

Lead Prevalence Assessment for Homes in Escambia County, Florida

Lori. R. Stansbury, Stephen C. Metzler, John J. Lanza

Florida Department of Health Escambia County Health Department, 295 W. Fairfield Drive,
Pensacola, FL 32501

ABSTRACT

The aim of this project was to conduct environmental follow-up assessment services for children with elevated blood lead levels (those identified by the Escambia County Health Department, ECHD, from 1999-2001 screenings, and any new cases identified by the ECHD during the project period), to complement other components of case management. The availability of no-cost lead assessment services was communicated to target households by letters, and to the community at large through news media and multiple community partners. Nevertheless, voluntary participation in this program was relatively low presumably because of potential consequences of finding lead contamination in homes (e.g., owner liability, costs of remediation, displacement of tenants), frequent movement of target individuals among rented dwellings, and general apathy. Consequently, this assessment was limited to 33 homes built before 1979 in the Escambia County. Analyses of paint chips, soil, and wipe samples showed that 21.2% of the tested homes had lead

contamination levels above the HUD guidelines for one or more samples, whereas 51.5% of the homes had detectable levels of lead contamination. Regardless of the level of lead contamination found, each of the study participants was provided with education materials and contact information for additional advice on dealing with lead hazards. Specific recommendations were made to the study participants, ranging from extensive building replacement to interim controls and inexpensive ways to maintain a clean home, so as to reduce lead hazards in the home. The findings from the present study, along with the City of Pensacola HUD program data indicating a cumulative lead prevalence between 50-55% above HUD guidelines and 80% with detectable levels of lead contamination, suggest that continued education and lead screening of homes and children would be beneficial for the reduction of lead hazards and improvements in community health.

Introduction

Childhood lead poisoning is a significant and preventable disease. Despite this, almost one million children in the United States have elevated levels of lead in their blood. Children can be exposed to lead in many ways. A major source of childhood lead poisoning is lead-based paint in older homes that is deteriorating, creating dust and paint chips that are easily ingested by young children. As many as 70 million American homes may still contain lead paint (US Census, 2000a). Other sources of exposure include: drinking water from pipes lined or soldered with lead; ingestion of lead-contaminated soil; air-releases of lead from coal-burning power plants and other industries; lead-containing materials used in parental occupations or hobbies such as stained glass and fishing wrights; use of lead-containing ceramics for cooking, eating, or drinking; workplace dust brought home on the clothing of people who have jobs that use lead such as battery manufacturers or smelting companies; and, use of folk remedies that contain lead (AAP, 1998).

Since the mid 1970's to 1990's, the overall mean blood lead level (BLL) for the general United States population has decreased from 12.8 to 2.3 $\mu\text{g}/\text{dL}$. This decline can be attributed to removal of lead from gasoline, paint, and food cans. However, an estimated 890,000 children aged <6 years have BLLs $\geq 10 \mu\text{g}/\text{dL}$, with the highest rates among African-American, low-income, or urban children (AAP, 1998).

From 1993 through 1999, there were 12,450 cases of lead poisoning (venous lead level $\geq 10 \mu\text{g}/\text{dL}$) recorded in Florida and 567 cases in Escambia County. For 1999-2001, there were 73 cases in Escambia County and 2 cases in Santa Rosa County. Decreased elevated blood level findings in the two counties are probably related to reduced screening efforts and increased community education rather than to remediation of the existing older homes. U.S. Census data indicates that as many as 40-60% of the 124,600 and 49,119 homes in Escambia and Santa Rosa counties, respectively, were built before 1979, and, therefore, could be contaminated with lead-based paint (CDC, 2002; US. Census, 2000b).

Information is available at the Escambia and Santa Rosa County Health Departments (ECHD and SRCHD, respectively) regarding children and adults who were measured to have elevated blood lead levels in the years 1999-2001. No information is available on the actual prevalence of lead contaminated paint/soil in or around the homes of these individuals. Previous lead testing done by health departments or other entities has been on a situational basis or where defective paint in a home built prior to 1979 was known and that a child <6 years might reside there (HUD, 1995). The City of Pensacola has been conducting home lead testing as part of HUD Section 8 requirements. The objective of this study was to determine the prevalence of lead contamination in homes built before 1979 in Escambia and Santa Rosa counties in Florida. Surveyed homes would be those, at

least initially, in which children with elevated BLLs resided between 1999–2001. City of Pensacola data would be used as a comparison to the ECHD compiled information.

Materials and Methods

For this study, lead testing was intended to occur in homes where resident elevated blood levels were recorded for the year 1999-2001. All samples were collected by an EPA Certified Lead Inspector. Disposable latex gloves and other measures were used to reduce the risk of cross-contamination.

Soil Samples

All soil samples collected for residential lead-based paint assessment purposes were a composite. Samples were collected from bare soil in the child's principal play area(s) or the residence yard and a second sample was collected from the soil around the building foundation. Each composite sample consisted of 3-10 sub-samples mixed together.

Bare soil samples were collected with a 5cc disposable syringe coring device. The soil to be analyzed came from the top one-half inch of soil. All aliquots of the composite were double-bagged in plastic bags and labeled accordingly.

Wipe Samples

The areas selected for wipe samples were marked out prior to sampling to ensure equivalent surface areas so that one room would not be over-sampled. A separate wipe was used for each sample area. Whenever possible, hard floors were sampled instead of carpets.

Wipe Sampling Media

Wipe samples were taken using EPA acceptable wipe material as defined in ASTM E 1792, "Standard Specification for Wipe Sampling Materials for Lead in Surface Dust." Wipe materials were supplied by Environmental Hazards Services, LLC.

Paint Chip Samples

Paint chip sampling is a destructive methodology and samples were collected from inconspicuous areas with approval of the home owner/tenant. The paint chip samples were 2-4 square inches in size. The sampling method utilized was to scrape paint directly off the substrate removing all layers of paint equally, while attempting to remove none of the substrate.

Water Samples

Water samples were not collected because of sampling method constraints. Sampling would have consisted of collecting a one-liter sample directly from the kitchen or bathroom cold-water tap after the water has stood motionless for at least 6 hours (i.e., a "first flush" sample) as a worst-case sample. If there is reason to believe that other parts of the water system (such as leaded service lines, valves or water mains) are contributing lead, additional samples following the "first flush" would have been collected.

Field Sample Forms

Sample forms were generated for each sample site and were completed in the field. Sample forms noted sample date, sample ID number, sample location, sample condition, and laboratory results.

Information from field sample forms was continuously added to a Microsoft Office Access file for report generation.

Documentation / Sample Identification Number

Each sample was assigned a unique identification number consisting of a distinct set of numbers.

Chain of Custody / Submission Sheet

Laboratory provided chain of custody forms were utilized for each sample batch sent for analysis (.

Sample Packing / Shipping

Wipe samples and soil samples were stored in non-sterilized polyethylene centrifuge tubes (50ml size) with sealable caps. Centrifuge tubes were supplied by Environmental Hazards Services, LLC.

Samples were shipped to the laboratory via the State of Florida approved shipping company Airborne Express. Samples were shipped in Airborne Express provided shipping packs and were not required to be packed on ice or cooled.

Holding Times

There are no holding time issues with wipe samples, soil samples, or paint chips.

Laboratory

Samples were sent to Environmental Hazards Services, LLC, in Richmond Virginia for processing and analysis.

Analytical Methods

Samples were processed using EPA Method 3051 and analyzed using EPA SW 846 Method 7420.

Sample Reporting

Sample results were reported to the department as follows:

Soil $\mu\text{g/g}$

Paint $\%$ by weight

Dust $\mu\text{g/ft}^2$

Building Condition Assessment

As per EPA regulations, a building condition assessment form was used to obtain further information in the event that a full risk assessment was needed.

Pictures

Site pictures of sample locations were taken on an as-needed basis for documentation. Pictures were taken with a digital camera and were available for uploading into reports.

Site Maps

Site maps were drawn in the field to indicate sample locations both inside and outside of the sampled residence. Substrate and component illustrations were utilized to pinpoint exact name and location of samples. In addition, GPS mapping programs were used in report generation.

Test Subjects

To facilitate the study, test subjects were needed in Escambia and Santa Rosa Counties. A meeting was held with the Head Nurse at the Escambia County Health Department (ECHD) to review health department records for children that had undergone capillary or venous blood testing for elevated blood lead (EBL) levels during the years 1999-2003. A second meeting was held to review records of children with documented EBL levels that were possibly living in homes with lead paint levels above HUD guidelines. In addition, the Florida State Childhood and Adult Lead Poisoning Prevention Program was contacted to obtain state reported EBL data from Escambia County. The resulting data were combined into a Microsoft Office Access file. The residential addresses were verified where possible with Escambia County Property Appraisal Records and Polk Directories. A meeting was held with the ECHD Director to better define study participants and determine to what extent Health Department services would be offered to the study participants. Study participants were defined as "homes in Escambia or Santa Rosa Counties built before 1980, inhabited by children or grandchildren under the age of six." Furthermore, as a special incentive to allow the ECHD access to properties, free blood screening of children living in homes that tested positive for lead based paint would be provided through ECHD.

Study Notification Letters

A project introduction letter was developed and sent to all addresses on the database. The first letters were addressed to the property resident. The letter briefly outlined the Lead Grant, its participants and the reason the potential study participant was being contacted. The letter also included the ECHD's offer of free blood screening of children found to be living in lead contaminated homes. A review of the addresses provided indicated that most of the residents were not the actual property owners. This was most common in older, low-income neighborhoods. A second set of project introduction letters were sent to the attention of the actual property owners with information obtained from Escambia County Property Appraisal Records and Polk Address listing. The letter was altered slightly to appeal to the group audience of homeowners rather than tenants.

Field Work

In order to properly execute residential lead-based paint investigations, the following scope of work was developed incorporating ECHD and EPA/HUD guidelines. Appointments were scheduled with study participants. Upon arrival, the test property was visually surveyed and notes regarding overall property condition were recorded. The property owner/resident was asked to sign a disclosure/consent form allowing access and sampling by ECHD personnel. The following questions were asked of the parent/guardian:

1. Has this property ever been tested for lead?
2. Have the children ever been tested for lead?
3. Are there any areas of the house that are of particular concern?
4. What is the age of the home?

5. How long have the children lived in the house?
6. What is the age of all children living or spending large amounts of time in the house?
7. Are all windows / windowsills original to the home?
8. When was the last time the property (inside / outside) was painted?
9. If a tenants, is the property maintained on a timely basis by the landlord / owner?
10. Are there any recent additions to the property?
11. In what areas of the yard do the children generally play?

Any questions regarding lead-based paint were answered and EPA/HUD provided literature was left with the study participant. Prior to leaving the site all investigative derived waste was removed and disposed of off site. Collected samples were documented on a chain of custody and shipped to the laboratory for analysis the same week they were acquired. Analytical results were received via fax approximately one (1) week later, with original hard copies arriving via mail one (1) week later. A report of the findings was developed noting if lead-based hazards were found and where. In addition, general information and site-specific lead paint prevention measures utilizing EPA/HUD guidelines were provided. Reports were mailed to participants approximately four (4) weeks from the date of the inspection.

Results

During the project period, ECHD staff were able to investigate 33 homes in Escambia County. No homes in Santa Rosa County were lead tested by the ECHD.

The ECHD staff had great difficulty developing interest in homeowners/tenants to have their home lead-tested even with a previous history of a resident's child with an elevated BLL. Thirty of 33 homes were tested due to public response from media reports of this project while three of the homes were tested from referrals by the ECHD lead program. Only three homes were evaluated where children with elevated BLL's resided. None of these homes had lead contaminants above the HUD action levels.

Tables 1 to 3 show the analysis results for the paint chips, soil, and wipe sample, respectively. The current HUD/EPA exposure limits are given in Table 4.

For those homes evaluated by the ECHD, the following results are presented:

1. Paint Chip Sample Analysis

Eight Escambia homes had paint chip analysis performed. One of eight homes built before 1978 had lead-based paint detectable at the HUD/EPA exposure limit guideline of $\geq 0.5\%$ by weight, making a lead prevalence of 12.5%. Six out of eight homes had lead paint measured above the lower limit of detection indicating a 75% prevalence.

2. Soil Sample Analysis

Twenty-one homes in Escambia County built before 1978 had outside soil tested for lead. Four out of twenty-one homes had lead levels above the HUD/EPA exposure limit guideline of 400 ppm, for a prevalence of 19%. Thirteen of twenty-one homes had levels of lead above the detection limit for a prevalence of 61.9%.

3. Wipe Sample Analysis

Wipe Samples were taken from 33 separate homes. HUD/EPA exposure limit guidelines are: Floor (40 µg), window sill (250 µg) and window trough (400 µg). Floors were swiped in 30 homes with 4 testing positive for lead at the HUD/EPA guideline level giving a 13.3% prevalence. Twenty-one homes were window sill tested with two positively testing for lead for a 9.5% prevalence. Four homes had their window trough tested of which there were three positives for lead showing a 75% prevalence rate.

4. Summary

From a total of 33 homes tested by the ECHD by examining paint chips, sills or wipes, 7 of 33 had at least one component at greater than the HUD/EPA guidelines for a lead prevalence of 21.2%. Seventeen of thirty-three homes or 51.5% had any measurable lead above the HUD/EPA detection limit.

The City of Pensacola HUD section 8 program performed lead testing on homes in Escambia and Santa Rosa counties. This data was not available as a hard copy but was reported to ECHD staff by the City lead investigator (S. Hunt, 2005). The City's sampling method included paint chips only in areas of the home that had contaminated or damaged paint. The samples were tested by BTS Labs in Waldorf, MD. They did not perform an investigation of the entire home.

The results from the City's HUD testing programs were:

1. 300 homes were tested.
2. 50-55% of homes tested above the HUD guidelines.
3. 80% of homes tested above the detection limit.

4. Homes built between 1900-1940 comprised about 50% of the homes tested and almost always tested at least one sample above the detection limit.
5. Homes built in the 1950's had a lead prevalence of 50% above the HUD guidelines.
6. Homes built in the 1960's had a lead prevalence of about 10% above the HUD guidelines.
7. Homes built in the 1970's had a lead prevalence of about 10% above the HUD guidelines.