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Childhood Lead Poisoning Prevention and Intervention Programs in Connecticut: a Historical Analysis

Ana Chambers

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Childhood Lead Poisoning Prevention and Intervention Programs in Connecticut:

A Historical Analysis

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B.A., University of Connecticut, 1986
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CHILDHOOD LEAD POISONING PREVENTION AND INTERVENTION PROGRAMS IN CONNECTICUT: A HISTORICAL ANALYSIS

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2003
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To my father, I owe my perseverance and work ethic. You set an example of hard work and tireless energy. You have met every one of life’s challenges with strength, dignity, and faith. I can only hope to mirror that somewhat in my life. To my family, I owe gratitude for believing I could accomplish this when I did not believe so.

To my husband, John …you are my rock. Thank you for supporting me and believing in me. Thank you for your patience and positive outlook. You made me believe I could do this, despite everything else that life has placed before me. You made me see that there really was light at the end of the tunnel. I dedicate this paper to you. I love you always.

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Introduction

Each year, thousands of children in this country are affected by lead poisoning and, according to CDC data from the National Health and Nutrition Examination Survey III (NHANES), Phase 2 (1991-1994), the average blood lead level (BLL) in children decreased approximately 80% since the late 1970s (Centers for Disease Control and Prevention, 2002). However, elevated BLLs have remained more common among low-income children, urban children, and those living in older housing.

Although recent data continue to demonstrate a decline in the prevalence of elevated blood lead levels (EBLLs) in children, childhood lead poisoning remains a major preventable, environmental health threat in our nation, mainly among the nation’s poorer children. The adverse health effects on children from exposure to lead are a major public health concern. High levels of lead in the body are associated with developmental and neuro-behavioral problems such as impulsivity, aggression, and short attention span. The National Childhood Blood Lead Surveillance (NCBLS) System defines elevated blood lead level as a single venous blood lead test greater than or equal to 10 micrograms per deciliter (mcg/dl). Currently, the CDC defines an elevated blood lead level as the same, but is researching evidence that speaks to the subtle effects of lower blood lead levels (Centers for Disease Control and Prevention, 2002).

Childhood lead is a serious illness with potential lifelong effects for children in all socio-economic brackets. It disproportionately affects poor inner city minority children. It is estimated that close to 500,000 children in the United States have blood levels high enough to cause decreased intelligence, behavioral disturbances, delayed development, and other adverse health effects (Centers for Disease Control and Prevention, 2002).
Nationally, eighty-five percent of these children are on Medicaid, and only 19% of those children on Medicaid have been screened for elevated blood lead levels (Centers for Disease Control and Prevention, 2002).

The elimination of childhood lead poisoning over the next seven years (by 2010) is a national public health priority that will create millions of lead-safe homes for low-income families with children; especially for minority children (Hispanic and African American) and their families who are at greatest risk for lead exposure. On April 21, 1997, President Clinton issued Executive Order 13045, which created a Presidential Task Force on Children’s Environmental Health and Safety Risks to improve environmental health and safety for children. The creation of the Task Force was based on growing evidence which has demonstrated that children who live in older housing, receive services from public assistance programs, and meet the public criteria of a personal risk assessment questionnaire are those children who would benefit the most from a targeted screening approach and policy interventions to make their living environment lead-safe (Centers for Disease Control and Prevention, 2002).

As a society, the United States is already bearing high costs related to childhood lead poisoning. Some of these costs are relatively easy to measure: medical treatment costs, costs for relocation to lead-safe housing of children having elevated blood lead levels, and special education costs. Other costs are more difficult to quantify: higher school failure rates; reduction in lifetime earning potential due to permanent loss of intelligence; and increases in societal pathologies (such as crime) due to the reduced ability of lead-poisoned children to succeed as adults (Centers for Disease Control and Prevention,
Experts differ in their dollar estimates. However, the societal costs per child poisoned are significant.

The nature of the lead problem differs from state to state and city to city. Knowledge about the problem and the ability to identify and control lead hazards is critical in containing the problem and eliminating childhood lead poisoning all together. Today, most of the children who have lead poisoning, or are at high risk for lead poisoning, live in poverty and in older, deteriorating inner-city housing. They are difficult to reach and it has proven difficult to assure assessment, follow-up, and prevention services.

There are many health-protective and cost-effective methods that should be considered in the elimination of childhood lead poisoning in Connecticut. Some important recommendations that the author will explore in this paper include:

- Lead-based paint hazards are costly public health and housing problems. Funding assistance should be developed for homeowners and property managers to rectify the lead hazards in their houses and apartments.
- The essential approach to the elimination of childhood lead poisoning is primary prevention.
- Prioritization should be given to housing with a high likelihood of lead-based paint hazards.
- There is a tremendous need for a range of primary prevention, case management, and surveillance strategies.
- There is a need for flexibility among property owners in selecting health-protective strategies and finding financial assistance options.
- Public subsidies are vital to eliminating lead hazards in poor neighborhoods.
• State and local programs should be tailored to specific community or neighborhood needs.

• Prevention programs should build on community-based organizations and should help build their capacity to resolve residential environmental problems, making use of existing infrastructures.

This paper will address the current status of childhood lead poisoning in Connecticut. The author will examine childhood lead poisoning prevention measures currently in place that target prevention and intervention. Current practices in other states will be explored to ascertain a best practices approach. The screening and treatment guidelines used in Connecticut will be examined. Emphasis will be placed upon the strategies that are in place today and how they must evolve for the future to meet the needs of the increasingly diverse urban population in Connecticut. Finally, the author will conclude with recommendations for future childhood lead poisoning prevention and intervention measures, with consideration for budgetary concerns, policy changes, and resources for families in Connecticut battling this serious, yet preventable, environmental health concern.
Lead: The History of its Use

Lead is a heavy, soft, malleable bluish metal. It is one of the metals of antiquity that generally occurs in nature in the form of ores. It is estimated that lead was discovered over 5,000 years ago, dating back to at least 3500 B.C., although there are some documents that speak to its earlier discovery (Lin-Fu, 1985). Its early application in civilization is documented by a wide variety of artifacts uncovered in archaeological excavations.

The oldest known lead object was a statue excavated in Turkey and dated somewhere around 6500 B.C. Lead objects have been found in Egyptian tombs and in ancient Syria. Lead was used in rods and in pieces as a means of currency. World production of lead 4,000 years ago has been estimated at 160 tons per year; 2,700 years ago, it was 10,000 tons per year; and, during the Roman Empire, lead production increased to 80,000 tons per year (Waldron, 1973, as cited in Lin-Fu, 1985).

After its discovery around 3500 B.C., vast amounts of lead began to be mined and smelted in both southwest Asia and Europe, mainly for its utility in building. However, despite its wide usage, this dull metal remained in relative obscurity until the Romans began large-scale use of it in their elaborate aqueduct systems. It is believed that 12,000 tons of lead was used in the construction of a single siphon unit in the greatest aqueduct at Lyons. Both the Romans and the Greeks found many applications for this useful metal (Waldron, 1973, as cited in Lin-Fu, 1985).

The use of lead in the aqueducts carried over into the Middle Ages when the metal found wide use as a building material. Today, lead remains an important metal in
construction. The problem with lead is that once it is mined, processed, and introduced into the environment, it is a potential problem without end. No known or foreseeable technology will destroy it or render it harmless. Nearly all of the lead in the environment is due to human activities (Lin-Fu, 1985).

The magnitude of the problem of lead toxicity from its use and misuse in certain cultures has caused historians to speculate that the decline of both the Roman Empire and the Shan Dynasty in China may be linked to lead poisoning. Since both civilizations found lead to be such a valuable metal in building their vast empires, it was used for constructing aqueducts, bridges, and buildings. Lead was ever present in the environment. The belief is that lead toxicity was the cause, in part, of lowered birth rates, and increased mental disturbances among the populace (Lin-Fu, 1985).

Centuries of mining, smelting, and use have released millions of tons of lead into the environment. Since its discovery about 5,000 years ago, and particularly since the Industrial Revolution of the mid-18th century, there has been a steady increase in lead production and the dispersion of this toxic metal into the environment, thus increasing the potential for occupational and residential exposures. Its versatility, as well as favorable physical and chemical properties, account for its extensive use. Much of its usefulness is due to its plasticity and softness. Lead can be rolled into sheets, which can be made into rods and pipes. It can be molded into containers and mixed with other metallic elements. Lead has been used in building construction, especially roofing, cornices, electrical conduits, and water and sewer pipes (Lin-Fu, 1985).

Studies of the lead concentration of snow sheets in the Greenland ice cap dated by carbon 14 determination, extending from 800 B.C. to recent decades, have demonstrated
a sharp increase in the lead content of sheets corresponding to 1750, the beginning of industrialization. The lead concentrations of the snow layers tripled in the second half of the 18th century and again tripled between 1935 and 1965. In 1965, the lead concentration of Greenland snow sheets was about 400 times that found in 800 B.C. (Lin-Fu, 1985).

The use of lead in our most recent history is also well documented. Lead has been used in paints to ensure that paint adheres better, dries more quickly, and resists chipping and peeling better. It has been used in the solder of pipes as a bonding agent. That lead can then leach from the pipes into drinking water. Lead dust moves through the environment and will eventually rest on the soil. Therefore, drinking water and foods grown in a residential garden may contain lead. Lead may also be found in the paint on some toys, lead-glazed imported pottery, batteries, cosmetics, canned food, and some printing inks. Some folk remedies and imported spices may also contain lead.

Lead was originally added to gasoline as a lubricant for motor vehicles by protecting exhaust valves from excessive wear and to boost octane levels. Lead was outlawed as an automotive gasoline additive in the United States in 1986 – more than 60 years after its introduction – to enable the use of emissions-reducing catalytic converters in cars. Thousands of tons of lead have been removed from the environment as a result of it being removed from automotive gasoline. Lead is not naturally occurring in gasoline; it is only present in gasoline if it is placed there (Kitman, 2000).

Lead in paint was banned in 1978. In the United States, with the ban of lead in paint and gasoline, the average blood lead level for persons ages 1 to 74 years dropped from 128 mcg/dl in 1980 to 2.9 mcg/dl in 1991 (Needham & Cloutman, 1999).
Lead in the Environment Today

Because it does not decompose or break down into smaller particles, lead deposited in the past is still present in the soil. Coupled with deteriorating lead-based paint falling from the exterior of houses, soil becomes a significant pathway by which lead poisoning can occur (Needham & Cloutman, 1999). Bare soil used as a play area contributes to the lead exposure of young children because lead-contaminated dust from these areas is tracked into the home.

The greatest problem remains the presence of many older homes with deteriorating lead-based paint. Homes built between 1900 and 1950 are most likely to contain lead-based paint in their interiors. Those built from 1950 through 1978 may contain lead-based paint, especially on exterior surfaces. The older the home, the more likely it is that lead-based paint was used. A few homes built in the two years after the 1978 ban on leaded paint may even contain this paint, because products remaining on store shelves were sold and used. Chipping, flaking, and chalking lead-based paint contribute to the environmental dust found in households. Although there may be new layers of paint over old lead-based ones, all layers are involved when deterioration occurs (Needham & Cloutman, 1999).

Sustained use of large quantities of lead over many years has resulted in extensive environmental contamination. Although lead occurs naturally in small quantities in the earth’s crust, by far the greatest risk of exposure to lead comes from man-made processes and products. Today, the principal industrial use of lead is in the manufacture of electrical storage batteries. Other current uses include the production of ammunition, various chemicals, and sinkers for fishing. The use of lead in paint additives, gasoline
additives, solder, and pipes has been reduced substantially or eliminated (Connecticut
Department of Public Health, 1999). Nevertheless, old installed products or residuals
from their use remain in the environment.

Experts agree that there are three major sources of lead exposure: (1) lead-based
paint, (2) urban soil and dust (deposits from paint, gasoline, and industrial sources), and,
(3) drinking water, primarily from lead solder, brass fittings and fixtures, and service
lines. Other sources can result in high exposures in individual cases. Contributions from
other sources add to the problem and are, therefore, of potential concern (Connecticut
Department of Public Health, 1999).

In 1980, the U.S. National Academy of Sciences study estimated that each year,
through various end uses, about 600,000 tons of lead is added to our already polluted
environment. In addition, huge quantities are dispersed through mining, smelting,
manufacturing, and recycling processes. This continuous dispersion of huge amounts of
lead in the ecosystem is highly relevant to human life. Studies have demonstrated the
differences in the body lead burden in bones and teeth of ancient populations and
contemporary Americans. The study found the dentine lead concentration of United
States children today to be 18-80 times that present in ancient Nubian children who lived
between 3300 and 2900 B.C. Similarly, it was reported that the skeletal lead content of
American adults is many times greater than that found in ancient Peruvians. Even among
contemporary populations, blood lead levels of those living in relatively uncontaminated
environments are much lower than that of the U.S. population (Shapiro, et al., 1979, as
cited in Lin-Fu, 1985).
“Undue exposure to lead in the environment and its impact on human health presents one of the greatest ironies in modern preventive medicine. During the first seven decades of this century, while scientific and technological accomplishments dramatically prevented numerous diseases and virtually wiped out others, lowered infant and maternal mortality, increased life span and improved the quality of life, the dangerous exposure of human beings to this highly toxic and potentially lethal element was left virtually untouched. Only in the last 30 years has the problem received serious attention.” (Lin-Fu, 1985, p. 67)

Environmental Lead Pollution and Human Exposure: Who Is At Risk?

The ancient Greeks were the first to write about lead poisoning. They identified a link between the ingestion of lead and delays in neurological development in children. This did not, however, give them cause to cease the use of lead. For most of its long history, lead had not been suspected as a hazard. In fact, doctors over the years have utilized lead as a treatment for various diseases. A medical dictionary dated 1745 suggested that lead dissolved in a mild acid such as vinegar might be used to cure sores or skin diseases (Waldron, 1979, as cited in Lin-Fu, 1985). Others claimed that lead therapy could cure consumption, diabetes, dysentery, and epilepsy.

Despite its known toxicity, lead use in the United States increased enormously from the industrial revolution through the 1970s, especially after World War II. Between 1940 and 1977, the annual production of lead in the United States almost doubled (Berney, 1993). In the 1980s, largely as a result of the regulation of lead in gasoline, lead exposures in the United States leveled off and began to decrease.

Lead is a poison that affects nearly every system of the body. No amount of lead in the body is safe. Lead poisoning is a major environmental health issue today but one that is also very easily prevented. Historians have shown that knowledge of the dangers of lead poisoning to workers and children can be traced back to the 19th century and that in the first third of the 20th century a broad scientific literature on the subject accumulated in
Australia, England, and the United States. Lead hazards have long been documented among American workers in the pigment manufacturing, battery, painting, plumbing, ceramics, pottery, and other industries. In the United States, the problem facing young children today began in the early 1900s when white lead, in concentrations as high as 50 percent, was added to paints, and when tetra-ethyl lead was added to gasoline as an anti-stock compound (Markowitz & Rosner, 2000).

When lead enters the body there are some specific biochemical responses that occur. While it is difficult to measure exactly how much lead will cause how much damage, it is possible to determine the path the lead takes in the body to cause the damage that it does. The size of the child being poisoned will determine how that child's body will respond to the lead in the body. Other determinants include the child's nutritional health, the amount of lead paint or dust ingested by the child, and the period over which the child is lead poisoned (Lead Poison Net, 2003).

The body mistakes lead for calcium when ingested. The lead attaches itself to and disrupts enzymes essential to the functioning of the brain and other cells. The lead remains in the bloodstream for a few weeks, then it is absorbed into the bones, where it collects for a lifetime. The body never decomposes the lead into another, more easily tolerated substance, because lead is an element. Most of the lead that is absorbed into a child’s brain remains there forever. The U.S. Public Health Service estimates that one out of six children under age six has enough lead in his or her blood to place him or her in what scientists now consider high risk (Child & Family Resources, Inc., 2003).
Most heavy metals like lead react with proteins like enzymes. Lead permanently binds to the heme in the blood. Therefore, a child that is iron deficient or anemic will be more susceptible to lead’s assaults on the body (Lead Poison Net, 2003).

A 1985 EPA study estimated that as many as 5,000 Americans died annually from lead-related heart disease prior to the beginning of the lead phase-out. According to a 1988 report to Congress on childhood lead poisoning in America by the Agency for Toxic Substances and Disease Registry (ATSDR), the blood lead levels of up to 2 million children were reduced every year between, 1970 and 1987, to below toxic levels as leaded gasoline was reduced (Kitman, 2000).

The major source of lead for most adults is occupational exposure. For infants and young children, however, surface dust and soil are the major lead hazard, because young children play on floors and in outside play spaces that may be contaminated with lead. They frequently put fingers, toys, and other objects in their mouths. The surface dust and soil exposure pathways are often derived from lead-based paint, although lead may be present in airborne dust during refinishing or renovation activities or because of windblown surface dust. Children are also exposed to lead which is brought into the house on the work clothes of parents.

Lead poisoning can strike any child, regardless of race, nationality, economic status, or geographic location. Lead affects virtually every organ system and is particularly harmful to the developing brains and nervous systems of fetuses and young children (Connecticut Department of Public Health, 1999). Children are also at greater risk of exposure because of normal hand-to-mouth activity and enhanced absorption of lead.
According to the Centers for Disease Control and Prevention (CDC), it is estimated that one of every 20 children in the United States suffers from sub clinical lead poisoning (Markowitz & Rosner, 2000). Paint appears to be the major source of childhood lead poisoning in the United States.

Any child may become poisoned through exposure to a single high-level source or through the cumulative effect of repeated exposure to several low level sources. High level or acute lead exposures can be severe, resulting in convulsions, coma, and even death (Connecticut Department of Public Health, 1999). In the United States, there has been a great amount of research on lead and its effects. During the first half of the 1900s, health advocates designed studies to prove that lead absorbed by the body is not fully eliminated and has toxic effects. In the early 1970s, the Surgeon General issued a formal statement regarding lead poisoning and its potential toxicity. In 1971, the passage of the Lead Paint Poisoning Prevention Act, the first piece of anti-lead legislation, began the trend toward lead paint phase-out (Needham & Cloutman, 1999).

Young children absorb approximately 50 percent of the lead to which they are exposed, whereas adults absorb approximately 10 percent. Children’s bodies are much more receptive to lead, thus creating a more efficient and thorough process of absorption. A child does not need to eat loose paint chips to be exposed to the toxin; normal hand-to-mouth behavior, coupled with the presence of lead dust in the environment, is the usual method of poisoning (Needham & Cloutman, 1999).

Children’s smaller body size and developing systems place them at greater risk than adults for complications resulting from exposure to lead. Because they are smaller, children receive higher doses of toxins per pound of body weight. Pound for pound,
children drink more water, eat more food, and breathe more air than adults. Many organ
systems in young children, such as the nervous system and the lungs, undergo rapid
growth and development in the first years of life. During these periods of development,
children’s organ systems are especially vulnerable to injury. Of special concern is
exposure of the fetus, whose organs and body systems are still developing. Children’s
activities put them at higher risk of exposure to lead poisoning than adults (Agency for
Toxic Substances and Disease Registry, 2002).

Lead can cause permanent damage to infants, toddlers, unborn fetuses, and children
under the age of six. Lead poisoning damages the brain and other parts of the nervous
system and can cause long-term behavioral and learning problems (Hartford Health
Department, 2002). Children with elevated blood levels are at risk for major disabling
conditions, including mental retardation, paralysis, kidney disease, or convulsive
seizures. Very high blood lead levels may even cause death. Studies have also found
that even slightly elevated blood lead levels can result in learning disabilities and
diminished IQ (Connecticut Department of Public Health, May 2002).

The Physical and Economic Impact of Lead Poisoning

The effects of lead depend on the level of lead in the blood. For example, in children,
very high levels can cause coma, convulsions, and, in rare instances, death. Moderate
levels, too, can harm the brain and nervous systems, kidneys, and liver. Even very low
levels, which do not cause any obvious symptoms, are associated with decreased
intelligence, behavioral problems, decreased growth, and impaired hearing (Centers for
Disease Control and Prevention, 1997).
In Connecticut, most children hospitalized for lead poisoning are between the ages of one and two, Hispanic or Black, and poor. On average, patients stayed in the hospital for almost six days, at an average cost per stay of $6,055 (Hartford Health Department, 2002).

Children exposed to lead have significantly greater odds of developing delinquent behavior. The results of the study were published in a recent issue of Neurotoxicology and Teratology, 2003.

The lead author was Dr. Herbert Needleman who is known for his groundbreaking studies on the effects of lead exposure on children that were instrumental in establishing nationwide government bans on lead from paint, gasoline and food and beverage cans. The researchers examined 194 youths convicted in Juvenile Court of Allegheny County, PA, and 146 non-delinquent controls from high schools in Pittsburgh. Bone lead levels, measure by X-ray fluorescence (XRF) spectroscopy of the tibia, showed that the delinquent youths had significantly higher mean concentrations of lead in their bones; 110 parts per million (ppm), compared to 1.5 ppm in the control group (Neurotoxicology and Teratology, 2003). This study is the first to show that lead exposure is higher in convicted delinquents. It is part of a growing body of evidence linking lead to cognitive and behavioral problems in children.

In 1996, Dr. Needleman published a study of 300 boys in Pittsburgh public schools and found that those with relatively high levels of lead in their bones were more likely to engage in antisocial activities like bullying, vandalism, truancy and shoplifting. In 1979, Dr. Needleman, using measurements of lead in children’s teeth, concluded that children with high lead levels in their teeth, but no outward signs of lead poisoning, had lower IQ
scores, shorter attention spans, and poorer language skills (Neurotoxicology and Teratology, 2003).

The cognitive and developmental problems that lead causes remain long after childhood. In comparison with children who have not been exposed to excessive levels of lead, children who have been exposed are much more likely to have the following:

- Reading difficulties
- Poor vocabulary
- Attention problems
- Poor coordination
- More school absences
- Lower class ranking
- Greater chance of dropping out of high school (Hartford Health Department, 2002).

When lead is inhaled or ingested, it is deposited in both the hard tissues (long-term sites) and soft tissues (short-term sites) of the body. The half-life of lead deposited in soft tissue is about 30 days, and the half-life of lead deposited in hard tissue (such as bone) is 5.1 years. Therefore, when measuring lead exposure, the concentration of lead can be determined from whole blood, which demonstrates acute exposure; or from bone, which demonstrates chronic or long-term exposure (Krowchuk, 1995).

The neurobehavioral effects of lead exposure in children are particularly notable because of the sensitivity of the developing central and peripheral nervous system and the irreversibility of lead-associated injury to the system. In early lead-poisoning studies, researchers described neurological impairment resulting from high levels of lead in children. It is now well documented that severe lead exposure in children (PbB >80 mcg/dl) can cause poisoning characterized by ataxia, impairment of consciousness, coma, and seizures. Consequently, recent research has focused on the neurobehavioral effects
of low-level lead exposure (PbB ≤44 mcg/dl), and many researchers have conducted cross-sectional investigations to study these effects (Krowchuk, 1995).

Babies born to women with high levels of lead in their bones face the same sort of developmental problems as babies exposed to lead from sources like old paint. In a recent article in the journal *Pediatrics*, researchers stated that this type of lead exposure might be considered a significant public health problem due to the length of time lead is in the bone (Gomaa, et.al., 2002). The chief investigator, Dr. Howard Hue of Harvard, said the findings demonstrated that protecting children from the serious risks posed by lead was still more complicated than believed. This study suggests that doctors may now need to figure out how to protect children before birth, and that public officials need to do more to ensure that women are not exposed to lead in the workplace (Gomaa, et.al., 2002).

The study, based on examinations of 197 mothers and their babies in Mexico, found that high levels of lead in the women’s bones at the time of birth corresponded to lower mental functioning for children at age 2. Dr. Hue explains that lead builds up in the bones when people are exposed to the metal over a period of time. It can remain in the bones for at least 10 years. The lead may reach the fetus through a process called demineralization. Some studies have found that calcium supplements can slow this process, which suggests that women with high levels of lead may benefit from them (Gomaa, et. al., 2002).

The more subtle effects of lower levels of lead are less fully documented. During the past 15 years, however, an increasing body of literature suggests that blood lead levels as low as 10 mcg/dl can result in detectable physical, cognitive, and behavioral deficits in
children. In response to this accumulating evidence, the Centers for Disease Control and Prevention (CDC) lowered its definition of an elevated blood lead level from 30 mcg/dl in 1975, to 25 mcg/dl in 1985, and to 10 mcg/dl in 1991. Approximately 12 percent (3 million) of children in the United States are estimated to have blood lead levels of 10 mcg/dl (Tuthill, 1996).

Although there is clear consensus on the serious damage that results from clinically evident lead poisoning, there is no clear consensus about the magnitude of the risks of subclinical lead exposure. The current controversy is not about the toxicity of lead but the failure of public health initiatives to successfully protect children from exposure to this potent toxin. In the past thirty years, lead levels for U.S. children have decreased nearly threefold from a mean of 17 mcg/dl in the early 1970s to a current mean of approximately 6 mcg/dl (Schonfeld, 1993).

Today, everyone is exposed to environmental lead. Exposure to lead and lead chemicals occurs from breathing air, drinking water, eating foods, and swallowing or touching dust or dirt that contains lead. With the phase-out of lead in gasoline, lead in paints and in soils and dusts have become the principal source of exposure in the United States. The government has made many efforts to reduce residential exposure to lead, including instituting a phase-out of lead in gasoline, setting a maximum allowable lead content in paint of 0.06% in 1977, and setting an action level for lead in public drinking water and in occupational settings (Agency for Toxic Substances and Disease Registry, 2000).

Although lead poisoning can and does affect people of all races, ethnicities, and socioeconomic statuses, children in low-income families and families of color who live in
urban areas or older housing are at greater risk. In Connecticut, and nationwide, African-American and Hispanic children are five times more likely to be lead poisoned than white children. Children from poor families are eight times more likely to be poisoned than are those from higher-income families (Centers for Disease Control and Prevention, 2003).

Lead exposure is an international issue. Lead mining, lead smelting, and the use of leaded gasoline are common in many developing countries, resulting in substantial lead exposure. Immigrants to the United States bring lead poisoning with them. When appropriate, a medical history should include questions about living conditions in previous and current residences.

Lead poisoning has become a significant health problem in the urban sectors of Connecticut among refugee and immigrant populations. Recent cases of lead poisoning in Saudi Arabian children have been attributed to lead-based folk remedies and cosmetic agents, including farouk (often used for rubbing gums of children to enhance teeth eruption), al kohol (a cosmetic powder used as eye mascara or as an astringent applied to the umbilical cord), or bint al zahab (used to treat colic). It has been shown that the use of al kohol, a lead-containing eye cosmetic often used in the Middle East, is associated with higher blood lead levels in infants whether it is applied to the eyes of the infants or their mothers (Schonfeld, 1993).

Inadequate, crowded, or costly housing also poses serious problems to children’s physical, psychological, or material well being (Federal Interagency Forum on Children and Family Statistics, 2002). The percentage of households with children that report that they are living in physically inadequate, crowded, and/or costly housing provides an estimate of the percentage of children whose well-being may be affected by their family’s
housing. Due to the large percentage of older housing stock in urban Connecticut, children living in these homes are at increased risk for lead poisoning and numerous other environmental problems.

Children who reside in pre-1978 housing (and especially those in inner cities or those built before 1950) and adults who are occupationally exposed are at greatest risk. Although many body systems can be severely affected by high chronic and acute lead exposure, lead is dangerous in large part because moderate or low but chronic exposure can affect the developing nervous system of young children in subtle but damaging ways (Agency for Toxic Substances and Disease Registry, 2000).

Connecticut ranks among the top 15 states with the highest levels of at-risk housing due to the large segment of housing built prior to 1950 and the large proportion of rental housing. Houses built prior to 1950 pose the greatest risk of lead-based paint exposure because lead was a major component in the paint of that era (Connecticut Department of Public Health, May 2002).

Some populations of children are still at significant risk of lead poisoning. In particular, children who live in older housing are more likely to have elevated blood lead levels (EBLLs) than the population of the country as a whole. This holds true for Connecticut as well. These children are more likely to be poor and from racial and ethnic minority groups. To illustrate, the same 1991-1994 national survey of children ages 1-5 that found that 4.4 percent of children nationwide had EBLLs ($\geq 10$ mcg/dl) also found that:

- 21.9 percent of black children living in older housing had EBLLs, and 11.2 percent of all black children had EBLLs
- 16.4 percent of poor children living in older housing had EBLLs
11.5 percent of children living in older housing in large urban areas (population of 1,000,000 or greater) had EBLLs (Agency for Toxic Substances and Disease Registry, 2000).

For some local populations, the percentage of children with EBLLs may be even higher. In one study of 817 children ages 10 months through 6 years in an inner-city Philadelphia outpatient population, 68 percent had BLLs greater than or equal to 10 mcg/dl (Agency for Toxic Substances and Disease Registry, 2000).

It is important to note, however, that no economic or racial/ethnic subgroup of children is free from the risk of having BLLs high enough to cause adverse health effects. Sizable numbers of children from families with incomes well above the poverty line have been diagnosed with lead poisoning, especially those children who live in older and/or renovated homes. It is not poverty alone that contributes to children’s high risk for lead exposure. However, poor families are more likely to live in high-risk housing and not be aware of the environmental exposures to lead poisoning.

Children who are recipients of HUSKY, the State’s Medicaid/ S-CHIP program, are three times more likely to have an elevated blood lead level than children not receiving Medicaid health insurance (Connecticut Department of Public Health, January 2001). In addition, a disproportionate number of minority children have elevated lead levels. Any child, however, is at risk for becoming lead poisoned if lead-hazardous conditions are present in their environment.

Epidemiology of Lead Poisoning and Projected Costs

Children’s exposure to lead, as indicated by their BLLs, has declined significantly since the 1970s. Average BLLs for children have dropped more than 80 percent over this time period, according to the CDC. In 1984, 17 percent of United States children ages 1-5 were estimated to be at risk of lead poisoning (BLLs greater than or equal to 10
mcg/dl). In 1994, the CDC published data indicating that only 4.4 percent of children ages 1-5 had BLLs greater than or equal to 10 mcg/dl. This is the CDC’s recommended action level for lead exposure in children (Agency for Toxic Substances and Disease Registry, 2000).

Data from the most recent National Health and Nutrition Examination Survey (NHANES, 1999) indicates a continuing decline in lead exposure among children. There was also a decline in the geometric mean blood lead level of 2.7 mcg/dl from NHANES III, Phase 2 (1991-1994), to 2.0 mcg/dl in NHANES 1999. Two major sources of lead exposure remain a significant health threat for children: (1) deteriorated lead based paint in older housing, and (2) urban soil and dust that has been contaminated by previous use of leaded gasoline and the deterioration of exterior lead-based paint on dwellings (Connecticut Department of Public Health, September 2001).

The following tables provide summary information on the housing stock, race and ethnicity, and basic prevalence of lead poisoning in Connecticut’s children (Connecticut Department of Public Health, September 2001).

**Table 1 – Housing Stock Summary (2000 U.S. Census Data)**

<table>
<thead>
<tr>
<th>Location</th>
<th>% pre-1950 Units</th>
<th>% of Population Below Poverty Level in pre-1950 Housing</th>
<th>% Occupied Rental Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connecticut</td>
<td>31.4</td>
<td>9.0</td>
<td>33.2</td>
</tr>
<tr>
<td>Hartford</td>
<td>47.2</td>
<td>23.0</td>
<td>75.4</td>
</tr>
<tr>
<td>Bridgeport</td>
<td>46.9</td>
<td>14.7</td>
<td>56.8</td>
</tr>
<tr>
<td>New Haven</td>
<td>48.7</td>
<td>17.2</td>
<td>70.4</td>
</tr>
<tr>
<td>Waterbury</td>
<td>40.6</td>
<td>15.0</td>
<td>52.4</td>
</tr>
<tr>
<td>Stamford</td>
<td>26.6</td>
<td>7.8</td>
<td>43.3</td>
</tr>
</tbody>
</table>

**NOTE:** This summary does not reflect rural or semi-rural regions, which also have a significant proportion of pre-1950 housing.
Table 2 – Race, Ethnicity, and Poverty Status of Connecticut Children <6 Years of Age (2000 Census Data); % Children <6 Years of Age

<table>
<thead>
<tr>
<th>Location</th>
<th>% Black</th>
<th>% Hispanic</th>
<th>% Children &lt;6 Below Poverty Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connecticut</td>
<td>20.6</td>
<td>25.0</td>
<td>10.9</td>
</tr>
<tr>
<td>Hartford</td>
<td>71.0</td>
<td>88.2</td>
<td>40.0</td>
</tr>
<tr>
<td>Bridgeport</td>
<td>63.0</td>
<td>68.2</td>
<td>24.5</td>
</tr>
<tr>
<td>New Haven</td>
<td>83.2</td>
<td>54.7</td>
<td>21.4</td>
</tr>
<tr>
<td>Waterbury</td>
<td>37.9</td>
<td>59.3</td>
<td>26.3</td>
</tr>
<tr>
<td>Stamford</td>
<td>30.0</td>
<td>33.3</td>
<td>9.4</td>
</tr>
</tbody>
</table>

Table 3 – Prevalence of Lead Poisoning, 2000-2001**

<table>
<thead>
<tr>
<th>Location</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;6</td>
<td>1-2 yr</td>
<td>&lt;6</td>
<td>1-2 yr</td>
</tr>
<tr>
<td>Connecticut</td>
<td>4.6</td>
<td>4.6</td>
<td>3.4</td>
<td>3.5</td>
</tr>
<tr>
<td>Hartford</td>
<td>17.5</td>
<td>17.4</td>
<td>11.6</td>
<td>11.0</td>
</tr>
<tr>
<td>Bridgeport</td>
<td>6.4</td>
<td>7.7</td>
<td>5.3</td>
<td>6.3</td>
</tr>
<tr>
<td>New Haven</td>
<td>14.8</td>
<td>15.7</td>
<td>9.7</td>
<td>11.2</td>
</tr>
<tr>
<td>Waterbury</td>
<td>2.2</td>
<td>1.7</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Stamford</td>
<td>5.5</td>
<td>5.1</td>
<td>4.7</td>
<td>3.7</td>
</tr>
</tbody>
</table>

*2001 Provisional Data

+The preceding table on prevalence demonstrates that the cities in Connecticut with a high percentage of the risk factors associated with lead poisoning, do in fact have slightly declining lead levels, but still have a high prevalence of lead poisoning in children under six years of age with the highest rates in children one and two years of age. It should also be noted that the percentage of children who were lead poisoned may be underestimated, as there were children who had initial screening tests and had elevated blood lead levels, but never received confirmatory testing. These statistics do not include that group of children.

Although there has been a decline in lead exposure nationwide, lead poisoning continues to be an important public health issue in Connecticut. Most affected are black and Hispanic children, living in old housing stock (pre 1950), in the state’s highest risk cities (Bridgeport, Hartford, New Haven, Waterbury, Stamford).

Since treatment is difficult, government officials and physicians recommend a process called lead abatement, which involves encapsulating lead paint or stripping it out
A study conducted in 1991 by the CDC showed that cleaning up lead in homes would save the nation about $62 billion in medical and special education costs over 20 years. However, abatement is very expensive as well. It may run anywhere between $2,500 to $10,000 or more per housing unit, depending on the size of the home and the extent of the lead presence (Spake & Couzin, 1999). This is a prohibitive cost for most families.

Researchers quantify the economic benefits from projected improvements in worker productivity resulting from the reduction in children’s exposure to lead in the United States since 1976. According to their calculations, overall future earnings of children who were 2 years old in 2000 will increase between $110 billion and $318 billion, compared with their counterparts in the mid-1970s, as a result of their reduced exposure to lead in the environment (Environmental Health Perspectives, 2002).

High annual costs of lead poisoning and other environmental problems impact on U.S. children. It is estimated that annual costs for children’s environmental diseases are $54.9 billion; $43.4 billion for lead poisoning; $2.0 billion for asthma; $0.3 billion for childhood cancer; $9.2 billion for neurobehavioral disorders. This sum amounts to 2.8% of total U.S. health care costs (Environmental Health Perspectives, 2002).
Chapter Two: Regulatory Overview

Although many cases of lead poisoning were reported in the United States in the early 20th century, it was not until the 1950s that public health officials began to link the cause of lead poisoning to housing with deteriorated lead-based paint. Thus, the initial steps in regulating lead paint began in the 1950s and 1960s with public education and awareness. Programming consisted of educating the public about lead hazards and prevention, and screening children for lead poisoning. Among the first cities in the United States to actually ban the use of lead-based paint on interiors were Baltimore, Chicago, Cincinnati, Jersey City, New Haven, Philadelphia, St. Louis, Washington D.C., and New York. Eventually, in 1955, the paint industry itself adopted a voluntary standard limiting the use of lead in interior paints to no more than 1% by weight of nonvolatile solids (Connecticut Department of Public Health, 1999).

Federal and state legislation protecting citizens against the hazards of environmental lead exposure began in the early 1970s.

Federal Regulations

In 1971, the federal government enacted the Lead-Based Paint Poisoning Prevention Act (LBPPPA), which, most importantly, required the Secretary of Health, Education, and Welfare (now known as the Secretary of Health and Human Services) to prohibit the use of lead-based paint in residential structures constructed or rehabilitated by the federal government or with federal assistance in any form (Connecticut Department of Public Health, 1999). At that time, lead-based paint was defined as paint containing more than 1% lead by weight. The 1971 act also authorized a national program to encourage and assist states and cities to conduct mass screening programs to identify children with lead
poisoning, refer affected children for medical treatment, investigate the homes for lead, and order abatement procedures. This was the first federal law passed which prohibited the use of lead-based paint in federally owned or subsidized housing.

In 1973, the LBPPPA was amended to lower the lead content allowed in paint to 0.5% until December 31, 1974, and 0.06% after that date unless the Consumer Product Safety Commission (CPSC) found that a higher percentage was safe. In 1974, CPSC reported 0.5% to be a safe level.

The 1973 amendments to the LBPPPA also required the Agency for Housing and Urban Development (HUD) to eliminate all lead-based paint poisoning in pre-1950 housing covered by housing subsidies and applications for mortgage insurance, and also in all pre-1950 federally owned housing prior to sale. HUD issued regulations implementing those requirements in 1976.

In 1976, the LBPPPA was further amended to again lower the lead content in paint to 0.06% unless the CPSC determined a higher limit not exceeding 0.5% was safe. The CPSC did not do so. Therefore, as of June 23, 1977, lead-based paint was defined as paint containing more than 0.06% lead content by weight. Additionally, in 1978 the CPSC, acting under the authority of the Consumer Product Safety Act, banned the sale of lead-based paint to consumers and the use of lead-based paint in residences and other areas where consumers would have direct contact with painted surfaces. The CPSC concluded that the impact would not be that severe because 95 percent of latex paints and 70 percent of oil paints intended for consumers were already in compliance (Connecticut Department of Public Health, 1999).
The 1980s saw multiple revisions to the federal laws, especially in more specifically defining lead hazards and in requiring that all proposals for renovations be accompanied by an abatement plan.

In 1983, HUD was ordered by the court in Ashton V. Pierce to conduct further rulemaking. In that case, public housing tenants in Washington, D.C. alleged that HUD’s guidelines failed to define intact lead-based paint as an immediate hazard requiring treatment. At that time, hazards of lead-based paint only applied to defective paint. In 1986, HUD issued new regulations for all HUD housing programs that redefined immediate hazard and changed the construction cutoff date from 1950 to 1973 in most cases.

In 1987, Congress further amended the LBPPA to require:

1. Inclusion of intact paint into the definition of immediate hazard and a construction cutoff date of 1978.
2. The inspection of random sample dwellings in pre-1978 family developments, to be completed by December 6, 1994, and the abatement of lead hazards exceeding 1.0 mg/cm2.
3. An extensive research and demonstration program.
4. Several reports including a comprehensive and workable plan for abatement in privately owned housing (Connecticut Department of Public Health, 1999).

Further amendments to the LBPPA in 1988 required a comprehensive and workable plan for abatement in public housing (Connecticut Department of Public Health, 1999). Also added to the LBPPPA was a real estate disclosure rule, which states that all residential property owners must disclose any known lead hazards when they sell or rent pre-1978 housing. The Lead-Based Paint Poisoning Prevention Act was further revised in 1992 and today is most commonly referred to as Title X.

In response to the 1987 amendments, HUD issued new regulations in June 1988 pertaining primarily to the public housing program but also making 1978 the construction
cutoff for all programs in accordance with the act. Major regulatory changes for the non-
public housing programs have been delayed until the completion of an abatement
demonstration program pursuant to the mandates contained in the 1987 amendments. In
April, 1989, a number of federal agencies including HUD, EPA, and the U.S. Department
of Health and Human Services (HHS) formed a lead task force to ensure that the
regulatory efforts conducted under different statutory authorities produce a unified and
coherent approach to lead pollution problems, based on a common understanding of the
health data (Connecticut Department of Public Health, 1999).

In 1989, HUD developed comprehensive technical guidelines on testing, abatement,
clean up, and disposal of lead-based paint. Known as the HUD Interim Guidelines for
Public and Indian Housing, these are intended for use in conjunction with the
requirements of any state and local codes. The Interim Guidelines consist of twelve
chapters and four technical appendices. The purpose of these Interim Guidelines is to
establish risk assessment, building inspection, and minimum work standards during the
testing and abatement of lead-based materials by public and Indian housing authorities
(Connecticut Department of Public Health, 1999).

In January 2001, the EPA, under the Clinton Administration, finalized new reporting
requirements, which dramatically lowered the threshold at which lead emissions must be
reported by businesses that use toxic metal. In April 2001, the Bush Administration, after
a 3-month review of the rule, accepted the new requirements. Prior to the rule change,
the EPA's Toxic Release Inventory (TRI) required companies to report lead emissions
into the air, water, and land only if they processed or manufactured more than 25,000
pounds annually or, used more than 10,000 pounds annually. A 1998 report by the U.S.
Public Interest Research Group found that, as a result of this threshold, 70 percent of lead releases went unreported (Franz, 2002).

With this new rule, businesses that were previously not required to report lead emissions had to account for their lead emissions. Many small businesses argued that this new requirement was unfair to them and that its implementation was unrealistic. Although the rule was not put into effect until April 2001, and the EPA did not issue a guidance on the rule until the end of that fiscal year (June 2001), companies and businesses were expected on July 1, 2002 to provide an accounting of all the lead they released in 2001.

In June 2002, the House Small Business Regulatory Reform Subcommittee held a hearing to determine how these reporting requirements would be implemented. While they were postponed, they will still go into effect.

The Occupational Safety and Health Administration (OSHA) also have standard regulations in place to protect adults against occupational exposure to inorganic lead in industry. Those will not be discussed in this paper, as they do not directly pertain to legislation and statutes put in place to protect the health and safety of children.

State of Connecticut Regulations

Sections 19a-110 and 19a-110a ensure the protection of children against the hazards of lead poisoning, and apply to all children in Connecticut under the age of six. Section 19a-111 requires the abatement of all deteriorated lead-based surfaces – both interior and exterior – of a property where a child resides. If the child is lead-poisoned (≥20 mcg/dl), abatement includes all chewable and friction surfaces. Any intact lead-based paint in a child-occupied dwelling must be placed under a lead management plan. The local health departments of Connecticut are charged with enforcing this law in their communities and are responsible for reviewing and accepting or denying abatement plans. The Connecticut Department of Public Health is responsible for overseeing the efforts of the local health departments and ensuring that they enforce the regulations.

Section 19a-110 (formerly Section 19-65a) required that all childhood lead poisoning cases in Connecticut will be reported to the Department of Public Health and the local health department in the town of residence within 48 hours of receipt of an elevated blood lead screen. This information is forwarded to the State Lead Surveillance System where all children with EBLLs are tracked to ensure that appropriate case management, intervention, and environmental remediation occur.

Section 19a-110a was established to enable the Department of Public Health, within available appropriations, to establish two regional lead poisoning treatment centers in different areas of the state by providing grants in aid to two hospitals. The Department of Public Health currently funds those two centers in the cities of New Haven (Yale-New Haven Regional Lead Treatment Center) and Hartford (Hartford Regional Lead Treatment Center, based at both Saint Francis Hospital and Connecticut Children’s Medical Center) (State of Connecticut, General Statutes, 1992).
Section 19a applies specifically to the actions taken around properties and those who work on properties, as that work affects the health and safety of Connecticut’s children.

The following requirements are included in Section 19a:

- Definition of terms used in lead-based paint activities (19a111-1);
- Applicability of regulations (19a-111-2);
- Activities involved with inspections, reporting requirements and notifications to property owners (19a-111-3);
- Abatement of toxic levels of lead;
- Time periods for compliance;
- Worker protection;
- Reporting requirements to the commissioner of the Department of Public Health;
- Certification criteria and procedures for lead inspectors and contractors;

Like the federal legislation, toxic levels of lead in Connecticut are identified when more than 0.06% lead by weight is present in paint offered for sale for use on or in a residential dwelling. When lead is present in dried paint, plaster, or other accessible surfaces in a residential dwelling containing more than 0.5% lead by dry weight, it is considered toxic. Furthermore, more than 1.0 mcg/cm² as measured by an x-ray fluorescent (XRF) analyzer is also considered toxic.

Inspectors must determine whether or not state or local regulations conflict with federal regulations. If they do, the more stringent of the two requirements will be applied. For example, the State of Connecticut requires abatement of lead-based paint if the concentration, as measured by an XRF detector exceeds 1.0 mg/cm². This is the same level required by HUD. In this case, the inspector would follow the 1.0 mg/cm² standards, as it is the same in Connecticut as what is required by HUD. Conversely, the state of Massachusetts’ lead paint laws state that abatement will be performed if the lead concentration exceeds 1.2 mg/cm². In this case, the inspector would follow the HUD Interim Guidelines (Connecticut Department of Public Health, 1999).
The Connecticut Regulations ensure that inspections of properties for local health are prioritized according to:

- Elevated blood lead levels (≥20 mcg/dl);
- Other dwelling units in a building;

The federal government ensures that federal funds are available, on a competitive basis, for the enforcement of lead-based paint hazard legislation. In 2002, approximately $80 million was awarded for Lead-Based Paint Hazard Control grants to states, municipalities, and Indian tribal governments (Alliance to End Childhood Lead Poisoning, March/April 2002). These grant monies are awarded to governments that take measures to evaluate and reduce lead-based paint hazards in private housing, rented or owned by low-income families. In 2002, requirements were changed to increase the emphasis on grantee performance and authorize the use of persons trained in lead-safe work practices to perform grant-funded interim control work.

The Community Environmental Health Resource Center (CEHRC), a project of the Alliance to End Childhood Lead Poisoning (AECLP), also offers grant monies to states, municipalities, and tribal nations for lead-based paint hazard removal efforts (Alliance to End Childhood Lead Poisoning, March/April 2002). Qualified organizations are awarded grants to conduct outreach, training, and community building through projects to identify, control, and prevent housing-related health hazards.
Chapter Three: Clinical and Environmental Case Management – The Impact on Intervention Programs

Screening for Childhood Lead Poisoning in Connecticut

Although the prevention of childhood lead poisoning is the ultimate goal, until lead hazards are more universally identified and contained or eliminated in every neighborhood, identification of children with elevated blood lead levels is still a priority. By locating children with mild or moderate levels of lead poisoning, steps can be taken to prevent the exposure and the ensuing damage to the neurologic and other systems. Appendix I illustrates the schematic of an elevated blood lead level (EBLL) investigation, from screening to reporting.

In order to decrease the effects of lead poisoning, at risk children need to be identified at an early age, and screening and primary prevention interventions must be initiated in a timely manner. In 2001, the Connecticut Department of Public Health developed and introduced statewide screening recommendations that call for screening of children to occur at 12 months and 24 months of age (Appendix II). All children between 2 and 6 years of age not previously screened should also have a blood lead screen, regardless of their risk. Screening is to be accompanied by an initial risk assessment by the health care provider, as well as anticipatory guidance and parental health education (Connecticut Department of Public Health, 2001). New Hampshire’s Childhood Lead Poisoning Prevention Program uses a Childhood Lead Risk Evaluation and Screening Questionnaire to poll providers about their lead screening practices (Appendix III).

While the overall lead screening target population is children under age 6, the primary focus is the 1 and 2 year olds. These children are most susceptible to the adverse effects
of lead poisoning. Children at highest risk are those living in old housing stock that has not been remediated. These are most commonly found in urban sectors.

The Department of Public Health State Laboratory receives all blood lead test results. According to the Connecticut Registration Report for all births in 1999 and 2000, if all 1 and 2 year olds were screened, there would have been at least 86,331 blood lead tests conducted in Connecticut in 2001 (Connecticut Department of Public Health, January 2001). According to provisional surveillance data from the Connecticut Department of Public Health, 36,792 one and two year olds were screened for lead poisoning in 2001. This accounts for 42.6 percent of the 1999 and 2000 birth cohorts. In order to receive a lead screen, children must see a physician. Families of children that are uninsured, unable to pay for medical services, or undocumented immigrants, are not being tested. This accounts for a large gap in the number of children actually receiving lead screening.

One year after the passage of welfare reform in August 1996, Congress established the State Children’s Health Insurance Program (S-CHIP), an optional health insurance program for children in families with incomes above the federal poverty level, who do not qualify for Medicaid. In Connecticut, this program is known as HUSKY (Health Care for UninSured Kids and Youth). The HUSKY program combined two federal approaches to increase health insurance coverage. It increased coverage by expanding Medicaid eligibility for children and by creating a new program to subsidize private insurance for children. The plan is administered by the Connecticut Department of Social Services (DSS) and is funded through federal S-CHIP Title XXI funds and state dollars. Implementation of HUSKY began in June of 1998. HUSKY provides insurance coverage for children age 18 and under in families with incomes too high to qualify for
Medicaid, but too low to afford private health insurance (Connecticut Department of Public Health, September 2001).

Screening at 12 and 24 months of age is also consistent with federal requirements for children receiving Medicaid benefits. Since 1989, federal law has required routine screening of young children for lead poisoning as part of Medicaid EPSDT (Early, Periodic Screening, Diagnosis, and Treatment) services. Currently, the Centers for Medicare and Medicaid Services (formerly known as HCFA) require blood lead screening of all 1 and 2-year-old children receiving Medicaid benefits. Under EPSDT all 12 and 24-month-old children, at their well-child visits, must receive a blood lead test for elevated blood lead levels. It is important to note that a significant portion of those Connecticut children with elevated blood lead levels receives Medicaid/HUSKY health insurance coverage (Connecticut Department of Public Health, September 2001).

In 2002, the Bush Administration announced its plans to abandon federal leadership and oversight of Medicaid screening for lead poisoning, and instead leave it up to each state to decide whether to screen low-income children. Lead poisoning prevention advocates protested that such a change in policy would make a bad situation even worse. According to the Centers for Disease Control and Prevention (CDC) and the General Accounting Office, Medicaid children account for an estimated 93% of severely lead-poisoned children and 60 percent of all children with elevated blood lead levels in this country (Alliance to End Childhood Lead Poisoning, 2002). The proposal drew such negative response from members of Congress, lead poisoning prevention advocates, the National Health Law Program, and local and state governments, that later that year the Bush Administration announced that it would not pursue the matter.
According to figures supplied to the government by state Medicaid programs, only 20 percent of 1 and 2 year old children are currently being screened for lead poisoning. In 2001, the Alliance to End Childhood Lead Poisoning (AECLP) published “Track, Monitor, and Respond: Three Keys to Better Lead Screening for Children in Medicaid.” This paper is aimed at regional, state, and local Medicaid offices and offers materials that are intended to improve screening rates among the Medicaid children of all states.

In 2002, New York’s Sixth Circuit Court of Appeals reversed a lower court’s decision that had declared private parties have no right to sue state agencies to force compliance with Medicaid’s EPSDT requirements (Alliance to End Childhood Lead Poisoning, 2002). In this reversal, the New York Sixth Circuit Court has made it possible for one or more families to sue their state Medicaid agency to force them to ensure compliance with federal requirements that all Medicaid enrolled children be screened for lead poisoning at 12 and 24 months of age.

In 1998 and 2000, the Connecticut Department of Public Health (DPH) and the Department of Social Services (DSS) conducted two studies to determine whether Medicaid children born in 1996 were being screened for lead poisoning. Almost 80 percent of the Medicaid children in urban areas statewide were being screened at least once before the age of six. Data analysis indicated that Black and Hispanic children had the highest percentages of elevated blood lead levels for the 1996 birth cohort. The study also found that screening rates among children in rural areas are lower than those of children living in urban areas (Connecticut Department of Public Health, January 2001).
CDC Guidelines

In 1991, the CDC identified lead exposure as the number one environmental health problem for children in the United States today. With the removal of lead additives from gasoline and the elimination of domestically produced food and beverage cans with lead-soldered seams, average blood lead concentrations in young children in the United States have declined during the past decade from 15.9 mcg/dl to approximately 5 mcg/dl whole blood (Chisholm, 1993). With the reduction of lead in air and food, children residing in older lead-painted housing, particularly those with high interior lead dust levels, continue to be at the highest risk.

In 1991, CDC provided 3 new recommendations on lead poisoning:

- The blood lead level, by way of a venous blood draw, should be the primary screening test to be considered.
- Screening is to be instituted at 6 months of age as opposed to 12 months of age as previously suggested.
- A risk assessment questionnaire is to be administered at every regularly scheduled well-child visit, beginning at 6 months of age and continuing through age 6 years (Chisholm, 1993).

Childhood lead poisoning is entirely preventable. Teaching families how to protect their children from lead hazards is a major thrust of prevention efforts. Anticipatory guidance for families with young children is essential for achieving the CDC’s Healthy People 2010 goal of lead-free children. The CDC has made recommendations for when families should be taught about lead poisoning in children (Needham & Cloutman, 1999). During prenatal care, when a child is 3 to 6 months old, and at 1-year of age, the following topics should be discussed with families:

- Hazards of lead-based paint in older housing
- Ways to control lead hazards safely
- Hazards accompanying repainting and renovation of homes built before 1978
• Other exposure sources, such as traditional remedies that might be relevant for a family (Needham & Cloutman, 1999).

Ideally, there should be no lead-based paint in the home of a child. Obviously, that is not always a possibility. Since lead-based paint presents a hazard only when it deteriorates or is disturbed, families must be made aware of potential lead hazards when they live in older homes. Before beginning a repainting or renovation project on a home built before 1978, the family must be informed of the need to investigate the type of paint they may be disturbing.

Screening children for lead poisoning is an important secondary prevention activity. Although devastating effects are known to occur at high levels of lead, the evidence of impact on an individual child at lower levels is less clear. Screening does not prevent the initial exposure of a child to lead. However, identification can lead to intervention and prevention of the harmful effects before the exposure is prolonged and the lead burden increases to an extreme level. Secondary prevention activities are activities that reduce residential lead hazards and prevent continued exposure for children who are already lead poisoned. These activities are directed toward screening, medical management, environmental investigation, and remediation. The CDC recommends that a prescreening exposure questionnaire be administered at every well-child visit between 6 months and 6 years of age (Schonfeld, 1993).

Guidelines from the CDC recommend universal or targeted screening on the basis of each state’s determination of need. This need is established using blood lead surveillance and other risk factor data collected over time to establish the status and risk of children throughout the state. In areas without available data, universal screening is recommended. The CDC Guidelines indicate that universally, all children should have a
blood lead test at the ages of 1 and 2 years of age. Any child between 3 and 6 years of age who has not been screened should also be tested. Children at high risk should be screened earlier and more often. A mobile or transient child in an environment containing lead dust hazards is also considered to be at high risk, particularly when frequent hand-to-mouth behaviors are present (Schonfeld, 1993).

Targeted screening is acceptable when an area has been determined by existing data to have less risk. At 1 and 2 years of age (or from 3 to 6 years if previously unscreened), a child may be targeted for screening for several reasons. Children should be screened if they live in a geographic area determined to be at risk (i.e. Medicaid recipients, old housing stock), or if their family cannot answer “no” to the following personal risk questions:

- Does your child live in or regularly visit a house that was built before 1950?
- Does your child live in or regularly visit a house that was built before 1978 with recent or ongoing renovations or remodeling within the past 6 months?
- Does your child have a sibling or playmate that has or did have lead poisoning? (Needham & Cloutman, 1999).

Universal screening involves the blood lead screening of all children in all areas. The current DPH recommendation for universal screening in Connecticut calls for all children to be screened at 12 and 24 months of age, and between 25 and 72 months of age, if not previously screened. Problems exist with universal screening, according to many Connecticut physicians. Blood lead testing, either a finger stick in the physician’s office or a venous draw in a laboratory, can be time consuming. Due to the nature of any type of blood-draw test, small children often require more comforting and more time. Physicians working under the time and productivity constraints placed upon them by HMOs are not able to devote extra time to patients.
A Bristol, Connecticut physician who conducted universal screenings in his practice for one year, reported his findings to the Bristol Health Department. From September 11, 2001 to September 10, 2002, Delbert H. Hodder, M.D., conducted a study to determine the risk of elevated blood lead levels in his patient population (Hodder, 2002). During this year-long study, all children who presented to the office for their one year or two year health visits were screened. The nurse, using a questionnaire, first screened all children for risk factors. All children were screened for lead poisoning using a finger stick test. All children with lead levels above 10 mcg/dl on their finger stick test were referred for venous sampling at a laboratory.

During this period, 822 children were screened for EBLLs. Thirty-two children (3.9 percent) were found to have screening lead levels above 10 mcg/dl. However, 22 of those children were elevated during a two-month period when test tubes provided by the state laboratory were found to be contaminated. Five of the 32 children had venous levels confirmed at more than 10 mcg/dl. Ten of the 32 families refused a confirmatory venapuncture because of a lack of risk factors. Fifteen of the 32 were found to be normal upon venapuncture testing.

The test showed a 78 percent false positive rate on finger stick screening, assuming the 10 low-risk patients who refused confirmatory tests were normal. All of the 5 patients with elevated lead levels were identified as being at a “high risk” by the questionnaire administered by the nurse. These five would have been tested anyway.

These results caused the Bristol physician to re-consider universal screening and revert back to targeted screening using a risk assessment questionnaire.
Local Health Departments

Section 19a of the Connecticut General Statutes calls for the prioritization of inspections of properties by local health departments where there is a child in residence found to have a blood lead level greater than or equal to 20 mcg/dl. According to Section 19a, local health departments must conduct inspections of such properties, produce reports of their findings, and provide homeowners with notifications of required activities as a result of the property inspection (State of Connecticut General Statutes, 1992).

Local health departments oversee the methods of inspection and ensure that inspectors are properly licensed and certified, as required by the State of Connecticut. They conduct soil-sampling tests in addition to inspection of the physical structure. They identify the specific corrective action to be taken by the homeowner and conduct post abatement inspections to ensure that the work has been done properly and completely.

The local health department, prior to commencement of work, must approve all abatement projects of toxic lead levels. Residents will, by law, be properly informed of the activity. Once an abatement project is completed and approved by the local health department, a letter of compliance is forwarded to the property owner.

Time periods for compliance are very stringent in Connecticut. A property owner has 15 working days from the time of receipt of an inspection report to submit an abatement plan to the director of health. If the director of health does not deem the plan acceptable, he/she must then provide the property owner, within 10 days, a written explanation of what was incomplete in the plan and a timetable for compliance. The owner must initiate abatement within 45 days of notification of inspection results (Connecticut Department of
Public Health, 1999). Property owners who fail to comply with these abatement orders may be prosecuted in Connecticut Housing Court.

Once the abatement plan is approved and completed and the local health director issues a letter of compliance, the case may be closed. Appendix IV illustrates the path of environmental case management and closure for an EBLL in Connecticut.

Lead inspectors must work very closely with case managers to ensure that a lead poisoned child receives the necessary medical treatment and is removed from the lead-poisoned environment, either temporarily or permanently. A lead poisoned child may not be relocated to the residence or home where the source of lead is found until proper abatement procedures are conducted and approved by the local director of health.

**Case Management Utilizing Targeted Intervention Strategies**

Clinical case management should occur at the point where a child is found to have an elevated blood lead level (Appendix V). In the Department of Public Health, a nurse case manager monitors the progress of all children under the age of 6 that have been identified to have blood lead levels greater than or equal to 20 mcg/dl (Connecticut Department of Public Health, January 2003). The local health departments in Connecticut, per Connecticut General Statute Section 19a, are legally responsible for tracking the care and treatment of all children found to have EBLLs, greater than or equal to 20 mcg/dl. They are also responsible for opening and conducting an environmental investigation to identify and remove the source of lead in the child’s environment.

The Connecticut Department of Public Health Childhood Lead Poisoning Prevention Program (CLPPP) provides oversight of local health department case management efforts. The CLPPP nurse case manager provides oversight to the local health
departments and districts in the areas of clinical management and follow-up of children with elevated blood lead levels. The case manager is the primary resource for medical providers and other health professionals that require information on the clinical aspects of lead poisoning. The case manager performs record-based audits of local health department lead poisoning prevention programs to assure that health department sanitarians conduct and document appropriate case management and follow-up to children that have been reported with elevated blood lead levels (Connecticut Department of Public Health, January 2003).
Chapter Four: Childhood Lead Poisoning Prevention and Intervention Programs in Connecticut

Historically, the lead industry played an influential role in shaping popular and professional opinion about lead and lead paint products. In the 1920s, the Lead Industries Association (LIA) and its member companies sought to alleviate growing public and professional concerns about the dangers of lead-based paint to children. The LIA and its members engaged in aggressive marketing and advertising campaigns to persuade the public of their product’s appropriateness for indoor use (Markowitz and Rosner, 2000). The images on their advertising often included children (Appendix VI).

The lead industry made no effort to discourage the use of lead paint on walls and woodwork. Nor did it warn the general public or public health authorities of the dangers inherent in the product. In fact, despite the accumulating evidences of lead paint’s dangers to young children, it did the opposite. The industry engaged in an energetic promotion of lead paint for both exterior and interior uses from the 1920s through World War II (Markowitz and Rosner, 2000).

As lead poisoning became a more important public health issue, public health departments began to focus on intervention programs to prevent lead poisoning, to treat those children that were lead poisoned, and remove children from the lead sources to which they were exposed. For the purposes of this paper, the author will focus on the State of Connecticut Department of Public Health’s childhood lead poisoning prevention and intervention efforts.

As recently as five years ago, health education efforts involved mass distribution of pamphlets and posters, and materials handed out at health fairs. Most health education
materials were only produced in English. The Childhood Lead Poisoning Prevention Program (CLPPP) did not begin to translate its materials into Spanish until the mid 1990s.

Intervention efforts in the CLPPP included:

- Community health fairs
- Mass mailings to physicians and other health care providers
- Newsletters to multiple audiences (i.e. health care providers, sanitarians, parents).

These education programs were aimed at a wide variety of audiences and their messages were tailored to no one specific audience. Intervention efforts were not at all targeted at any specific population (Connecticut Department of Public Health, 1999).

Broad-based education around lead exposure, prevention of exposure, and sources of lead is extremely important to any health intervention program. Health education efforts should focus around primary prevention efforts and elimination of lead hazards in the child’s home environment. Secondary prevention efforts aimed at decreasing continued exposure for children that already have elevated blood lead levels are also critically important.

**Current Approach**

The Connecticut Department of Public Health Childhood Lead Poisoning Prevention Program (CLPPP) adopts a holistic approach to childhood lead poisoning prevention. A critical component of the CLPPP are the primary prevention activities of the program. Primary prevention strategies combine a well-balanced environmental management component represented by environmental remediation, a strong health education and
intervention component, a strong relationship with state and federal partner agencies, and the collaborative partners that form the core of the program’s community partnerships.

Since 1991, the CLPPP has addressed the childhood lead poisoning problem in Connecticut. The CLPPP focuses on primary prevention as well as clinical case management and surveillance. The overall goal of the program is to increase screening rates for lead poisoning among children under six in the state. The mission of the CLPPP is to reduce the incidence of lead poisoning in the children of Connecticut. To accomplish this, the CLPPP uses a three-pronged approach: education and intervention, surveillance, and clinical case management (Chambers, 2002). Ultimately, the program strives to meet the CDC’s Healthy People 2010 objective to eliminate childhood lead poisoning.

The CLPPP assumes a leadership role in Connecticut in educating diverse audiences and populations regarding the health hazards of lead poisoning in children. The program provides training and educational seminars to individuals and groups that work with families or children. The CLPPP also offers educational support and materials to local health departments so that they may better serve their communities. In addition, CLPPP works with health care providers, Medicaid/HUSKY managed care organizations, schools, and community leaders to target underprivileged, high-risk populations and immigrant and refugee groups (Chambers, 2002).

The CLPPP collaborates with the DPH Lead Environmental Management Unit (LEMU) to offer education and information regarding lead inspections, abatement, and renovation. LEMU is the regulatory arm of the agency’s lead poisoning prevention efforts. LEMU staff is comprised of registered sanitarians that oversee the local health
departments and assure that they have all of the technical assistance and support they require to maintain safe housing and buildings in their communities (Chambers, 2002).

The CLPPP surveillance team has developed and improved a lead surveillance system that allows for the identification of individual cases of children with lead poisoning, the identification of trends in various communities with high lead exposure, and also allows for the tracking of clinical case management of children with elevated blood lead levels. By state law, all laboratories must report blood lead test results to the DPH CLPPP’s surveillance system, regardless of whether they are elevated or not (Appendix VII). The surveillance team is thus able to track the progress of every child in Connecticut that has a blood lead test. Additionally, the surveillance team is able to track the efforts of local health departments and define the state’s lead poisoning problem. This system enables the health education team to better design targeted intervention and outreach programs and to identify high-risk populations or communities (Chambers, 2002).

The CLPPP’s nurse case manager provides oversight of local health departments and districts in the areas of clinical management and follow-up of children with elevated blood lead levels. In addition to environmental health-based site audits conducted by LEMU personnel, the case manager performs record-based audits of local health department lead poisoning prevention programs to assure that health department sanitarians conduct and document appropriate case management and follow-up to children that have been reported with elevated blood lead levels. The case manager is the primary resource for medical providers and other health professionals that require information on the clinical aspects of lead poisoning. The case manager also serves as a resource to the local health community in the areas of availability of health care resources
and services. The case manager collaborates with the health educator to provide training and clinical information to a wide range of health professionals (Chambers, 2002).

**Intervention Programs that Work**

Some environmental lead management programs focus on remediation efforts within the home. The *Keep it Clean* campaign is a New England initiative begun in 1996 (Keep It Clean, 2002). This annual initiative targets retailers, including paint stores and hardware stores, to educate and inform store owners, managers, and staff regarding lead-safe painting and home improvement projects. The *Keep it Clean* campaign also focuses on consumers shopping in these stores to increase their knowledge of lead-safe home improvement practices. The New England Lead Coordinating Council (NELCC) sponsors *Keep it Clean* as a model environmental remediation education program for retailers and consumers. The Connecticut *Keep it Clean* campaign occurs every summer. After the summer 2002 campaign, DPH staff members evaluated their program last fall. They followed-up with telephone surveys to ascertain whether program participants had read the literature they were handed in the stores during the campaign, and whether they had retained any information from those brochures and from their conversations with staff during the store campaign (New England Lead Coordinating Council, 2002).

The DPH CLPPP intervention approach includes building relationships with community partners in all of the urban and suburban sectors of Connecticut. In addition to working with local health departments, CLPPP links with community agencies, community health centers, school systems, and the two regional lead treatment centers in Connecticut.
The DPH CLPPP has developed a comprehensive lead poisoning program that focuses on primary prevention, targeted education and intervention initiatives, case management, and surveillance. The CLPPP has many roles. They include:

- Analyze and assess EBLL data provided to the department from laboratories throughout the state.
- Identify children with EBLLs and follow their progress to ensure that appropriate interim containment measures are followed, and that clinical case management occurs.
- Develop community partnerships for prevention, education, and targeted intervention.
- Work with Medicaid Managed Care Organizations (MCOs) to increase HUSKY screening rates and medical compliance.

The education and outreach component of the CLPPP involves statewide outreach to targeted groups that work with or have contact with parents, families, and children. These include:

- Schools – family resource centers, school nurses, teacher professional development seminars, and Head Start and School Readiness programs
- Parents – Parent Teacher Organizations (PTOs), teachers’ aides
- Children – Pre-school and kindergarten presentations utilizing a Sesame Street Video that speaks to the importance of hand washing, not eating paint chips, and informing an adult of any lead dangers.
• Day Care Providers – presentation of the lead poisoning awareness educational curriculum developed by the University of Connecticut Cooperative Extension System (UCONN CES).

• Health Care Providers – working with the nurse case manager, provide grand rounds, screening guidelines, clinical training programs to educate physicians about screening rates, Medicaid/HUSKY requirements, and treatment of lead poisoned children.

• Regional WIC Centers – partner with nutritionists to offer professional in-services regarding lead poisoning and the increased risk for children with low iron levels. This also includes on-site lead screenings and bilingual education for parents.

• Immunizations Coordinators – partner with statewide coordinators conducting site visits of health care providers’ offices to ensure that lead screenings are occurring.

The CLPPP is evolving as the population of the state of Connecticut diversifies. The program has moved away from the general distribution of generic information about lead poisoning to a multitude of audiences, to a more targeted intervention approach. The program utilizes the AECLP’s manual on developing primary prevention programs to design its intervention programs. According to this manual, the basic components of a prevention program are:

• Identify the target audience.
• Identify the current landscape of that audience: socio-economic and demographic characteristics.
• Identify the problem to be solved: elimination of lead poisoning.
• Include the critical elements of all prevention programs: target audience, cultural and ethnic sensitivity and awareness, clear and concise goals, and evaluation of the program (Alliance to End Childhood Lead Poisoning, 2002).
The CLPPP conducts site assistance visits to local health departments and hosts educational conferences for its partners throughout the state. In order to increase the public’s awareness of childhood lead poisoning, the CLPPP conducts ongoing education campaigns that target professionals working or caring for young children, parents, lead professionals, and landlords. The CLPPP and its local health department partners sponsor educational outreach campaigns throughout the state.

The CLPPP has also partnered with the DPH Asthma Management Program to implement educational programs that target families living in lead-based painted homes. The collaboration is based upon the fact that a housing unit with deteriorating lead-based paint often has many known asthma triggers. Therefore, culturally diverse low-income families are educated on how to identify and manage indoor air pollutants (i.e. dust mites, molds, and second hand smoke and cockroach detritus, which contribute to the exacerbation of asthma in children). The goal of this project is that while a family is addressing their lead-based paint issue, they will also be able to identify their individual asthma triggers and manage them effectively (Connecticut Department of Public Health, 2001).

In recent years, many urban centers in Connecticut have seen a growing influx of immigrant and refugee populations from all parts of the world. With this new emigration trend comes a need for public health professionals to respond accordingly. Cultural sensitivity, tolerance, and education are vitally important to the success of any intervention and outreach program when working with ethnic populations. The traditional approaches are no longer effective (Connecticut Department of Public Health, November 2002). In order for any primary prevention strategy to be successful, each
population must be considered for its unique characteristics and values, and approached accordingly.

Lead poisoning prevention efforts are varied and complex. Any program must consider the many facets of a targeted intervention program – the message, the medium used, and barriers to the message’s receipt, to name a few. Because of the socio-economic status of most lead poisoned families, there are barriers to conveying a message of primary prevention. These populations come from a multitude of different ethnic backgrounds and foreign countries. Their beliefs and value systems are different than those of American citizens. The authors of the W.K. Kellogg Foundation’s “Reaching Out: Successful Efforts to Provide Children and Families with Health Care” identified the following barriers to reaching high-risk populations:

- Lack of Information – Many families do not know that public assistance programs assist or they do not know that they may be eligible, or know how to apply for programs or help.
- Misconceptions and Mistrust – Many immigrants have come to the United States from oppressive governments and have fear of entering “the system.”
- Language and Cultural Differences – Immigrant families face challenges in communicating due to language. Cultural practices and religious practices, if not understood and respected by public health professionals, can become a permanent barrier between the family and the public health practitioner.
- Stigmatization – There is a stigma to applying for some public assistance programs, or seeking care or refuge in a lead clinic or Lead Safe Home.
- Geographical Barriers – Populations that are transient, homeless, and/or living in rural areas are often difficult to reach through traditional marketing or neighborhood outreach activities. Those without permanent residences are very difficult to keep track of and therefore, treatment is often interrupted (Silow-Carroll, et. al., 2002).

The CLPPP continues to work with partner agencies toward a common objective of reducing lead hazards, while eliminating other environmental and health hazards to Connecticut’s children. The CLPPP has worked with, and will continue to work with, the Asthma Management Unit of DPH, the Lead Environmental Management Unit of DPH,
the local health departments and districts throughout the state, and the Child Day Care Licensing Unit of DPH. Wherever possible, the program partners with state and/or national agencies that reach parents, guardians, or care givers of children, to deliver its message.

The Connecticut Child Day Care Licensing Unit is responsible for the certification and licensing of day care providers in Connecticut. Applicants are required to undergo a childcare first aid and safety course. Within that course, is a module on childhood asthma – its signs and symptoms, treatment, and what a day care provider should or should not do. The CLPPP is working with the Day Care Licensing Unit to develop a module on environmental lead hazards, prevention, and notification to parents (Connecticut Department of Public Health, March 2003).

While these are extremely helpful guidelines for reaching a hard-to-reach population, the most critical component to a lead poisoning prevention and intervention program is to tailor the message to the specific audience being addressed. Caregivers and parents receive and process information differently than physicians or health care providers. It is equally important to use an outreach method that truly reaches the audience. For example, Latino families are much more responsive to personal interaction than to being handed a pamphlet in the midst of a busy health fair.

The Department of Public Health’s Childhood Lead Poisoning Prevention Program has begun to tailor specific campaigns to very specific audiences. Of critical importance is not just the message, but how it is delivered. Targeting specific ethnic groups, neighborhoods, or audiences requires extensive research into the background of each.
Lead Treatment Centers and Lead Safe Housing

There are currently two state-funded lead treatment regional centers – one in Hartford and the other in New Haven that administer a total of 11 units. As part of ongoing statewide prevention efforts, five Connecticut municipalities receive HUD funding for abatement of residential properties and to provide lead-safe and lead-free environments in their jurisdictions. In some of these communities, lead-safe homes are also maintained. Additionally, several communities conduct lead-based paint hazard reduction activities with funds from HUD’s lead program and/or the Community Development Block Grant (CDBG) program.

In Hartford, Saint Francis Hospital and Connecticut Children’s Medical Center are the clinical agencies overseeing care. In New Haven, the Yale New Haven Hospital runs the regional lead treatment center. These two centers are the only comprehensive lead poisoning treatment centers for children in Connecticut. They represent a collaborative effort between clinical, behavioral, social work, and shelters, working to identify high-risk children, treat them and remove them from unsafe homes. The centers serve Hartford and New Haven primarily, although they do accept referrals from all parts of the state.

The Hartford and New Haven Regional Lead Treatment Centers provide coordinated medical treatment, social services, and outreach and education services. Their functions include:

- Verifying lead levels
- Assessing general health, development, behavior, environment, and lifestyle issues related to lead poisoning
- Helping to find the sources of lead, in conjunction with the local health department, to ensure that homes are inspected and corrective measures are undertaken when necessary
• Providing in-home education to parents and guardians
• Providing medical and social service follow-up (Chambers, 2002).

It has been established that one of the major childhood lead poisoning-related issues in Connecticut is the lack of lead-safe housing units. When a child is found to have an elevated blood lead level equal to or greater than 20 mcg/dl and lead-based paint is found in the unit of residence, the child may be temporarily relocated to allow for abatement of the unit. In some instances, the family moves into another unit that is not lead-safe, thus risking re-exposure of the child (Connecticut Department of Public Health, March 2003).

Once children are diagnosed as being lead-poisoned, they must be removed from the environment where the lead is found. Permanent lead safe housing is not always available or affordable. To provide temporary lead-safe housing to families of children with high lead levels, both regional lead treatment centers operate Lead Safe Houses. They are located on city bus lines and are close to pharmacies. Each house has approximately five apartments. Families may remain in the Lead Safe Houses for up to ninety days. Housing is available to Hartford and New Haven residents, respectively, as well as to residents of surrounding towns. The Bridgeport Hospital also operates a Lead Safe House, available to Bridgeport and area residents (Chambers, 2002).
Chapter Five: Best Practices in Childhood Lead Poisoning Prevention and Intervention Programs

As the Centers for Disease Control (CDC) focus on the elimination of childhood lead poisoning by 2010, state programs are redefining their prevention and intervention programs to target the specific audiences that are at highest risk for becoming lead poisoned. The focus is on eliminating the incidence of childhood lead poisoning, by identifying specific communities where childhood lead poisoning remains a prevalent problem, and eliminating it in those populations.

Of particular interest to the CDC is that state childhood lead poisoning prevention programs seek more opportunities to partner with other state and national organizations that are involved in childhood hazards reduction efforts and the development of protective policies. At the CDC’s Strategic Planning Meeting in December 2002, several recommendations were made for enhancements and changes to state programs that receive CDC grant funding for childhood lead poisoning prevention, intervention, and elimination.

- States should better promote their primary prevention efforts through the development of state lead registries, greater utilization of HUD funding for the safe repair of lead hazards and publicizing addresses with lead hazards as a way to encourage landlords and home owners to comply with written orders for lead hazard corrections.
- Target primary prevention efforts through appropriate use of surveillance data – environmental and blood lead.
- Refine education objectives in primary prevention by audience, considering differences in languages, cultural practices, religious practices, and socioeconomic standing.
- Increase screening to identify high-risk housing units (Centers for Disease Control and Prevention, 2002).
The guidance goes on to further indicate that state programs will provide practical information to prevent, reduce and eliminate lead hazards by:

- Developing culturally appropriate, relevant, prevention-based information for parents and families.
- Informing and educating community partners about their role in primary prevention.
- Educating housing consumers about safety practices and informing tenants of their rights and responsibilities.
- Informing landlords of their rights and responsibilities.

Appendix VIII lists some additional examples of primary prevention activities.

The CLPPP currently employs many of these strategies.

Secondary prevention activities are also critical components of any program. The CDC encourages states to conduct High Intensity Targeted Screening (HITS) projects in large cities where the greatest proportion of children are at risk for lead poisoning. States should involve Women, Infants, and Children’s (WIC) programs and Medicaid/HUSKY providers in their HITS projects (Centers for Disease Control and Prevention, 2002).

One of the most important considerations in outreach and education campaigns is the audience, its receptivity to the message, and its ability to act upon the information being provided. The Connecticut Department of Public Health Childhood Lead Poisoning Prevention Program (CLPPP) has identified some reasons why parents and families are not able to identify with the messages they receive. The CLPPP uses a list of considerations, developed by Silow-Carroll, et. al., 2002, when developing an education and outreach campaign that addresses some of the general barriers to parents accessing services to protect their children from lead poisoning. These are referenced on page 57.

The author researched some exemplary programs that speak to community outreach and intervention programs which focus on primary prevention and targeted approaches to
promote education about childhood lead poisoning prevention and ensure that children are being screened and, where necessary, receiving proper case management. These three examples of best practices are discussed in detail here.

**North Carolina Childhood Lead Poisoning Prevention Program**

The North Carolina Childhood Lead Poisoning Prevention Program uses surveillance data and housing programs to drive its intervention efforts. In 1997, the program established a model voluntary preventive maintenance program targeting owners of older residential rental properties. Participating landlords are eligible to receive liability relief from potential lead poisoning litigation as well as other financial incentives if they successfully complete a specified list of essential maintenance practices and standard treatments using lead-safe work practices. As a result of this initiative, a lead-safe housing registry has been established and program staff conducts training workshops targeting housing, environmental, and clinical professionals.

The North Carolina program uses screening results to describe target populations as well as the geographic distribution and risk factors for childhood lead exposure. County-specific data are reported for all 100 counties in North Carolina. These reports are utilized by other agencies to monitor mandated child health and Medicaid services. In 2001, nearly 120,000 children were screened, including almost 82,000 1- and 2-year-olds. This amounts to 35 percent of the program's primary target population. Using annual data matching with Medicaid billing records, the program is able to estimate that nearly 54 percent of 1- and 2-year-olds that received Medicaid services in that year were screened (Norman and Ward, 2002).
In contrast to the Northeast and Midwest, in North Carolina older rural housing contains more lead-based paint than urban housing and poses a greater risk of lead poisoning. North Carolina, like most of the southeastern United States, experienced its major growth phase in the 1980s and onward, after lead became a banned substance in paint.

The North Carolina Childhood Lead Poisoning Prevention Program utilizes Geographic Information Systems (GIS) technology to compare identified risk factors for exposures with the spatial distribution of blood lead levels (Miranda, et. al., 2002). Using the knowledge of the risks rural housing poses, plus the identification of the socioeconomic and racial/ethnicity status of residential neighborhoods, a child’s risk level for low- and high-level lead poisoning can be identified. Other identifying factors that can be helpful when using GIS technology include the percentage of single-parent households, median income, percentage of children living in poverty, percentage of renter-occupied housing, median age of housing, and blood lead screening rates.

The North Carolina Childhood Lead Poisoning Prevention Program has obtained substantial information about the risk factors for childhood lead exposure using GIS technology. They include: age, socioeconomic status, race and ethnicity, nutritional status, age, and urban vs. rural status of housing. The program has not yet succeeded in translating this information into targeted preventive strategies aimed at specific high-risk neighborhoods. This is because some scientific limitations still exist with GIS technology. Geographic location as a predictor for lead poisoning has not been fully researched and substantiated. Studies are underway in North Carolina, however, to
estimate exposure risk across a variety of risk factors at a very fine geographic resolution (Miranda, et. al., 2002).

**Phillips Neighborhood Healthy Housing Collaborative**

The Phillips Neighborhood Healthy Housing Collaborative (PNHHC) in Minneapolis, Minnesota was established in 1993. Formerly known as the Phillips Neighborhood Lead Collaborative, the idea for PNHHC came about after several residents from the Phillips neighborhood challenged the University of Minnesota to become more involved in the health issues of their community. The Phillips resident activists, with the help of the University of Minnesota, decided to embark upon a healthy housing initiative by identifying the extent of the childhood lead poisoning problem in their community and exploring possible solutions.

With a total population of 17,067, the Phillips neighborhood represents 4.7% of the total population of the City of Minneapolis, according to 1990 Census Data. Of the 7,611 housing units in Phillips Neighborhood, 63.6% were built prior to 1969, and 49.5% were built prior to 1939 (Phillips Neighborhood, 2000).

The Phillips Lead Poisoning Prevention Project, an education research project designed by residents and representatives of various departments of the University of Minnesota, was designed to address residents’ desires to do constructive work around addressing the childhood lead poisoning problem. The Lead Project was launched in 1993. During the course of the project, the Phillips residents also discovered the extent of the lead poisoning problem in their neighborhood.

The project was designed according to University standards regarding scientific and ethical research requirements. However, the residents of Phillips assumed the role of
designing the specifics of the project, such as using culturally appropriate language, the manner in which area residents would be approached, and how to respectfully deal with members of the neighborhood. They conducted role-plays, rewrote language, and trained their own Phillips residents to go door-to-door and conduct outreach and intervention around childhood lead poisoning. With the assistance and expertise of the University supporters, PNHHC was able to apply for federal funding and operate the support services that have made the Lead Project a success. The project is organized, run, and coordinated by the residents of Phillips. There are no job titles or hierarchical status. All of the residents of Phillips neighborhood are equals and work together to make this program a success (Gust, 2000). This serves to foster a genuine sense of community.

The Lead Project is a primary prevention initiative intended to prevent children from becoming lead-poisoned and to avoid the clinical and housing consequences of lead poisoning. Nearly 600 caregivers – parents, grandparents, and guardians – with infant children were recruited for an intensive education group. The participants received educational materials translated into their own language and a peer teacher for up to three years. The peer teachers were of the same ethnicity as the participants being trained.

To evaluate the success of the program in preventing lead poisoning, three types of information were collected from participants over the five-year duration of the project. First, pre- and post-tests were taken prior to and after the administration of the educational component. Second, the lead level in the home was obtained by comparing the results of an initial lead inspection of the home and the soil with samples of dust taken every six month, thereafter. Third, children were screened for lead poisoning every
four months. All of the participants received written results of the home inspections and the blood tests (Phillips Neighborhood, 2000).

The Lead Project was designed so that mechanisms and services were in place to address the needs of families who would be discovered to have lead poisoned children. To address the concern of families about losing their housing, and with funds provided by the Neighborhood Revitalization Program and Phillips own NRP funds, the Phillips Safety Net was developed. The Safety Net provides: a safe house with a short-term and long-term unit; a family advocate to work with families in the safe house or other families in the community affected by lead poisoning; and a community organizer to keep a connection between the needs of families affected by lead poisoning, the PNHHC, and the public policies requiring change. Both the City of Minneapolis and the State of Minnesota Health Departments are vital members of the PNHHC, supporting the neighborhood through services delivered to its residents. For example, the City of Minneapolis has incorporated a family advocacy approach offered by Sustainable Resource Center, the agency that implements the Safety Net Program (Gust, 2000).

Over the five years of the project, over 40 people were hired and trained as peer teachers and outreach workers, 19 of them were Phillips residents holding their first professional position. Approximately 592 families received some form of education on lead poisoning and its prevention. Families were compensated for their participation and provided transportation to clinic appointments, whenever necessary.

In its five years, the Lead Project has produced positive outcomes in the fight to end childhood lead poisoning. Families are more educated about lead poisoning and services and resources for care of their children, as well as housing matters. Families have the
support of the Safety Net Program to deal with housing issues without fear of losing their homes. Through risk factor education and intense blood lead screening, most children in Phillips have been able to maintain their blood lead levels within normal limits. Most importantly, the neighborhood as a collective played an integral role in defining an idea for a research project, working with University of Minnesota researchers, and succeeding in carrying out a major project to serve the Phillips neighborhood.

**North End Outreach Network (NEON)**

The North End Outreach Network (NEON) is a collaboration of community residents from the greater Springfield, MA area that formed in the fall of 1996. NEON is a community-based door-to-door outreach program that targets the North End neighborhood of Springfield.

The North End’s population is 90% Hispanic, with approximately 10,000 persons. An estimated 55% of that population is comprised of individuals 18 years of age or younger; 11% are over the age of 60 (New England Lead Coordinating Council, 2002). The North End is the poorest neighborhood in the City of Springfield, with an average per capita income of less than $16,000 per year. It also has the highest teen birth rate and the lowest childhood immunization rate in the city. Lead poisoning is one of its biggest childhood environmental health concerns, and is attributed to the old housing stock of the area and the poverty level of the population (New England Lead Coordinating Council, 2002).

NEON receives support from the Waitt Family Foundation, the Center for Reflective Community Practices at MIT, and the Springfield Planning Department. Through the use of community health advocates, NEON is able to conduct door-to-door outreach to all of the neighborhood residents. The program identifies childhood lead poisoning, childhood
asthma, and adult diabetes among the greatest health challenges for area residents. The project’s community health advocates undergo a rigorous 6-week training on health topics which include CPR, nutrition, childhood safety, domestic violence, environmental health issues such as lead poisoning, and first aid. Going door-to-door, these health advocates are able to form a relationship with members of the community, identify their health concerns, and provide them the links to the appropriate services they may need. These may range from providing information about a pediatric dentist that participates in the Massachusetts CHIP program, coordinating transportation for medical appointments, or enlisting the resident in the local *Meals on Wheels* program.

NEON had developed a partnership with the Center for Reflective Community Practice (CRCP) at MIT, a learning and knowledge-building institute focused on the relationship between community development, social change, and the development of an information and technology infrastructure. With the help of CRCP and the Springfield Planning Department, NEON has been able to develop a data warehouse and GIS mapping capacity, develop processes to record, retrieve and integrate information from the thousands of home visits community advocates have made, and to begin telling community stories, via digital story-telling methodology (Waitt Family Foundation, 2003). This Community Health Assessment Project was designed specifically for NEON using zone mapping and GIS technology to maintain important health information on North End neighborhood residents (New England Lead Coordinating Council, 2002).

As community health advocates visit with neighborhood residents, the information they collect is entered into the Community Health Assessment Project database. This information is used to map trends, correlate health conditions, track employment and
education information, health insurance information and status, race and ethnicity, and to develop community resources referrals. The community health advocates collect this information by completing a standardized household and individual form for each visit to each household and individual. To ensure confidentiality, each household and individual is given a number, rather than using actual client names. The community survey data is exported onto the program’s GIS mapping software. The information can then be plotted and tracked by street for the entire North End neighborhood.

The primary mission of NEON is to provide a model of population based health services through an outreach network. The goal is to ensure access to and coordination of existing health and social services, the planning and development of community health, and evaluation and monitoring of services for North End community residents. Ultimately, this will serve to improve and maintain a measurable health status of the entire community (New England Lead Coordinating Council, 2002).

NEON partners with community agencies throughout Springfield in numerous discipline areas – health and wellness, education, domestic violence, job training, youth violence, and health care and Medicaid services. Three key initiatives being addressed by NEON are: 1) community outreach and health education programs to residents; 2) comprehensive school health programs in the elementary and middle schools; and 3) youth development programs, including after-school programs.

The success of the NEON strategy lies in its partnership with its resident population and with community partners such as teachers, clinicians, parents, and health care and social workers. The North End, as a result of NEON’s efforts, is a community that provides for the development, health, and safety of its school-aged children, and has been
successful in empowering and educating its residents as confident health care consumers. Community members are provided with the links to necessary services. But, most importantly, they are also taught how to navigate these systems in order to be more confident and informed consumers in the future.
Conclusion

There are three recommended program components that encompass the operations and activities of any childhood lead poisoning prevention program. First, the environmental management unit is responsible for the programmatic oversight of all policy issues, the adherence to state statutes, enforcement of all statutes and regulations related to environmental remediation, and the licensure and certification of all lead abatement consultants and contractors. Second, the surveillance and case management unit is responsible for statewide lead poisoning surveillance, the generation of data for analysis and program planning, and the case management and follow-up of lead poisoned children. Third, the health education and risk reduction unit is responsible for developing population-specific targeted intervention programs, developing and distributing appropriate educational materials, and the delivery of presentations and training sessions for parents, educators, health care providers, and the general public.

These components all currently exist in the State of Connecticut’s Childhood Lead Poisoning Prevention Program (CLPPP). The author has some additional recommendations for improving the outcomes of Connecticut’s program. Those are listed here.

A statewide plan for health education and risk reduction should be developed. The plan would ensure that Connecticut’s public and professional populations are provided the resources and information needed to address lead poisoning prevention issues. The plan would develop a guidance document for the CLPPP to use when planning risk reduction activities throughout the state. The plan would ensure that the training and educational needs of all relevant target groups are met. It would enable the CLPPP to
secure additional grant monies for the state. And, it would provide a guidance document for local health departments, other state agencies and organizations to use when planning educational activities.

Major program objectives would include the implementation of a statewide lead registry of at-risk housing to make parents aware of safe vs. unsafe housing within their neighborhoods. The DPH CLPPP is currently working with the East End community of Bridgeport to develop a lead-safe housing registry for that community. The program will research the possibility of developing a statewide lead-safe housing registry that will be updated and maintained by the Department. Information regarding remediation status of housing must be included in this registry.

The DPH CLPPP needs to ensure the implementation of annual targeted screening for high-risk children, between six months and six years of age; ensuring that all children with elevated blood lead levels receive appropriate and timely medical and environmental case management. The challenge to accomplishing this is that not all local health departments have a nurse case manager that can track screening of high-risk children. The author proposes incorporating funding requests for at least part-time case management staffing for all local health departments. This would ensure that case management functions are taking place and would also ensure the necessary cooperation with lead inspectors who are overseeing the inspection and abatement of high-risk properties.

Finally, the CLPPP needs to ensure that parent and community education and outreach is taking place. Parents must be made more aware of this preventable illness, the
potential risks their children face, the treatment options, and their rights to screening and
treatment for their children.

The CDC believes that a concerted effort, especially in the area of primary prevention
of lead poisoning of children, could virtually eliminate this disease by 2010, and
accomplish the nation’s health objective to eliminate blood lead levels in children, as
presented in the Department of Health and Human Services’ “Healthy People 2010”
(Centers for Disease Control and Prevention, 2003). The Department of Public Health’s
CLPPP is a recipient of CDC grant monies. Therefore, it has agreed to strive toward this
goal. To achieve this, the CLPPP’s efforts will need to focus on assessment of the data
on childhood lead levels and assurance that focused, efficient, and quality services are
available. Also, there is a great need for renewed childhood lead poisoning prevention
efforts in policy development and policy change, to guarantee that policy makers (local
and state health departments, legislators) institute and support policies, laws, and
regulations that will decrease the burden of lead poisoning.

The development of a strategic plan to eliminate childhood lead poisoning as a public
health problem is an important tool in helping communities focus efforts and resources.
It is also instrumental in gauging progress and helping leaders to determine when and if
they should adjust activities and refocus resources to ensure success of the overall goal of
elimination (Centers for Disease Control and Prevention, 2003). The formation of an
advisory workgroup or committee is the best way to develop and implement a statewide
childhood lead poisoning elimination plan. The workgroup should be made up of
personnel from: local health departments, Medicaid/HUSKY office, real estate and
landlord organizations, educators, nursing and case management representatives, health
educators, grass roots advocacy groups, and other programs focused on children who are also likely to be at high risk for lead poisoning (e.g., WIC, Immunizations, Asthma Control, Head Start, Healthy Start, and School Readiness).

The advisory workgroup should develop a five-year plan complete with goals and objectives that address, at a minimum, the key areas of surveillance, targeting high-risk populations, and primary prevention. Some examples of primary prevention activities are found in Appendix VIII. Within the five-year plan there should be an objective to evaluate the progress on an annual basis (Centers for Disease Control and Prevention, 2003). This plan should specify who will conduct the evaluation, what data sources and other information will be used to assess progress, and how the information will be used. A timeline for conducting and presenting annual evaluations to the workgroup and the CDC, and how the evaluation results will be used to improve progress towards elimination, should also be included.

The CDC’s National Strategic Plan to Eliminate Childhood Lead Poisoning (NSPECLP) by 2010, is a partnership effort between federal, state, and local public health departments. The DPH CLPPP should incorporate these goals into its childhood lead poisoning efforts.

- Prevent children from being exposed to lead through the promotion of comprehensive lead poisoning prevention programs and the implementation of effective state and local public health policies and lead hazard controls.
- Develop effective screening guidelines and science-based lead poisoning prevention interventions to reduce the harmful effects of elevated blood lead levels.
- Collect, analyze, and prepare rapid assessments of state and local surveillance data that will provide public health officials with a picture of state and local surveillance capacity to monitor and evaluate EBLLs in their respective jurisdictions.
- Provide Geographic Information Systems (GIS) technical assistance to public health departments to plan interventions targeted to children living in high-risk
areas, evaluate and measure past screening performance, geocode data to the address level and map pockets of older housing stock to target screening efforts, and educate health professionals and the public on areas of concern in their jurisdiction.

- Improve case management services for children with elevated blood lead levels through the implementation of best practices and guidelines to enhance care coordination in the areas of medicine, nutrition, environmental exposure, childhood development, and education.

- Enhance existing scientific studies that will allow a more strategic focus on the identification and control of lead hazards in homes (e.g., assess long-term impact of lead hazard control methods on EBLLs greater than 10 micrograms per deciliter, research and evaluate the cost-effectiveness of interventions, examine community-level lead sources and their contributions to children’s lead exposure), and provide technical assistance and training to other countries with identified lead hazards.

- Develop new performance measures to evaluate the effectiveness of policies and environmental interventions to promote and translate successful community-based intervention into widespread practices across CDC funded programs (Centers for Disease Control and Prevention, 2002).

The author recommends these statewide goals for health education and risk reduction:

- Identify the issues and concerns of the entities interested in lead. This can be accomplished by conducting focus groups with community members and parents. Meeting with parents, individually or in small groups, also allows them to voice their issues and concerns.

- Identify the grass roots organizations, community health centers, school programs, and religious entities that have a presence in the targeted community.

- Identify and develop strategies to address the issues and concerns. These may involve hiring an outreach worker to go door-to-door, providing education to parents and other community members, and coordinating the services of all agencies and entities in the community to reach one common goal.

- Use the information acquired from the needs assessment as a guidance document to plan program activities.
• Promote a model of collaboration and partnership among already existing entities within the community to reach the goal of eliminating childhood lead poisoning by 2010.

Putting Recommendations Into Practice: The Bridgeport East End Initiative

The use of targeted neighborhood outreach projects has proven successful in many communities, as has been evidenced by the best practices programs highlighted in Chapter Five. The Connecticut CLPPP is currently undertaking such a project with its East End Initiative in Bridgeport.

With new immigration trends in Connecticut’s urban sectors comes a need for public health professionals to respond accordingly. Cultural sensitivity, tolerance, and education are vitally important to the success of any intervention and outreach program when working with ethnically and culturally diverse populations (Connecticut Department of Public Health, 2002). In order for any primary prevention strategy to be successful, each population must be considered for its unique characteristics and value system and approached accordingly.

It is not uncommon for immigrants to enter this country with exposures to lead poisoning and/or already being lead poisoned (Connecticut Department of Public Health, November 2002). This presents a screening and detection problem, as current emphasis is placed on the importance of screening children at 12 and 24 months of age. Older children who are entering this country with lead poisoning are going undetected. As stated earlier in this paper, the onset of symptoms of childhood lead poisoning, indicates that a child has been chronically poisoned for a long period of time, sometimes years. At this point, the effects of the lead poisoning are usually irreversible.
The City of Bridgeport is no exception. It contains a large immigrant population from Latin America, Afghanistan, Russia, and Africa. The city also has a large African American population. The immigrants living in Bridgeport speak more than 40 different languages. These ethnic and cultural groups tend to settle together. That is, they will move into a community or neighborhood where they already have relatives or friends that speak the same language, practice the same faith, and share the same culture (Connecticut Department of Public Health, May 2002).

Bridgeport has the second highest rate of lead poisoning in Connecticut (Hartford having the highest). According to provisional Department of Public Health data, in 2001 there were 462 children identified with elevated blood lead levels (≥10 mcg/dl) and of these, 60 children were identified with blood lead levels greater than or equal to 20 mcg/dl (Connecticut Department of Public Health, November 2002). Within this group, children receiving Medicaid assistance have been identified as the population at highest risk for lead poisoning in Connecticut.

As a result of these findings, the Connecticut Department of Public Health’s Childhood Lead Poisoning Prevention Program (CLPPP) is developing a community based outreach and intervention program in one of Bridgeport’s largest neighborhoods. Working in the East End of the city, the CLPPP will target community residents to improve childhood lead poisoning screening rates and case management, educate parents and caregivers about lead poisoning, as well as offer technical assistance and education for addressing housing issues.

The East End neighborhood is comprised of nearly 70 percent African American residents with a slightly higher percentage of home ownership than the rest of the poorer
parts of the city. The street boundaries for the East End are Barnum Avenue to the north; the Bridgeport/Stratford city line to the east; Long Island Sound to the south; and Seaview Avenue to the west. Since it is one of the older sections of the Bridgeport, it is estimated that nearly 80 percent of the housing stock is wood frame, modest Victorian era housing. Bridgeport was a shipping port and ship building city when the East End community was established. So, lead-based paint was utilized in these homes from the time they were built until the late 1970s (Connecticut Department of Public Health, March 2003). Habitat for Humanity has done some work in this community, but their current approach involves tearing down the houses and rebuilding them. While this approach eliminates the source of lead in the house, the demolition process releases additional lead dust into the air and soil.

The East End Initiative will rely on community partners such as the Fairfield University School of Nursing Health Promotion Center, the Bridgeport Child Advocacy Coalition (BCAC), the East End Community Council (EECC), the Office of Planning and Economic Development (OPED), and the Bridgeport Community Health Center.

In July 2003, the CLPPP will enter into a formal partnership with the Fairfield University School of Nursing Health Promotion Center to assist them in a community program that will provide screening, education, outreach and intervention services, and case management for the East End neighborhood of Bridgeport. The expansion of program efforts will be designed to pool together the vast resources of this community – community health centers, Head Start and Early Head Start sites, schools, school readiness programs, school-based health centers, churches, day care centers, and Medicaid/HUSKY providers – to provide prevention and intervention services to the
culturally diverse population of low and moderate income residents in the East End. This program will complement and supplement the Bridgeport Health Department’s CLPPP regulatory requirements. Collaboration with entities that establish programs protective of children is a key primary prevention focus of this program. The Bridgeport initiative approach will be expanded to other cities in subsequent years.

This neighborhood-based intensive community outreach/case management approach will provide knowledge, information, skills, and empowerment for parents and community members, enabling them to identify problems and rectify them on their own. This strategic partnership will involve a primary prevention approach in outreach and education of parents and community leaders. Educational training sessions will be offered to parents, health care providers, including Medicaid/HUSKY providers, day care owners and staff, Head Start and Family Resource Center staff, school readiness programs, and religious organizations. The Bridgeport Community Health Center will be the primary health care provider targeted since it serves the geographic catchments area of the East End neighborhood.

The primary objective of this intervention program is to target an underserved, high-risk population, develop a model program that will become a prototype for future intervention programs, and utilize the infrastructure that already exists within the community. In conjunction with the Fairfield University School of Nursing Health Promotion Center staff (which will be the fiduciary agent of this project), the program will provide blood lead screenings of high-risk children within the neighborhood, case management of all elevated blood lead cases, assistance to community partners in procuring grant funding for abatement of selected homes, development of a lead-safe
housing registry for the East End neighborhood (and ultimately, all of Bridgeport), and education for parents. The use of GIS technology to map trends in the East End neighborhood is being researched, based on information received from the North End Outreach Network in Springfield, Massachusetts.

The CLPPP will seek to develop other neighborhood-based model programs in years to come, targeting both urban and rural communities in Connecticut that exhibit low screening rates, high poisoning levels, and insufficient services.

The East End Initiative will ultimately set up a coordinated infrastructure that will facilitate the screening of children, the case management of children with elevated blood lead levels, and the necessary education and intervention for parents in the neighborhood. This program will ultimately be able to sustain itself without the existing federal funding. The program's success will be measured based on certain quantifiable measures: number of children screened, number of children with EBLLs receiving case management; number of Medicaid/HUSKY children being screened; number of Medicaid/HUSKY children with EBLLs receiving case management; and overall reduction in the number of EBLLs. The program will be refined as necessary, based on evaluation information and data.

This collaboration represents a unique opportunity for the State of Connecticut Department of Public Health to partner with the local health department, community agencies, and the existing infrastructure that already supports this community to prevent lead poisoning in East End children. The project will enable the CLPPP to strengthen an already existing community partnership in the City of Bridgeport.
To make this project a success, the CLPPP is developing specific criteria for the use of community residents as outreach workers. The enrollment workers will work in a variety of neighborhood settings. They will provide door-to-door outreach, be a technical assistance resource for their neighbors needing assistance in accessing services, and they will serve as a voice for the community in expressing concerns about gaps in services and resources. This strategy, referred to as out-stationing, provides convenient, accessible locations for learning about childhood lead poisoning and programs available to help community members. These programs can be medical screening and treatment, financial assistance in remediating lead-poisoned homes, or finding lead-safe housing. Common sites for out-stationing neighborhood workers or volunteers will include, but not be limited to, clinics, schools, libraries, churches, Head Start/childcare programs, WIC clinics, and other places frequently visited by families with children.

The program will enlist neighborhood residents, community health workers, and volunteer or paid staff. This involves enlisting neighborhood residents, generally those with children, to engage with community members and participate in the outreach process. These individuals are highly successful because they are trusted members of the community and speak from their own experience. They are generally volunteers, but may also be paid staff. Paying staff will serve to professionalize the work done by resident staff and will legitimize their value to the program. In the training to become outreach volunteers or employees, these neighborhood workers obtain valuable skills that can help them enter or expand their opportunities in the labor force.

Success in the East End community is contingent upon the ability of its residents to maintain their level of organization and commitment to eliminating childhood lead
poisoning in their neighborhood. As seen in Chapter Five, the success of the Phillips Neighborhood Healthy Housing Collaborative rests largely on the fact that this initiative is part of a larger community development project. Also, the neighborhood residents in Phillips had the insight to enlist the assistance of the University of Minnesota, the City of Minneapolis, and the State of Minnesota Health Department. While the Phillips Neighborhood residents ultimately control the program, develop the objectives, and execute the initiatives, they may rely on these entities for support.

Bridgeport’s East End Community Council (EEECC) has partnered with the Bridgeport Health Department, the State Health Department’s CLPPP, the city’s Office of Planning and Economic Development (OPED), Yale University, Fairfield University, and the EPA’s Region I. These partnerships will ensure that this program is able to continue once the initial funding is no longer available. Key to continued success is the ability to identify and apply for funding dollars. The CLPPP and Fairfield University staff involved in the project are currently researching grant writing programs, which they will fund, to train the EECC’s executive director to locate and apply for grants.

As with any intervention program, obstacles exist in Bridgeport’s East End. First, the EECC does not have a dedicated paid staff. Its executive director provides his services, in kind. Overhead costs such as heat, electricity, and office supplies are sometimes provided for by community contributions. However, this is not a steady, consistent flow of donations. Parents and community leaders, including the EECC’s executive director, have not been properly trained in community organizing or on how to provide outreach services. Finally, while the many local, state, and federal agencies involved have a strong
commitment to the success of this initiative, each agency has its own specific goals and agenda items, as well as varying definitions of success.

The most urgent thing that needs to be accomplished is to ensure that all of the contributing agencies are in agreement regarding the desired outcomes for success and how to accomplish that end. One central agency, such as the EECC, which represents the members of the East End community, should be the key decision maker. All requests for information, activities, and community participation need to be funneled through EECC. The other participants will work toward achieving the goals established by the EECC by offering funding support, technical assistance, in kind services, training of outreach workers, screening services, and surveillance and case management of all identified cases in the East End neighborhood. The partners will also arm the EECC executive director and the East End community with grant writing and applications skills as well as training in community organizing.

**Targeted Intervention Programs: Keys to Success**

Some important points to consider when using neighborhood residents as community outreach workers are listed below:

- Identify good candidates. It is helpful to identify individuals who have gone through similar circumstances with lead poisoned children. Look for persons who are comfortable with approaching and talking to people.
- Recruit for participation. Develop a method for enlisting potential workers and volunteers. These workers can help with the distribution of flyers, conduct door-to-door outreach, and make weekly visits to community residents.
- Conduct training. There should be an initial training session to educate the individuals about the basic elements of the program.
- Agree on specific areas of responsibility. There should be an understanding of the scope of the individual’s “territory”. The worker should also be very clear about what his/her responsibilities are and how to go about completing them (Silow-Carroll, et al., 2002).
Building relationships with community organizations is also important. This points to the importance of developing and nurturing relationships with schools, local churches, local small businesses, and schools, etc. This approach permits the outreach effort to go beyond the limited sites where childhood lead poisoning professionals may work (i.e., clinics, health care centers). It multiplies the number of places where potential applicants can pick up literature forms, view posters, and other notices about the program, ask questions of individuals who are briefed about the program, and obtain referrals for health care services such as screening and treatment.

Establishing a relationship with and having a presence in schools and Head Start sites is critical. Some strategies that will prove successful are:

- Conduct on-site lead screenings of children.
- Distribute brochures, pamphlets, and flyers about lead poisoning to school personnel, including school nurses.
- Collaborate with free and reduced lunch programs to offer information about healthy nutrition habits and their impact on lead poisoning in children.
- Distribute back-to-school promotional items such as pencils, book covers, and highlighters, post it notes, and magnets with the lead poisoning message and referral numbers on them.
- Work with school nurses to identify high-risk children and arrange to have them screened for lead poisoning. Be prepared to follow-up and provide treatment options for children that test positive for lead poisoning.
- Distribute materials and make presentations at Parent Teacher Organization (PTO) meetings.
School aged children are not representative of the target screening population in Connecticut. However, this approach presents an opportunity to reach young elementary school aged children who may not have received prior lead screenings but could benefit from screening and possible medical intervention before their condition becomes so severe that it is irreversible.

The impact of budgetary constraints at the federal, state, and local level have made it necessary for childhood lead poisoning prevention programs to become more innovative and creative. The author has illustrated that the programs that seem to work the best in improving awareness of childhood lead poisoning and ensuring its elimination by 2010 are those that involve community partners and the general public. Community and neighborhood partnerships need to be established and better cultivated. The future of childhood lead poisoning prevention and intervention programs rests upon our ability to identify specific target audiences and work with them to eliminate the problem.
Appendices
Appendix I

Schematic of EBLL Investigation

Blood Lead Screening/Reporting

- Environmental Case Management of Property
- Epidemiological Investigation
- Comprehensive Lead Inspection
- Abatement Order
- Abatement Plan
- Abatement
- Clearance
- Closure

EBLL Investigation

- Medical Case Management of Child
- Education
- Monitoring/Follow-up
- Closure

Reference: Connecticut Department of Public Health, September 2003
Appendix II

Childhood Lead Poisoning Prevention Screening Advisory Committee – Recommendations for Childhood Lead Screening in Connecticut

The goal of lead screening is to identify children who have been exposed to lead, provide appropriate interventions and reduce the risk of exposure.

I. Recommendations for Health Care Professionals

A. Anticipatory Guidance and Lead Hazard Reduction Education

- Anticipatory guidance regarding lead hazard identification and risk reduction measures should be a routine part of an ongoing educational approach for pregnant women, children and their families.
- Family education and anticipatory guidance should be offered with awareness of, and respect for, the cultural determinants of health behaviors and attitudes in the family and community.
- Family education that takes place during a visit should be supplemented with written materials in the family’s primary language at an appropriate reading level.

B. Universal Blood Lead Screening

- At well-child visits, at age 12 months and again at age 24 months, health care providers should screen all children using a blood lead test for elevated blood lead levels.
- Any child between 25-72 months of age, who has not previously been screened, should also have a blood lead screen performed immediately, regardless of risk.
- Additional blood lead screening is indicated for any child < 72 months of age, with developmental delays, especially if associated with pica.
- All children 6-72 months of age in HUSKY Part A Medicaid must be assessed for risk, and at a minimum, screened at 12 months and 24 months of age.

Blood lead testing should also be considered for any child regardless of age, with:

- Unexplained seizures, neurologic symptoms, hyperactivity, behavior disorders, growth failure, abdominal pain, or other symptoms consistent with lead poisoning or associated with lead exposure;
- Recent history of ingesting, or an atypical behavior pattern of inserting, any foreign object (even if the foreign object is unleaded) into a body orifice.

C. Risk Assessment

- In addition to screening children at the recommended time intervals, health care providers should assess children 6 months to 72 months of age for risk of lead exposure using risk assessment questions - see reference A on reverse for suggested risk assessment questions.

D. Diagnostic Testing and Follow-up

- If a screening blood lead level is elevated (equal to or greater than 10 µg/dl), confirm with a diagnostic (venous) blood lead test with reference to CDC guidelines - see Reference B on reverse.
- Children with an elevated diagnostic blood lead test require additional follow-up blood testing at appropriate intervals, CDC guidelines - see Reference B on reverse.
- Providers can contact one of Connecticut’s Regional Lead Treatment Centers for guidance and assistance with clinical management of a lead poisoned child.
Reference: A

At each routine well-child visit, health care providers should assess children 6 months to 72 months of age for risk of lead exposure.

Risk Assessment Questions

1. Does your child live in or regularly visit a house that was built before 1960? Ask about day care center, preschool, the home of a babysitter or a relative, recent move, etc.
2. Does your child live in or regularly visit a house built before 1978 with recent, ongoing, or planned renovation or remodeling?
3. Does your child have a history of an elevated blood lead level?
4. Does your child have a brother or sister, housemate, or playmate being followed or treated for lead poisoning?
5. Does your child frequently come in contact with an adult whose job or hobby involves exposure to lead (e.g. construction, welding, automotive repair shop, other trades practiced in your community, stained glass making; using lead solder, artist paints or ceramic glazes; etc.)?
6. Does your child live near an active lead smelter, battery recycling plant, or other industry likely to release lead?
7. Does your child live near a heavily traveled major highway where soil and dust may be contaminated with lead?
8. Has your child been given any home remedies? Home remedies containing lead include: azarcon (also known as rueda, coral, Maria Luisa, alarcon, liga); albayalde; greta; pay-loo-ah; ghasard; bala goli; kandu; kohl.

Ask any additional questions that may be specific to situations that exist in a particular community (e.g. operating or abandoned industrial sources; waste disposal sites; drinking water; has your child ever lived outside the U.S.; does your family use pottery for cooking, eating or drinking; etc.).

If the answer to any of the above questions is YES, then the child is considered to be at risk and should be screened with a blood lead test.

Reference: B

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Clinical Management ≥ 20 µg/dl*

**1-2 month intervals (closer intervals for very high BLLs) until the following conditions are met:**

1) BLL remained <15 µg/dl for at least 6 months, and
2) Lead Hazards have been removed, and
3) No new exposures.

**When conditions are met:**

- Children age <36 months of age should be tested every 3 months until BLL is <10µg/dl.
- Children age ≥36 months of age no longer need to receive follow-up testing, re-screen after 1 year.

Appendix III

Childhood Lead Risk Evaluation & Screening Questionnaire

The New Hampshire Department of Health and Human Services, Childhood Lead Poisoning Prevention Program is conducting this survey to learn about your current screening practices. Please complete this 5-minute survey by May 24, 2002 and send it to the NH Lead Program (fax and mailing information below). Your responses will be completely confidential. Thank you.

Lead Risk Evaluation
Please check one or more boxes to indicate your response:

| 1a. | Do you **routinely** perform a blood lead test on any children? | [ ] Yes | [ ] No |

If No, Skip to Question 2a

| 1b. Which children do you **routinely** test for lead? | [ ] All children | [ ] Some children |

<table>
<thead>
<tr>
<th>1c. At what age(s) do you <strong>routinely</strong> perform a blood test on children?</th>
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</thead>
<tbody>
<tr>
<td>[ ] 6 months</td>
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</table>
| [ ] 18 months | [ ] 24 months | [ ] 36 months | [ ] other ___________

| 2a. | Do you **routinely** determine a child’s risk of lead exposure, either verbally or by questionnaire, at any well child visit? | [ ] Yes | [ ] No |

If No, Skip to Question 3a

<table>
<thead>
<tr>
<th>2b. At what age(s) do you <strong>routinely</strong> determine a child’s risk of exposure to lead?</th>
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<tbody>
<tr>
<td>[ ] 6 months</td>
</tr>
</tbody>
</table>
| [ ] 18 months | [ ] 24 months | [ ] 36 months | [ ] other ___________

<table>
<thead>
<tr>
<th>2c. Do you <strong>routinely</strong> determine the risk of lead exposure:</th>
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</thead>
<tbody>
<tr>
<td>[ ] Based on the community in which the child lives</td>
</tr>
<tr>
<td>[ ] Using a parent-completed questionnaire</td>
</tr>
<tr>
<td>[ ] Using a provider or office staff-completed questionnaire</td>
</tr>
<tr>
<td>[ ] Verbally, asking standard questions during encounter</td>
</tr>
</tbody>
</table>
| [ ] Other (specify) ___________

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<tr>
<th>2d. Do you <strong>routinely</strong> ask any of the following to determine a child’s risk for lead poisoning?</th>
</tr>
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<tbody>
<tr>
<td>[ ] Whether the child lives in a pre-1950 home</td>
</tr>
<tr>
<td>[ ] Whether the child lives in a pre-1978 home with recent renovations (in past 6 months)</td>
</tr>
<tr>
<td>[ ] Whether the child has a sibling or playmate with lead poisoning or a high lead level</td>
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</tbody>
</table>

| 3a. Is your practice able to identify children on Medicaid? | [ ] Yes | [ ] No |

| 3b. Do you **routinely** perform a blood test on children with Medicaid? | [ ] Yes | [ ] No |

<table>
<thead>
<tr>
<th>3c. When do you <strong>routinely</strong> perform a blood test on children with Medicaid?</th>
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</thead>
<tbody>
<tr>
<td>[ ] 6 months</td>
</tr>
<tr>
<td>[ ] 18 months</td>
</tr>
</tbody>
</table>
4. Who in your practice is responsible for identifying children who need a lead test? (check all that apply)
- Clerical staff
- Nursing staff
- Provider
- Computer record system
- Other

5a. Do you have any systems in place for identifying children who might need lead screening?  
- Yes  
- No  

↓ If No, Skip to Question 6

5b. What kind of system do you use?
- Chart reviewed at visit
- Post-it- chart is reviewed before visit and post-it is used as reminder
- Chart Prompts- a standardized well child visit form (electronic or paper chart)
- Other (specify)

6. Do you routinely distribute educational materials to parents on lead issues?  
- Yes  
- No  
- Don’t know

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**Lead Screening and Risk**

7. According to the Centers for Disease Control and Prevention, what is the lowest blood lead level that should be a cause for concern?  
- 5 µg/dL  
- 10 µg/dL  
- 15 µg/dL  
- 20 µg/dL  
- Don’t know

8. Children are less likely to be at risk for lead poisoning at age 2 than at age 1.  
- True  
- False

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**Your Office Practice**

9. Do you collect blood specimens for lead testing in your office?  
- Yes  
- No

10. Lead exposure is a problem for my patients.  
- Strongly Agree  
- Agree  
- Neither Agree Nor Disagree  
- Disagree  
- Strongly Disagree

11a. Is lead screening difficult to carry out in your practice?  
- Yes  
- No  

↓ If No, Skip to Question 12

11b. Why is it difficult? ________________________________
12. Approximately what percentage of children in your primary care practice is on Medicaid or uninsured?
(Specify) Medicaid ___________ Uninsured ___________

What year did you graduate from school? Medical School _________ Nursing Program _________
Physician Assistant Program _________

Phone: 800-897-LEAD Fax: 603-271-3991 6 Hazen Drive, Concord, NH 03301
Appendix IV

ENVIRONMENTAL CASE MANAGEMENT AND CLOSURE
ELEVATED BLOOD LEAD LEVEL (EBLL) $\geq 20 \mu g/dL$

July 27, 2001

Purpose: To provide guidance to local health departments for appropriate environmental case management and closeout of the investigation of a residence of a confirmed lead poisoned child ($\geq 20 \mu g/dL$). This guidance does not address additional environmental health issues that may be identified during the comprehensive epidemiological investigation (reference the Epidemiological Investigation Form). Clinical case management and follow-up of children with elevated blood lead levels will be addressed separately in a document to be developed by the CLPPP Case Manager.

Environmental Case Management

Step 1:
The local health department (LHD) reviews the date of the confirmatory (venous) blood analysis and the date of receipt of the EBLL report by the LHD.
- The clinical laboratory must report the EBLL to the LHD within 48 hours of analysis. (Note: The attending physician must also report a confirmed EBLL to the LHD using form #PD-23.)
- Notification may be provided in writing, by facsimile, or verbally (with subsequent written confirmation) and must include all required data elements.
- The initial date of receipt of the confirmatory sample results by the LHD must be clearly indicated in the LHD case file.

Step 2:
The LHD initiates an epidemiological investigation that will include, but not be limited to, a comprehensive lead inspection of the child’s residence(s) (when such residences are pre-1978 vintage).
- The LHD will initiate the investigation within 5 working days of receipt of the notification of the EBLL by the LHD. (Note: “initiate” means active follow-up has been started by the LHD.)
- The date on which the investigation was initiated by the LHD must be clearly indicated in the LHD case file.
- The date on which the LHD initially contacted the child’s parent(s) or guardian(s) must be clearly indicated in the LHD case file. Additionally, any unsuccessful attempts to contact the child’s parent(s) or guardian(s) must be clearly documented.

Step 3:
The LHD conducts a comprehensive lead inspection of the child’s residence(s).
- The LHD prepares the lead inspection report(s) within 2 working days of completion of the lead inspection(s).
• The lead inspection report is filed in the LHD case file. Copies of the lead inspection report are forwarded to the owner(s) of the property and the Connecticut Department of Public Health.

**Step 4:**
If the LHD has identified lead-based paint hazards and/or lead in soil hazards during the lead inspection, a lead abatement order is issued by the director of health.

• The lead abatement order is sent to the property owner(s) by certified mail with return receipt.
• A copy of the lead abatement order is filed in the LHD case file.
• Documentation of receipt of the lead abatement order by the property owner(s) is filed in the LHD case file.

**Step 5:**
The property owner submits the proposed lead abatement plan to the LHD.

• The abatement plan is to be submitted within 15 working days from the receipt of the lead abatement order by the property owner(s).
• The date on which the LHD received the proposed lead abatement plan must be clearly indicated in the LHD case file.
• The proposed lead abatement plan must be reviewed by the LHD within 10 working days of receipt of the proposed plan.
• If the lead abatement plan is found to be deficient by the LHD, the property owner(s) is/are notified in writing within 10 days. A timetable for the development of a revised plan is established.
• All activities regarding the submission and review of the proposed lead abatement plan must be clearly documented in the LHD case file.
• A copy of the plan approval letter and indication of the project start date must be in the LHD case file in addition to any other documentation that would pertain to a valid reason for a delay in the start of the abatement work.

**Step 6:**
The lead abatement work is to begin within 45 working days of the lead abatement plan approval date.

**Step 7:**
After the lead abatement project has been properly completed and compliance has been achieved, a letter of compliance must be issued by the lead inspector within 5 working days of the compliance evaluation of the residence.

• The compliance inspection must include visual inspection, retesting of stripped surfaces, and clearance dust wipe samples.
• The letter of compliance must state that the lead inspector has found the dwelling unit to be free of lead hazards. If intact lead-based surfaces remain, the letter of compliance must state that a lead management plan must be followed to assure continued compliance with the applicable regulations.
• A copy of the letter of compliance is forwarded to the owner(s) of the property and to the LHD. The letter is filed in the case file.
Step 8:
Post abatement inspection of the residence by the LHD must occur within 10 working days following notification of completion of the abatement work.
- A post abatement inspection report must be completed within 2 working days following the post abatement inspection.
- The post abatement inspection report is filed in the LHD case file. Copies of the post abatement inspection report are forwarded to the owner(s) of the property and to the Connecticut Department of Public Health.

Environmental Case Closure

Scenario One: Primary Closeout Criteria
- The reinspection and the compliance evaluation are conducted after abatement work has been completed per Steps 7 and 8 above.
- The LHD evaluates whether lead hazards have been abated according to the approved abatement plan.
- The letter of compliance is issued following a satisfactory compliance evaluation per Step 7 above.
- The LHD documents reinspection results and sends the reinspection report to the property owner(s) and the Connecticut Department of Public Health.
- The case is closed.

Scenario Two: Other Acceptable Closeout Criteria
- No lead-based paint hazards and/or lead in soil hazards were identified during the lead inspection.
- Town authorized demolition of the building.
- A fire or other disaster where the fire marshal or building official deems the property unsafe for human inhabitation and requires demolition.*
- A fire or other disaster levels the building.*

Scenario Three: Closeout is not Warranted Under These Conditions
- A lead abatement plan is under appeal.
- The case has been referred to housing court.
- The child relocates to another residence after an inspection has been initiated.**
- The landlord or tenant does not voluntarily allow access to the property for inspection or abatement.
- Noncompliance with the approved abatement plan.
- The family moves once order has been issued.
- The property is for sale or has been sold.
- The property owner proposes a change of building use.

*Any lead in soil hazards must also be properly addressed.
**If the child has relocated prior to the initiation of the inspection, the residence must still be investigated for potential lead-based paint hazards and/or lead in soil, pursuant to Connecticut General Statutes §19a-111.

Appendix V

CONNECTICUT REGIONAL LEAD TREATMENT CENTERS’ STANDARDS OF CARE FOR CLINICAL MANAGEMENT OF CHILDREN WITH AN ELEVATED BLOOD LEAD LEVEL*

BLL ≥ 10 μg/dL

**Reporting requirements:** BLLs ≥ 20 μg/dL must be reported to the state and local DPH within 12 hours. Laboratories or point of care test sites must report BLLs ≥ 10 μg/dL within 48 hours. All blood lead tests, regardless of level, must be reported month.

Confirm all elevated (finger stick) blood lead screens greater than or equal to 10 micrograms per deciliter with a venous blood sample.

**ACTIONS TO BE TAKEN FOR AN ELEVATED VENOUS BLOOD LEAD LEVEL**

**If BLL is 10-14 μg/dL.**

Provide anticipatory guidance and educational materials that cover:

- BLL and what it means
- Potential adverse effects of an elevated BLL
- Importance of good nutrition, especially a diet rich in calcium and iron
- Need for follow-up blood tests and visits
- Potential sources of lead exposure and how to reduce or eliminate
- The use of wet versus dry cleaning methods to reduce exposure
- Hazards of improper removal of lead paint
- **Retest within 3-6 months**
- Test siblings and other children living in the home who are <6 years of age.

**If BLL is 15-19 μg/dL.**

Provide anticipatory guidance and educational materials that cover:

- BLL and what it means
- Potential adverse effects of an elevated BLL
- Importance of good nutrition, especially a diet rich in calcium and iron
- Need for follow-up blood tests and visits
- Potential sources of lead exposure and how to reduce or eliminate
- The use of wet versus dry cleaning methods to reduce exposure
- Hazards of improper removal of lead paint
- **Retest within 3 months**
- Test siblings and other children living in the home who are <6 years of age.

**Note:** If child has two BLLs of 15-19 μg/dL at least 3 months apart, contact the local health department for advice and assistance with identifying potential sources of lead.
exposure. (Consider using the outreach services of the Regional Lead Treatment Centers.)

**If BLL is 20-44 µg/dL**

**Provide full clinical management and related activities.**

*Address the following issues related to lead poisoning:*
- Assess for iron deficiency anemia (e.g. hemoglobin, hematocrit, ferritin, MCV {mean corpuscular volume}, RDW {red cell distribution width})
- ZPP (zinc protoporphyrin) or FEP (free erythrocyte protoporphyrin)
- Assess for developmental concerns
- Coordinate with local health department to identify lead hazards
- Confirm that cessation of lead exposure has occurred.

*Provide detailed lead education to family on the following:*
- BLL and what it means
- Potential adverse effects of lead poisoning
- Importance of good nutrition, especially a diet rich in calcium and iron
- Need for follow-up blood tests and visits
- Need for environmental inspection and possible relocation
- Potential sources of lead exposure and how to reduce or eliminate
- The use of wet versus dry cleaning methods to reduce exposure
- Hazards of improper removal of lead paint.

*Connect family with referral sources:*
- Birth-to-three or public school special education services if 2.8 years of age
- Social services agencies
- Local health departments
- Connecticut Childhood Lead Poisoning Prevention Program
- State Regional Lead Treatment Centers (New Haven and Hartford) offer:
  - Comprehensive case management
  - Coordination of services
  - Comprehensive medical management
  - Consultation to physicians and families
  - Home and program-based educational services
  - Neurodevelopmental evaluations
  - Lead-safe housing
  - Nutritional counseling
  - Outreach services

*Provide follow-up testing at appropriate intervals:*
- Repeat BLL & ZPP or FEP at 1 to 2 month intervals (more often for higher levels) until the following conditions are met: ZPP or FEP has normalized and
BLL has remained <15 μg/dL for at least 6 months, and lead hazards have been removed, and no new exposures have occurred.

- When conditions are met, test every 3-6 months until the child is >36 months.
- When conditions are met and child has reached 36 months, resume annual testing.

Note: Monitor more closely for higher magnitudes of lead poisoning. The BLL and ZPP or FEP together help establish an estimated body burden of lead, confirm lead excretion over time, indicate when evaluation for iron deficiency may be in order and suggest when re-exposure occurs.

Assess the need for chelation therapy:

- Chelation is necessary when the BLL is >44 μg/dL and sometimes useful at a slightly lower BLL, especially when the ZPP is considerably elevated.
- Consultation services and chelation protocols are available from the Regional Lead Treatment Centers.

If BLL is 45-69 μg/dL
Provide full clinical management as above.

- Provide chelation therapy. Consult a Regional Lead Treatment Center for protocols.
- Hospitalize if indicated or lead-safe housing is not available for outpatient chelation.
- Confirm lead-hazard-free environment for chelation and/or hospital discharge.
- Prior to chelation, perform abdominal x-ray (KUB) to ensure absence of paint chips.
- Educate the family about rebound phenomenon and danger of re-exposure.
- Educate family about long-term process of lead excretion.
- Ensure child has a neurodevelopmental evaluation and is referred for needed services.

If BLL is >69 μg/dL
This is a medical emergency.

- Hospitalization is indicated.
- Special chelation protocols are indicated. Consult a Regional Lead Treatment Center for protocols.
- Full and intense case management is necessary. Regional Lead Treatment Centers are available for any level of service needed.
- Careful attention to neurodevelopmental status is essential.

Reference: Screening Young Children for Lead Poisoning, CDC, 1997 and standards of care protocols of the Hartford and New Haven Regional Lead Treatment Centers.
Do Not Forget the Children—Some Day They May Be Customers

We are not even overlooking the children in our campaign for a record paint business this fall. The children's paint book, which is reproduced in only two colors above, carries a paint message to the grown-ups, while its jingles and "pictures" amuse the little ones. Moreover, in the back of the book there is a special paint message to the parents.

By all means do not hand out these children's paint books at random. One way is to hand a copy to each younger who comes into your store with a parent. Parents appreciate little attentions of this sort paid their children. They like to trade at stores where the youngster is not overlooked. Another effective method is to mail the paint books to the children of prospective customers. Accompany the book with a pleasant little personal letter, working in subtly a few references to your store and the "Save the Surface" idea. There are other ways to distribute these clever little books, which you no doubt will work out to your advantage. Order a supply of these children's paint books today.


FIGURE 2—"Painting the House That Jack Built." The Dutch boy, carrying a bucket of white lead, reminds retailers to court customers through their children by offering children's "paint books."

Appendix VII

Appendix VIII

Examples of Primary Prevention Activities

1. Link families at high risk for lead poisoning to housing and environmental intervention resources before children’s blood lead levels become elevated.

2. Incorporate lead poisoning prevention activities into health and community services that reach families at high risk for lead poisoning.

3. Conduct family and community education and communication activities to support primary prevention activities.

4. Conduct professional health education, communication, and training to increase awareness and involvement in primary prevention activities.

5. Conduct environmental investigation activities (such as dust wipes, visual inspections, and paint chip and soil samples) of a high-risk child’s environment before his/her blood lead level reaches or exceeds 10 micrograms/deciliter.

6. When a child is found with elevated blood lead, environmental screening of other high-risk housing (i.e., house next door, apartments nearby) should also be conducted.

7. Assure that lead tainted housing, where children have been demonstrated to have acquired elevated blood lead levels does not become a source for children who subsequently live in the housing.

8. Assure that dust sampling is a part of every investigation, and part of the clearance testing after abatement and remediation is completed.

9. Provide and/or build community capacity to conduct lead-safe training and provide resources to help families reduce lead hazards in their homes or places.
that they frequent (such as HEPA-vacuum loaner programs, cleaning supplies, etc.).

10. Assure that lead abatement contractors are trained and certified in lead-safe work methods.

References
References


