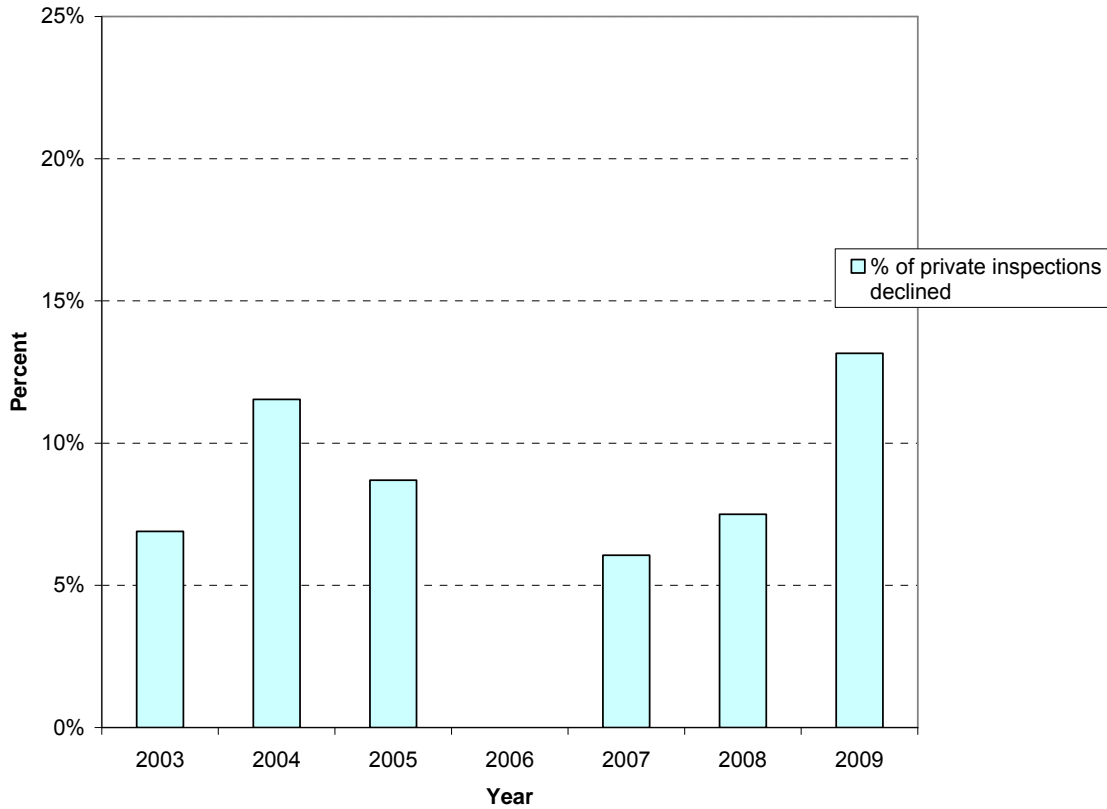


Figure 4: Percent of Environmental Inspections (EIs) declined by private homeowners by year. In 2006, no one declined the offer of an EI.

Data obtained from Environmental Inspections (EI) can also be used to compare the characteristics of the housing where EIs have occurred. Figure 8 compares the percent of completed Environmental Inspections that have occurred from 2003 to 2008 where the home was a private residence vs. a rental property.

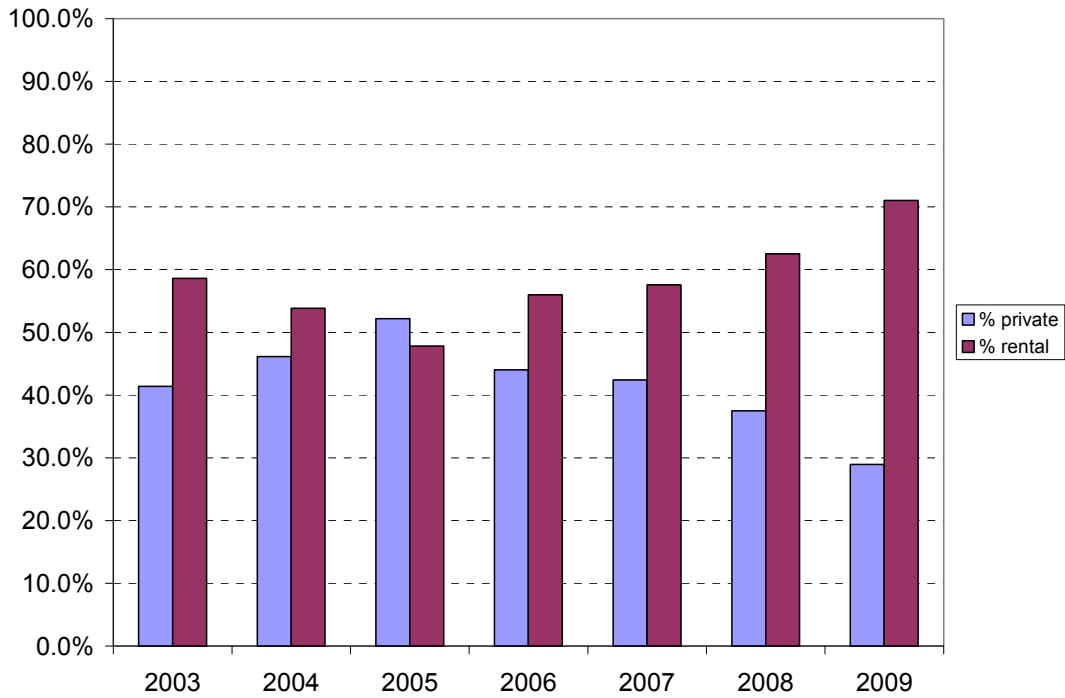


Figure 5: Percent of Environmental Inspections in Rental vs. Private Dwellings by Year

The data show that from a statewide perspective, roughly 50% of the lead poisonings are in rental properties vs. private properties. This is in contrast to the 5 high density areas identified in Figure 6. Overall, in the high density regions (Sanford, Biddeford/Saco, Auburn/Lewiston, Portland/Westbrook, and Bangor) over 80% of the children with EBLs reside in rental housing.

Figure 9 shows the percent of completed Environmental Investigations where no apparent housing hazard had been identified during the time period. Note the large increase in cases in the 2008 time period. This increase was in part, due to an increase number of cases identified due to “take home lead”, where a parent’s exposure to lead dust resulted in a child’s EBL.

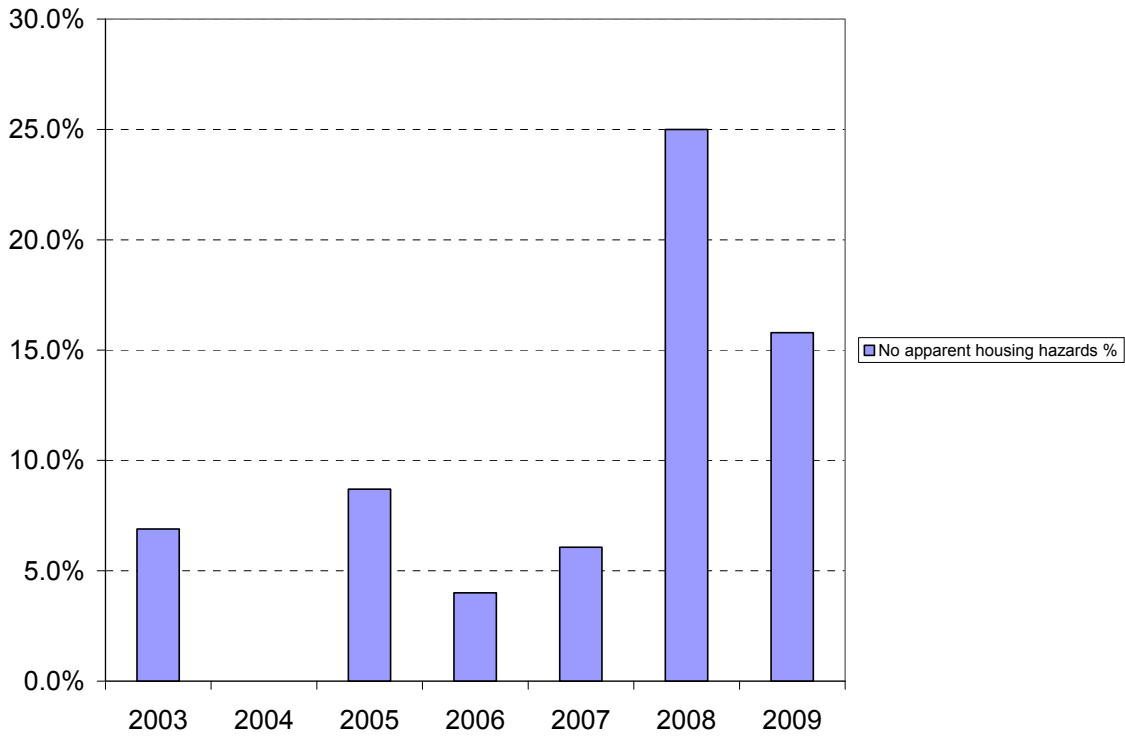


Figure 6: Percent , by year, of EIs where no apparent housing hazards were found

Figure 10 shows the percent of completed Environmental Investigations from 2003 to 2008 where renovations happened in the 6 month period prior to the child being identified with a BLL requiring an Environmental Investigation. As can be seen, renovations are a significant risk factor for a childhood EBLL, with more than 35% of the cases where Environmental Inspections had occurred happened in locations where a recent renovation had happened. Additionally, renovations performed by building owners (including homeowners and landlords) or occupants are associated with more EBLs than renovations performed by a contractor. Renovations increase the likelihood of childhood lead exposure occurring in both private homes and rental dwellings.

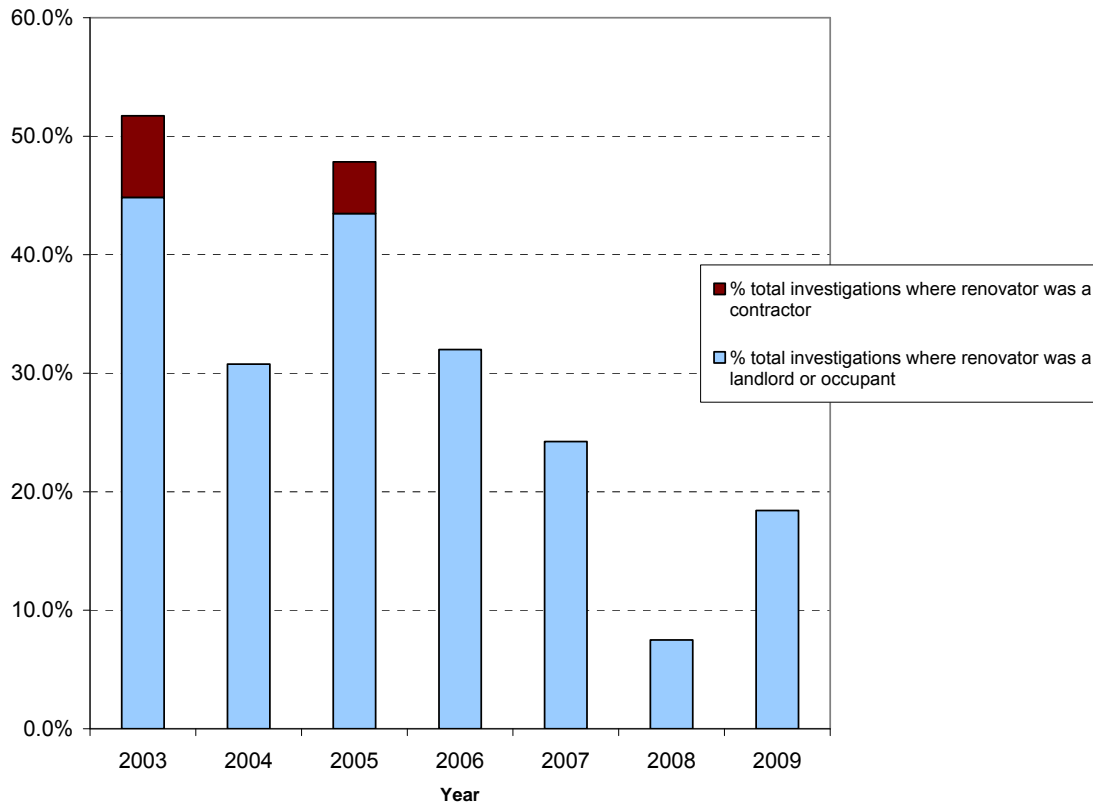


Figure 7: Percent of EIs where renovations caused lead dust hazards

Assessment of Risk Factors for Lead Poisoning Among Children Tested for Blood Lead Levels

In 2006 to 2007 a small web based survey was performed by the Childhood Lead Poisoning Prevention Program to improve targeted screening and prevention activities and to understand risk factors associated with blood lead levels below 20 ug/dl. The study is limited by a poor response rate – approximately 20% (739 out of 3626 contacted). For that reason, the total number of individuals in different categories (with the exception of low blood lead levels) tended to be small. Even so, however, some conclusions can be drawn from the study, especially if they are confirmed by other data sources.

For example, Figure 11 shows the distribution of blood lead levels according to risk of the parent’s exposure to lead from their occupation or hobby. Low risk occupations with potential lead exposures that were found to have a low correlation with children with BLLs greater than 5 ug/dL are car repair, gardening, making pottery, painting pictures, reloading ammunition, soldering pipes. Occupations with a high risk of correlation with children with BLLs greater than 5 ug/dL included auto radiator repair, bridge painting or blasting, boat painting, sanding or repair, carpentry, construction, furniture refinishing, home remodeling or repair, painting houses, painting furniture, refinishing car bodies, or scrap metal recycling. Note that the percent of individuals with BLL greater or equal to 5 ug/dl are higher for both the highest risk occupations and the lowest risk occupations compared to those with a BLL < 5 ug/dl.

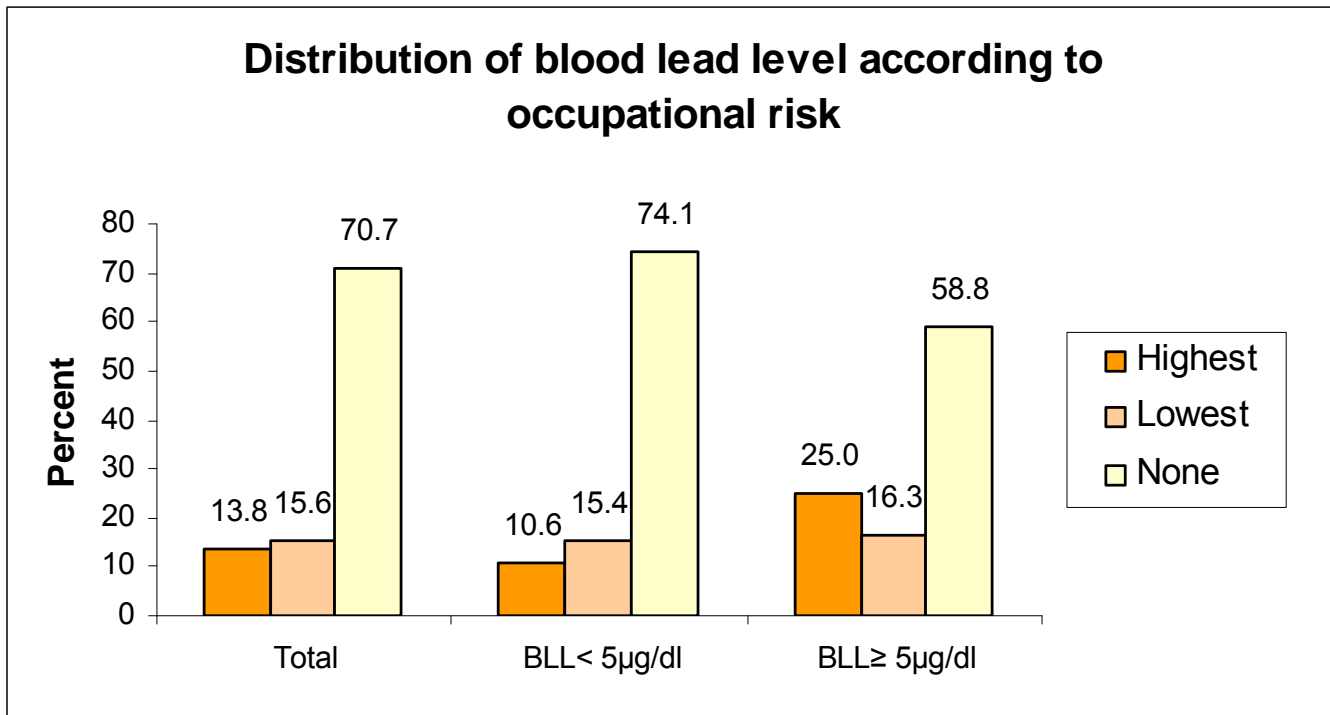


Figure 8: Percent of those surveyed by BLL and occupational risk

Other risk factors identified in the survey include:

- Children living in pre-1950 housing are more likely to have BLL>5 compared to post 1950 housing categories.
- In pre-1950 housing, painted windows and/or hard to open windows and painted floors and/or gaps in floors were significant risk factors.
- There is a protective effect seen from time spent in daycare as opposed to pre-1950 housing; i.e. for children who lived in pre-1950 housing, those who spent time in day care had significantly lower BLL than those who did not.