Indiana State Department of Health
Lead & Healthy Homes Program

2014 Surveillance Report

The Indiana Lead Poisoning Prevention Program and Healthy Homes Program are pleased to present the 2014 annual surveillance report. The Healthy Housing program is committed to eliminate the incidence of childhood lead poisoning in Indiana. This report provides information regarding the number of Indiana children tested for lead poisoning, the number of children found to have elevated blood lead levels, and the number of children who, as a result of an elevated blood lead level, received case management services.

***Statistics and alterations revised on 2/26/2016.*

May 2015

Lead poisoning is the most preventable condition of children in the United States. Possibly 4 million households with children in them are being exposed to high levels of lead, according to the Centers for Disease Control and Prevention (CDC). The CDC has recently (2012) reclassified the blood lead level of concern from 10 µg/dL to 5 µg/dL. It's important to note that while levels of concern have long been classified, no safe level of lead has yet been determined by the CDC. Indiana recognizes this and provides case management starting at the 10 µg/dL level, and provides lead education at levels of 5µg/dL and above.

Lead poisoning or lead in the blood, when it occurs, may result in harmful, irreversible health effects. These complications are variable, potentially affecting nearly every system in the body. This includes kidney and nervous system damage, cognitive deficits such as Attention Deficit/Hyperactivity Disorder (AD/HD), decreased IQ ,and learning disabilities, seizures, coma, and even death.

Indiana recognizes the importance of lead screening and prevention. In 2014, 40,811 unique children have been screened for elevated blood lead levels. Among the unique children tested, the number of blood lead levels above or equal to 5 µg/dL in Indiana is 1,765, which is 4% among those screened. The Indiana Lead and Healthy Homes Program and local health departments provided case management services, including, but not limited to, home visits, education, prevention techniques, and referrals, to 101 new, confirmed cases of lead poisoned children under the age of 7 during 2014. The program led to 845 risk assessment inspections of residences of lead-poisoned children conducted in 2014.

Despite being banned for residential use in 1978, lead-based paint remains the leading risk factor for lead poisoning. Due primarily to the current breakdown of existing lead-based paint in older homes, ingestion and inhalation of lead-based paint particles remains a serious health concern. Nearly 2 million homes, more than 63 percent of residential structures, in Indiana were built prior to 1978, making this concern highly relevant for Indiana. Children between the ages of 1 to 3 years of age are at greatest risk for being lead poisoned due to their prevalence of hand-to-mouth activity behavior, their developing bodies and brains, and their size. Children, on a pound-for pound basis, breathe more air, drink more water, and eat more food than adults, meaning they can potentially be exposed to a higher percentage of carcinogens and chemicals.

In 2014, in order to further improve the health of Indiana families, we look forward to increasing awareness of lead poisoning hazards and health effects and raise the rates of identification of poisoned children, based on CDC standards. Awareness and identification include increased outreach and education for prevention techniques, increased rates of screening for children 6 and under, and increased timeliness and effectiveness of delivery of case management services at this time. We also intend to increase and improve reporting, to increase education and outreach capacity.

Thank you for reviewing this annual report. Please direct questions regarding the data report, to Magan Meade, Environmental Epidemiologist with the Division of Environmental Public Health. I may be reached by email at MMeade@isdh.in.gov, or by telephone at (317) 233-9264

Sincerely,

Magan Meade
Environmental Epidemiologist

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INDIANA LEAD SURVEILLANCE SUMMARY

Mission: To eliminate the incidence of childhood lead poisoning.

Vision: To prevent the social, behavioral, and economic ramifications of childhood lead poisoning for the future of Indiana.

Goals: The goals of the program are: 1) to identify susceptible populations in Indiana to childhood lead poisoning, identify their sources of lead exposure, and provide outreach and education to those communities to prevent future incidence; 2) To screen for lead poisoning in counties which are more at risk for lead exposures due to older housing; and 3) To provide case management to lead poisoned children and remove hazards associated with a childhood lead poisoning case.

Highlights from 2014:

- This year the Lead Data Flow Database experienced technical difficulties for a time span of three months, which may impair the number of lead poisoning cases reported in this report. In 2015, the Indiana State Department of Health is still receiving cases from 2014.
- In 2014, there were 40,811 unique Hoosier children screened in Indiana. Therefore, the screening rate for childhood lead poisoning program for the state is 7%, based on the United States Census Population Estimate for 2010-2013, 598,175.
- Of the 40,811 unique Hoosier children tested, 1,765 were at or above the CDC standard of 5µg/dL. The incidence rate for childhood lead poisoning at the 5µg/dL and above level is 43 per 1,000 children tested.
- Of the 40,811 unique Hoosier children tested, 101 were confirmed cases with a blood level at 10µg/dL and above. All of the in-state children were confirmed with an initial venous blood test. 101 out of 289 elevated blood levels at 10µg/dL and above were confirmed.
- Of the 40,811 unique Hoosier children tested in 2014 with lead levels at 5µg/dL or above:
    - 55% are males
    - Children born in 2008 (6 year olds) had the highest lead incidence rates compared to other age groups (68 cases per 1,000 children tested). One and two year olds had the highest screening rates, which accounted for 69% of the children screened.
    - Asian/ Pacific Islander and Black children had the highest incidence rates at 55 and 52 per 1,000 children tested, respectively.
    - 26% are covered by Medicaid and exhibited lead poisoning incidence rates 3X that of children not covered by Medicaid.

    Some of the characteristics above are among the CDC's top risk factors for a child experiencing lead poisoning.

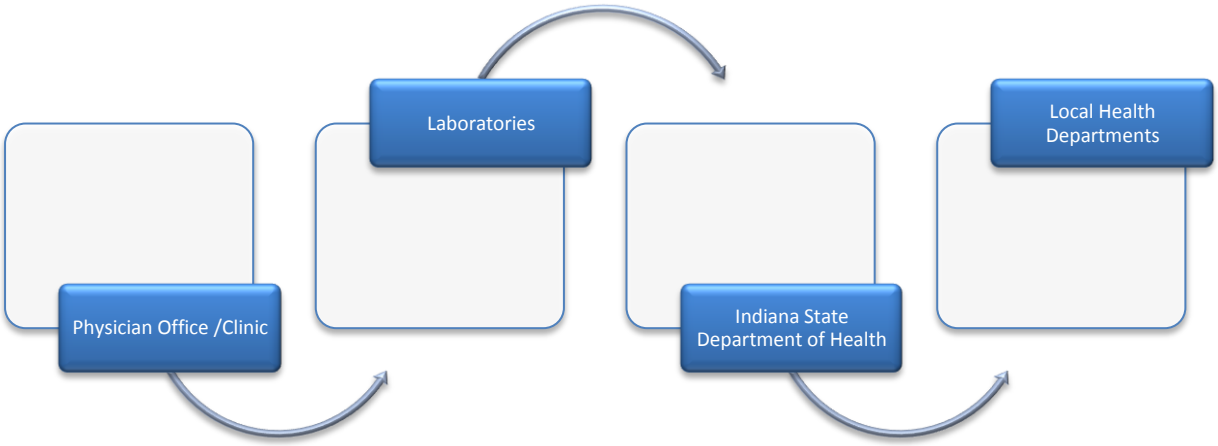
Indiana Steps to Remove Childhood Lead Hazards from Homes: County specific information from the lead program is provided at the end of this report. This includes the number of children tested in each county, the number of risk assessments performed, the number of hazards identified, and the percentage of housing built pre-1980.

- The number of risk assessments performed in Indiana in 2014 is 1,260, in which 845 lead hazards were identified.

INDIANA BLOOD LEAD SURVEILLANCE

Blood lead data is reported to the State of Indiana electronically, either through the Lead Data Flow database system or through fax. Indiana collects this information through an output from the Lead Data Flow database. This data is then cleaned up by the epidemiologist to remove duplicates, individuals out of the age frame, and out of state data. The duplication among the data from previous years has been recognized. We plan to sort through this historical data, in order to obtain a more accurate picture of lead poisoning rates in Indiana.

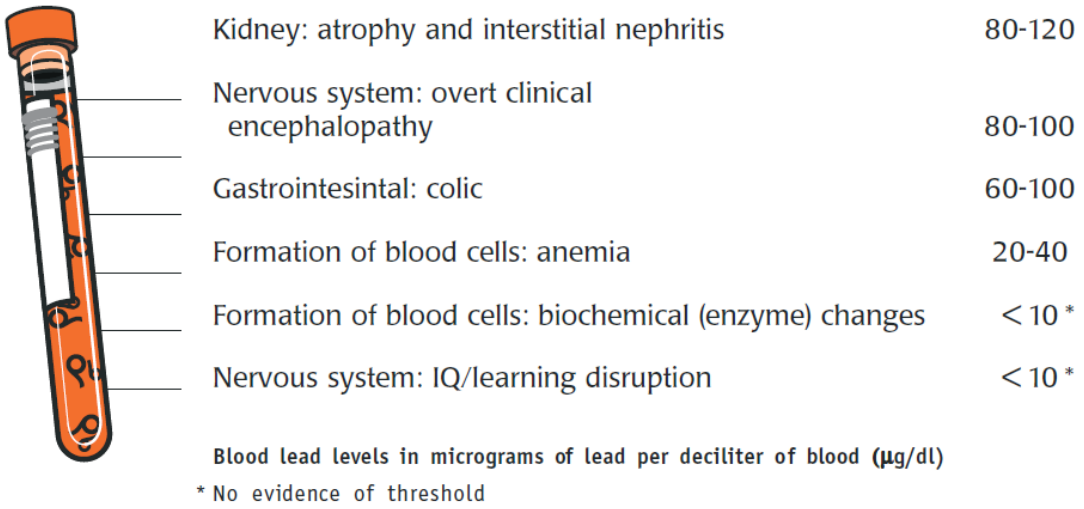
The diagram below displays Indiana blood lead surveillance and reporting.



This model can include an arrow at the end, due to the interaction between the Indiana State Department of Health and the local health departments when a child receives case management. The agencies may work collaboratively depending on each case.

Due to the source of lead poisoning among the majority of cases in Indiana, we plan to demonstrate the impact of children living in older housing (pre-1978) on childhood lead poisoning rates through the historical data. To gather historical data for the counties, we will be able to target screening among counties with historical lead poisoning rates related to older

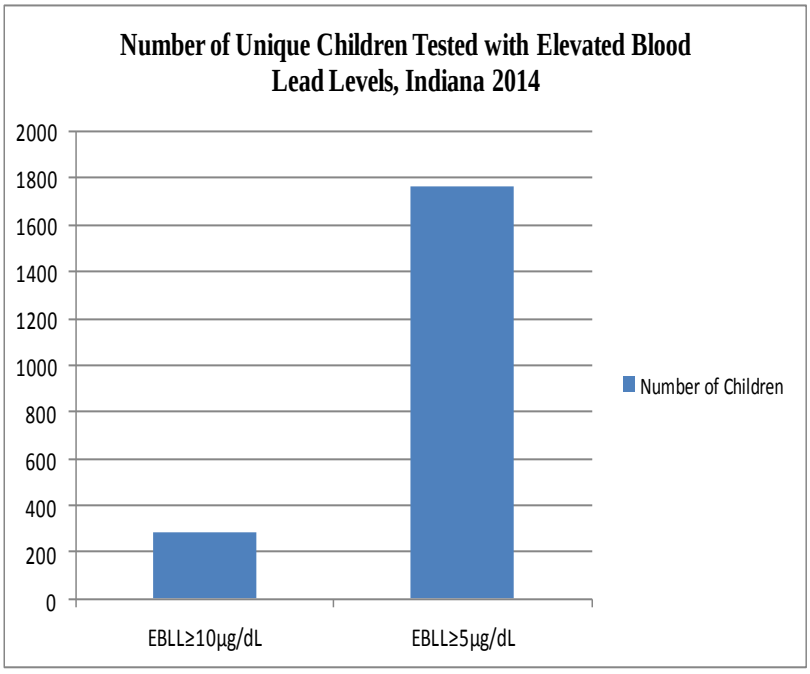
housing that may contain lead-based paints. It seems in Indiana, lead-based paint was/remains a factor in childhood lead poisoning rates.



BLOOD LEAD LEVELS AT THE NEW REFERENCE LEVEL

Furthermore, Indiana is collecting and monitoring data at the new CDC standard for blood lead levels of 5µg/dL and above. **There is no safe level of lead for children**. The effects of lead poisoning are irreversible.

The figure above displays the health effects from each blood lead level. Although blood lead levels have decreased over the past ten years, there is still a large number of children that experience blood lead levels <10. Lead ban legislation in 1978 has been one of the primary reasons for the decrease. However, lead is still contained in older housing, the environment, drinking water, and some imported, consumer products. "Blood lead levels (BLLs) between 2 and 10 µg/dL have been found to cause persistent cognitive damage and children with BLLs in this range are likely to benefit from aggressive therapy." (Gould 2009)



From BLLs in the 2 to 10 range, we would expect to see permanent damage such as

IQ lost and behavioral changes. The study by Elise Gould (2009) mentions societal damage from this range from lifetime earnings lost, costs from special education, and an increase in crime and high school dropout rates.

Since 2013, other states (Michigan and Minnesota) have released reports on the potential amount of economic burden due to lost in lifetime earnings (mostly underestimates) that the state could experience due to childhood lead poisoning incidence. Minnesota Department of Health in their report, "Economic burden of the environment on two childhood diseases: Asthma and lead poisoning in Minnesota," states a $1.9 billion lost in lifetime earnings from children among a birth cohort in 2004, whom were tested for lead poisoning. The full report is available at: http://www.health.state.mn.us/divs/hpcd/tracking/projects/burden.html).

Based on similar methods and resources from the Minnesota report, children who experienced an elevated blood lead level (BLL) in Indiana and was a confirmed case from 2010 to 2014, there is a potential lifetime costs for these children of $121.7 million. This includes healthcare costs associated with a confirmed case of 10µg/dL or above and the lost in lifetime earnings associated with these lead poisoned children.

DEMOGRAPHICS AND LEAD POISONING RATES AMONG CHILDREN TESTED

Indiana law does not require universal testing of all Hoosier children; the only children, who are required by Federal law to be tested for lead poisoning, are those who receive Medicaid benefits. Testing for that specific population was 26% in 2014. Reporting Medicaid status remains an issue. In the table below, the lead poisoning rate is highest among children with Medicaid. When comparing the unknown Medicaid status group, their rates are higher than non-Medicaid children. An assumption could be that there is a large portion of children with Medicaid in the unknown-Medicaid status group.

Medicaid Status	EBLL≥10µg/dL	EBLL≥5µg/dL	Number Tested	% Screened	Rate EBLL≥5µg/dL per 1,000 children tested
Yes	131	652	10,523	26	62
No	63	397	14,785	36	27
Unknown	95	716	15,503	38	46

Although Indiana does not have universal testing requirements in place, parents/guardians of "at risk" children are strongly encouraged to have their children tested for lead poisoning. "At risk" is defined as a child who:

- lives in or regularly visits a house or other structure built before 1978;
- has a sibling or playmate who has been lead poisoned;
- has frequent contact with an adult who works in an industry or has a hobby that uses lead;
- is an immigrant or refugee or has recently lived abroad;
- is a member of a minority group;
- is a Medicaid recipient;
- uses medicines or cosmetics containing lead; or
- lives in a geographic area that increases the child's probability of exposure to lead.

Race	EBLL≥10µg/dL	EBLL≥5µg/dL	Number Tested	Rate EBLL≥10µg/dL per 1,000 children tested	Rate EBLL≥5µg/dL per 1,000 children tested
American Indian	*	*	50	*	*
Asian/Pacific	*	45	814	*	55
Black	47	295	5719	8	52
White	168	962	18926	9	51
Mulitracial/Other	16	83	2031	8	41
Unknown/Missing	54	375	13271	4	28
Hispanic	35	215	4239	8	51
Non-hispanic	153	912	17143	9	53
Unknown	101	638	19429	5	33

Among children tested, minority groups are compared. From the table above, the highest lead poisoning rates (EBLL≥5µg/dL) in 2014 are among Asian/Pacific, Black, and White children. However, significantly more white children are screened in Indiana (18,926) than any other group, which helps detect lead poisoning. Currently, there is a project, working with the Allen County Health Department and the Indiana State Department of Health, the Food Protection Program and the Division of Environmental Public Health, to conduct environmental sampling to help detect the reason for the consistent lead levels among the Asian/Pacific population (presumed to be the large Burmese refugee population). Education and resources will be developed for this population.

The Lead and Healthy Homes program also plans to conduct more outreach and education in counties that were not identified before, that may be more affected by lead poisoning due to older housing. This information is provided in the county lead database at the end of this document and the county rankings information below. Ultimately, it is our mission to eliminate the incidence of childhood lead poisoning.

COUNTY RANKINGS FROM 2014 DATA

This year, the report includes a county ranking system for County Lead Programs. Due to the small incidence rates in some of the counties, we will only list the top five or ten counties based on the following parameters: Childhood Lead Poisoning Screening Rates, Highest Lead Incidence Rates, and Counties with Majority Housing before 1980. Due to the low number of confirmed cases for each county, we cannot effectively demonstrate the percent follow-up for a confirmed case and an environmental assessment.

Small Counties with the Highest Screening Rates

County Name	2013 Population Estimate of Children (≤5)	Number of Children Tested (2014)	% Screening Rate
Owen	1,060	297	28

Green	1,836	443	24
Union	364	60	16
Fayette	1,312	193	15
Brown	631	92	15

Small Counties with the Lowest Screening Rates

County Name	2013 Population Estimate of Children (≤5)	Number of Children Tested (2014)	% Screening Rate
Starke	1,299	24	2
Pike	723	20	3
Jasper	2,003	71	4
Fulton	1,206	43	4
Newton	718	26	4

Large Counties with the Highest Screening Rates

County Name	2013 Population Estimate of Children (≤5)	Number of Children Tested (2014)	Screening Rate (%)
Monroe	6385	2596	41
Grant	3940	1087	28
Wayne	4209	869	21
Flloyd	4422	802	18
Harrison	2154	305	14

Large Counties with the Lowest Screening Rates

County Name	2013 Population Estimate of Children (≤5)	Number of Children Tested (2014)	Screening Rate (%)
Dubois	2626	27	1
LaGrange	3610	73	2
Shelby	2773	66	2
Hendricks	9848	247	3
Porter	9161	308	3

Small Counties with Highest Expected Lead Poisoning Rates per 1,000 Children Tested

County Name	Number of Children Screened	Number of Lead Poisoned Children	Rate per 1,000 Children Tested
Rush	61	10	164
Warren	32	*	*
Fountain	73	10	123
Pulaski	38	*	*
Blackford	89	9	90

Large Counties with Highest Expected Lead Poisoning Rates per 1,000 Children Tested

County Name	Number of Children Screened	Number of Lead Poisoned Children	Rate per 1,000 Children Tested
Wayne	869	95	109
Clinton	196	21	107
Shelby	66	7	106
Madison	725	70	97
Henry	87	7	80

Counties with the Largest Percentage of Housing Built before 1980

County Name	Percentage of Housing Built before 1980 (%)
Benton	80
Randolph	80
Jay	80
Tipton	79
Knox	79
Cass	79
Wayne*+	79
Fayette+	78
Henry*	78
Grant+	77

+ Signifies a county with high screening rates

*** Signifies a county with a high lead poisoning rate**

County Name	Children Tested	% Children Tested	% Pre-1980 Housing	# PB poisoned (≥5µg/dL)	Pb Poison Rate per 1,000	Hazards Identified	Risk Assessments
Adams	130	4%	65%	8	46	27	23
Allen	2519	10%	62%	169	57	115	94
Bartholomew	540	10%	63%	14	22	34	15
Benton	48	9%	80%	*	63	3	1
Blackford	89	12%	72%	9	90	0	0
Boone	241	6%	51%	6	21	2	1
Brown	92	15%	55%	*	11	4	1
Carroll	126	12%	66%	8	63	12	12
Cass	138	6%	79%	8	51	5	4
Clark	961	14%	56%	20	17	7	4
Clay	97	6%	69%	*	21	0	0
Clinton	196	9%	76%	21	107	4	2
Crawford	52	9%	59%	*	38	0	0
Daviess	106	4%	67%	*	28	15	1
De Kalb	183	7%	63%	*	16	0	0
Dearborn	201	7%	52%	9	45	16	15
Decatur	115	7%	66%	*	9	2	1
Delaware	692	11%	74%	49	58	6	3
Dubois	27	1%	54%	*	0	9	2
Elkhart	1869	12%	57%	105	48	57	54
Fayette	193	15%	78%	17	78	21	6
Flloyd	802	18%	61%	27	27	6	4
Fountain	73	7%	69%	10	123	2	0

Franklin	145	11%	54%	*	28	1	1
Fulton	43	4%	66%	*	47	0	0
Gibson	134	6%	64%	7	45	0	0
Grant	1087	28%	77%	38	29	7	4
Greene	443	24%	65%	10	18	9	0
Hamilton	1311	6%	24%	22	15	27	1
Hancock	240	6%	48%	7	21	10	4
Harrison	305	14%	50%	8	26	1	0
Hendricks	247	3%	35%	11	32	9	4
Henry	87	4%	78%	7	80	13	2
Howard	385	8%	72%	33	75	8	7
Huntington	174	8%	71%	*	29	0	0
Jackson	163	6%	58%	8	43	11	4
Jasper	71	4%	54%	*	42	1	0
Jay	177	12%	80%	7	34	1	1
Jefferson	209	12%	64%	10	38	8	6
Jennings	118	7%	50%	*	17	5	3
Johnson	447	5%	42%	17	34	15	10
Knox	164	7%	79%	9	43	20	2
Kosciusko	352	7%	60%	12	28	3	2
La Porte	352	5%	70%	21	48	44	36
Lagrange	73	2%	56%	*	14	1	1
Lake	2370	8%	73%	181	67	112	97
Lawrence	239	9%	60%	*	13	16	2
Madison	725	10%	75%	70	97	32	22
Marion	7273	10%	65%	339	41	231	161
Marshall	142	5%	63%	*	21	4	3
Martin	69	12%	57%	*	58	1	0

Miami	243	13%	75%	12	41	1	1
Monroe	2596	41%	51%	28	10	3	1
Montgomery	294	12%	71%	19	58	5	1
Morgan	366	9%	54%	*	14	4	3
Newton	26	4%	73%	*	38	1	1
Noble	183	6%	63%	*	16	1	1
Ohio	19	8%	57%	*	0	4	4
Orange	58	5%	58%	*	52	2	1
Owen	297	28%	50%	7	24	1	0
Parke	56	6%	67%	*	36	1	0
Perry	87	8%	70%	*	23	1	1
Pike	20	3%	65%	*	50	0	0
Porter	308	3%	54%	6	13	10	7
Posey	160	11%	67%	8	50	1	1
Pulaski	38	5%	67%	*	105	0	0
Putnam	90	5%	56%	*	33	15	15
Randolph	115	8%	80%	13	78	18	7
Ripley	190	11%	59%	*	16	9	8
Rush	61	7%	76%	10	164	5	2
Scott	124	9%	52%	*	0	0	0
Shelby	66	2%	70%	7	106	15	11
Spencer	135	11%	57%	6	37	1	1
St Joseph	1714	10%	69%	128	62	137	120
Starke	24	2%	67%	*	83	3	2
Steuben	166	9%	54%	*	24	2	1
Sullivan	86	8%	64%	*	47	1	0
Switzerland	41	6%	51%	*	73	0	0
Tippecanoe	1383	13%	52%	50	35	42	11

Tipton	34	5%	79%	*	88	0	0
Union	60	16%	62%	*	17	0	0
Vanderburgh	1003	9%	70%	71	58	13	10
Vermillion	98	12%	72%	9	61	3	2
Vigo	770	12%	73%	53	58	4	4
Wabash	214	12%	75%	9	42	1	1
Warren	32	6%	66%	*	125	1	0
Warrick	152	4%	51%	*	0	4	0
Washington	136	9%	49%	*	7	2	1
Wayne	869	21%	79%	95	109	8	8
Wells	110	6%	69%	*	27	1	1
White	117	8%	75%	11	77	3	2
Whitley	112	6%	61%	*	27	0	0

References

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Gould, E. (2009). Childhood lead poisoning: Conservative estimates of the social and economic benefits of lead hazard control. Environmental Health Perspectives. 117:7 (1162- 1167).

Minnesota Department of Health. (2014). Economic burden of the environment on two childhood diseases: Asthma & Lead Poisoning in Minnesota. http://www.health.state.mn.us/divs/hpcd/tracking/projects/burden.html

United States Census Bureau. Annual Estimates of the Resident Population by Single Year of Age and Sex for the United States, States, and Puerto Rico Commonwealth: April 1, 2010 to July 1, 2013. www.census.gov/newsroom/releases/pdf/PEP_2012_PEPSYASEX.pdf

The information contained in this report was compiled by the Indiana Lead and Healthy Homes Program in compliance with IC 16-41-39.4-5, available at http://www.in.gov/legislative/iac/ which requires:

Sec. 5.

a. The state department shall, in cooperation with other state agencies, collect data under this chapter and, before March 15 of each year, report the results to the general assembly for the previous calendar year. A copy of the report shall be transmitted in an electronic format under IC 5-14-6 to the executive director of the legislative services agency for distribution to the members of the general assembly.
b. The report transmitted under subsection (a) must include for each county the following information concerning children who are less than seven (7) years of age:
    i. The number of children who received a blood lead test.
    ii. The number of children who had a blood test result of at least ten (10) micrograms of lead per deciliter of blood.
    iii. The number of children identified under subdivision (2) who received a blood test to confirm that they had lead poisoning.
    iv. The number of children identified under subdivision (3) who had lead poisoning.
    v. The number of children identified under subdivision (4) who had a blood test result of less than ten (10) micrograms of lead per deciliter of blood.
    vi. The average number of days taken to confirm a blood lead test.
    vii. The number of risk assessments performed for children identified under subdivision (4) and the average number of days taken to perform the risk assessment.
    viii. The number of housing units in which risk assessments performed under subdivision (7) documented lead hazards as defined by 40 CFR 745.
    ix. The number of housing units identified under subdivision (8) that were covered by orders issued under IC 13-14-10-2 or by another governmental authority to eliminate lead hazards.
    x. The number of housing units identified under subdivision (9) for which lead hazards have been eliminated within thirty (30) days, three (3) months, and six (6) months.