Kentucky's Department for Public Health,
Childhood Lead Poisoning Prevention Program

2010 Annual Surveillance Report

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Executive Summary

The Kentucky Department for Public Health Childhood Lead Poisoning Prevention Program (CLPPP) is proud to present the 2010 Annual Surveillance Report. The overall purpose of this Annual Childhood Lead Poisoning Prevention Surveillance Report is to utilize surveillance data to outline Kentucky's commitment and progress towards the Healthy People goal of eliminating lead poisoning in children by 2010. This report depicts CLPPP's progress through trend examination of Kentucky's blood lead screening rates, Medicaid screening rates, high risk screening rates, and the number of children who received case management services.

The Centers for Disease Control and Prevention (CDC) recommends public health action be initiated if a blood lead level of 10 micrograms of lead per deciliter of blood (10µg/dL) or greater is present in a child under the age of six (CDC, 2005). Young children are especially vulnerable to the adverse health effects of lead because their nervous systems are still developing and their common hand-to-mouth behaviors increase their risk for ingesting lead in their environment (Jones, et al., 2009). In particular, children living at or below the poverty level and live in older housing are at the greatest risk for lead poisoning (CDC, 2009, June 1). Widely known effects of lead poisoning in children include anemia, learning disabilities, lowered intelligence quotient (IQ), behavioral disorders, seizures, growth failure, hyperactivity, hearing loss, and in severe cases coma or death (CDC, 2005).

Since 2000, 2,605,314 Kentucky children under 6 years of age have been screened for elevated blood lead levels (EBLLs), which is any level greater than or equal to 10µg/dL. The number of Kentucky children screened for lead has increased by 10% since 2000. Furthermore, the number of lead poisoned children in Kentucky has decreased from 1,925 children in 2000 to 346 children in 2010. Case management services were initiated for 121 children and100 risk assessments were conducted in 2010 in response to this number of lead poisoned children. The decline in childhood lead poisoning cases in Kentucky illustrates the effectiveness of Kentucky's Childhood Lead Poisoning Prevention Program.

Although the number of lead poisoning cases among Kentucky children has decreased, lead is still one of the most detrimental environmental hazards to our children. Lead poisoning is 100% preventable and a simple blood test can prevent a lifetime of irreversible effects on the body (CDC, 2009, June 1). Therefore, continued efforts of preventing children from coming into contact with lead and treating children who have been poisoned by lead is a must in order to eliminate this preventable health burden among Kentucky's children.

Kentucky's 2010 Annual Childhood Lead Poisoning Prevention Surveillance Report

Background of Lead

Lead is a toxic metal that occurs naturally in the environment but has no biological function in the body. Lead was used for many years in paint and other products found in and around our homes. Lead also can be emitted into the air from industrial sources and leaded aviation gasoline (EPA, 2010, June 8). In addition, lead can enter drinking water from plumbing materials (EPA, 2010 June 8). Unfortunately, this wide use of lead in consumer products has resulted in increased human exposure.

Although lead's manufacture for use in the home was discontinued in 1978, lead-based paint remains to be the primary source of exposure for lead (CDC, 2009, June 1). The most common means of exposure include chronic ingestion of lead-contaminated dust from deteriorating (chipping, peeling, or flaking) paint in older homes of poor condition (ATSDR, 2010). Other sources of lead exposure include soil around the home (children playing in yards can ingest or inhale lead dust or lead contaminated soil), drinking water (your home might have older lead plumbing or lead solder), certain jobs (if you work with lead, you could bring it home on your hands or clothes), old painted toys and furniture, food and liquids stored in lead crystal or lead-glazed pottery or porcelain, lead smelters or other industries that release lead into the air, hobbies that use lead, (i.e. making pottery, stained glass, or fishing sinkers, or refinishing furniture), and folk remedies that contain lead (i.e. "greta" and "azarcon" used to treat an upset stomach) (EPA, 2010, June 8).

Lead is a potent neurotoxin that accumulates in soft tissues and bone over time. Shortly after lead gets into the body it will travel in the blood to soft tissues - liver, kidneys, lungs, brain, spleen, muscles, and heart (ATSDR, 2010). Lead will store at sites that normally bind calcium, iron and vitamin C. If the body is not getting an adequate supply of these nutrients lead will readily absorb and bind in those empty sites (ATSDR, 2010). Lead is eliminated in the urine and feces. After several weeks, most lead, if not excreted, will be stored in the bones and teeth (ATSDR, 2010). The half-life (the amount of time it takes for half of a substance to decay) of lead stored in bone is 3-5 years (ATSDR, 2010).

The effects of lead in the body are the same regardless of exposure route. Widely known effects of lead poisoning in children include anemia, learning disabilities, lowered intelligence quotient (IQ), behavioral disorders, seizures, growth failure, hyperactivity, hearing loss, and in severe cases coma or death (ATSDR, 2010).

Lead is also known to adversely affect the fetus of a pregnant woman. Past bone lead accumulation from an exposure as a child or while in a high risk occupation may be released into the blood during pregnancy as the body's need for calcium increases (ATSDR, 2010). Lead levels as low as 5µd/dL may result in adverse pregnancy outcomes including spontaneous

abortion, premature birth, stillbirth, birth defects, and decreased intellect and/or behavior problems in the child (ATSDR, 2010). Simple education measures such as increasing calcium in the diet can help prevent fetal exposure.

Young children are especially vulnerable to the adverse health effects of lead because their bodies are still developing, which allows for lead to be absorbed more readily (EPA, 2010, June 8) Children have the capacity to absorb up to 50% of the lead to which they are exposed (ATSDR, 2010). Children between the ages of 1 to 3 years are at the greatest risk for being lead poisoned due to common hand-to-mouth activity among this age group, which increase their risk for ingesting lead from their environment (Jones, et al., 2009). Nutritional education plays a key role in decreasing a child's blood lead level. With the increase of calcium, iron, and vitamin C in the diet, lead is more likely to be excreted before absorption (ATSDR, 2010). A diet low in fat will help keep the body from retaining lead, as fat stores lead and increases the amount of lead absorbed by the body (Barltrop and Khoo, 1975).

The Centers for Disease Control and Prevention (CDC) recommends public health action be initiated if a blood lead level of 10 micrograms of lead per deciliter of blood (10µg/dL) or greater is present in a child under the age of six (CDC, 2005). However, there is no safe level of lead in the body. Kentucky provides services to families of children who have a blood lead level (BLL) of 5 µg/dL or above through case management, education, and other forms of intervention.

Overview of Kentucky's Childhood Lead Poisoning Prevention Program

Since 2006, the mission of Kentucky's Childhood Lead Poisoning Prevention Program (KCLPPP) has been ***"To Eliminate Lead Poisoning and Its Detrimental Effects on Kentucky Children by 2010 through Health, Housing and Legislative Actions"***. KCLPPP assists family members, Local Health Departments (LHDs), medical care providers, and other community members in the reduction and prevention of lead poisoning. The program targets prevention efforts towards young children and prenatal patients, those at greatest risk for lead poisoning.

According to Kentucky's Revised Statue (KRS) **211.903**, KCLPPP should receive all blood lead laboratory results on Kentucky residents. The data collected is used to track cases and trends over time, as well as identify geographic areas at risk. KCLPPP developed a targeted screening plan for Kentucky using local childhood lead poisoning prevalence data, pre-1950 housing data, and poverty data to ensure that children at-risk are tested for lead. For a list of Kentucky's Targeted Zip Codes, please see Appendix I.

Kentucky's lead testing guidelines require that children at-risk for lead poisoning be tested, at the prescribed ages of one (1) and two (2) years. Those who test at confirmed elevated levels will receive case management services from local health department case managers. A public health lead investigation will also be conducted at the child's residence and other locations where the child spends six or more hours per week. Three high-risk areas (Jefferson County, Fayette County, and Northern Kentucky District) receive CDC pass-through funding to provide risk assessment and case management services for lead-poisoned children, as well as preventive and outreach services for high-risk children.

Kentucky's Lead Testing Requirements. According to Federal Medicaid requirement, a blood lead test must be administered at ages one and two years, or up to six (6) years if no previous test has been done, based on the following criteria:

- If a child is enrolled in Kentucky's Medical Assistance Program, he/she must have a blood lead level drawn at ages 1 and 2.
- If the child resides in a high-risk zip code (Appendix I) he/she must be tested (**KRS 211.903**).
- If the parent(s) responds "yes" or the answer is unknown to one or more of the Verbal Risk Assessment questions below, the child must be tested:
    - Does the patient live in or visit a building built prior to 1978 with peeling/chipping paint?
    - Does the patient live in or visit a building built prior to 1978 where ongoing renovation takes place?
    - Does the patient have someone close to you (at work, home, church, school, etc.) that has or has had lead poisoning or an elevated blood lead level?
    - Does the patient or a family member (who visits or the child visits or lives with you) work in an occupation or participates in a hobby that may contain lead?
    - Does the patient live near a busy road or highway?

***Medical Assessment and Intervention*.** The Kentucky Department for Public Health provides medical assessment and intervention guidelines for childhood lead poisoning cases to healthcare providers. These guidelines are based on the CDC's recommended guidelines for management of elevated blood lead levels in children. The following chart lists these guidelines by blood lead level.

Table 1. Childhood Lead Poisoning Intervention Guidelines

Blood Lead Level (BLL) µg/dL	Elevated blood Lead Level Interventions
≤10 µg/dL	▪ **Repeat BLL in one year if any risk factor exists.** ▪ **Refer to local health department for preventive lead education and resources**
10-14 µg/dL	▪ **Refer to Local Health Department for Case Management Services:** **1. Lead Education: Dietary** **Environmental** **2. Follow-up (F/U) BLL's** ▪ Repeat BLL every 12 weeks until BLL is <10µg/dL. Repeat annually if known risk factor exists until 72 months of age. **3. Refer for Nutrition Services** **4. Home Visits**

Lead Poisoning ≥ 15 µg/dL	**Confirm BLL (venous is confirmed, if capillary, a 2nd capillary is needed)** • **Within 1 week if: 15-44 µg/dL** • **Within 28 hrs if: 45-69 µg/dL** • **STAT if : ≥ 70 µg/dL** ▪ **Repeat F/U BLLs every 1-2 months until BLL is <10µg/dL for 6 months…** ▪ **Refer to Local Health Department for Case Management Services:** 1. **Lead Education: Dietary Environmental** 2. **Follow-Up Blood Lead Monitoring** 3. **Refer for Nutrition Services** 4. **Home Visits/Environmental Investigation and Lead Hazard Reduction** ▪ **Complete history and physical exam** ▪ **Lab Work: Hemoglobin or Hematocrit Iron Status**
PLEASE Consult: ≥25 µg/dL**	**All of the above interventions and:** ▪ **FEP or ZPP** ▪ **Neuro developmental Monitoring** ▪ **Abdominal X-ray with Bowel Decontamination if indicated** ▪ **Chelation Therapy as indicated, if chelated, monthly BLL's until BLL s <10µg/dL for 6 months, please consult Lead Specialist.** ▪ **Repeat BLL every 12 weeks until BLL is <10µg/dL** **Any confirmed BLL ≥25µg/dL, consult a Lead Specialist for guidance on medical evaluation and possible chelation therapy.**
≥70µg/dL	**All of the above interventions and:** ▪ **Hospitalize and commence Chelation Therapy** ▪ **Proceed according to all above interventions** ▪ **Retest monthly during chelation therapy**

Demographics of Kentucky

Kentucky's estimated poverty rate is significantly higher (17.4%) than the National rate of 14% (US Census Bureau, 2008-2009). Of Kentucky's children under the age of five, 27.4% live at or below the federal poverty level (US Census Bureau, 2008-2009). Almost half (45.2%) of Kentucky's children are enrolled for Medicaid services (Kentucky Department for Medicaid Services, 2009). People living in poverty or low income situations are more likely to live in unhealthy homes and be at an increased risk for lead poisoning.

In addition, it is estimated that 57% of Kentucky's housing stock, or approximately 1,092,010 units were built on or before 1979 (US Census Bureau, 2006-2008). These older homes have

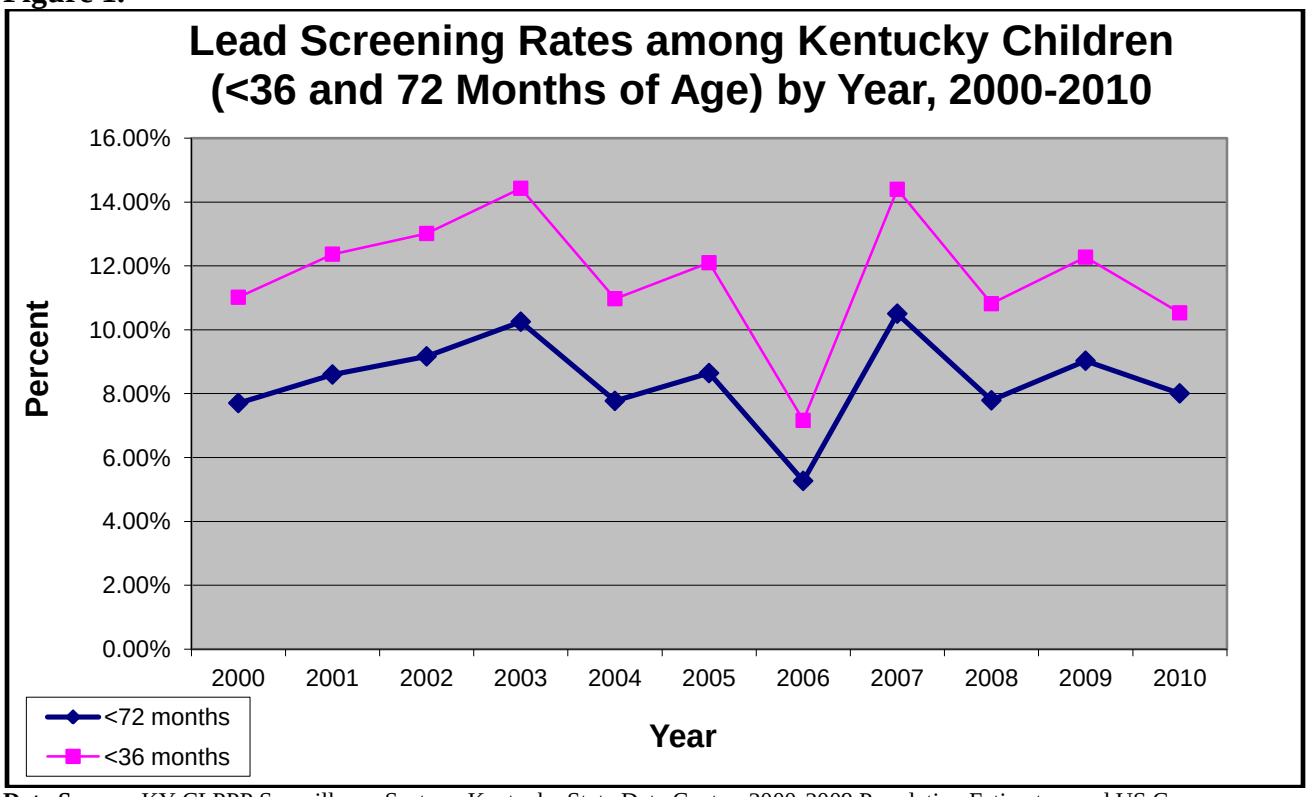
greater potential for housing-related health hazards, such as structural deficiencies, poor ventilation, and hazardous agents (i.e. dust mites, pests, and mold). Seventeen percent of all Kentucky homes were built before 1950, thereby increasing the risk of lead-based paint hazard exposures and other housing-related health hazards (US Census Bureau, 2006-2008).

Kentucky's largest urban areas (Louisville/Jefferson County, Northern Kentucky (NKY), and Lexington) run a higher risk for lead poisoning due to a higher concentration of pre-1950 housing, higher number of older homes poorly maintained, larger number of children enrolled in Medicaid, larger minority populations, and a greater number of children in general. KCLPPP has sub-grantees in each of these areas to focus on these populations due to their overall need.

Kentucky's Burden of Childhood Lead Poisoning: An Overview of the Data

Rates of Lead Screening and EBLLs among Children. It is recommended that children be tested at the ages of one and two years, or up to six years if no previous test has been done. It is vital that children are screened between the ages of 1 to 3 years because they are at the greatest risk for being lead poisoned due to common hand-to-mouth activity among this age group (Jones, et al., 2009). Consistent with these testing recommendations, the screening rate among Kentucky children under the age of 3 years has consistently been higher than the screening rate among Kentucky Children under the age of 6 years from 2000 through 2010 (Figure 1).

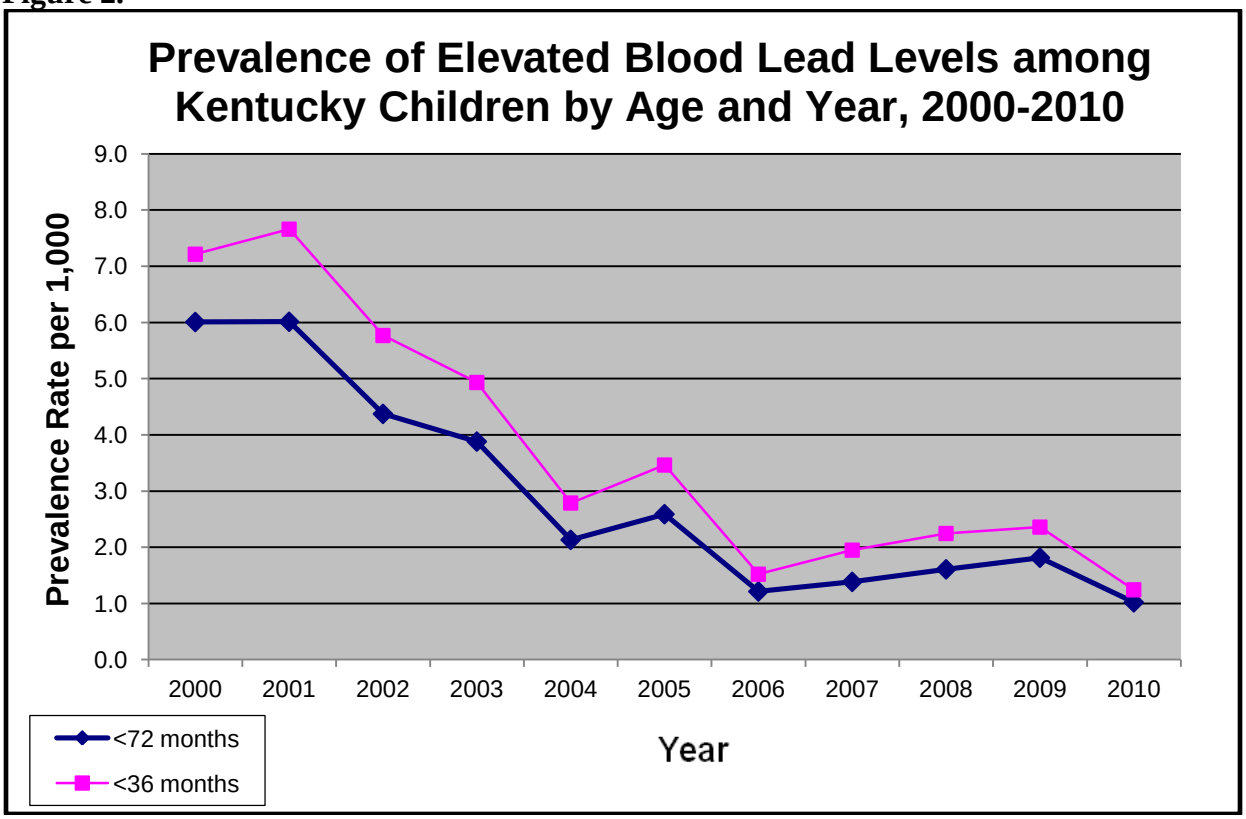
Figure 1.



Data Source: KY CLPPP Surveillance System; Kentucky State Data Center, 2000-2009 Population Estimates; and US Census Bureau, American Fact Finder, 2010 Population Data.

Since 2000, the prevalence rate of elevated blood lead levels (EBLLs), which is any level greater than 10µg/dL, among Kentucky children less than 36 months of age (<3 years) and less than 72 months of age (<6 years) has decreased significantly. From 2000 to 2010 the prevalence of EBLLs has decreased by 83%, for both age groups (Figure 2). This demonstrates Kentucky's commitment and progress towards the goal of eliminating lead poisoning in children.

Figure 2.



Data Source: KY CLPPP Surveillance System; Kentucky State Data Center, 2000-2009 Population Estimates; and US Census Bureau, American Fact Finder, 2010 Population Data.

Table 2 below provides an overview of Kentucky's lead data for children less than 72 months of age (<6 years old) from 2000 to 2010. Kentucky's screening rate for lead poisoning has increased by 10% since 2000 and the prevalence rate of elevated blood lead levels (EBLLs) among children <72 months of age significantly decreased from 6.01 per 1,000 children tested in 2000 to 1.02 per 1,000 children tested in 2010.

Table 2. Number and Rate of Children (<72 Months of Age) Screened for Lead in Kentucky by Year and BLL Group

Year	Population	Number of Children Tested	Screening Rate as %	Total EBLL Children (Over 10 µg/dL	Prevalence Rate per 1,000	Number of EBLL Children					
						10-14 µg/dL	15-19 µg/dL	20-24 µg/dL	25-44 µg/dL	45-69 µg/dL	>=70 µg/dL
2000	320,380	24,685	7.70%	1,925	6.01	1395	321	86	96	15	12
2001	321,464	27,637	8.60%	1,933	6.01	1343	320	105	112	31	22
2002	322,120	29,529	9.17%	1,409	4.37	994	235	72	85	15	8
2003	324,090	33,226	10.25%	1,258	3.88	875	222	57	74	24	6
2004	326,385	25,364	7.77%	696	2.13	457	133	48	47	11	0
2005	328,672	28,405	8.64%	851	2.59	535	162	70	74	5	5
2006	328,672	17,310	5.27%	399	1.21	240	80	40	35	3	1
2007	333,531	35,031	10.50%	462	1.39	273	89	48	43	7	2
2008	343,261	26,738	7.79%	552	1.61	334	104	42	70	1	1
2009	344,443	31,100	9.03%	625	1.81	360	108	63	82	11	1
2010	338,977	27,142	8.01%	346	1.02	189	66	22	51	16	2

Data Source: KY CLPPP Surveillance System; Kentucky State Data Center, 2000-2009 Population Estimates; and US Census Bureau, American Fact Finder, 2010 Population Data.

Table 3 below provides an overview of Kentucky's lead data for children less than 36 months of age (<3 years old) from 2000 to 2010. The prevalence rate of elevated blood lead levels (EBLLs) among children <36 months of age significantly decreased from 7.22 per 1,000 children tested in 2000 to 1.24 per 1,000 children tested in 2010.

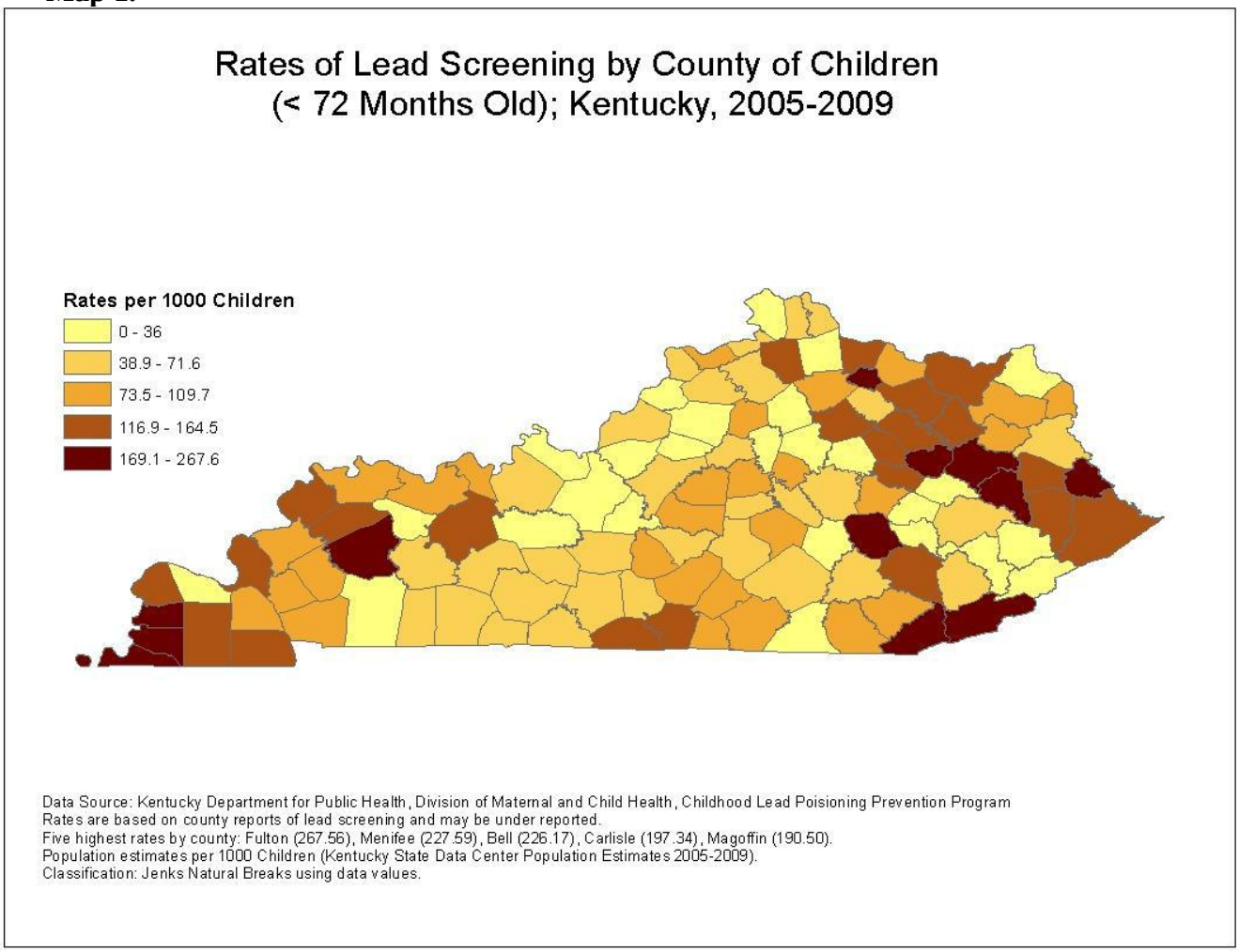
Table 3. Number and Rate of Children (<36 Months of Age) Screened for Lead in Kentucky by Year and BLL Group

Year	Population	Number of Children Tested	Screening Rate as %	Total EBLL Children (Over 10 µg/dL	Prevalence Rate per 1,000	Number of EBLL Children					
						10-14 µg/dL	15-19 µg/dL	20-24 µg/dL	25-44 µg/dL	45-69 µg/dL	>=70 µg/dL
2000	159,519	17,575	11.02%	1,151	7.22	839	181	46	66	10	9
2001	161,587	20,017	12.37%	1,240	7.66	834	221	25	82	23	13
2002	162,080	21,094	13.01%	935	5.77	648	153	49	66	11	8
2003	163,191	23,547	14.13%	805	4.93	552	148	44	38	18	5
2004	163,571	17,948	10.97%	456	2.79	296	78	39	36	7	0
2005	165,427	20,016	12.10%	573	3.46	391	103	44	55	1	3
2006	166,953	11,955	7.16%	254	1.52	152	52	22	25	2	1
2007	166,720	24,005	14.10%	325	1.95	181	68	38	34	3	1
2008	174,537	18,877	10.82%	392	2.25	231	82	26	51	1	1
2009	173,797	21,332	12.27%	410	2.36	239	77	45	43	5	1
2010	168,074	17,698	10.53%	209	1.24	114	48	14	29	3	1

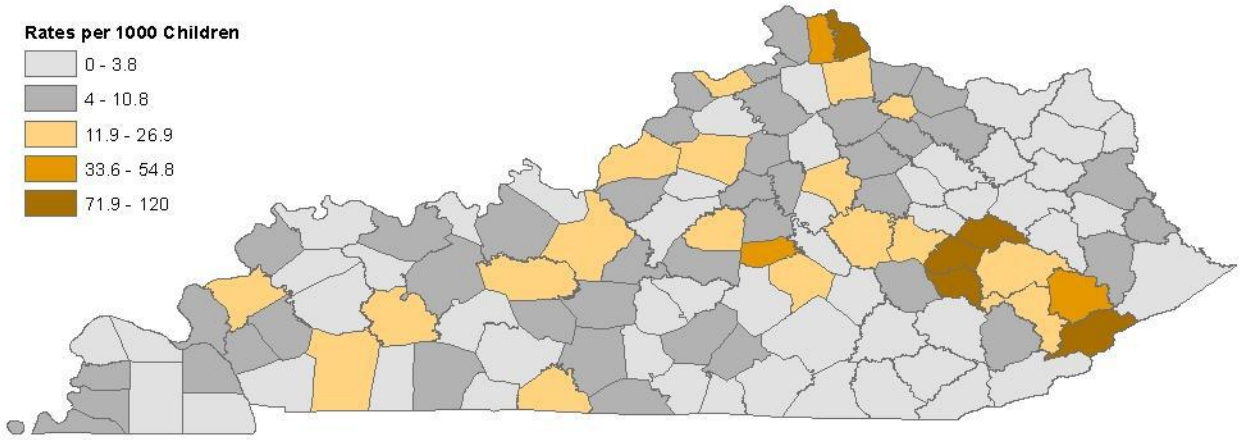
Data Source: KY CLPPP Surveillance System; Kentucky State Data Center, 2000-2009 Population Estimates; and US Census Bureau, American Fact Finder, 2010 Population Data.

Geographic Distribution of Lead Screening and EBLL Rates. In looking at aggregate data from 2005-2009, Fulton, Menifee, Bell, Carlisle, and Magoffin counties had the highest lead screening rates per 1,000 children (<72 months of age) compared to all other counties in Kentucky (Map 1). Those counties with the highest prevalence rate of EBLLs greater than 10µg/dL among children less than 72 months of age include: Owsley, Letcher, Lee, Wolfe, and Campbell (Map 2).

Map 1.



Map 2.

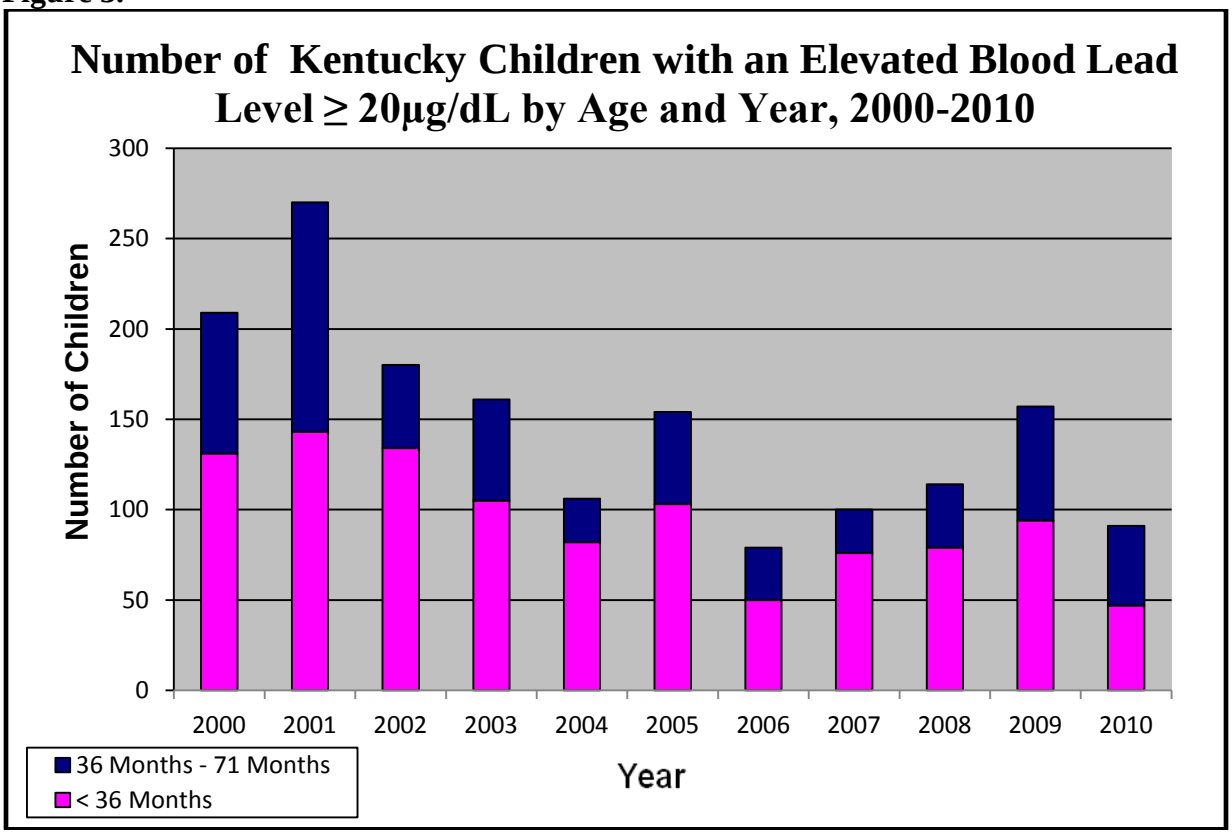


Data Source: Kentucky Department for Public Health, Division of Maternal and Child Health, Childhood Lead Poisoning Prevention Program
Five highest rates by county: Owsley (120), Letcher (82.84), Lee (81.08), Wolfe (72.07), Campbell (71.88).
Rates are based on county reports of lead screening and may be under reported.
Classifications: Jenks Natural Breaks using data values.

EBLLS ≥ 20µg/dL among Kentucky's Children. Greater lead concentrations in the blood can cause more severe health problems, especially for those most vulnerable (children <6 years of age) to the adverse effects of lead (ATSDR, 2010). Children between the ages of one and three exhibit the highest rates of lead poisoning, which could be due to more frequent hand-to-mouth activity in this age group, creating a higher risk for contamination by ingestion (Jones, et al., 2009).

Overall, the number of children with EBLLs ≥ 20µg/dL has decreased from 209 children in 2000 to 91 children in 2010, a 56% decrease. EBLLs of ≥ 20µg/dL among children less than 36 months (<3 years), decreased by 64% during this time period and among children 3 to less than 6 years of age, EBLLs ≥ 20µg/dL decreased by 44% (Figure 3).

Figure 3.



Data Source: KY CLPPP Surveillance System; Kentucky State Data Center, 2000-2009 Population Estimates; and US Census Bureau, American Fact Finder, 2010 Population Data.

Medicaid Screening Rates among Kentucky Children. Children living at or below the poverty line have been considered to be at greater risk for lead poisoning (CDC, 2009, June 1). Federal Medicaid policy requires that a blood lead test must be administered at ages one and two years, or up to six (6) years age if they have not been previously screened for lead poisoning. Therefore, the state of Kentucky mandates (**KRS 211.903**) that if a child is a recipient of the Commonwealth's Medical Assistance Program, blood lead testing shall be an eligible benefit. In addition, testing for lead poisoning shall be made available as part of the regular immunization program offered by the cabinet and shall be provided without charge by the cabinet and by local health departments. Furthermore, at-risk children up to 72 months of age should receive a blood lead test if they have not been previously tested.

Table 4 below provides a breakdown of Kentucky's Medicaid data for children ≤12 months, 13-24 months, and 25-71 months from 2006 to 2010. Although Kentucky's Medicaid screening rate among children is far below the CDC's recommended rate of 100%, this rate has increased since 2006 for all age groups.

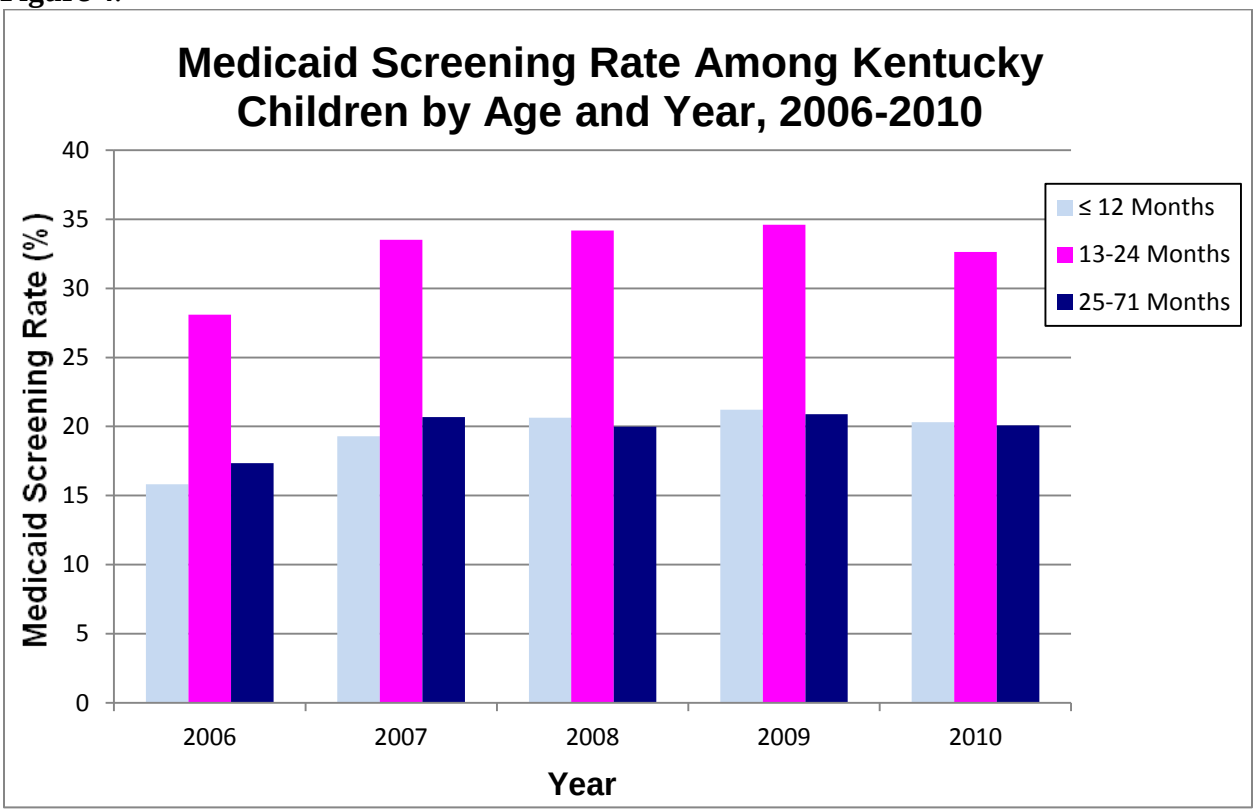
Table 4. Medicaid Screening Rates among Kentucky Children by Age and Year, 2006-2010

Age	Year	# of Children Enrolled in Medicaid	# of Children Tested for Lead	Medicaid Screening Rate (%)
≤ 12 Months	2006	70,609	11,175	15.83
	2007	74,189	14,304	19.28
	2008	76,109	15,708	20.64
	2009	77,900	16,533	21.22
	2010	77,900	15,821	20.31
13-24 Months	2006	31,536	8,857	28.09
	2007	32,325	10,833	33.51
	2008	35,547	12,150	34.18
	2009	37,610	13,016	34.61
	2010	38,605	12,600	32.64
25-71 Months	2006	86,908	15,085	17.36
	2007	88,404	18,277	20.67
	2008	92,190	18,415	19.98
	2009	100,918	21,080	20.89
	2010	107,367	21,552	20.07

Data Source: Department for Medicaid Services Data System

The Medicaid screening rate has been consistently higher among children aged 13-24 months compared to the screening rate of children ≤ 12 months and children aged 25-71 months (Figure 4). Over the years, the Medicaid screening rate among children ≤ 12 months has been relatively the same as the Medicaid screening rate among children aged 25-71 months. This indicates that KCLPPP needs to increase efforts towards educating physicians on the importance and the requirement of screening at risk children, with an emphasis on children 12 months of age.

Figure 4.



Data Source: Department for Medicaid Services Data System

Lead Screening among Kentucky's Children Living in High Risk Zip Codes. To identify geographic areas at risk, KCLPPP developed a targeted screening plan for Kentucky using local childhood lead poisoning prevalence data, pre-1950 housing data, and poverty data of children by zip code to develop a Lead Poisoning Risk Index for each zip code in Kentucky. It was determined that the housing data and the blood lead data should be weighted equally and weight heavier than the poverty data.

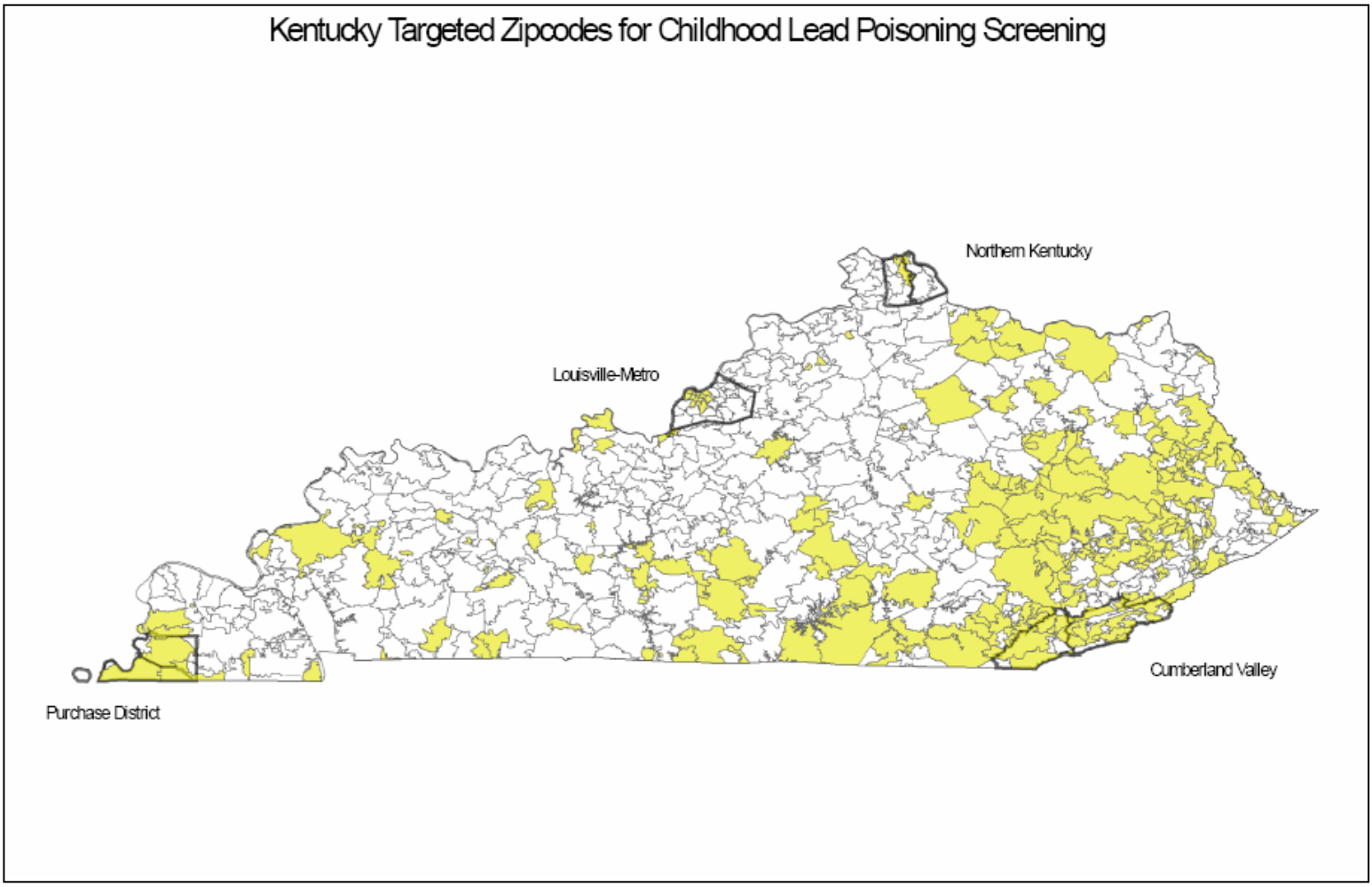
The formula used to develop the Lead Poisoning Risk Index is the following:

$$LPRI = HI + PI + II$$

LPRI = Lead Poisoning Risk Index
HI = Housing Index (percentage of pre-1950 by zip code)
PI = Prevalence Index (percentage of children with lead poisoning by zip code)
II = Income Index (percentage of children living in poverty by zip code)

Kentucky zip codes with a risk index score equal to or greater than 52.30 are considered to be at high risk for lead poisoning. There were a total of 263 out of 765 zip codes found to be at high risk (Map 3). Children living in these areas should have a blood lead test conducted.

Map 3.



Data Source: KY CLPPP Surveillance System and 2000 US Census Bureau Population and Housing Data

The screening rate among children < 72 months of age living in targeted zip codes was higher than the screening rate among children living in non-targeted zip codes (Table 5). This is as expected. However, this targeted screening rate is far below CDC's recommended rate, indicating the need to increase efforts towards educating physicians on the importance of conducting blood lead screens for children living in these high risk areas.

Table 5. Targeted Screening Rates among Kentucky Children < 72 Months of Age, 2010

Targeted Status	Number of Children Screened	Targeted Screening Rate (%)	Number of EBLL Children					
			10-14 µg/dL	15-19 µg/dL	20-24 µg/dL	25-44 µg/dL	45-69 µg/dL	>=70 µg/dL
Targeted	6837	9.90%	87	32	12	36	16	2
Non-Targeted	20305	7.50%	102	34	10	15	0	0

Data Source: KY CLPPP Surveillance System

Limitations of Kentucky's Lead Data.

Unfortunately, KCLPPP has several data limitations. One major limitation is that multiple systems are used to store different segments of lead data. The three data systems used to store Kentucky's lead data are described below.

- **Case Management (CM) database (Access)** – This database stores every child that has been entered into CM since 1997 whether the status of the child be active, closed, or waiting. The CM database currently stores nearly 2,000 records (records are added manually on a daily basis).
- **Environmental Risk Assessment (RA) database (Excel)** – This database stores the results of every lead follow-up environmental RA conducted in Kentucky since 2003. The RA database currently stores nearly 700 records (records are added manually on a weekly basis).
- **CLPPP database (SQL)** – This database stores lead reports conducted by labs, physicians, and LHDs in Kentucky since 1999. The CLPPP database currently stores nearly 430,000 records (records are added electronically and manually on a weekly basis).

Having multiple systems capturing different elements makes it difficult to track, monitor, and maintain the data, as well as clean, validate, and remove duplicates.

In addition, manual entry of data occurs in all three databases. Manual entry increases the chance of entering data incorrectly. Furthermore, there are almost no safeguards in the CLPPP system to minimize erroneous entries because no fields are required. Electronically reported data has also been plagued by incomplete or missing information.

Another limitation of Kentucky's lead data is that some local health departments have been using the Central Data Processing (CDP) system to report lead results and some of this data is not currently in the CLPPP database. Kentucky is diligently working with CDP to obtain the lead data, but unfortunately not all records have been received.

This report presents data in which 2000 US Census data was used to calculate screening rates and prevalence rates. In addition, the targeted zip codes were also determined using 2000 US Census data. 2010 US Census data would reveal a more true representation of the data. Unfortunately, the 2010 Census Data was not yet available. Once available, the targeted zip codes will be re-evaluated and the screening and prevalence rates adjusted accordingly.

All of these data limitations should be taken into consideration when interpreting the analyzed data presented in this report. Screening rates and prevalence rates may be over or under estimated due to these limitations. Additionally, there might be an increase or a decrease in the targeted zip codes based on the new 2010 Census data.

Conclusion

Significant strides have been made towards the identification and elimination of lead poisoning over the last decade in the state of Kentucky. The number of Kentucky children screened for lead has increased by 10% since 2000. By increasing the testing numbers, Kentucky is able to identify children with levels under 10 µg/dL and work to ensure that their levels do not increase further. In comparing 2000 to 2010, the prevalence rate of Kentucky children with elevated blood lead levels have decreased by 83%. This decline in childhood lead poisoning cases in Kentucky illustrates the effectiveness of Kentucky's Childhood Lead Poisoning Prevention Program. With continued education, primary prevention, surveillance activities, identification of lead hazards, and correction of these hazards, Kentucky will continue to make vast progress towards eliminating this preventable health burden among Kentucky's children.

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Appendix I

Kentucky's High Risk Targeted Zip Codes

Adair		Breckinridge		Edmonson		Graves		Henry
42715		40170		42275		42040		40007
42742				42285		42061		40058
42761		Calloway						
		42076		Elliott		Grayson		Hopkins
Allen				41171		42762		42408
42153		Campbell						42410
		41071		Estill		Green		
Ballard		41073		40336		42743		Jackson
42060		41074		40472				40447
		41085				Greenup		40486
Barren				Fayette		41174		
42160		Carlisle		40508				Jefferson
		42021				Hardin		40202
		42023		Fleming		40155		40203
Bath				41049		40177		40204
40374		Carter						40205
		41146		Floyd		Harlan		40206
Bell				41605		40801		40208
40845		Casey		41606		40807		40209
40902		42528		41607		40810		40210
40958		42539		41612		40815		40211
40977				41615		40819		40212
40988		Christian		41619		40820		40213
		42266		41630		40823		40215
Bourbon		42254		41635		40828		40217
40348				41636		40830		Johnson
40361		Clay		41640		40831		41216
		40914		41649		40843		41219
Boyd		40941		41650		40854		41222
41101		40972		41651		40855		41228
		40983		41653		40863		41238
Bracken				41660		40870		41240

41002		**Clinton**		**41666**		**40873**		**41254**
41004		**42602**		**41669**		**Hart**		**41255**
Breathitt		**Crittenden**		**Fulton**		**42722**		**41257**
41317		**42064**		**42041**		**42729**		**41260**
41339				**42050**		**42749**		**41263**
41385		**Cumberland**						**41265**
		42759		**Garrard**		**Hickman**		**41268**
				40461		**42031**		**41274**
Kenton		**Lee**		**Magoffin**		**Muhlenberg**		**Pike**
41011		**41311**		**41426**		**42374**		**41514**
41014		**41397**		**41464**		**42321**		**41524**
41015				**41465**		**42332**		**41543**
41016		**Letcher**		**41632**		**42339**		**41546**
		40826						**41549**
Knott		**40862**		**Martin**		**Ohio**		**41553**
41740		**41537**		**41203**		**42333**		**41555**
41822		**41819**		**41224**		**42338**		**41563**
41843		**41825**		**41250**		**42343**		**41564**
41844		**41826**		**41262**		**42369**		**41567**
41759		**41833**		**41267**				**41569**
41772		**41835**				**Owen**		
41817		**41855**		**Mason**		**40355**		**Todd**
41834		**41810**		**41055**				**42204**
41839		**41840**		**41056**		**Owsley**		
41859		**41845**				**41314**		**Warren**
		41849		**Meade**		**41364**		**42170**
Knox				**40104**		**41386**		
40734		**Lewis**		**40176**				**Wayne**
40771		**41135**				**Pulaski**		**42633**
40903		**41170**		**Menifee**		**42501**		**42632**
40906		**41179**		**40322**		**42544**		
40935				**40346**		**42553**		**Webster**
40953		**Lincoln**		**40387**				**42450**
40982		**40448**				**Wayne**		**42463**
40995				**Mercer**		**42633**		**42403**
40997		**Livingston**		**40310**		**42632**		
		42047						**Whitley**
Lawrence				**Metcalf**		**Perry**		**40759**

41124		**Logan**		**42129**		**41367**		**40763**
41159		**42265**		**42154**		**41701**		**40769**
41230						**41712**		
		McCreary		**Monroe**		**41723**		**Wolfe**
Leslie		**42647**		**42167**		**41778**		**41301**
40827		**42653**		**42157**		**41735**		**41332**
40858		**42638**		**42140**		**41751**		**41365**
40874						**41773**		
41714		**McLean**		**Morgan**				
41730		**42371**		**41408**		**Robertson**		
41762				**41421**		**41064**		
41775		**Marion**		**41425**				
41776		**40009**		**Nelson**		**Rowan**		
		40328		**40008**		**40313**		