

The Elimination of Childhood Lead Poisoning in Houston by 2020

I. Statement of Purpose

Lead is recognized as the leading environmental poison for children in the City of Houston. Exposure to lead is associated with a range of serious health effects in children, including anemia, impaired hearing, detrimental effects on cognitive and behavioral development with serious personal and social consequences that may persist throughout their lifetime.¹ As part of the Healthy People 2020 Environmental Health goal, the Houston Health Department (HHD) has taken a leadership role in updating this strategic plan for the elimination of childhood lead poisoning in the City of Houston by 2020.

II. Mission

The mission of the HHD is to work in partnership with the community to promote and protect the health and social well-being of Houstonians and the environment in which they live. Houston's Childhood Lead Poisoning Prevention Program (HCLPPP), under the HHD Bureau of Community and Children's Environmental Health (BCCEH), works to reduce the incidence and prevalence of childhood lead poisoning in Houston, by educating health care professionals and parents about blood lead screening guidelines, as well as identifying, tracking and providing follow-up case management to children with lead poisoning.

HCLPPP's mission aligns with that of the HHD's goals:

- Protect the Community from Disease
- Prepare for, Respond to and Recover from Disasters
- Increase Opportunities for Healthy Living
- Give Children a Healthy Start
- Align Services with National Mandates and Standards
- Demonstrate Organizational Excellence
- Reduce Health Disparities

HCLPPP assists in the accomplishment of these goals by: collecting, analyzing, and disseminating health data; educating to promote and encourage healthy behaviors; protecting against environmental hazards (such as lead); and assuring quality and accessibility of community-wide health and human services.

III. Scope of the Childhood Lead Poisoning Problem in the United States

Childhood lead poisoning is a preventable environmental health problem that still affects many children today in the United States. The Centers for Disease Control and Prevention (CDC) currently estimates that in the United States around 500,000 children between the ages of 1 and 5

¹ U.S. Environmental Protection Agency (EPA), *Learn about Lead*, n.d.

years old have BLLs of 5 µg/dL or greater.² The scope of the issue varies widely between different regions of the country and even between neighboring communities, reflecting symptoms of larger, complex social determinants of health affecting families such as poverty, housing, family support structures, community environment, and access to quality health care. Recent declines in childhood blood lead levels are evidenced by a decrease in median blood lead levels of children between 1 and 5 years of age in the United States from 15 µg/gL in 1976-1980 to 0.7 µg/gL in 2013-2014 (95% decrease).³ This is attributable to federal regulation passed in 1978, which banned the use of lead in household paint as well as a host of other consumer products (e.g. crayons, candles, food containers).⁴ Nonetheless, the issue of lead paint in pre-1978 housing stock, as well as a multitude of other lead-based products imported or brought over to the US by immigrant families, still exists today.

The CDC considers children between 6 months and 72 months of age exposed to houses built before 1960, to be at greatest risk. The CDC estimates that over 4 million children could be at risk for lead poisoning. Childhood lead poisoning is a complex health problem caused largely by lead exposure in a child's environment. A few of the most common sources of lead poisoning for children are: lead-based paint, lead-glazed pottery and tiles, certain vinyl mini-blinds, home remedies, toys and crayons (made with lead), contaminated soil, and automobile parts such as batteries and radiators. Lead can affect many organs and systems, and complicating factors affect the health outcomes of children exposed to lead. As of 2012, the CDC uses a blood lead level (BLL) of 5 µg/gL or greater as a reference level for follow-up actions *but recognizes that there is no safe blood lead level for children*.⁵ Even a BLL below 5 µg/dL is associated with a lower IQ and academics as well as attention-related and problem behaviors.⁶ As BLLs increase in a child, more serious physical and mental health issues can occur such as delayed growth or puberty, decrease in auditory functions, slower nerve conduction, anemia, colic, abdominal pain, and anorexia. When BLL levels reach 80 µg/dL, devastating health effects can occur including convulsions, coma, loss of muscle control and even death.

IV. Risk Factors for Lead Exposure and Lead Poisoning

Health Insurance Coverage

The 2016 American Community Survey (ACS) 5-year Estimates concluded that 95.2% of almost 24 million children under 6 in the United States have health insurance.⁷ The 2016 ACS 1-year Estimates showed that over 10 million children under the age of 6 are covered by Medicaid (about

² CDC, *Lead*, n.d.

³ EPA, *Biomonitoring: Lead*, 2017.

⁴ U.S. Consumer Product Safety Commission, *Ban of Lead-Containing Paint and Certain Consumer Products Bearing Lead-Containing Paint*, 2011.

⁵ CDC, *Lead*, n.d.

⁶ President's Task Force on Environmental Health Risks and Safety Risks to Children, *Key Federal Programs to Reduce Childhood Lead Exposures and Eliminate Associated Health Impacts*, 2016.

⁷ U.S. Census Bureau, *2016 American Community Survey (ACS) 5-year Estimates*, 2016.

44% of the population under 6 years old).⁸ However, there are still almost 5% of children who are not insured (private or public coverage).⁹ The primary reasons that these children do not have insurance or qualify for Medicaid is that: (1) their parent/guardian does not have a job that provides medical insurance as a benefit and (2) their parent/guardian earns more money than current regulations allow to qualify for Medicaid. Essentially, these children belong to families of a class that are considered the working poor. At the same time, the children from families that live at or below the poverty level are at a higher risk of lead poisoning than children from upper-income households.¹⁰

Age

Lead is dangerous for anyone who is exposed, but young children are especially vulnerable. When children are young, their brain undergoes its greatest development and body weight is at its lowest therefore lead is more easily absorbed and can stay in their system longer. Children are very interactive with their environment and often exhibit hand-to-mouth behaviors. If lead dust is present (in home, on toys, in soil, etc.), a child can get the dust on their hands through crawling and playing which in turn can be ingested or inhaled. The median blood level based on NHANES 2011-2014 data for children between the ages 1 and 5 years is 0.8 µg/dL.

Race

Historically, lead poisoning has been shown to disproportionately affect children in minority groups. For non-Hispanic Black children, the median BLL is 1.1 µg/dL, statistically significantly higher than the median BLL (0.8 µg/dL) of children in any other race or ethnic group. There have been decreases seen in the median BLL from 1991-1994 to 2011-2014 data. The BLL in non-Hispanic Black children has fallen to 1.1 µg/dL from 4.3 µg/dL (74% decline), Mexican American has fallen to 0.8 µg/dL from 3.1 µg/dL (74%), and non-Hispanic White has fallen to 0.8 µg/dL from 2.3 µg/dL (65%).¹¹ Children in minority communities may be more at risk due to other factors such as if their parents cook in ceramic imported cooking pots or use traditional home remedies (e.g., Azarcon and Greta).

Poverty/Socioeconomic Status

Socioeconomic Status (SES) is a powerful predictor in assessing vulnerability to lead exposure. For example, the median BLL for children in families with income below poverty level was 1 µg/dL, which is statistically higher than the median BLL of 0.7 µg/dL for children in families at or above poverty level. Similarly, the 95 percentile BLL for children living poverty is 3.4 µg/dL

⁸ U.S. Census Bureau, *2016 ACS 1-year Estimates*, 2016.

⁹ E. A. Benfer, *Contaminated Childhood: The Chronic Lead Poisoning of Low-Income Children and Communities of Color in the United States*, 2017).

¹⁰ Benfer, *Contaminated Childhood*.

¹¹ Benfer, *Contaminated Childhood*.

which is higher than those children living at or above poverty (2.0 µg/dL).¹² Children who live at or below the poverty level are at risk because they tend to live in older housing and have a high risk of exposure to lead which their parents may bring home from their place of work (i.e., radiator shop, car mechanic, print shop, etc.).¹³

Housing and Lead-Based Paint Hazards

The CDC has designated lead-based paint as “the most widespread and dangerous high-dose source of lead exposure for young children”.¹⁴ In 1977, the Consumer Product Safety Commission (CPSC) restricted the allowable concentration of lead in household paint to 600 ppm.¹⁵ While lead from paint may not be a major concern in newer homes, children living in older, deteriorated homes are at highest risk of lead exposure. Homes built before 1978 are more likely to contain lead-based paint than those built after 1978, with homes built between 1960 and 1977 24% more likely, between 1940 and 1959 69% more likely, and homes built before 1940 87% more likely.¹⁶ At present, an estimated 37.1 million homes in the United States have lead-based paint and 23.2 million of these homes have one or more significant lead-based hazard. Further, an estimated 3 million homes with lead-based pain have at least one child under the age of 6. About a third of these homes are considered low-income households.¹⁷ Close to 70% of lead exposure in children originates from lead-based paint in their homes or places they visit.¹⁸

Nutritional Deficiency

Children who do not receive good nutrition can be more susceptible to absorption and storage of lead in their bones.¹⁹ Nutritional interventions have not proven clinically significant in improving the BLLs of children who have already been exposed to lead;²⁰ however, the right nutrition can have an impact on how much lead is absorbed by the body. The CDC recommends that children have overall healthy, well-balanced diets, but diets rich in iron, calcium and vitamin C have been shown to help combat lead absorption.²¹

Immigration Status

¹² EPA, *Biomonitoring*.

¹³ J.L. Pirkle et al., *The decline in blood lead levels in the United States*, 1994, 284-291.

¹⁴ CDC, *Sources of Lead*, 2015.

¹⁵ ATSDR, *Lead Toxicity: Where is Lead Found?*, 2017.

¹⁶ EPA, *Protect Your Family from Exposures to Lead*, 2017.

¹⁷ President’s Task Force, 2016.

¹⁸ Abelsohn & Sanborn, *Lead and Children*, 2010.

¹⁹ Nebraska Department of Health and Human Services, *Nutrition and Lead Poisoning Prevention*, 2013.

²⁰ CDC, *Managing Elevated Blood Lead Levels Among Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention*, 2002.

²¹ Thayer, B. *How to Fight Lead Exposure with Nutrition*, 2018.

The 2016 ACS 5-Year Estimates report that over 42 million people in the United States are foreign born. Higher prevalence of elevated BLLs have historically been observed among refugee and internationally adopted children, but previous studies did not include control groups or control for the effect of confounding variables. However, recent studies comparing lead results in foreign-born children and US-born children of Mexican descent showed higher BLLs in foreign-born children. A study in New York City children supports these results by finding that foreign-born children are 5 times more likely than US-born children to have BLLs above CDC's reference level. The same study found that the likelihood of BLL above the reference level was 11 times higher if the child had lived in a foreign residence within six months of their blood test.²²

Increased risk of lead exposure among immigrant populations can be attributed to uncommon lead sources tied to their countries of origin and/or a variety of cultural practices such as traditional folk medicines, cosmetics, and ceramics. Additionally, immigrants may be migrating from countries where less stringent environmental control measures have kept environmental lead levels high. Public health professionals and providers can contribute to identifying sources of lead exposure in immigrant communities by learning about community-specific sources of lead exposure in the areas they serve.

Pregnancy

The relationship between women and their children present unique modes of lead exposure. Women with a history of lead exposure may have lead stored in their bones which can expose the fetus to blood lead in the process of maternal bone resorption and demineralization during pregnancy. The transfer of blood lead from mother to fetus is evidenced by a strong correlation between maternal BLL and umbilical cord BLL. Following birth, newborns are at risk of lead exposure via lead in breast milk. Increased lead levels in breast milk are associated with increased maternal BLL.²³

V. Bureau of Children's Environmental Health History, Purpose and Partnerships

The Childhood Lead Poisoning Prevention Program (CLPPP) was founded in July 1992 with a grant from the CDC and in-kind contributions from the HHD. As discussed in Section I., the purpose of the Houston Childhood Lead Poisoning Prevention Project (HCLPPP) is to reduce the prevalence of childhood lead poisoning in the City of Houston, to educate health care professionals and the public about the hazards of childhood lead poisoning and to identify and provide follow-up care to children with childhood lead poisoning. HCLPPP provides care coordination to children with blood lead levels above the reference value, educates citizens and contractors about lead poisoning and how lead hazards can be remediated from residential neighborhoods. In accordance with CDC policies, the HCLPPP focuses on providing care coordination, educating the public and

²² Tehranifar et al., *Immigration and Risk of Childhood Lead Poisoning: Findings From a Case-Control Study in New York City Children*, 2008.

²³ EPA, *Learn about Lead*, n.d.

health care professionals, and providing assurance that Managed Care Organizations (MCOs) are screening children for blood lead poisoning

Two years after the HCLPPP was established, the Houston Lead-Based Paint Hazard Control Program (LBPHCP) came into being with a grant from HUD, matching funds from the Houston Department of Housing and Community Development and in-kind contributions from the HHD. The purpose of LBPHCP is to offer, as a grant, lead hazard reduction to qualified pre-1978 housing units where children under 6 years of age with BLLs above CDC's reference level reside.

The LBHCP Environmental investigations are conducted by the BCCEH risk assessment inspectors. The environmental investigator inspects the child's residence in order to identify potential sources of lead exposure. This includes but is not limited to testing the paint, the soil, mini-blinds, ceramic pottery (jarro jars), and or toys that child may play with. The goal of an environmental investigation is to identify the source of the lead poisoning. In 2003, the LBPHCP and CLPPP grant programs were consolidated in one HHD bureau, BCCEH, in order to expand the potential of addressing gaps in education and awareness related to childhood lead poisoning, to increase the network of stakeholders and community partners, to foster and promote multidisciplinary program activities, and to create a working environment to ensure that annual performance objectives are achieved.

The HCLPPP provides patient follow-up, referrals to medical care, and in home environmental investigations as well as education and outreach to the public and health care professionals on childhood lead poisoning. This includes organizing and conducting training seminars, developing educational videos, and providing educational materials. HCLPPP participates in health fairs at schools, churches, community groups and public health organizations. Finally, the HCLPPP has established partnerships, both public and private, to accomplish its goal of reducing childhood lead poisoning in the City of Houston.

Currently, HCLPPP partners with a variety of institutions and community programs including:

- **Health and Safety in Near Northside project, a BUILD grant (Bold, Upstream, Innovative, Local and Data-Driven):** supports community partner capacity support in lead education;
- **Baylor Hospital and College of Medicine:** provides education, outreach and lead screening to the community; creating a five-year longitudinal study of lead in Houston;
- **University of Texas School of Public Health:** provides education and training to community health workers, community and professionals; co-chair with BCCEH in the Texas Healthy Homes Training Center; developed syllabus for Healthy Homes education;
- **Houston Air Alliance:** provides environmental education to the community on lead and air quality; sponsors local health fairs and workshops within targeted areas and refers parents to HCLPPP;

- **The HHD's Women, Infants, and Children (WIC) program:** provides nutritional services and lead poisoning prevention education to WIC patients and HCLPPP often provides outreach at WIC sites;
- **Texas Department of State Health Services (TDSHS) TX CLPPP:** provides BLL data for all children screened and HCLPPP in turn provides environmental investigation and lead hazard data for TX CLPPP surveillance; HCLPPP also is a part of the TX CLPPP strategic planning committee;
- **Avance and Baker Ripley Head Starts:** distribute lead poisoning prevention and hazard reduction literature to parents and staff; sponsor local health fairs and workshops within targeted areas; coordinate lead screening events;
- **University of Houston:** partners on special projects and works to develop educational tools;
- **Houston Community College and Lone Star Community College:** invites HCLPPP to participate in several health fairs at various locations in Houston; provides students and families lead poisoning prevention resources;
- **Rebuild Together Houston:** works with BCCEH to refer clients to services available;
- **Mexican Consulate:** allows HCLPPP to educate and hand out prevention materials to families visiting consulate;
- **United Way:** allows HCLPPP to share resources and network with other agencies at sponsored meetings;
- **Pasadena Independent School District (PISD):** invites HCLPPP to health fairs to engage with families on lead poisoning prevention;
- **South Texas Dental:** distributes lead poisoning prevention and hazard reduction literature; sponsors local health fairs and workshops and invites HCLPPP to participate;
- **Rice-Kinder Urban Data Platform:** houses HCLPPP data to be used for research studies and publications with approval of the HHD;
- **Good Hope Missionary Baptist Church:** distributes lead poisoning prevention and hazard reduction literature; sponsors local health fairs;
- **Gulf Coast Community Services Association:** distributes lead poisoning prevention and hazard reduction literature; sponsors local health fairs;
- **Harris County Department of Education:** distributes lead poisoning prevention and hazard reduction literature; sponsors local health fairs;
- **Avenue CDC:** partners with BUILD project to provide lead education to the community and refer clients to lead-based paint program;
- **Houston Independent School District (HISD):** invites HCLPPP to health fairs; HCLPPP networks with teachers and staff from schools in order to present lead education to families during parent meetings;
- **Lily Grove Missionary Baptist Church:** distributes lead poisoning prevention and hazard reduction literature; sponsors local health fairs

VI. LEAD POISONING PROBLEM IN HOUSTON

The City of Houston has a significant lead poisoning problem. However, the extent of the lead poisoning problem varies by zip codes within Houston, by ethnic group, and by socioeconomic status. The US 2010 Census reports that a total of 202,810 children under 6 years of age were living in the City of Houston, which is 9.7% of the city’s total population. The Texas Department of State Health Services (TDSHS) identified zip codes to be targeted for lead poisoning prevention in the City of Houston. TDSHS identified targeted zips by one or more associated census tracts in which:

- The percentage of children age 1-2 years old with a blood lead level $\geq 5 \mu\text{g/dL}$ is $\geq 3\%$ among those tested in 2016, or
- The percentage of residential structures built before 1950 is $\geq 27\%$.

In 2016, the mean BLL for children screened under 6 years of age in the City of Houston was 2.09 $\mu\text{g/dL}$ (national mean is 1.8 $\mu\text{g/dL}$).²⁴ Over 72,000 children were screened in Houston in 2016, a third of the population of children under the age of 6. The HCLPPP has 78 targeted zip codes in the program which includes 188,577 children under the age of 6 years. For 2016, 45,672 children under 6 years of age were screened living in HCLPPP’s targeted zip codes (about 24% of the target zip codes population). There were 826 children screened that had a BLL at or above the CDC’s reference level of 5 $\mu\text{g/dL}$ in these targeted zip codes.

See Table 1 for breakdown of number of children screened by BLL range in HCLPPP’s targeted zip codes.

Table 1: Number of Children under the age of 6 years residing in HCLPPP’s targeted zip codes that received blood lead screening in 2016, by age and blood lead level.

Blood Lead Level ($\mu\text{g/dL}$)	Number of Children Screened in <i>Target Zip Codes</i>	Percent of Total Screened in <i>Target Zip Codes</i>	Percent of Population Tested in <i>Target Zip Codes</i>
Below 5	44,846	98.19%	23.78%
5 – 9	654	1.43%	0.35%
10 – 14	111	0.24%	0.06%
15 – 19	32	0.07%	0.02%
20 – 24	12	0.03%	0.01%
25 – 44	14	0.03%	0.01%
45 and above	3	0.01%	0.00%
Total	45,672	100.00%	188,577

²⁴ Office of Disease Prevention and Health Promotion, *Healthy People 2020*, 2014.

Primary Sources of Lead Poisoning in Houston

The City of Houston has several environmental and social factors which contribute to the large percentage of children under the age of six at risk for childhood lead poisoning.

Lead Paint

The primary cause of lead poisoning in Houston is lead-based paint. According to ACS 2016 5-year estimates, there are over 900,000 housing units in Houston, with over 7% of households having children under 6 years of age. About 57.8% of these housing units were built before 1980 and about 10% were built before 1950. In addition, within the 610-loop upwards of 25% of the housing stock was built before 1950. In some zip codes the percentage of housing built before 1950 is as high as 35%. The majority of the confirmed childhood elevated blood lead levels in Houston occur within the zip codes that have a high-percentage of pre-1950 housing stock. In fact, out of the 138 Houston zip codes, eight residing within the 610 Loop or immediately bordering it account for 15.0% of children with blood lead levels above CDC's reference value (5 µg/dL) in Houston.

Ceramic Pottery

The second leading cause of BLLs above the reference level in Houston is due to the use of ceramic cooking pots and jars (jarros/jars) produced in foreign countries like Mexico. Lead glaze in this pottery is absorbed by the food which is cooked in the ceramic pots and jars. When a child eats any food cooked in these ceramic pots and jars they ingest the lead. Over a period of several months, this can lead to BLLs above the reference level.²⁵

The ceramic pots and jars are sold legally by many stores and flea markets within the City of Houston. As long as the ceramic pots and jars are clearly labeled "Not for Cooking" or "Not for Storage" they can be placed in the market. However, many immigrants from Mexico and other Latin American countries used the ceramic pots and jars in their own countries for cooking and continue to do so once they are in the United States. In addition, the HCLPPP has identified many upper income and non-Hispanic households that have used the ceramic pots and jars as containers for fruits and vegetables. Fruits and vegetables, even if they are not cooked in the ceramic pots and jars, can absorb the lead glaze through their skins.

Home Remedies

Finally, the third leading cause of blood lead levels at or above CDC's reference level in Houston, is home remedies. Home remedies are most commonly associated with Asian and Hispanic ethnic groups. The most common home remedies identified in Houston are Azarcon and Greta. Azarcon and Greta are home remedies which are used to treat upset stomachs. The treatments seem to

²⁵ Valles-Medina et al., *Do Glazed Pots in a Mexico-US Border City Still Contain Lead?*, 2014.

relieve upset stomachs, however, Azarcon and Greta can be as high as 90% pure lead by volume.²⁶ This means that a young child can be given upwards of 1 to 2 teaspoons of almost pure lead as a treatment. Traditional herbal medicines from various cultures can be another source of lead exposure. For example, traditional Ayurvedic medicine is used for treating various ailments including headaches, cancer, colds, infertility and psychiatric disorders can often contain heavy metals including lead.²⁷ These medicines are often not regulated by the FDA and can be found in some local stores as well as being easily purchased on the internet.²⁸ Some of these home remedies and medicines can lead to very high elevated blood lead levels of 25 µg/dL or greater.

Other Sources

There are several other sources of lead that HCLPPP has found in home environment inspections. Imported toys, spices, makeup, antique furniture are just a few household items that can contain lead and potentially be ingested or touched by children. A Parent or another member of the household's occupation can be a source of lead exposure. Below is a list of some lead exposures HCLPPP has found in investigations and other potential sources:²⁹

- Soil (from exterior paint, nearby industry or highways)
- Toys
- Drinking Water (exterior pipes and old plumbing)
- Lead in food (pots, glazed pottery mentioned above, crystal glassware, imported spice mixtures)
- Imported products (spices, cosmetics, home remedies)
- Other consumer products (crayons, jewelry, soft vinyl lunch boxes, candle wicks, PVC mini-blinds, synthetic turf dust)
- Hobbies and occupations (stained glass, pottery, furniture refinishing)
 - Battery manufacturers, pigments, solder, plastics, ammunition, battery recycling

VII. RECOMMENDED LEAD POISONING BLOOD SCREENING GUIDELINES

Capillary vs Venous Screening

There are two common types of methods to screen blood lead levels in a child: Capillary and Venous. Capillary screening involves taking blood through a finger-prick sample (or sometimes heel-prick). Though this method is widely used, it is not considered a confirmatory test due to the potential of contamination which can lead to a false positive. For example, a capillary sample on a child could give a high BLL result due to lead present on the skin or in the surrounding environment, not actually in the blood. A venous blood lead screen or test (where blood is taken

²⁶ CDC, *Folk Medicine*, 2013.

²⁷ Pierce et al., *Buyers Beware: Lead Poisoning due to Ayurvedic Medicine*, 2012.

²⁸ Gunturu et al., *Ayurvedic herbal medicine and lead poisoning*, 2011.

²⁹ Abelsohn & Sanborn, 2010.

from a vein in the arm) can give a more accurate reading of BLL and therefore is considered to be a confirmatory test. Often capillary screenings are followed up by venous tests to confirm BLL results.

HCLPPP Guidelines:

The state of Texas does not have universal screening for childhood blood lead poisoning, therefore HCLPPP uses targeted screening protocols for follow-up and case management. HCLPPP follows the Texas Department of State Health Services (TDSHS) PB-120 screening guidelines and PB-109 for follow-up and medical case management protocols.

Medicaid Enrolled Children

The Texas Health and Human Service Commissions reported that approximately 352,663 children and families are receiving Medicaid benefits in targeted zip codes defined by TDSHS. Medicaid and Texas Health Steps well child guidelines provide for a venous or capillary blood screening at regular checkups at ages 12 and 24 months or at checkups at any age after 12 months up to 6 years if the child has never been screened. A Lead Risk Questionnaire may be administered to a child's family to screen for risk of lead exposure at any checkup through age 6 along with anticipatory guidance about lead exposure risk.

The purpose of screening children at their 12 month and 24 month checkup is to identify children with elevated blood lead levels early in their development stages. Studies by the CDC and the U.S. Department of Health and Human Services have repeatedly demonstrated that children on Medicaid are at a higher risk for having blood lead poisoning than children in the general population due to their socio-economic status and typically reside in older housing stock (pre-1978 and pre-1950), and have parents that may work in jobs that have increased exposure to lead as stated in Sections IV. and VI.

Non-Medicaid Enrolled Children

If the child is not enrolled in Medicaid but *is* considered to live in a targeted zip code for HCLPPP, this child is eligible for a venous or capillary blood lead test at ages 6, 12 and 24 months and 3 and 4 years of age. Other testing may be performed only if a previous test comes back abnormal or there is a change in risk exposure history.

If the child is not enrolled in Medicaid and is *not* considered to live in a targeted zip code, then the Lead Risk Questionnaire (TDSHS PB-110, see *General Screening Recommendations* below) should be completed at ages 6, 12 and 24 months and 3 and 4 years of age. If any of the answers to the questions listed is "Yes" or "I don't know", then the child should be immediately tested.

Screening Recommendations for Children that Reside in High-risk Areas

In 2005, in addition to identifying targeted zip codes for lead poisoning prevention interventions, TDSHS defined certain zip codes as *high-risk areas* for lead exposure based on the following criteria:

- 1) At least 25% of the households live at or below the poverty level
- 2) More than 20% of the residences were built before 1950
- 3) At least 25% of the population are members of a minority group
- 4) Historical evidence shows that a significant percentage (at least 10%) of children in this area have tested positive for blood lead poisoning

Based on the 2015 American Housing Survey (AHS), Houston has an estimated 2.5 million housing units. Almost 60,000 are occupied pre-1940 housing units with 46% occupied by renters.³⁰ **Sixteen Zip codes have been classified as high-risk target areas in Houston.** TDSHS recommends that all children that reside in a high-risk area be screened for blood lead poisoning. The following list of zip codes meets the minimum criteria for a high-risk area as identified in the preceding paragraph:

77002, 77003, 77004, 77005, 77006, 77007, 77008, 77009, 77011, 77012, 77019, 77020, 77023, 77026, 77030, 77098

See Table 2 for breakdown of number of children screened by BLL range in HCLPPP’s high-risk zip codes.

Table 2: Number of Children under the age of 6 years residing in HCLPPP’s High-Risk Zip Codes that received blood lead screening in 2016, by age and blood lead level.

Blood Lead Level (µg/dL)	Number of Children Tested	Percent of Total Tested	Percent of Population Tested
Below 5	5,958	98.07%	25.99%
5 – 9	107	1.76%	0.47%
10 – 14	7	0.12%	0.03%
15 – 19	2	0.03%	0.01%
20 – 24	1	0.02%	0.00%
25 – 44	0	0.00%	0.00%
45 and above	0	0.00%	0.00%
Total	6,075	100.00%	22,928

General Screening Recommendations

³⁰ U.S. Census Bureau, *American Housing Survey*, 2015.

A child whose parent or guardian has private insurance or who is self-paying should be administered the Lead Risk Questionnaire developed by the TDSHS (PB-110). The lead risk questionnaire was developed as a tool for physicians and health care providers to screen children that are assumed to not be at high risk for lead poisoning because of their socioeconomic status, race or ethnicity, and the housing they reside in. The Lead Risk Questionnaire asks the parent or guardian seven questions regarding the child's housing, eating habits, environments, and hobbies. A parent or guardian that answers "Yes" or "I don't Know" to any of the questions should have their child screened for blood lead poisoning by capillary or venous blood lead draw. **A child that resides in one of the "high-risk" zip codes should be screened for blood lead poisoning even if the parent answers "No" to all of the questions in the questionnaire due to the historical high prevalence of elevated blood lead levels in those zip codes.**

For detailed screening guidelines, follow-up testing schedules and the Lead Risk Questionnaire (PB-120, PB-109 and PB-110) please see: <https://www.dshs.texas.gov/lead/providers.shtm>

VIII. STRATEGIC GOALS & OBJECTIVES:

The BCCEH has identified **four major goals** for eliminating child lead poisoning in Houston as a public health problem by 2020. Outlined under each goal are objectives for achieving the goal, short- and long-term activities for achieving each objective, and performance measures to evaluate achievement of each objective. Short-term activities are defined as those that will be in the planning and development stage within one year. Long-term activities will take longer than one year to develop.

STRATEGIC GOAL 1

BY 2020, INCREASE THE BLOOD LEAD SCREENING RATE FOR CHILDREN UNDER AGE 6 YEARS WHO ARE AT RISK FOR LEAD POISONING AS PER TDSHS SCREENING GUIDELINES

Objective 1.1: Increase the blood lead screening rate of children under age 6 at risk for lead poisoning

Mechanisms to achieve this objective are as follows:

Short-Term Activities

- Target screening in locations where young children spend time and/or organizations serving young children. These locations/organizations may include, but are not limited to, the following:
 - Day care provider sites (licensed and unlicensed homes, centers) (in progress as of June 2018)
 - WIC sites (in progress as of September 2018)
 - Immunization Clinics (in progress as of September 2018)

- Head Start programs (in progress as of June 2018)
- Early Intervention programs
- Public schools (children under age 6)
- Explore the feasibility of routinely checking the blood lead level at the same time the hematocrit is routinely checked on babies at approximately one year of age

Long-term Activities

- Target lead awareness to mothers of newborns at WIC centers and through the Vital Statistics Department
 - Provide mothers of newborns with a list of screening guidelines:
 - Send information through the mail
 - Send educational materials when birth certificate is sent
- Target information to grandparents and extended families. Many grandparents have custody of their grandchildren
- Work with high-risk areas of the city to determine how the BCCEH can help them locate resources and develop strategies to target high risk populations
- Explore the feasibility of mandatory testing of all children through partnerships with programs (WIC, daycares and other organizations that can screen children)

Performance Measures

- Analysis of data to show increased screening rates including:
 - 15% percent increase per year of children under age 6 years screened for blood lead levels from 24% in 2016
 - Meet target of 95% of children with a confirmed blood lead level of 5 µg/dL or above referred to recommended follow-up services within two weeks of results from 72% in 2016
 - Meet target of 95% of children who receive recommended follow-up service within two weeks of referral for recommended follow-up services following a confirmed BLLs above reference level test results to from 72% in 2016

Objective 1.2: Educate health care providers and licensed childcare providers about lead hazards

Short-term Activities

- Provide information mail outs and one-on-one trainings including, but not limited to, the following:
 - Identification of new at-risk groups and at-risk areas
 - Steps to take when a child has BLL above reference level
 - The state law requiring blood lead reporting
 - HHD resources to refer for environmental investigation and lead hazard reduction

- Identify Medicaid providers who are failing to screen children, encourage screening in these providers and set goals for improving lead screening
- Provide physicians with the results of environmental investigations on their patient's homes
- Work with medical school residency programs in Houston to inform new doctors about guidelines by allowing residents to shadow environmental investigators and CLPPP staff
- Provide information to licensed in-home day care providers

Long-term Activities

- Develop and provide incentives to Managed Care Organizations and their providers to follow the TDSHS screening guidelines and disincentives if they fail to meet requirements
- Develop a curriculum about lead in the environment, lead poisoning and awareness to be included and taught at the schools of nursing, medicine and dentistry
- Develop a card for the family to record the child's information about immunizations and lead screening since children often see multiple providers
- Explore the possibility of including training in continuing education for child care providers
- Explore the possibility of requiring certification of lead safe housing as part of childcare facility licensing requirement

Performance Measure

- Progress reports of efforts, successes, and failures toward the goals
- Analyze data and review if strategies have affected screening rates:
 - Increase number of education outreach events – including trainings – directed at public health professionals, clinical providers, and other lead preventions partners
 - Increase number of public health professionals and clinical providers who receive guidance documents
- Administer surveys to child care providers to gauge awareness of health hazards of lead exposure and the need for blood lead testing in children

Objective 1.3: Coordinate with WIC and the Bureau of Immunizations located in targeted zip codes to incorporate blood lead screening for children under age 6 into their protocols

Short-term Activities

- Initiate blood lead screenings in targeted zip codes at the Bureau of Immunizations to develop strategies for coordination of efforts
- Initiate dual-purpose blood testing for anemia and lead at WIC in targeted zip codes

Long-term Activities

- Develop a method for continuity of records and medical care (linkage to EPIC to see if receiving other health services)
- Develop linkages between various databases to better track children (link other environmental investigation and other health databases)

Performance measure

- Count of children that are screened through these services in targeted zip codes

Objective 1.4: Establish new and foster existing partnerships to increase public knowledge of lead hazards

Short-term Activities

- Maintain existing partnerships (see HCLPPP current partners above in Section V.)
- Foster partnerships with the following entities:
 - Houston schools - educate teen mothers and future parents about lead (e.g. high school health classes)
 - Community colleges - advocate including education about lead in curriculum.
 - Ministerial alliances - partner with churches to offer screening after Sunday services
 - Home visitors (e.g. public health, home health nurses and other HHD programs) - educate families
 - Community based organizations - disseminate information through local businesses (e.g. home improvement or grocery stores)
 - Collaborate with other agencies that have community health educators to include lead as a topic

Long-term Activities

- Foster partnerships with the following organizations:
 - Medicaid programs, Department of Human Services programs, faith-based organizations, celebrities, grocery stores, and other places where diapers and formula are sold where lead screening could be accomplished
 - Baby product companies (e.g. Johnson & Johnson) - include printed message about lead screening on bag/box, create a public service announcement
 - Medical, nursing, public health, social work and related schools- to include lead, lead risk exposure, and screening guidelines as educational topics
- Establish local affiliate of United Parents Against Lead

Performance Measure

- Develop a map of partnerships

- Analysis of data including:
 - Increase in number of new partner organizations and institutions engaged in brainstorming, strategizing, planning, implementing or evaluating interventions for lead poisoning prevention in targeted geographic areas
 - Identify other targeted at-risk populations (to include low-income and immigrant and refugee children)
 - Increase number of regularly scheduled and held meetings with partners and stakeholders to
 - Increase in number of new memoranda of understanding – or equivalent documents like memoranda of agreement and joint work plans – related to population-based childhood lead surveillance enhancement and targeted interventions for lead poisoning prevention developed and signed
 - Increase in number of new data-sharing agreements for enhanced population-based childhood lead surveillance developed and signed

STRATEGIC GOAL 2

BY 2020, DECREASE CHILDHOOD EXPOSURE TO NON-LEAD PAINT SOURCES

This goal addresses lead exposure from alternative sources; 50% of childhood lead exposure is from non-lead paint sources in Houston.

Objective 2.1: Identify and label products containing lead, so families can protect children from lead exposure

Short-term Activities

- Create a digital reference booklet of existing products that contain lead. The list will include, at a minimum, products identified by the Consumer Products Safety Commission (CPSC). Post the reference booklet on the HHD website
- Provide at-risk families with educational material on how to protect their children from lead exposure, including running water in the morning prior to use to flush the lines
- Create a tracking system for non-lead paint sources

Long-term Activities

- Add products to the reference booklet as new products containing lead are identified
- Explore whether policy changes to current regulatory laws would be beneficial for manufacturers and importers to understand lead restrictions. (e.g. border patrol, state representatives, senators, manufacturers, FDA)
- Promote the requirement to label products containing lead
- Promote the requirement to list hazards to children on the product label when there is no regulatory authority to remove the lead

- Collaborate with community partners of targeted zip codes to identify strategies to help reduce use of folk remedies of lead-containing products and cultural practices leading to childhood lead exposure

Performance measure

- Prepare a written plan with community partners addressing the development of a reference booklet of lead products, its availability to the public and promotional efforts for labeling

Objective 2.2: Provide public awareness about the dangers of exposing children to non-paint lead sources.

This objective will target educational efforts toward community members, clinics and providers, business owners and vendors, faith-based organizations, schools, etc.

Short-term Activities

- Develop lead poisoning prevention outreach materials addressing products containing lead, leaded pipes in older homes and hobbies/occupations that could lead to take home exposure of children:
 - Presentations
 - Flyers/brochures
 - Newsletter/newspaper articles
 - Radio/television announcements
 - Facebook, Twitter and other social media

Long-term Activities

- Use the Lead and Healthy Homes Planning Committee to promote public awareness.
- Gather support from local agencies, neighborhood associations, Parent Teachers Associations, etc.

Performance Measure

- Prepare a written report on material developed, dissemination to targeted groups, and survey results following lead-awareness training

STRATEGIC GOAL 3

BY 2020, RAISE AWARENESS ABOUT CHILDHOOD LEAD POISONING AMONG DECISION MAKERS AND THOSE WITH THE POWER TO MAKE HOUSING LEAD-SAFE

Objective 3.1: Develop a public awareness campaign.

This objective will be accomplished through the Lead and Healthy Homes Strategic Planning Committee (LHHSPC).

Short-term Activities

- LHHSPC will meet quarterly to:
 - Identify existing campaigns in other jurisdictions which may be applicable to Houston
 - Survey the current knowledge base in order to develop a baseline with which to gauge the success of the public awareness campaign

Long-term Activities

- LHHSPC will meet to:
 - Develop a public awareness campaign directed to decision makers
 - Compile reports and data on lead poisoning in Houston, Texas and nationally for the public awareness campaign
 - Collect families' personal stories about children with lead poisoning to have ready for opportunities that arise
 - Develop a web site on which to maintain information about lead poisoning and lead poisoning activities
 - Develop a campaign slogan
 - Develop a speakers' bureau through which to identify and train a diverse group of people, especially parents and guardians of children with lead poisoning, to speak publicly about lead poisoning
 - Target the following individuals/entities:
 - Local, state and federal legislators: councilmen, county commissioners, mayors, state and federal senators and representatives
 - Government officials: health departments, housing departments, boards of education
 - Media: TV, radio and print
 - Social Media: Facebook and Twitter
 - Others: philanthropic foundations, unions, clergy, bankers, realtors, insurers, healthcare administrators, healthcare providers, academics, associations, community-based organizations
 - Consider the following points in developing the campaign:
 - Legislators need to be educated about childhood lead poisoning and the impact on constituents in their legislative district.
 - The focus of the campaign should be prevention of lead poisoning.
 - Possible education points:

- The relationship between lead poisoning and behavior disorders that interfere with learning
- The cost of services for a lead poisoned child vs. the cost of making housing safe

Performance Measure

- A public awareness campaign is developed and implemented
- A written report is developed addressing efforts to target the individuals/entities identified above
- Analysis of data shows a greater awareness among policy makers
- Determine if activities have impacted decision makers’ actions relating to lead safe housing and addressing issues relating to children with elevated blood lead levels
- Records of meeting minutes and document all activities

STRATEGIC GOAL 4

BY 2020, INCREASE LEAD PROGRAM FUNDING

Objective 4.1: Create a sustainable funding plan

Short term Activities

- Identify new activities that could be reimbursable (e.g. case management)
- Explore pay-for-success projects

Long term Activities

- Work with Managed Care Organizations for better reimbursements and incentives or more severe disincentives

Performance measure:

- The number of new reimbursable activities identified
- The creation of a sustainable funding plan

Objective 4.2: Leverage current resources by expanding partnerships

This objective will identify organizations and agencies with resources that, while meeting their goals, can lead toward making housing lead safe.

Short-term Activities

- Continue to work with the US Department of Housing and Urban Development (HUD) Programs

- Explore availability of funding through Texas Department of Housing and Community Affairs Home Owner Occupied Housing Assistance
- Explore the feasibility of a Houston application for a Medicaid waiver for window replacement in properties where children were lead poisoned. Harris County received 1115 waiver funding to use Medicaid funds to pay for lead abatement
- Explore the availability of grants from EPA, HUD, CDC, and private foundations
- Make recommendations concerning best use of funds: remediation versus abatement

Performance Measure

- Prepare a written report of who was contacted to leverage funds and which funds were leveraged
- Communication plan on how to disseminate lead information
- Document grant review
- Ongoing analysis and recommendations of lead mitigation activities

Objective 4.3: Create new sources of funding

Develop and implement collaborative efforts to increase funding and knowledge of childhood lead poisoning and lead hazard reduction.

Short-term Activities

- Continue to support the LHHSPC and BUILD grant efforts
- Encourage the inclusion of governmental and private organizations promoting childhood lead poisoning prevention
- Solicit funding from new sources

Long-term Activities

- Explore the feasibility of city-wide ordinance for lead guidelines in rental properties
- Develop private-sector partnerships which would include funding, in-kind support or other charitable contributions from organizations such as home improvement chains, the paint industry, etc.

Performance Measure

- Prepare a financial plan outlining the establishment of partnerships and an innovative work plan to secure required resources

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