



National Center for
Healthy Housing

New York State's Childhood Lead Poisoning Primary Prevention Program: Year 8 Summary Report

April 1, 2014–March 31, 2015

Prepared by the National Center for Healthy Housing
for the New York State Department of Health,
Bureau of Community Environmental Health and Food Protection,
under Contract CO27566

(DRAFT)



Table of Contents

Introduction	4
1. Background	5
1.1 A Stubborn Public Health Problem	5
1.2 Sources of Lead Exposure	5
1.3 The Societal Impacts of Lead	5
1.4 NYS Childhood Lead Poisoning Primary Prevention Program	6
2. Methods	8
3. Results	9
3.1 Housing Units Visited and Their Characteristics	9
3.2 Inspection Activities, Identified Hazards, and Clearance Status of Inspected Housing Units	10
3.3 Enforcement of Remediation and Confirmation of Clearance	12
3.4 Benefits for Children and Others	14
3.5 Other Grantee Outcomes	14
Conclusions and Recommendations	16
Appendix: Selection of Units with Interior Activities	19
References	21

Introduction

Childhood lead poisoning remains a significant public health problem in the United States and in New York State (NYS), which consistently ranks high on key risk factors associated with lead poisoning, including many young children living in poverty, a large immigrant population, and an older, deteriorated housing stock.¹

In children, lead exposure can result in neurological damage, including intellectual impairment, developmental delays, learning disabilities, memory loss, hearing problems, attention deficits, hyperactivity, behavioral disorders, and other health problems. Lead is particularly dangerous to children under the age of six due to their normal hand-to-mouth activity, which increases the potential for exposure, as well as the rapid growth and development of their nervous systems and their greater rate of lead absorption in their bodies.²

New research links even low low-level lead exposure to harmful effects,² such as hampering the ability of children to do well in school. These studies suggest that lead exposure is responsible for a significant

and modifiable effect on the achievement gap. In an ecological study of third- and eighth-grade achievement scores for 57 counties in New York, excluding New York City, researchers found that the percentage of children in a county with blood lead levels (BLLs) greater than or equal to 10 µg/dL explained 8–16% of the variance in reading and math test scores, even when adjusting for indicators of poverty.³

Preventing lead poisoning in NYS will enable children to enter school ready to learn and succeed academically. Additional proactive action to reduce children's exposure to lead remains a state public health priority.

This report summarizes the progress of 15 NYS jurisdictions in implementing the Childhood Lead Poisoning Primary Prevention Program since its inception in 2007, with a particular focus on the April 1, 2014, to March 31, 2015, period. Prior annual reports for the program are available on the National Center for Healthy Housing Web site at www.nchh.org/Program/NewYorkStateCLPPPProgram.aspx.

1. Background

1.1 A Stubborn Public Health Problem

After decades of progress in reducing exposure to lead sources, such as gasoline and paint, and the corresponding decline in blood lead levels, researchers and practitioners now agree that there is no safe level of lead in children’s blood. The U.S. Centers for Disease Control and Prevention (CDC) announced in 2012 that it would no longer use the term “level of concern” in conjunction with a child’s blood lead level. All detectable levels of lead are of concern. CDC instead set a “reference value” of 5 µg/dL as the level at which children would be considered to have significantly more lead in their bodies than their peers.

Approximately 535,000 U.S. children ages 1–5 have BLLs greater than 5 µg/dL.⁴ Similar to national trends, the overall incidence (newly diagnosed cases) of lead poisoning among NYS children under age six has steadily declined since 1998.⁵ However, the prevalence of childhood lead poisoning in NYS for children with BLLs greater than or equal to 5µg/dL is 4.6%, compared to the national prevalence rate of 2.6%, and thousands of children are still at risk.⁶

While it is clear that lead poisoning is a serious public health concern in many New York communities, the risk for childhood lead poisoning is not evenly distributed across the state. Lead hazards are more prevalent in some communities and, as a result, blood lead levels vary greatly across the state. For the three-year period from 2010–2012, 75% of children under age six newly identified with BLLs greater than or equal to 10 µg/dL resided in the 12 counties of highest incidence: Kings, Erie, Queens, Bronx, Oneida, Monroe, Onondaga, Westchester, New York, Orange, Albany, and Nassau.⁷ Expanding this list to include 12 additional counties (Niagara,

Broome, Dutchess, Richmond, Suffolk, Chautauqua, Rockland, Rensselaer, Montgomery, Schenectady, Fulton, and Ulster) accounts for a full 90% of incident cases.⁷ Not surprisingly, these high-risk communities also have higher proportions of pre-1950 housing stock and low-income and minority populations.

At the same time, elimination of lead hazards and childhood lead poisoning in the highest-risk communities can be especially challenging due to a wide range of factors, including poverty, unemployment, low educational attainment, limited availability of affordable housing, and scarcity of financial resources for property maintenance and improvements. Elimination of childhood lead poisoning requires a variety of statewide actions, including intensive efforts targeting communities at highest risk.

1.2 Sources of Lead Exposure

Despite a 1978 federal government ban of lead in residential paint,⁸ there are still an estimated 38 million pre-1978 dwellings nationwide that contain old layers of lead-based paint (LBP) that become hazardous when a home is in disrepair or when the paint is disturbed by repairs or renovation.⁹ Approximately 24 million homes have LBP hazards (lead in soil, dust, or peeling paint),^{9,10} and more than four million of these house young children.⁹ The most common sources of lead in the U.S. include lead-based paint and lead-contaminated dust and soil.¹¹

1.3 The Societal Impacts of Lead

Low levels of lead exposure are detrimental to a child’s ability to thrive. A series of North Carolina studies of over 57,000 children found that children with a BLL as low as 4 µg/dL at three years of age were significantly more likely to be classified as

learning-disabled than children with a BLL of 1 µg/ dL.¹² In a study of 35,000 Connecticut children, researchers observed the same associations between blood lead levels as low as 3–4 µg/dL and decreased achievement on reading and math tests.¹³ These findings were further confirmed by a study of 48,000 school children in Chicago, where BLLs as low as 5 µg/dL were associated with lower scores on third-grade reading and math tests.¹⁴

Childhood lead exposure is also linked to juvenile delinquency later in life. Lead-poisoned children exhibit antisocial behavior, aggression, and hyperactivity—all of which can lead to delinquent behavior.^{15, 16} One study concluded that lead emissions from gasoline in automobiles explained 88% of the violent crime in America.¹⁵ When the use of leaded gas decreased, so did the crime rates. Another study that followed children from womb to adulthood found that higher childhood blood lead levels were associated with higher adult criminal arrests.¹⁷ A 2012 study by Mielke and Zahran in six cities corroborated earlier findings of the connection between childhood lead poisoning and violent behavior at the city level.¹⁸ These studies all show that the use of leaded gasoline strongly correlates with the increase of violent crime in the past and suggests that a benefit to preventing children’s lead exposure is a decrease in future adult crime.

Childhood lead poisoning imposes a financial burden on all taxpayers. Costs stemming from lead exposure are well established; one recent estimate stated the societal costs of lead poisoning to be \$50.9 billion in a single year.¹⁹

1.4 NYS Childhood Lead Poisoning Primary Prevention Program

The CDC and its advisory committee recommend primary prevention, “a strategy that emphasizes the prevention of lead exposure, rather than a response to exposure after it has taken place.”²⁰ In 2007, the NYS legislature passed, and the governor signed into law, a program to curtail childhood lead poisoning dramatically (PHL1370-a [3]). The

Childhood Lead Poisoning Primary Prevention Program (CLPPPP) authorized health departments to gain access to high-risk homes for the purposes of education and inspection. This represented a significant policy shift, since previously health departments could only gain access to a home if a child had already been diagnosed with an elevated blood lead level. The new approach enabled a more proactive and effective approach. Table 1 presents the annual funding levels for the program over its seven-year history. For additional background information on the CLPPPP, please see *New York State Task Force on the Prevention of Childhood Lead Poisoning Preliminary Report 2009*.ⁱ

The CLPPPP grantees seek to achieve five goals:

1. Identify housing at greatest risk of lead-based paint hazards.
2. Develop partnerships and community engagement to promote primary prevention.
3. Promote interventions to create lead-safe housing units.
4. Build lead-safe work practices (LSWP) workforce capacity.
5. Identify community resources for lead-hazard control.

The eight original pilot locations (funded in 2007) included Albany, Erie, Monroe, Oneida, Onondaga, Orange, and Westchester counties and New York City. In 2008, four new sites received funding: Broome, Chautauqua, Dutchess, and Schenectady counties. In 2009, Niagara and Rensselaer counties received funding. The Year 4 (2010–2011) addition of Ulster County brought the total number of grantees to 15. From 2011–2014 (years 5, 6, and 7), 15 grantees continued operating primary prevention programs.

Figure 1 shows the number of children with BLL ≥ 5 µg/dL in 2011 and the prevalence rates in the 15 primary prevention jurisdictions.

ⁱ Available at www.nchh.org/LinkClick.aspx?fileticket=iZ%2f%2fge9ofOY%3d&tabid=195

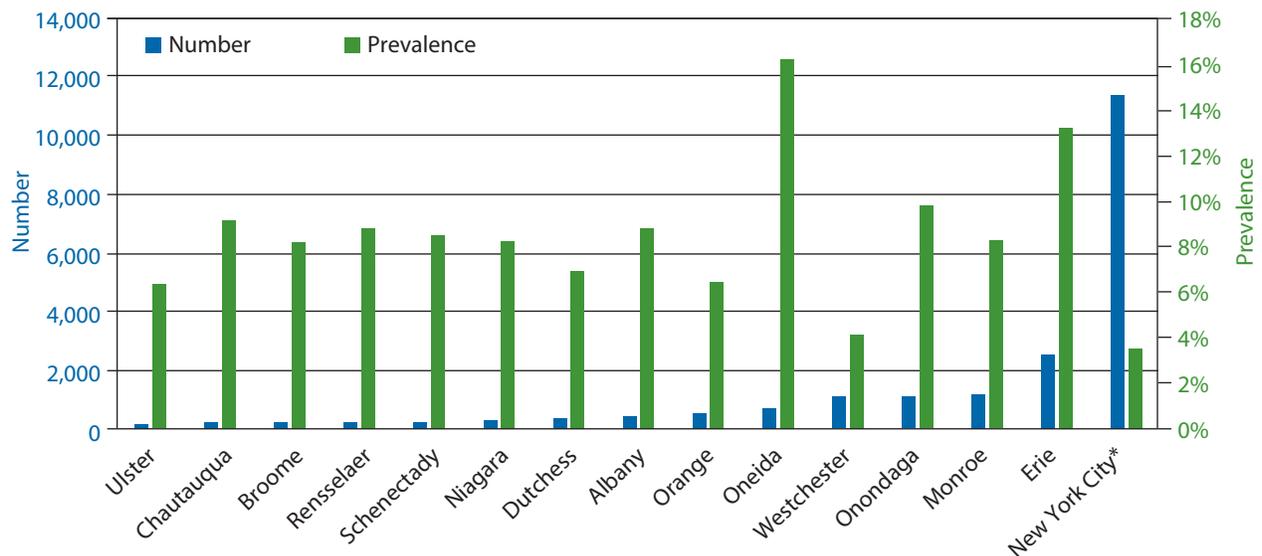
Table 1: NYS Childhood Lead Poisoning Primary Prevention Program Funding Levelⁱⁱ

Year	CLPPPP Annual Funding	Authority
2007–2008	\$3 million	Pilot Program: Public Health Law Section 1370-a (3)
2008–2009	\$5.4 million	
2009–2010	\$7.7 million	
2010–2011	\$7.96 million	
2011–2012 ⁱⁱⁱ	\$4 million	Permanent Program: Public Health Law Section 1370-a (3)
2012–2013	\$8 million	
2013–2014	\$8 million	
2014–2015	\$8.7 million	

ⁱⁱ Previous NCHH reports included NYS budget amounts; actual program funding levels are now presented.

ⁱⁱⁱ Six-month cycle to bring to state cycle of April 1–March 31.

Figure 1: The Number and Prevalence of Children with BLLs above 5 µg/dL in 2011 in NYS



*New York City is composed of five counties—Kings (Brooklyn), Queens, Bronx, New York (Manhattan), and Richmond (Staten Island). Source: U.S. Centers for Disease Control and Prevention. (2011). Childhood Lead Poisoning New York data, statistics, and surveillance. Retrieved October 20, 2015, from <http://www.cdc.gov/nceh/lead/data/state/nydata.htm>

2. Methods

The National Center for Healthy Housing (NCHH) provides technical and evaluation assistance to the NYSDOH and to CLPPP grantees. The contract enables NCHH field investigators to work with each grantee to provide model practices, peer networking, and support on program design and implementation issues. Investigators also join NYSDOH staff on site visits and in conference calls and meetings. NCHH gathers information from grantees about their actions and progress toward achieving each of the Primary Prevention Program's five goals.

This report is based on two sources of data: (1) narrative descriptions in grantee work plans and quarterly reports and (2) unit-based quantitative data collected by grantees and submitted to NCHH for analysis. To help grantees capture the unit-based housing data, grantees use a Microsoft Access database developed by NCHH.^{iv} At the end of March 2015, grantees sent their Access database to NCHH for analysis. NCHH then compiled data for all grantees and analyzed the data using SAS version 9.4.

Except where cumulative results are noted, the data presented in this report come from the April 2014 to March 2015 dataset (hereafter referred to as "Year 8"). These data include the 6,774 housing units first visited between April 1, 2014, and March 31, 2015, and 5,934 housing units carried over from prior years for a total of 12,708 housing units inspected by grantees in Year 8. Note that all data summarizing the program as a whole is influenced by the relative contribution of each grantee (e.g., grantees who visit and inspect more units have a greater influence on program totals). Please refer to *New York State's Childhood Lead Poisoning Primary Prevention Program: Grantee Impact Summaries, April 1, 2014–March 31, 2015*, for additional details on the contribution of each grantee.^v

Units inspected before April 2014 and found to have no hazards or cleared of all hazards before April 2014 were excluded. Interior and exterior activities (assessments, hazards identified, clearance) are reported separately. Unless otherwise noted, the data presented in this report refer to interior-only activities (see appendix).^{vi}

^{iv} Note: Due to changes in the data collection system over time, comparing data across years is not possible for all variables. For example, some data elements previously reported are no longer collected, and the revised system added a number of new data elements.

^v Available at www.nchh.org/Program/NewYorkStateCLPPPProgram.aspx

^{vi} Reporting of exterior activities for multifamily buildings varied greatly among grantees, and, as a result, the term "units" previously included both individual units and multifamily buildings. Moving forward, the data collection system will be revised to allow for reporting of interior activities by housing unit and exterior activities by building. In the meantime, NCHH devised a method for identifying units with interior activities using the current data structure. Please refer to the appendix for details.

3. Results

Since the CLPPP Program’s inception on October 1, 2007, grantees have visited and inspected the interiors of 37,731 homes, impacting over 23,000 children (Table 2).^{vii} See *New York State’s Childhood Lead Poisoning Primary Prevention Program: Grantee Impact Summaries, April 1, 2014– March 31, 2015*, for an impact summary for each of the 15 grantee programs.

Since the beginning of the program, grantees have cleared (deemed lead-safe) 75.6% (9,703) of the units having one or more confirmed or potential interior hazards. Typically, clearing a housing unit includes conducting a visual inspection to assure that all lead-based paint hazards have been treated appropriately and performing dust wipe clearance tests to confirm that lead dust levels on floors, windowsills, and window wells are below the national standards. Grantees experience a range of barriers in clearing units, including owners who

delay compliance with notices, are unresponsive to notices, or who lack the skills or resources to comply. Additionally, many jurisdictions may lack adequate recourse to enforce compliance with notices, since lead violation cases may receive lower priority among a myriad of other administrative or criminal violations heard by city and housing courts. The courts vary in format and resources across the state. Reducing compliance time frames and increasing compliance rates is a priority for the state and grantees.

3.1 Housing Units Visited and Their Characteristics

In the initial design of the Primary Prevention Program, NYSDOH identified the communities of concern and areas of high risk by identifying municipalities with an annual average of 16 or more incident cases of childhood lead poisoning and repeating the analysis at the ZIP code level to identify ZIP codes with an annual average of seven or more incident cases. A community had to meet both of these criteria to qualify as a target ZIP code. Individual grantees may further refine their target areas within these target ZIP codes.

^{vii} Includes activities that address the interior of a unit only. For comparison, using all interior and exterior activities for the program to date results in 50,530 units visited and inspected, 1,873 units visited but not yet inspected, and 24,737 children impacted. Please refer to the appendix for additional details.

Table 2: Impact of the Primary Prevention Program from October 1, 2007, to March 31, 2014^{viii}

Activity	Year 8	Cumulative
Units visited and inspected	12,708	37,731
Units with confirmed or potential lead-based paint hazards	5,421	12,840
Units cleared of all hazards	2,284	9,703
Children impacted by the program	9,167	23,018

^{viii} Table 2 includes activities that address the interior of a unit only.

The vast majority of units visited by the grantees (84%) were built before 1940; 85% were rental units and 10% were owner-occupied. Twenty-two percent of units visited through the program were single-family homes, 31% were multifamily properties with two units, 42% were multifamily properties with three or more units, and 5% of units were vacant.^{ix}

The U.S. Department of Housing and Urban Development’s 2011 American Healthy Homes Survey (AHHS) confirmed that pre-1940 units were most likely to contain significant lead-based paint hazards. Approximately 88% of inspected units with

^{ix} Percentages do not total 100% because (1) data on occupancy status and unit type are collected separately, and (2) data on occupancy status and/or unit type are missing for some units visited through the Primary Prevention Program.

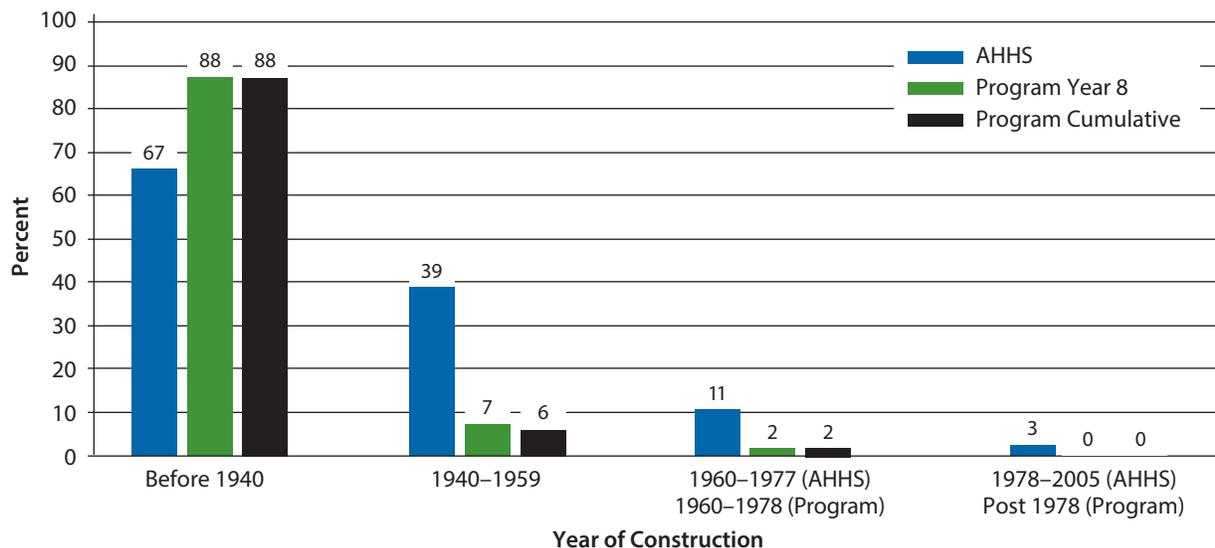
confirmed or potential, interior lead-based paint hazards were built prior to 1940 (see Figure 2).

3.2 Inspection Activities, Identified Hazards, and Clearance Status of Inspected Housing Units

Grantees partner with many agencies to facilitate inspections. In fact, the authorizing legislation for the program encourages such collaboration, including, for example, “deputizing” code enforcement agencies to conduct housing inspections on the health departments’ behalf. The following individuals conducted inspections in Year 8:

- CLPPPP staff at local health departments (65%);
- Staff of a code enforcement agency supported or deputized by CLPPPP (32%); and

Figure 2: Housing Units with Significant Lead-Based Paint Hazards by Year of Construction for CLPPPP and the U.S.



AHHS Data Source: U.S. Department of Housing and Urban Development, Office of Healthy Homes and Lead Hazard Control. (2011). American Healthy Homes Survey: Lead and arsenic findings. Retrieved from http://portal.hud.gov/hudportal/documents/huddoc?id=AHHS_REPORT.pdf

Table 3: Results of Grantee Inspections, Year 8 and Cumulative

	Units with Hazards		Units Sent Notice		Units Cleared	
	Year 8	Cumulative	Year 8	Cumulative	Year 8	Cumulative
Confirmed Interior Hazard	4,194	11,025	3,867	10,698	1,994	8,825
Potential Interior Hazard	1,227	1,815	1,013	1,601	296	884

Source: Unit-based data for units first inspected between April 1, 2014, and March 31, 2015, or carried over from previous years; and units inspected between October 1, 2007, and March 31, 2015.

Note 1: Potential hazards are hazards identified exclusively through visual assessment, without testing to confirm the presence of lead.

Note 2: Excludes 3,150 units with “unspecified hazards” only. “Unspecified hazards” are hazards identified prior to the changes to the data collection system in April 2011 that are unknown to be exterior, interior, or both.

- Staff of another organization supported or deputized by the CLPPPP (3%).

Grantees used a variety of interior inspection techniques, with interior visual assessments being the most frequently used assessment (96% in Year 8). X-ray fluorescence (XRF) testing, which uses an x-ray instrument to detect the presence of lead, was reported for approximately 47% of the units inspected, and dust wipe sampling was performed during 14% of inspections.^{x,xi}

Many factors affect time from inspection to clearance, including inclement weather in the winter season and enforcement actions needed to achieve clearance. Because neither the CLPPPP nor the department’s secondary prevention program (a case management program that responds to children with elevated blood lead levels) provide property owners with funding for repairing homes, in most cases compliance time frames are dependent on the owner’s ability to pay for the required repairs.^{xiii}

Table 3 shows the results of grantee interior inspections in Year 8 and cumulatively, including those units carried over from previous years.^{xii}

State laws and regulations allow for interim control treatments, since such treatments have been found to be effective at reducing lead exposure. However,

^x Note: This section discusses the use of dust wipe sampling during the inspection process. It does not include information on dust wipe sampling used during clearance.

^{xi} Note: Four grantees (Erie, New York City, Onondaga, and Westchester) account for approximately 63% of XRF activities. Similarly, three grantees (Monroe, New York City, and Oneida) account for approximately 90% of dust wipe sampling activities.

^{xii} In previous years’ evaluation reports, Table 3 has also contained information on exterior hazards identified and cleared. In both Year 8 and cumulatively, the program identified more exterior hazards than interior hazards.

	Units with Hazards		Units Sent Notice		Units Cleared	
	Year 8	Cumulative	Year 8	Cumulative	Year 8	Cumulative
Confirmed Exterior Hazard	4,773	10,881	4,646	10,754	2,491	8,599
Potential Exterior Hazard	3,722	6,301	3,338	5,917	1,248	3,827

Note: Exterior activities in multi-unit buildings may reflect either a single unit or an entire building.

^{xiii} For example, as a requirement of law in New York City, if owners fail to correct lead paint hazards safely and in a timely fashion, the address is referred to the Housing Preservation and Development’s Emergency Repair Program. The owner is billed for the service or a lien is placed on the property to accelerate the remediation of lead hazards identified during an inspection.

interim control treatments must be maintained through ongoing repairs. The data from this evaluation suggest that many property owners are not conducting ongoing maintenance of their units, resulting in “repeat” hazards. Of the 12,708 units inspected in Year 8 by the CLPPPP, 249 were previously found to have lead hazards by local health departments during an inspection for an elevated BLL. Among these units where a hazard was previously identified, 149 (60%) had a definitive interior hazard identified during the CLPPPP inspection. Beyond the problem of units with repeat hazards, apartment buildings that have previously been the subject of inspections for children with elevated BLLs are frequently the location of additional units with lead hazards. Grantees often use these addresses to target their primary prevention efforts. In Year 8, grantees inspected 438 units associated with properties where a lead hazard had been identified as part of a previous elevated BLL investigation for another unit in the building (but not within that specific unit). Of these, 257 (59%) had a definitive interior hazard identified as part of the CLPPPP investigation, suggesting that once a lead hazard is identified in any unit of a multifamily building, other units in the building may be appropriate targets for primary prevention inspections.

3.3 Enforcement of Remediation and Confirmation of Clearance

Notice and Demand orders are the primary method by which local health departments notify property owners when lead-based paint hazards are identified during an investigation. Grantees used them in 53% of the 4,854 units with a first notice reported. Grantees used additional enforcement

^{xi} For example, as a requirement of law in New York City, if owners fail to correct lead paint hazards safely and in a timely fashion, the address is referred to the Housing Preservation and Development’s Emergency Repair Program. The owner is billed for the service or a lien is placed on the property to accelerate the remediation of lead hazards identified during an inspection.

efforts for 1,276 of the 4,854 units with a first notice reported. These actions included office or field conferences, departmental or administrative hearings, court hearings, and fines. Grantees most frequently used the additional enforcement technique of departmental or administrative hearings (482 actions).

Cumulatively, almost 76% of units have been cleared of confirmed or potential interior hazards to date. About 13.3% of these units took longer than one year to achieve clearance. Figures 3a–3d show the median number of days from inspection to interior clearance and the percentage of units that took more than one year to achieve clearance by unit type for Year 8 and cumulatively.

Definitions of Actions

Office or field conferences: Consultations between the property owner and CLPPPP staff prior to the Notice and Demand due date to clarify scope of work, training requirements, and/or tenant protection or relocation needs.

Departmental or administrative hearings: Formal CLPPPP or health department hearings after the Notice and Demand due date has passed. These hearings are usually presided over by Board of Health members or municipal attorneys; property owners can appear with legal representation if needed. Barriers to compliance with the Notice and Demand and possible solutions are discussed; provisional extension of the Notice and Demand due date is often provided.

Court hearings and fines: After a specified time period (varying by program), noncompliant cases are referred to municipal or housing courts at the city and/or county level to allow stronger enforcement measures to be levied, including the assessment of a penalty or fine.

Figures 3a–3d: Compliance Rates and Time Frames

Figure 3a: Time to Clearance among Units that Achieved Clearance, Program Total

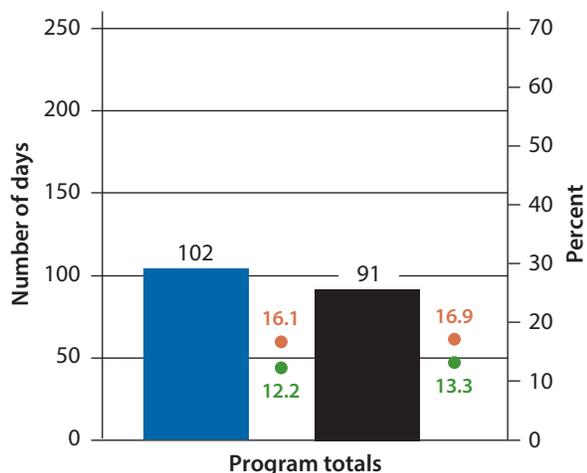


Figure 3b: Time to Clearance among Units that Achieved Clearance, by Building Type

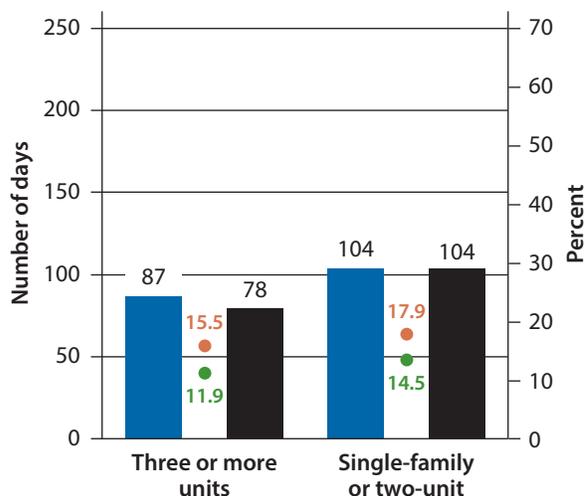


Figure 3c: Time to Clearance among Units that Achieved Clearance, by Enforcement

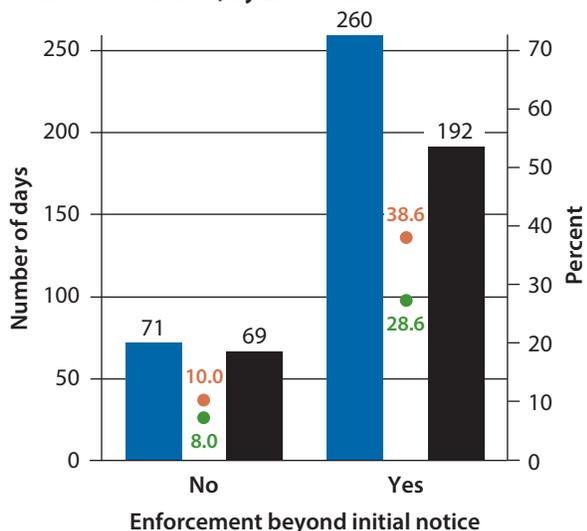
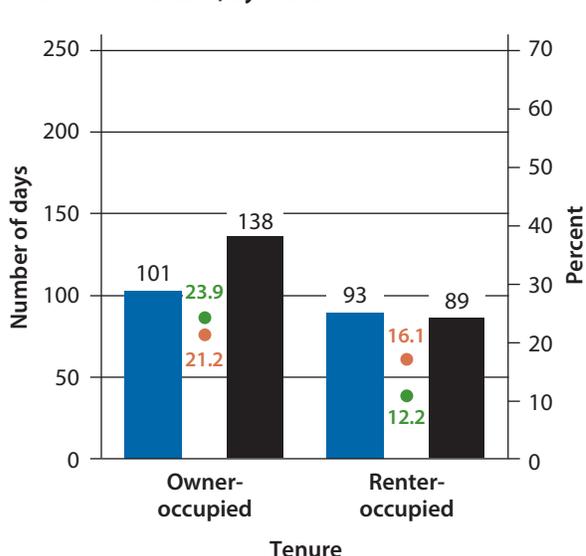


Figure 3d: Time to Clearance among Units that Achieved Clearance, by Tenure



- Median number of days, Year 8
- Median number of days, cumulative
- % more than one year, Year 8
- % more than one year, cumulative

3.4 Benefits for Children and Others

A significant number of children benefited from the program in Year 8, with grantees reporting the following:

- Visiting and inspecting 6,061 housing units where at least one child was present, reaching a total of 9,167 children.
- Making 1,732 housing units where at least one child was present lead-safe, impacting a total of 2,558 children.
- Referring 4,949 children for blood lead level testing as a result of these visits.^{xiv}

As funding for the CLPPPP has increased, so has the number of units visited and inspected, units cleared of all hazards, and children impacted. Figure 4 shows that at the early three-million-dollar funding mark, approximately 125 units were made lead-safe by the program, compared to an annual average

^{xiv} Children not tested at age one or two were referred for blood lead level tests, as were children who may have been tested previously but whose living environment warranted additional testing.

of 2,400 units at the \$7.67 to \$8.7 million-dollar funding level. The impact of a greater investment into the program holds true even when the number of counties participating in the program remained constant between October 2009 and March 2015 and the overall annual level of program funding remained within a roughly one-million dollar range. As grantees gain capacity, refine enforcement and partnership models, and deepen their reach into their communities, the program impact increases.

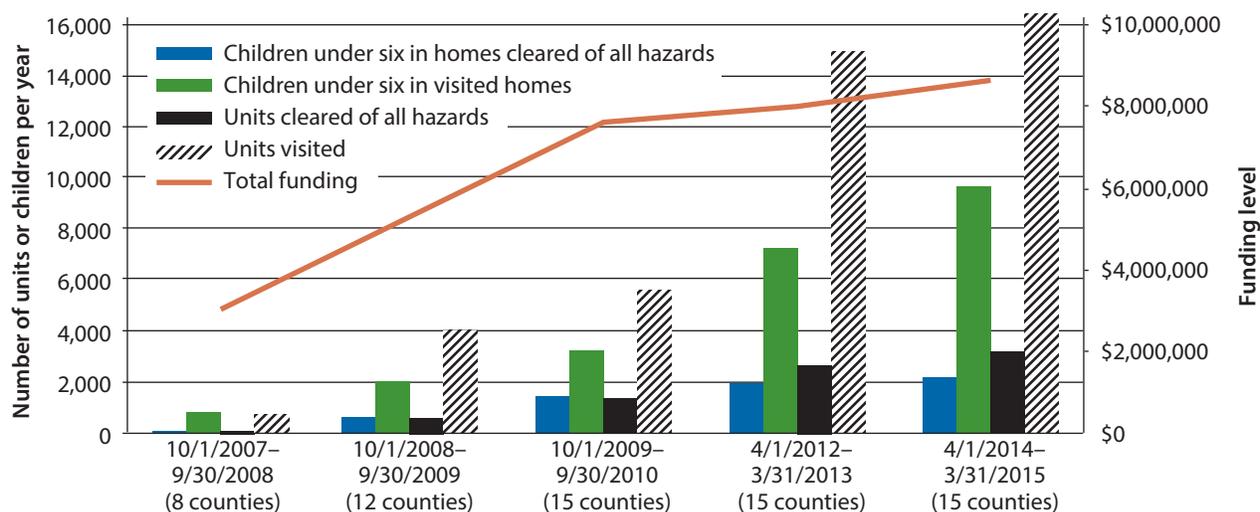
3.5 Other Grantee Outcomes

Grantees are required to conduct an annual program evaluation such as a cost analysis, outcome evaluation, or a continuous quality improvement project or process evaluation, depending on the needs of their program.

During Year 7, NCHH developed several technical assistance briefs and webinars, along with providing one-on-one technical assistance to facilitate other types of outcome evaluation and process improvement activities, including:

- Assessing the financial cost of Early Intervention Program services attributable to lead exposure;

Figure 4: Number of Units Visited and Children Impacted, Selected Years



- Estimating more accurate prevalence rates in high-risk communities with low screening activity;
- Conducting post-remediation follow-up to assess the longevity of lead hazard control; and
- Comparing prevalence rates and trends between target communities and similar, nontargeted areas.

Furthermore, in 2014, NYSDOH and NCHH developed and introduced improvement activities focusing on enhancement of targeting strategies, inspection protocols, compliance time frames, enforcement infrastructure, partnerships, and unit production. This framework was used to identify evaluation projects for grantees to advance their program performance. As a result, many of the outcomes evaluations concentrated on performance management projects focused on the improvement activities.

Highlights from the 2014–2015 reports include the following:

- Broome County conducted an evaluation of their effort to increase lead screening as a part of their county’s WIC program. The partnership identified 180 children with lead levels ≥ 10 $\mu\text{g}/\text{dL}$. A cost analysis of lead testing was also conducted that quantified the cost of staff time minus the revenue resulting from billing. Broome County quantified the lead screening cost per child to the WIC program as \$22.57. Based on the success of this pilot, Broome County WIC program has institutionalized lead testing into their operating procedures.
- Dutchess County conducted a cost analysis of their subcontract with the City of Poughkeepsie to evaluate the cost effectiveness of the partnership to inspect and remediate high-risk

housing units. From 2009–2012, the subcontract was budget based and not yielding optimal results. Starting in 2013, the subcontract became performance-based to increase the number of housing units inspected and the number of housing unit interiors assessed. While program challenges still existed at the time of the evaluation, the performance-based contract was found to be effective in decreasing the cost per inspection and increasing the number of housing unit interiors assessed.

- Erie County conducted post-remediation follow-up and evaluation on 391 housing units where lead hazard control was completed between 2010 and 2013. Eighty-four percent of the housing unit exteriors remediated were found to be maintained and in good condition upon reinspection.
- Ulster County conducted a program improvement project focusing on time frame analysis from inspection to case closure. The first phase of the project identified the need to expedite RRP training for owners and contractors, the ineffectiveness of the Notice and Information in facilitating compliance, the need to establish a tracking system to monitor the status of housing units throughout the process in order to facilitate timely case closure, and the effectiveness of timely informal departmental hearings in facilitating case closure.

Looking forward, many grantees are focusing their outcomes evaluation on time frame analysis of their inspectional systems and post-remediation follow-up to evaluate the longevity of lead hazard control interventions.

Conclusions and Recommendations

Since the CLPPPP's inception, grantees have visited and inspected the interiors of almost 38,000 homes, identified confirmed or potential lead hazards in 12,840, and have cleared (deemed lead-safe) 75.6% (9,703) of the units. As a result, over 11,020 children who were previously living in homes with confirmed or potential lead hazards are now at a greatly reduced risk for lead poisoning. The research overwhelmingly shows that this translates into fewer kids being labeled "learning disabled," fewer children who will score poorly on third-grade test scores (scores that we know portend future high school dropout), and more New York children will be placed into advanced and intellectually gifted programs. At a total program investment of approximately \$52.76 million since 2007, this amounts to just over \$4,700 per child—a fraction of the cost of special education for a child with lead exposure, which has been conservatively estimated at \$38,000 over three years.²¹

The evaluation data from this initiative can be used in several ways. In addition to evaluating program impact, data can be used to make midcourse improvements and gain greater visibility into program and policy areas that need attention. Program data can also help evaluate the societal outcomes of the program by connecting program data to other data sets. For example, Oneida County has used its data to examine the financial cost of Early Intervention Program services attributable to lead exposure in their jurisdiction. Exploring the connections between the CLPPP intervention and impacts on school performance and/or juvenile delinquency can help to elucidate the value of the state's investment into this program.

In 2013 and 2014 NCHH used program evaluation data to develop recommendations for midcourse adjustments that were presented to grantees by

webinar and at the spring, 2014 annual meeting. One on one technical assistance was also provided to grantees during the annual meeting and during follow-up phone calls and site visits. NCHH and NYSDOH worked with individual grantees to assess strengths and weaknesses and explore the barriers and opportunities to implementing program improvement activities. During Year 8, the current reporting period, grantees began to implement performance improvement activities related to the following recommendations:

1. Targeting the Highest-Risk Places

The state and its grantees are focused on the highest-risk counties, neighborhoods, and housing units. To facilitate targeting, in Year 7, NYSDOH updated its highest-risk ZIP code analysis using updated blood lead surveillance data. These data have been shared with grantees to help them focus their efforts to prevent additional poisonings in Year 8, specifically by targeting areas containing pre-1940 rental housing units where young children have previously been identified with elevated blood lead levels. Grantees are using new tools, such as birth record matching with high-risk areas, and data on units and properties where prior hazards have been found to ensure that these units provide no ongoing risk to children. Grantees were also encouraged to track and analyze which referral sources yielded inspections and to make adjustments as needed.

2. Expanding and Ensuring Consistency in the Scope of Hazard Assessments Being Performed

Since the correction of hazards in high-risk homes is based on an assessment of hazards, the scope and quality of those assessments is paramount to the success of the initiative. In Year 8, NYSDOH worked with grantees to review assessment protocols, with a focus on increasing the number of units with

interior assessments. During Year 9, NYSDOH will continue working with grantees to adopt more comprehensive hazard assessment protocols and detail components of the inspection process that are needed to assure high-quality work.

3. Decreasing the Compliance Time Frames for Making Homes Lead-Safe

Perhaps one of the most pernicious problems faced by grantees is gaining timely compliance with Notice and Demand orders. Lengthy court procedures, complicated ownership arrangements for units, and the simple lack of funding to address hazards can cause hazardous units to languish. A few grantees have successfully used the Spiegel Act to gain property owner compliance where state funding is being used for housing assistance. In Year 8, grantees learned more about this legal tool and some are actively exploring its use for their jurisdictions. Additional enforcement strategies include:

- Establishing program management tools to monitor the disposition of cases in order to facilitate more timely compliance.
- Eliminating the use of the Notice of Information as a more voluntary approach to lead hazard control. In most counties, it has been identified that this step in the process needlessly lengthens compliance time frames.
- Reducing compliance time frames.
- Utilizing the development of work plans with property owners to outline the steps needed to achieve compliance in a lead-safe manner.
- Exploring housing courts, or agreements with local code enforcement offices, prosecutors, and judges to expedite the resolution of cases involving lead-paint hazards.

4. Strengthening Collaborations

The primary prevention law provides critical authority to help agencies get into high-risk homes, but because the funding cannot be used for lead hazard control, successful collaborations with both HUD-funded lead hazard control and case management services are paramount to

the program's success. During Year 8, grantees were encouraged to reinforce relationships with HUD lead hazard control grantees to secure lead hazard control funding for units investigated by the CLPPPP. They were also encouraged to facilitate stronger collaborations with secondary intervention programs. Additional collaboration recommendations included the following:

- Increasing partnerships with philanthropic organizations and hospital community benefit programs.
- Leveraging the opportunity for Medicaid reimbursement for primary and secondary prevention visits for lead poisoning.
- Funding partner agencies to assist in identification of high-risk units and inspection strategies, while assuring performance of subcontracted agencies at the county level.

We have the following additional recommendations for NYSDOH:

- Assure that budgets and staffing structures are in place to assure that the goals of the program can be achieved. Several counties are affected by hiring freezes or difficulties that can result in obstacles to program improvement.
- Improve the transparency and access to data that can be used by the grantees and their community partners to target primary prevention activities. This includes making the high-risk ZIP codes for lead publicly accessible, working with the Department of State or others to make housing code enforcement data public, providing grantees with predictive demographic indicators, and/or providing blood lead data at more refined geographic scales (e.g., census tracts or blocks), while still protecting individual privacy.
- Support grantees in putting performance management systems in place in order to engage continuous quality improvement.
- Continue to emphasize program improvement activities and focus on the components of inspection and clearance processes needed for

high-quality work that has a sustainable impact on high-risk housing stock.

- Explore how judicial and legal systems can be better understood, resourced, and refined to assure swift legal action when compliance is difficult to achieve. Local political will may be needed to make changes to the court enforcement system.
- Review the 67.2 regulations for follow-up related to a child with an elevated blood lead level (EBL) and consider more stringent requirements for property owners with a prior history of code violations or EBL cases.
- Collaborate with the state Medicaid office to examine the extent to which children enrolled in Medicaid are receiving appropriate environmental follow-up according to the Early, Periodic, Diagnostic, and Testing schedule. Explore the feasibility of the state Medicaid office or private insurers reimbursing county health departments for environmental investigations for lead.
- Collaborate with the Department of Education to examine school performance alongside of childhood lead exposure.
- Analyze greater alignment and leveraging between the CLPPPP and the LPPP for local leveraging of resources and standardization of systems.
- Collaborate with the Department of State to train code enforcement officers in lead-safe work practices.
- Recommend the reformation of the Governor's Task Force on Childhood Lead Poisoning Prevention to serve as the foci for the interagency recommendations referenced above.
- Review and update the program's data collection and reporting system to better reflect program impact and grantee implementation of improvement activities. In particular, the data system should be updated to provide more timely data to grantees, NYSDOH, and other stakeholders.

Appendix:

Selection of Units with Interior Activities

This appendix describes the methodology used in selecting units with interior activities for analysis and the rationale for this change in approach.

Rationale: In previous CLPPPP evaluation reports, the term “units” included both individual units and in some cases multifamily buildings. However, in our data cleaning efforts, we found that reporting of exterior activities for multifamily buildings varied greatly among grantees. For instance, some grantees created a single record of exterior activities for a multifamily building and associated that with a single random unit within the building. Other grantees reported a similar exterior assessment of a multifamily building by recording that activity on the assessment form for every unit within a building. In some cases, grantees initiated a separate assessment form for exterior activities that was not linked to any units at all. Finally, some grantees focused primarily on exterior activities, and therefore most of their units were buildings. Thus, “units,” as reported on previously, were actually a mix of single-family housing units, multifamily housing units, and multi-unit buildings. The data collection system will be revised in the future to allow for reporting of interior activities by housing unit and exterior activities by building. In the meantime, NCHH devised a method for identifying units with interior activities using the current data structure. This enabled NCHH to report on activities that address actual housing units, a primary focus of the program.

Method for identifying units with interior activities: Units with interior activities are identified as any unit with an interior assessment or hazard identified. For units with interior hazards, interior visual assessment, dust sampling, or other interior assessment, this identification is straightforward.

However, there is a small subset of units with XRF testing that have no interior hazards identified and no other interior assessment (no interior visual assessment, dust sampling, or other interior assessment). The current data collection form does not distinguish between XRF testing done on the building exterior or unit interior, and absent other information that would identify the unit as one with interior activities, a conjecture must be made to estimate whether the unit has interior activities.

To estimate how many of these unassigned units are likely to have had interior activities, NCHH used the proportion of units with XRF testing (but no other interior assessment) that did have interior hazards identified. The assumption is that the proportion of units assessed with an XRF on the interior would not differ substantially based on whether an interior hazard was identified. This proportion (*Pi*) was calculated for each grantee individually using the cumulative dataset and applied to their unassigned units (Table A1).

For example, in Broome County, approximately 296 units were inspected. Of these, 271 had data to indicate a clear interior inspection or hazard and 25 were unassigned (had XRF testing, but no other definitive interior activity). Of the twenty-six units in the cumulative dataset that had XRF testing (but no other interior inspection), one (3.8%) had an interior hazard identified, indicating that the interior was assessed. This proportion (3.8%) is Broome’s *Pi* for the cumulative dataset. Multiplying the 25 unassigned units by 3.8% (Broome’s *Pi*) results in one additional unit classified as having interior activities for a total estimate of 272 units (271+1).

For additional information, contact Amanda Reddy (areddy@nchh.org).

Table A1. Data Used to Estimate P_i and Results Using P_i for Year 8

Grantee	Data Used to Estimate P_i (Cumulative)		Results Using P_i (Year 8)				
	N	Estimated P_i	# Inspected	Data indicated Clear Interior (1)	# with Imputation	Percent Interior	Estimated # of Interior Housing Units Inspected
Albany	17	94.1%	332	332	0	100%	332
Broome	26	3.8%	296	271	25	92%	272
Chautauqua	64	0.0%	286	240	44	84%	240
Dutchess	20	85.0%	557	349	3	63%	352
Erie	3,746	0.1%	3,011	1,752	1,218	58%	1,753
Monroe–City	1	100.0%	3,762	3,762	0	100%	3,762
Monroe–County	857	92.2%	467	378	89	99%	460
New York City	0	—	1,509	1,509	0	100%	1,509
Niagara	99	6.1%	1,474	413	74	28%	417
Oneida	12	0.0%	1,431	659	25	46%	659
Onondaga	9	22.2%	1,031	1,018	5	99%	1,019
Orange	43	90.7%	421	414	7	100%	420
Rensselaer	1	0.0%	279	275	1	99%	275
Schenectady	32	93.8%	154	153	1	100%	154
Ulster	53	71.7%	230	102	20	51%	116
Westchester	113	17.7%	1,033	953	79	94%	967
			16,273	12,580			12,708

(1) Unit had an interior inspection or an interior hazard.

(2) NA = New York City did not have any units with XRF testing that did not have either another interior assessment or interior hazards identified.

References

- ¹ New York State Department of Health. (2004). *Eliminating childhood lead poisoning in New York State by 2010: III. Environmental scan*. Retrieved April 9, 2015, from <http://www.health.ny.gov/environmental/lead/exposure/childhood/finalplanscan.htm>
- ² U.S. Centers for Disease Control and Prevention, National Center for Environmental Health. (n.d.). *Blood lead levels in children*. Retrieved April 9, 2015, from http://www.cdc.gov/nceh/lead/acclpp/lead_levels_in_children_fact_sheet.pdf
- ³ Strayhorn, J. C. & Strayhorn, J. M. (2012, January 23). Lead exposure and the 2010 achievement test scores of children in New York counties. *Child and Adolescent Psychiatry and Mental Health*, 6(4). DOI:10.1186/1753-2000-6-4. Retrieved April 9, 2015, from <http://www.capmh.com/content/6/1/4>
- ⁴ U.S. Centers for Disease Control and Prevention. (2013, April 5). Blood lead levels in children aged 1–5 years—United States, 1999–2010. *Morbidity and Mortality Weekly Report (MMWR)*, 62(13), 245–248. Retrieved April 9, 2015, from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6213a3.htm?s_cid=mm6213a3_w
- ⁵ New York State Department of Health. (2013, September). *New York State public health laws and regulations for lead poisoning*. Retrieved April 9, 2015, from www.health.ny.gov/environmental/lead/laws_and_regulations/index.htm
- ⁶ U.S. Centers for Disease Control and Prevention. (n.d.). Number of children tested and confirmed EBLs by state, year, and BLL group, children < 72 months old. Retrieved April 9, 2015, from <http://www.cdc.gov/nceh/lead/data/StateConfirmedByYear1997-2012.htm>
- ⁷ New York State Department of Health. (n.d.). LeadWeb data, 2010–2012.
- ⁸ Ban of Lead-Containing Paint and Certain Consumer Products Bearing Lead-Containing Paint. 16 CFR § 1303. (1978). Retrieved April 9, 2015, from http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title16/16cfr1303_main_02.tpl
- ⁹ Jacobs, D. E., Clickner, R. P., Zhou J. Y., Viet, S. M., Marker, D. A., Rogers, J. W., et al. (2002, October). The prevalence of lead-based paint hazards in U.S. housing. *Environmental Health Perspectives*, 110(10), A599–A606. Retrieved April 9, 2015, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1241046/pdf/ehp01110-a00599.pdf>
- ¹⁰ U.S. Centers for Disease Control and Prevention. (2013, December 18.) Prevent childhood lead poisoning [Infographic]. Retrieved April 9, 2015, from <http://www.cdc.gov/nceh/lead/infographic.htm>
- ¹¹ President’s Task Force on Environmental Health Risks and Safety Risks to Children. (2000, February). *Eliminating childhood lead poisoning: A federal strategy targeting lead paint hazards*. Retrieved April 9, 2015, from <http://www.cdc.gov/nceh/lead/about/fedstrategy2000.pdf>
- ¹² Miranda, M. L., Maxson, P., & Kim, D. (2010). Early childhood lead exposure and exceptionality designations for students. *International Journal of Child Health and Human Development*, 3(1), 77–84. Retrieved April 9, 2015, from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3082958/>

-
- ¹³ Miranda, M. L., Kim, D., Osgood, C., & Hastings, D. (2011, February 14). The impact of early childhood lead exposure on educational test performance among Connecticut schoolchildren, phase 1 report. Durham, NC: Children's Environmental Health Initiative. Retrieved April 9, 2015, from http://www.ct.gov/dph/lib/dph/environmental_health/lead/pdf/linking_lead_and_education_data_in_connecticut_phase_1_final.pdf
- ¹⁴ Evens, A., Hryhorczuk, D., Lanphear, B. P., Lewis, D. A., Forst, L., & Rosenberg, D. (2015). The impact of low-level lead toxicity on school performance among children in the Chicago public schools: A population-based retrospective cohort study. *Environmental Health*, 14(21). DOI: 10.1186/s12940-015-0008-9. [Online] Retrieved April 9, 2015, from <http://www.ehjournal.net/content/pdf/s12940-015-0008-9.pdf>
- ¹⁵ Nevin, R. (2000, May). How lead exposure relates to temporal changes in IQ, violent crime, and unwed pregnancy. *Environmental Research*, 83(1), 1–22. DOI: 10.1006/enrs.1999.4045. Retrieved April 9, 2015, from <http://pic.plover.com/Nevin/Nevin2000.pdf>
- ¹⁶ Dietrich, K. N., Douglas, R. M., Succop, P. A., Berger, O. G., & Bornschein, R. L. (2001). Early exposure to lead and juvenile delinquency. *Neurotoxicology and Teratology*, 23(6), 511–518. Retrieved April 9, 2015, from http://www.rachel.org/files/document/Early_Exposure_to_Lead_and_Juvenile_Delinquenc.pdf
- ¹⁷ Wright, J. P., Dietrich, K. N., Ris, M. D., Hornung, R. W., Wessel, S. D., Lanphear, B. P., Ho, M., & Rae, M. N. (2008, May 27). Association of prenatal and childhood blood lead concentrations with criminal arrests in early adulthood. *PLoS Medicine*, 5(5). DOI:10.1371/journal.pmed.0050101. Retrieved April 9, 2015, from <http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.0050101>
- ¹⁸ Mielke, H. W. & Zahran, S. (2012, August). The urban rise and fall of air lead (Pb) and the latent surge and retreat of societal violence. *Environment International*, 43, 48–55. DOI:10.1016/j.envint.2012.03.005. Retrieved April 9, 2015, from <http://www.sciencedirect.com/science/article/pii/S0160412012000566>
- ¹⁹ Trasande, L. & Liu, Y. (2011). Reducing the staggering costs of environmental disease in children, estimated at \$76.6 billion in 2008. *Health Affairs*, 30(5), 863–870. DOI:10.1377/hlthaff.2010.1239. Retrieved April 9, 2015, from <http://content.healthaffairs.org/content/early/2011/05/02/hlthaff.2010.1239.full.pdf+html>
- ²⁰ Advisory Committee on Childhood Lead Poisoning Prevention of the Centers for Disease Control and Prevention. (2012, January 4). Low level lead exposure harms children: A renewed call for primary prevention. Retrieved April 9, 2015, from http://www.cdc.gov/nceh/lead/acclpp/final_document_030712.pdf
- ²¹ Korfmacher, K. S. (2003, July 9). Long-term costs of lead poisoning: How much can New York save by stopping lead? Rochester, NY: Environmental Health Sciences Center, University of Rochester. Retrieved April 9, 2015, from <http://www.sehn.org/tccpdf/lead%20costs%20NY.pdf>
- ²² National Center for Healthy Housing. (2013, July). State and local childhood lead poisoning prevention programs: The impact of federal public health funding cuts. Columbia, MD: Author. Retrieved April 9, 2015, from http://nchh.org/Portals/0/Contents/State-and-Local-Childhood-Lead-Poisoning-Prevention-Programs_2013-08-01.pdf