



Indiana State Department of Health Lead & Healthy Homes Program
2010 Surveillance Report



April 2010

The Indiana Lead and Healthy Homes Program is pleased to present the 2010 annual surveillance report. As part of our commitment to Healthy People 2020, this report provides information as to the number of children tested for lead poisoning, the number of children who were found to have elevated blood lead levels, and the number of children who received case management services.

Since 2004 (the first year in which Indiana has electronic data available), 345,788 children have been screened for elevated blood lead levels. Lead poisoning is defined as having 10 micrograms of lead per deciliter of blood ($10\mu\text{g}/\text{dL}$). The number of lead-poisoned children in Indiana has declined from 893 total in 2004 to 768 total in 2010. These elevated blood lead levels led to 895 risk assessment inspections of residences of lead-poisoned children being conducted in 2010. The Indiana Lead and Healthy Homes Program and local health departments provided case management services (i.e., home visits, education, referrals) to 217 confirmed cases of lead poisoned children aged 7 and under during 2010.

Lead poisoning is a preventable condition that may result in harmful health effects. These effects are variable and may include colic, attention deficit hyperactivity disorder (ADHD), impaired peripheral nerve functionality, decreased IQ, coma, and even death. No safe level of lead has yet been determined by the Centers for Disease Control and Prevention.

Although its manufacture for use in the home was discontinued in 1978, lead-based paint remains the leading risk factor for lead poisoning. This is primarily due to the breakdown of existent lead-based paint in older homes. Nearly 2 million homes were built before 1978 in Indiana so ingestion or inhalation of lead-based paint particles remains a serious health concern. Children between the ages of 1 to 3 years of age are at the greatest risk for being lead poisoned due to the prevalence of hand-to-mouth activity behavior at these ages and because the blood/brain barrier is not fully developed.

In 2011 we look forward to implementing a healthy homes focus to further improve the health of Indiana families. Healthy homes include those which are dry, clean, pest-free, safe, contaminant-free, ventilated and maintained. We will also continue lead-poisoning prevention activities.

Thank you for reviewing this report. Please direct questions regarding the data reported here to Laura Gano, the Indiana Lead and Healthy Homes epidemiologist. She may be reached by email at lgano@isdh.in.gov or by telephone at 317.233.5605.

Sincerely,

A handwritten signature in black ink that reads "Dave McCormick".

David McCormick
Director
Indiana Lead and Healthy Homes Program



Prepared By

David McCormick
Program Director

Laura Gano, MPH
Epidemiologist

We would like to acknowledge all of those local health departments, medical professionals and laboratory personnel who test, diagnose and treat lead-poisoned children in Indiana. We also acknowledge our debt to the State of Illinois Department of Public Health Lead Program for the design of this report.

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To report the results of blood lead testing or for more information about childhood lead poisoning please contact the Indiana Lead and Healthy Homes Program at 317.233.1250 or phone the Indiana Family Helpline toll-free at 800.422.0746 or visit <http://www.in.gov/isdh/19124.htm>



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Introduction

The mission of the Indiana Lead and Healthy Homes Program is to eliminate the incidence of childhood lead poisoning in Indiana. The Centers for Disease Control and Prevention (CDC) standard for “elevated blood lead level” (EBLL) is 10µg/dL – 10 micrograms of lead per deciliter of blood. In 2010, 768 Hoosier children exhibited elevated blood lead levels compared to 893 in 2004 (the first year in which reliable electronic data is available). The number of children found to have elevated blood lead levels based on testing continues to decline. However, total screening rates remain low – only 9% of all children aged 7 and under were tested in 2010. By Indiana law, the only children who are required to be tested for lead poisoning are those who receive Medicaid benefits; testing for that specific population was 14%. These statistics point out that the level of lead poisoning may be significantly under-reported in Indiana. Although Indiana does not have universal testing requirements in place, parents/guardians of “at risk” children are strongly encouraged to have those 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.

The Indiana State Department of Health has been identifying children demonstrating elevated blood lead levels and monitoring the treatment of lead-poisoned children since the early 1990s. Program activities include determining and examining potential sources of lead exposure, estimating the extent of EBLLs in Indiana, providing follow-up case management, and allocating resources for primary prevention. Eight high-risk areas (Allen County, Elkhart County, LaPorte County, Marion County, St. Joseph County, Vanderburgh County, Wayne County, and the City of Gary) receive CDC pass-through funding to provide risk assessment and case management services for lead-poisoned children. In 2003 the Indiana legislature enacted Article 29 of Indiana Administrative Code Title 410 to specify procedures for reporting, monitoring and preventing lead poisoning. Article 32 of Indiana Administrative Code Title 410 was enacted in 2010 to formalize definitions and enforcement for the lead-based paint program. Indiana is committed to defining roles and responsibilities and enforcement of these rules to meet Healthy People 2020¹ objectives set forth by the US Department of Health and Human Services. The primary objective is to reduce mean blood-lead levels of children by 10% and ultimately the elimination of elevated blood lead levels in children. In 2010, ILHHP revised its statewide Childhood Lead Poisoning Elimination Plan to reflect these targets. The program also worked with retailers, contractors, business owners, landlords and homeowners to comply with the Environmental Protection Agency’s (EPA) Renovation, Repair and Painting (RRP) rule² which went into effect in April 2010. This rule requires specific work practices to prevent lead contamination in pre-1978 homes and facilities. In 2011 ILHHP will expand its programming to assess risks to Hoosier children in a more holistic fashion by collecting data reflecting the seven principles of healthy housing³ which may act synergistically to affect lead poisoning.



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The information contained in this report was compiled by the Indiana Lead and Healthy Homes Program in compliance with IC 16-41-39.4-5⁴ 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.

Sources:

¹ <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=12>

² <http://www.epa.gov/lead/pubs/renovation.htm>

³ <http://www.nchh.org/What-We-Do/Healthy-Homes-Principles.aspx>

⁴ <http://www.in.gov/legislative/iac/>

⁵ http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuid=datasets_1&_lang=en&_ts=http://factfinder.census.gov/servlet/STTable?_bm=y&-context=st&-qr_name=ACS_2009_5YR_G00_S2504&-ds_name=ACS_2009_5YR_G00_-CONTEXT=st&-tree_id=5309&-redoLog=false&-caller=geoselect&-geo_id=01000US&-format=&-lang=en



Summary statistics: Indiana childhood lead poisoning (calendar year 2010)

Table 1 (Summary statistics)

Variable	Total Children Tested		Proportion EBLL Results (based on total population) (%)
	Number (N)	Proportion (%)	
Number of children tested ¹	69,791	4.6	0.3
Number of children tested, age 7 and under ²	65,576	9.4	0.3
Age			
<1	8,213	4.7	0.2
1	24,077	27.6	0.3
2	11,426	13.1	0.4
3	6,223	7.2	0.4
4	7,357	8.5	0.3
5	4,131	4.7	0.2
6	1,896	2.2	0.3
7	1,111	1.3	0.0
Sex			
Male	35,758	51.2	56.7
Female	33,682	48.3	47.9
Unknown/missing	351	0.5	0.2
Racial/Ethnic Distribution³			
White	35,656	51.6	42.5
Black	12,229	17.7	25.7
Asian/Pacific Islander	1,001	1.5	2.2
American Indian/Alaska Native	60	0.1	0.0
Multiracial	467	0.7	0.0
Other	2,673	3.9	5.8
Unknown/missing	17,367	24.9	23.9
Hispanic	8,607	13.6	16.3
Confirmed BLLs per µg/dL			
≤4 µg/dL	65,068	93.2	
5 - 9 µg/dL	3,662	5.2	
10 - 14 µg/dL	465	0.7	
15 - 19 µg/dL	151	0.2	
20 - 24 µg/dL	62	0.1	
≥ 25 µg/dL	82	0.1	

¹The 2010 estimated population of children aged 16 and under (the eldest child tested in 2010) was 1,503,658; ²the estimated number of children under 7 was 697,279. ³Collecting race and ethnicity data remains a challenge.



Lead poisoning and screening rates

The decline in childhood lead poisoning in Indiana since 1997 – from 3.1% of children tested to 0.3% of children tested in 2010 - illustrates the effectiveness of the Indiana Lead and Healthy Homes Program. In 2007 there was a nationwide recall of toys that were found to contain lead; testing rates were elevated in that year due to increased awareness. The 2011 Lead Elimination Plan describes a plan to increase testing by 10% as mandated by the CDC.

Indiana remains committed to meeting Healthy People 2020 objectives set forth by the US Department of Health and Human Services: reducing mean blood-lead levels of children by 10% and ultimately the elimination of elevated blood lead levels in children.

Figure 1

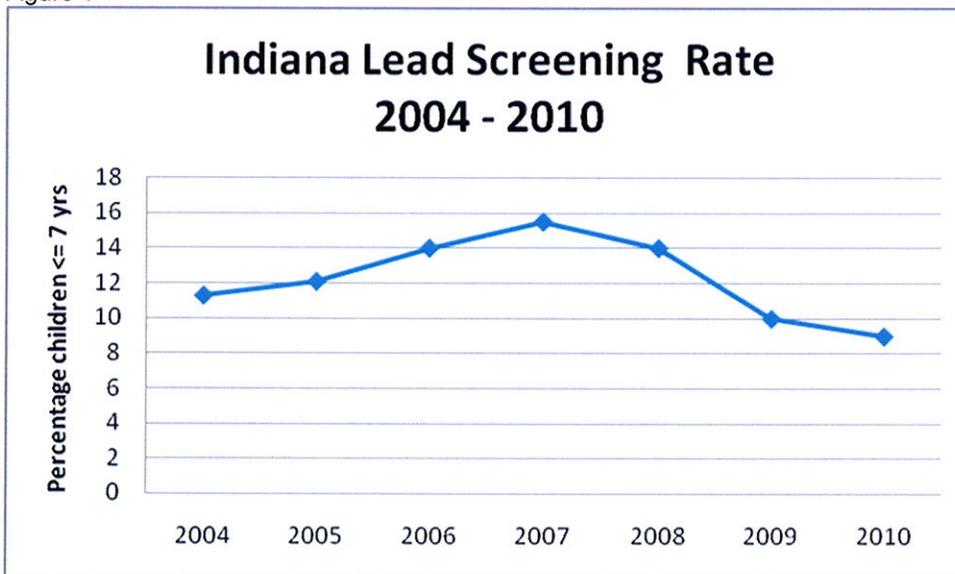
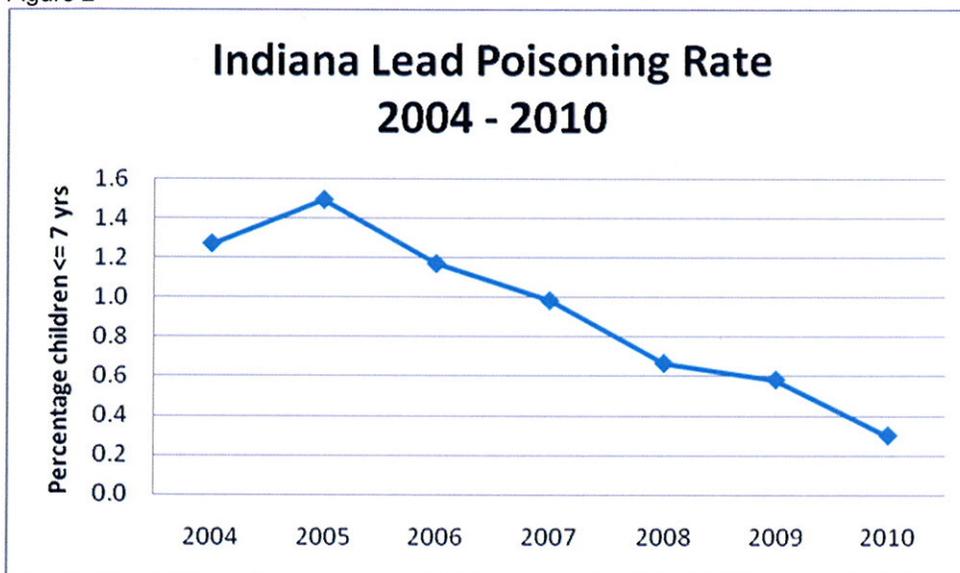


Figure 2





Blood lead levels by age

Lead poisoning is an environmental health issue that can affect anyone. Children aged 1 – 3 years old exhibit the highest rates of lead poisoning -- this may be attributed to more frequent hand-to-mouth activity in this age group which creates a higher risk for contamination by ingestion. Children aged 6 and under are at greater risk for adverse outcomes from elevated blood lead levels.

Figure 4 illustrates the percentage of EBLL results by age for the period 2004 – 2010. Each year of data was combined to create a single aggregate age.

Figure 3

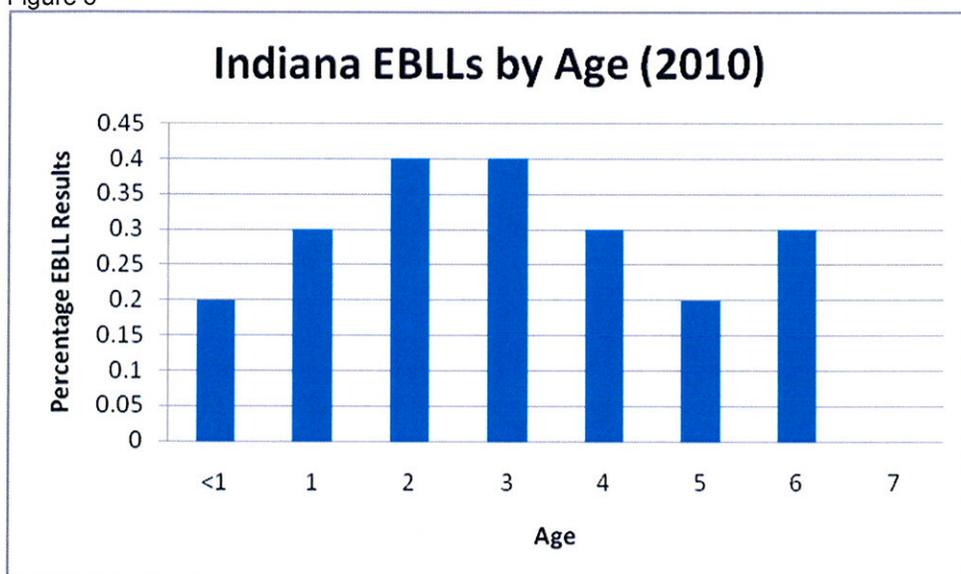
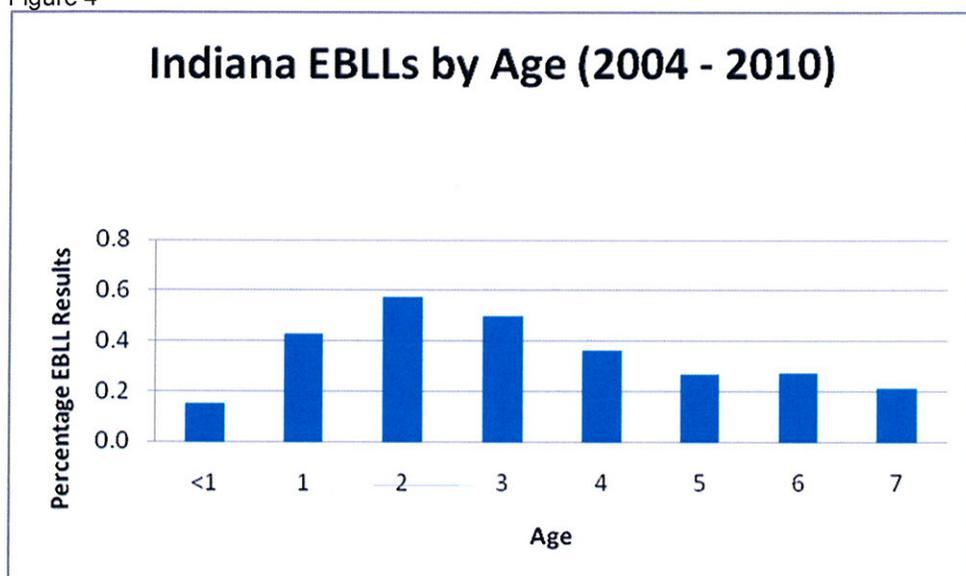


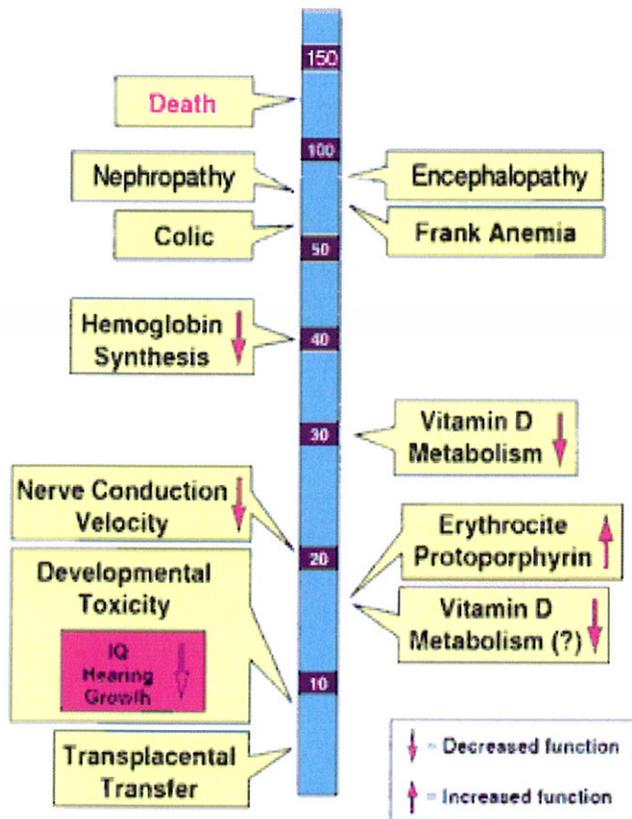
Figure 4





Distribution of elevated blood lead levels and adverse effects

Figure 5



At low levels there may be no overt signs or symptoms of lead poisoning. However, low levels of lead poisoning over time may lead to developmental delays, learning problems and attention difficulties. Moderate levels of lead poisoning can cause constipation, abdominal pain, and poor appetite. Higher levels can lead to irritability, vomiting and lethargy. Serious health conditions including neuropathy and encephalopathy may be experienced as the level of lead poisoning increases. Levels above 100 µg/dL can result in death. See figure 5 for other adverse health effects that may result from lead poisoning.



Race & ethnicity in relation to lead poisoning

Racial and ethnicity disparities exist in lead poisoning among Hoosier children. Data show that Asian/PI children experience lead poisoning almost twice as much as White children and that Black children are lead poisoned twice as often; children of race defined as other are lead poisoned over twice as much as White children. Slightly more Hispanic than non-Hispanic children were lead poisoned (37% vs. 34%, respectively).

Figure 6

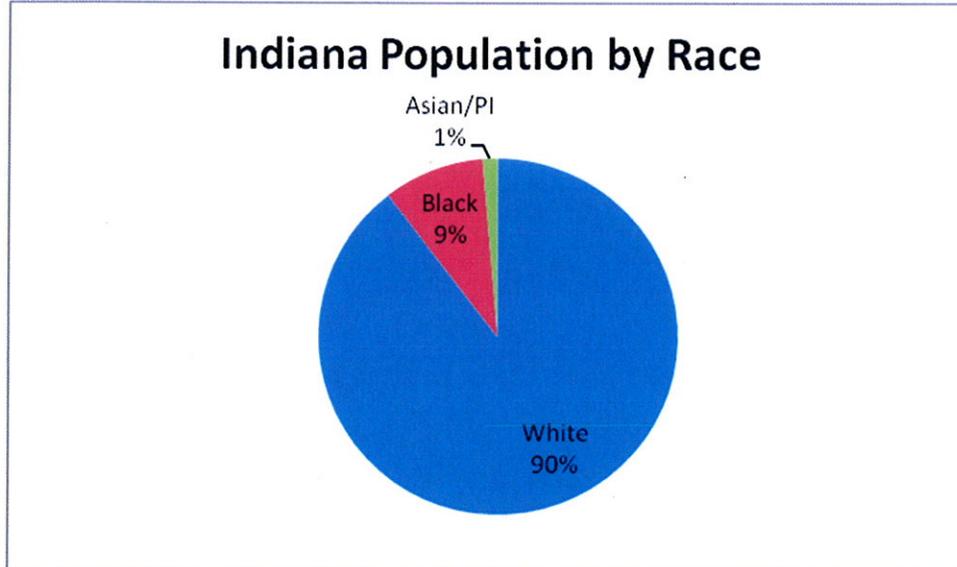
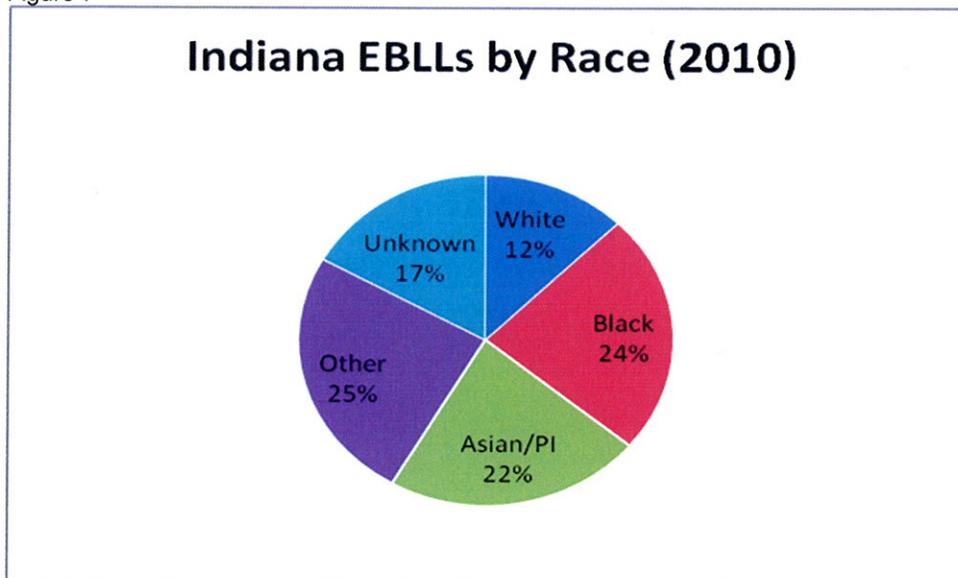


Figure 7





Race & ethnicity in relation to lead poisoning, cont'd.

Figure 8

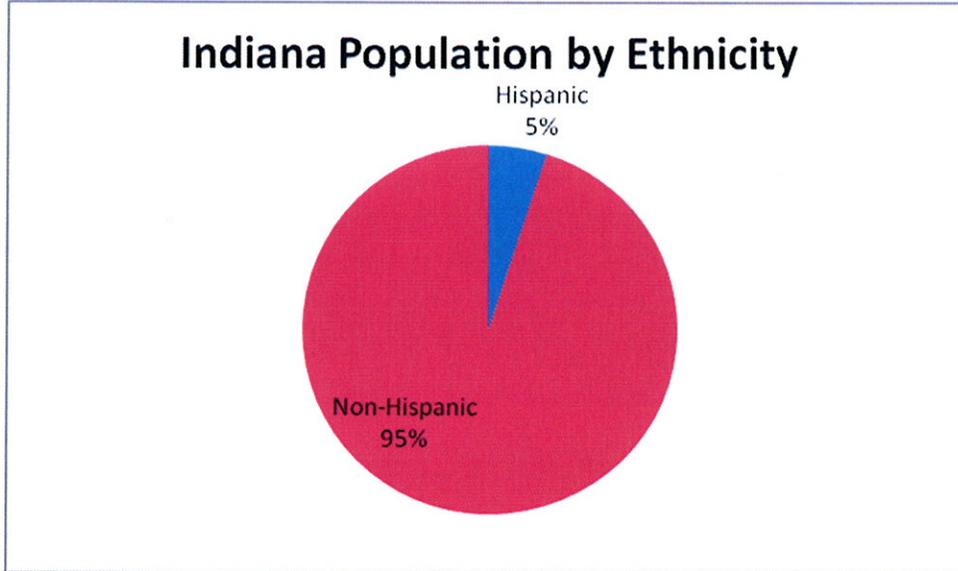
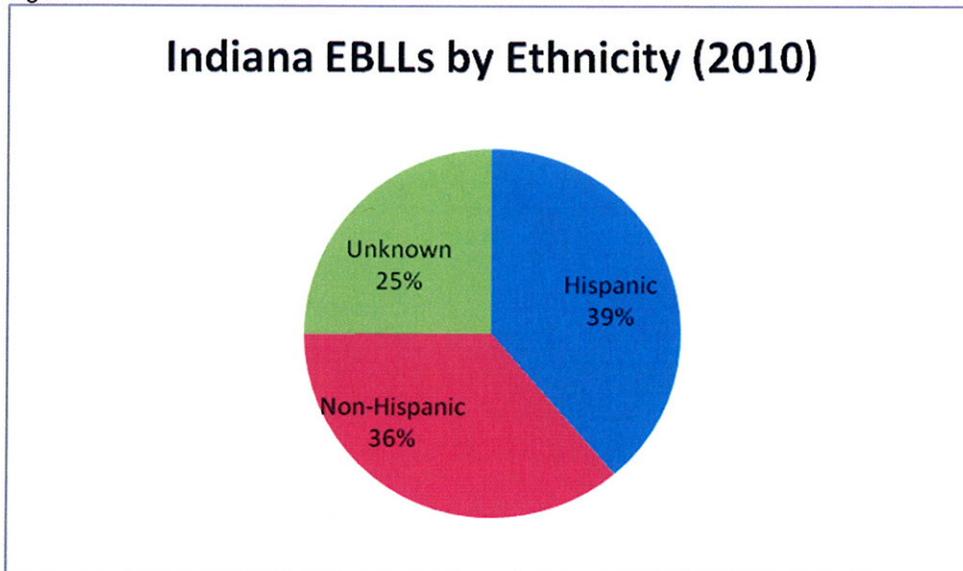


Figure 9





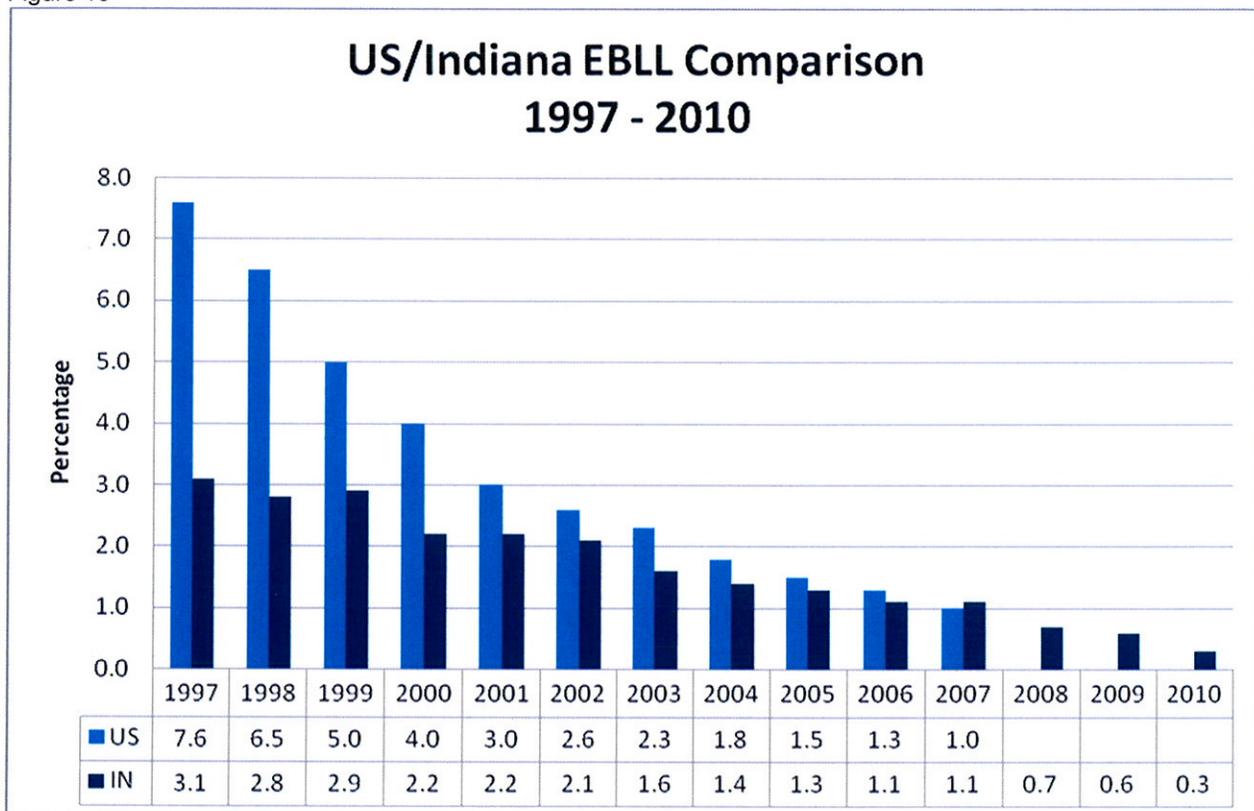
Lead poisoning rate comparison: Indiana & US, 1997 - 2010

Like lead poisoning rates for the United States as a whole, the percentage of lead poisoned children in Indiana has declined steadily since 1997. The exception is 2007 – during that year Indiana's rate (1.1%) slightly exceeded the national rate (1.0%).

As the Indiana program incorporates healthy homes principles in 2011, it will continue its primary mission to eliminate the incidence of lead poisoning.

Figure 9 provides a graphic comparison of lead poisoning rates in Indiana and for the nation for the period 1997 – 2010 (nationwide data is only available through 2007).

Figure 10



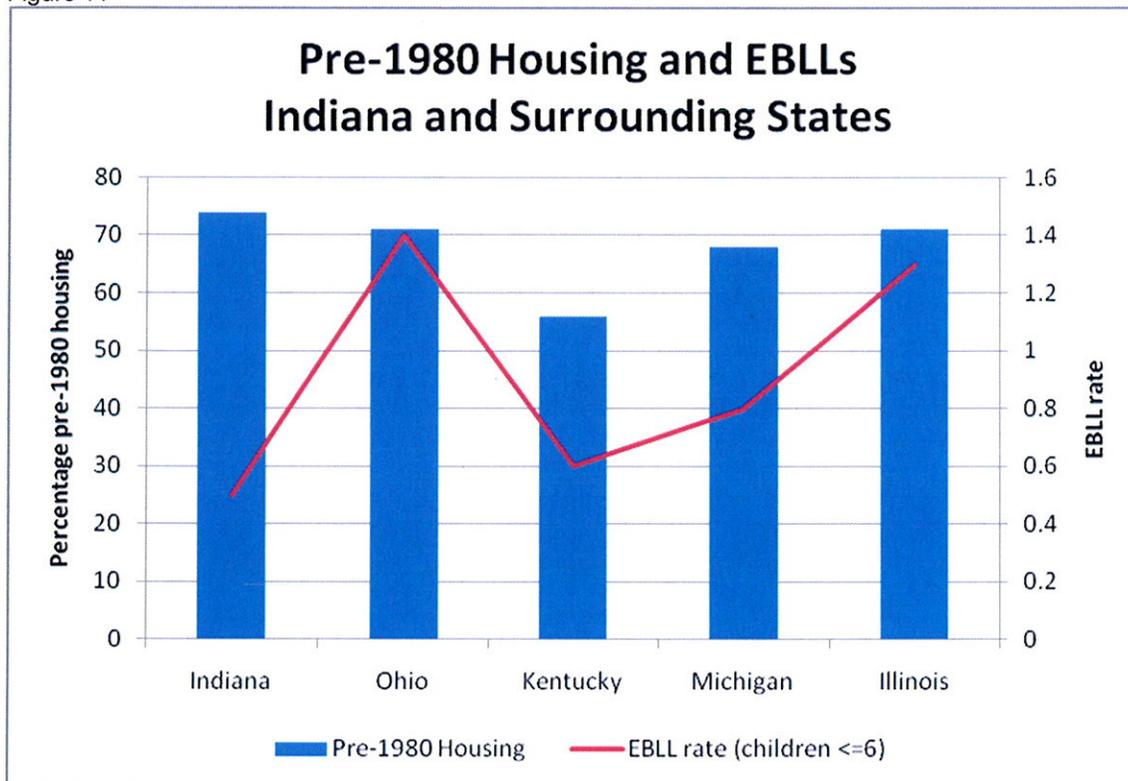


Pre-1980 housing units in Indiana and surrounding states

A key risk factor for lead poisoning is exposure to lead-based paint. Lead-based paint is typically found in housing built prior to 1978, the year in which the manufacture of lead-based paint intended for residential use was prohibited by federal legislation. According to the 2009 American Community Survey data, nearly 2 million (74%) of housing units in Indiana were built prior to 1980 (data is presented in 10-year increments; this is the nearest time-point to 1978 from which to derive estimates). Figure 12 on the following page maps pre-1980 housing in Indiana by county. Only one county (Hamilton) has less than 40% of its available housing built before 1980; 75 (82%) of Indiana's 92 counties have 41 – 80% of housing stock built before 1980; 16 Indiana counties have over 80% of their available housing built prior to 1980. (See page 11 for map of pre-1980 housing units in Indiana.)

In comparison with surrounding states, Indiana has the highest percentage of housing stock built before 1980 (74%) yet the statewide lead poisoning rates is lower (0.3). The figure below illustrates EBLL rates and percentage of pre-1980 housing for Indiana, Ohio, Michigan, Kentucky and Illinois (all EBLL rates are 2010 except for Illinois – only 2009 EBLL rate was available). *(Note: EBLL rates below are for children 6 and under, not 7 and under as mentioned elsewhere in this report.)*

Figure 11





Percentage of pre-1980 housing units in Indiana

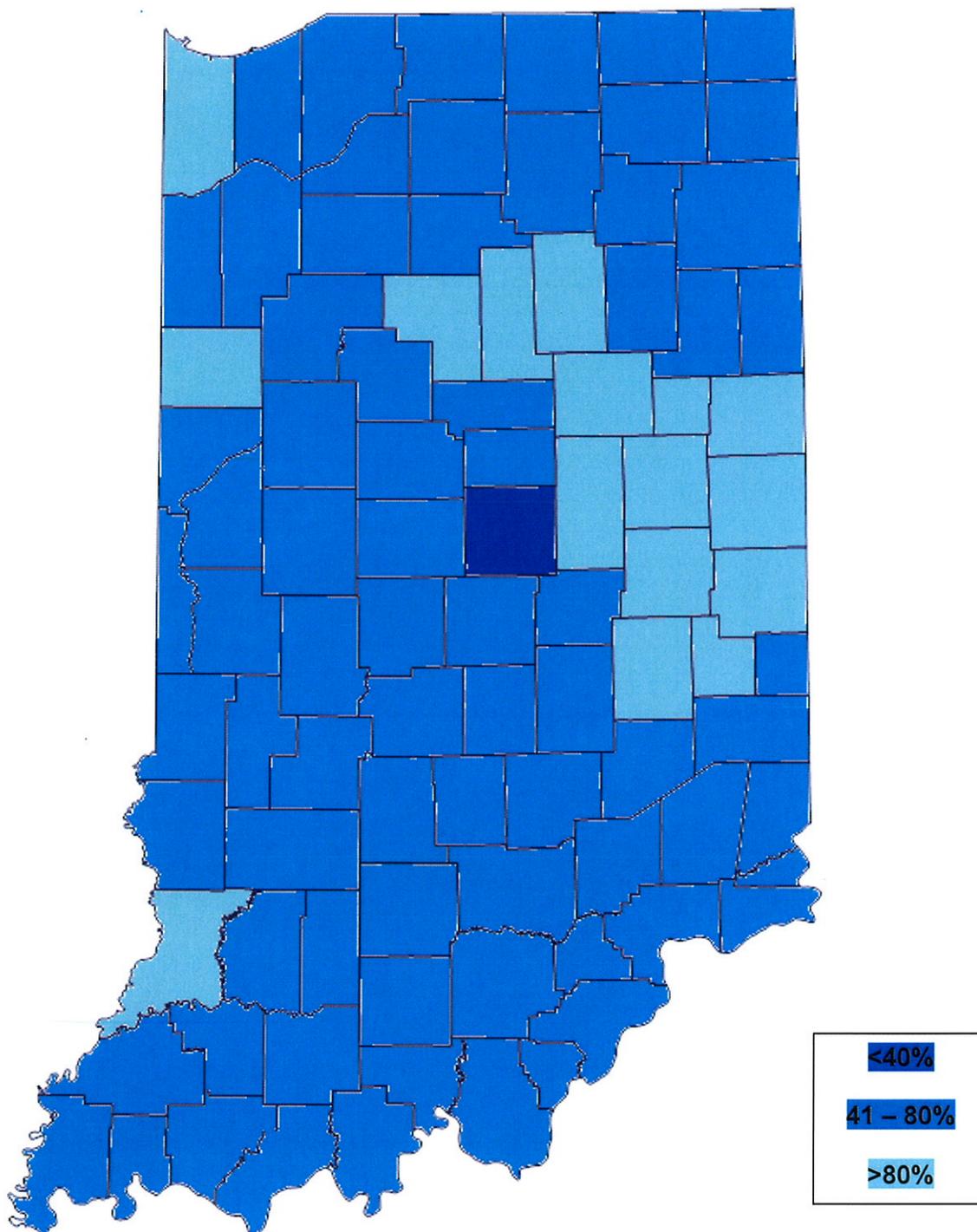


Figure 12



Lead poisoning in Medicaid-eligible children

In alignment with federally-mandated standards, Indiana requires that children receiving Medicaid benefits be screened for blood lead poisoning at the ages of 1 and 2 and anytime during the 3rd through 5th years if not previously tested.

Data from 2010 reveal that children who received Medicaid benefits illustrate racial disparities: Asian/Pacific Islanders experienced EBLLs at nearly 3 times the level of White children while American Indian/Alaska Native children had levels over 6 times as high as White children.

Table 2 (Lead poisoning in Medicaid-eligible children)

Age in Months	Medicaid-eligible Children Screening Rate (%)	BLL \geq 10 μ /dL (%)
6 - 12	22.8	0.5
6 - 24	32.8	1.0
12 - 36	27.3	1.3
12 - 72	16.3	1.3
Sex	Medicaid-eligible Children Screening Rate (%)	EBLL \geq 10 μ /dL (%)
Female	13.52	1.23
Male	13.87	1.18
Race	Medicaid-eligible Children Screening Rate (%)	EBLL \geq 10 μ /dL (%)
White	12.6	1.1
Black	14.9	1.3
AI/AN***	12.9	6.3
Asian/Pacific Islander	18.9	3.0
Other	13.9	0.6
Ethnicity	Medicaid-eligible Children Screening Rate (%)	EBLL \geq 10 μ /dL (%)
Hispanic	17.1	3.6

***AI/AN = American Indian/Alaskan Native



Lead poisoning in Medicaid-eligible children, cont'd.

Nearly half (47%) of all children aged 7 and under in Indiana were enrolled in Medicaid in 2010. Of those children with an EBLL, 63% were Medicaid recipients. The screening rate for the Medicaid population was 14% in 2010. This represents an increase from 2009 – 11% -- but is far from optimal; ILHHP continues to work with the Office of Medicaid Policy and Planning (OMPP) to increase testing rates among children under the requirements of the Medicaid EPSDT program (Hoosier Healthwise).

Lead poisoning rates for Medicaid recipients continue to decline as well but remains higher than the overall lead poisoning rate (0.3 µg/dL vs. 0.5 µg/dL respectively).

Figure 13

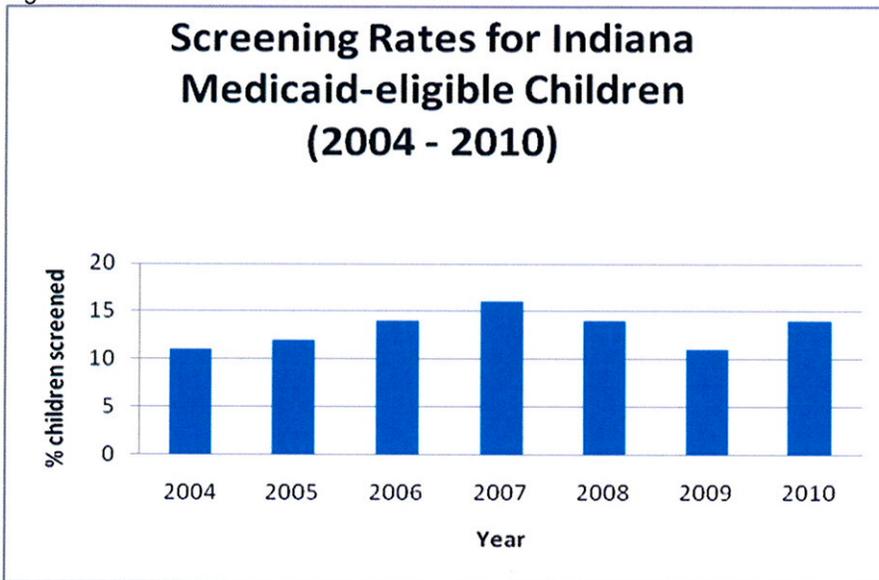
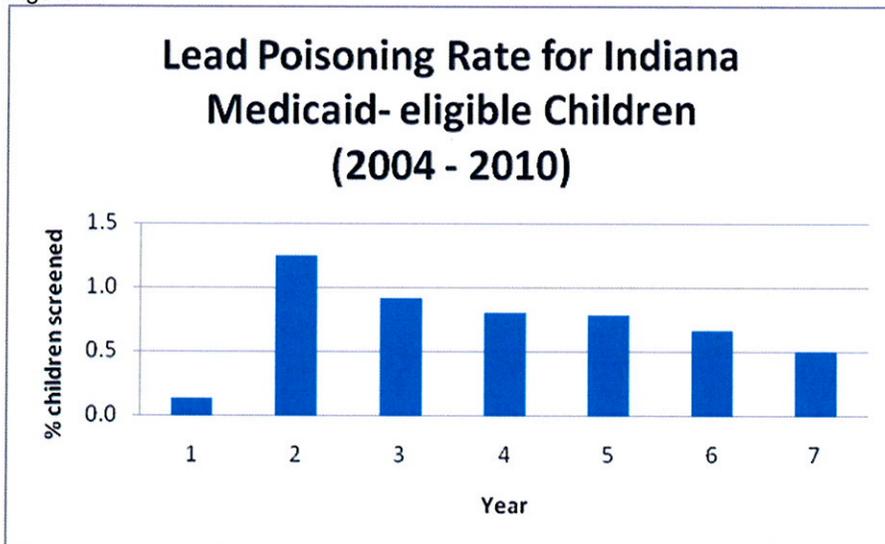


Figure 14





Required county-level data

Table 3 (Required county-level data)

County	Medicaid population n <=7	Tests	Total EBLL ¹	Unconfirmed EBLL ²	Confirmed EBLL ³	False positives ⁴	Avg # Days to confirm	Risk assessments performed	Hazard(s) identified	Hazard(s) remediated
Adams	1,292	96	1	1	0	0		2	2	
Allen	19,907	2013	126	24	17	4	6	40	30	3
Bartholome w	3,606	513	5	1	2	0				
Benton	473	61	2	1	0	1				
Blackford	716	108	0	0	0	0				
Boone	1,564	275	0	0	0	0		1	1	
Brown	611	70	0	0	0	0				
Carroll	668	79	1	0	1	0		1	1	
Cass	2,363	334	8	1	3	1		2	2	
Clark	5,146	825	1	0	0	0				
Clay	1,308	134	2	0	1	0				
Clinton	2,058	207	10	1	3	2	1	4	2	1
Crawford	543	93	1	0	0	1				
Daviess	1,511	133	4	1	0	0				
Dearborn	1,906	164	3	1	1	0	1	1	1	
Decatur	1,243	111	0	0	0	0				
Dekalb	2,079	268	4	2	0	0				
Delaware	5,606	997	22	5	4	6	2	6	4	1
Dubois	1,486	66	0	0	0	0		1	1	
Elkhart	13,918	3834	135	33	27	20	15	137	112	15
Fayette	1,523	268	5	4	0	0		2		
Floyd	3,228	563	11	1	2	4		1		
Fountain	807	43	0	0	0	0				
Franklin	928	94	0	0	0	0		1		
Fulton	1,185	95	5	3	0	0		1	1	
Gibson	1,443	151	1	0	0	0		1	1	



County	Medicaid population n <=7	Tests	Total EBLL ¹	Unconfirmed EBLL ²	Confirmed EBLL ³	False positives ⁴	Avg # Days to confirm	Risk assessments performed	Hazard(s) identified	Hazard(s) remediated
Grant	3,899	321	6	2	1	1		1		
Greene	1,484	209	2	1	0	0				
Hamilton	5,133	259	0	0	0	0		2		
Hancock	2,001	121	2	2	0	2				
Harrison	1,527	265	0	0	0	0				
Hendricks	3,426	201	0	0	0	0				
Henry	2,350	409	4	1	2	0		3		
Howard	4,476	651	6	1	3	1	1	4	3	1
Huntington	1,576	381	6	0	3	0		1	1	1
Jackson	2,163	228	1	0	0	1				
Jasper	1,454	205	4	0	1	0				
Jay	1,094	140	3	2	0	0		1	1	1
Jefferson	1,574	328	7	3	1	0	1	1		
Jennings	1,711	350	7	1	2	2		3	2	
Johnson	5,387	441	7	0	0	1		3	1	
Knox	1,841	186	5	0	1	0		2		
Kosciusko	3,544	351	8	1	0	1	2	1		
Lagrange	1,145	95	0	0	0	0		1	1	
Lake	29,585	3405	89	6	28	9	8	69	57	16
LaPorte	6,345	822	8	1	4	1		6	3	
Lawrence	2,223	355	3	2	0	0		1	1	
Madison	7,074	1035	23	1	5	4	2	4	4	1
Marion	67,893	9673	113	5	48	10	6	490	268	12
Marshall	2,258	226	4	3	0	0				
Martin	431	107	0	0	0	0				
Miami	1,773	230	3	1	0	0				
Monroe	4,300	1005	3	1	1	1		1	1	
Montgomery	1,854	282	4	1	1	0				
Morgan	3,183	318	2	1	0	1		1		
Newton	624	66	0	0	0	0				



County	Medicaid population n <=7	Tests	Total EBLL ¹	Unconfirmed EBLL ²	Confirmed EBLL ³	False positives ⁴	Avg # Days to confirm	Risk assessments performed	Hazard(s) identified	Hazard(s) remediated
Noble	2,365	163	3	0	1	1				
Ohio	187	10	1	0	0	1				
Orange	1,075	166	3	0	1	1	1	1	1	
Owen	1,078	306	3	2	0	0				
Parke	651	54	0	0	0	0				
Perry	775	94	0	0	0	0				
Pike	496	26	0	0	0	0				
Porter	5,426	444	1	0	0	0				
Posey	830	156	0	0	0	0				
Pulaski	671	48	0	0	0	0				
Putnam	1,437	292	3	1	1	0	1	1	1	
Randolph	1,396	148	2	0	1	0		6	5	1
Ripley	1,245	177	10	0	0	1		2	2	
Rush	806	100	10	2	0	1				
Scott	1,374	129	0	0	0	0				
Shelby	2,241	81	1	0	0	0				
Spencer	739	192	1	0	0	0				
St Joseph	14,495	2402	65	6	13	13	4	28	23	
Starke	1,414	112	0	0	0	0				
Steuben	1,547	285	1	0	1	0				
Sullivan	897	66	3	0	0	0				
Switzerland	500	29	0	0	0	0		1	1	
Tippecanoe	7,674	1522	22	4	6	6	6	8	6	3
Tipton	545	28	0	0	0	0				
Union	385	77	4	0	0	0		2	1	1
Vanderburgh	8,976	1877	58	5	7	12	7	19	16	
Vermillion	746	71	1	0	0	1				
Vigo	5,679	968	47	5	13	12	2	9	9	1



County	Medicaid population n <=7	Tests	Total EBLL ¹	Unconfirmed EBLL ²	Confirmed EBLL ³	False positives ⁴	Avg # Days to confirm	Risk assessments performed	Hazard(s) identified	Hazard(s) remediated
Wabash	1,521	181	3	3	1	0	1	1	1	
Warren	364	33	0	0	0	0				
Warrick	1,780	154	6	0	1	1	1	2	1	
Washington	1,388	175	2	1	0	0				
Wayne	3,858	944	61	0	17	5	10	19	14	7
Wells	1,016	119	1	0	0	1				
White	1,199	118	4	0	1	1				
Whitley	1,153	56	2	0	1	0	1			
Unknown		616	9	3	4	0	1			
TOTAL	328,375	46679	994	147	231	131	4	895	582	65

¹Total EBLLs in this column represents all testing, including re-testing for confirmatory reasons

²Unconfirmed tests include: child did not return for confirmatory test; child not required to return for confirmatory test at the time this report due to differences in reporting requirements depending upon blood lead level

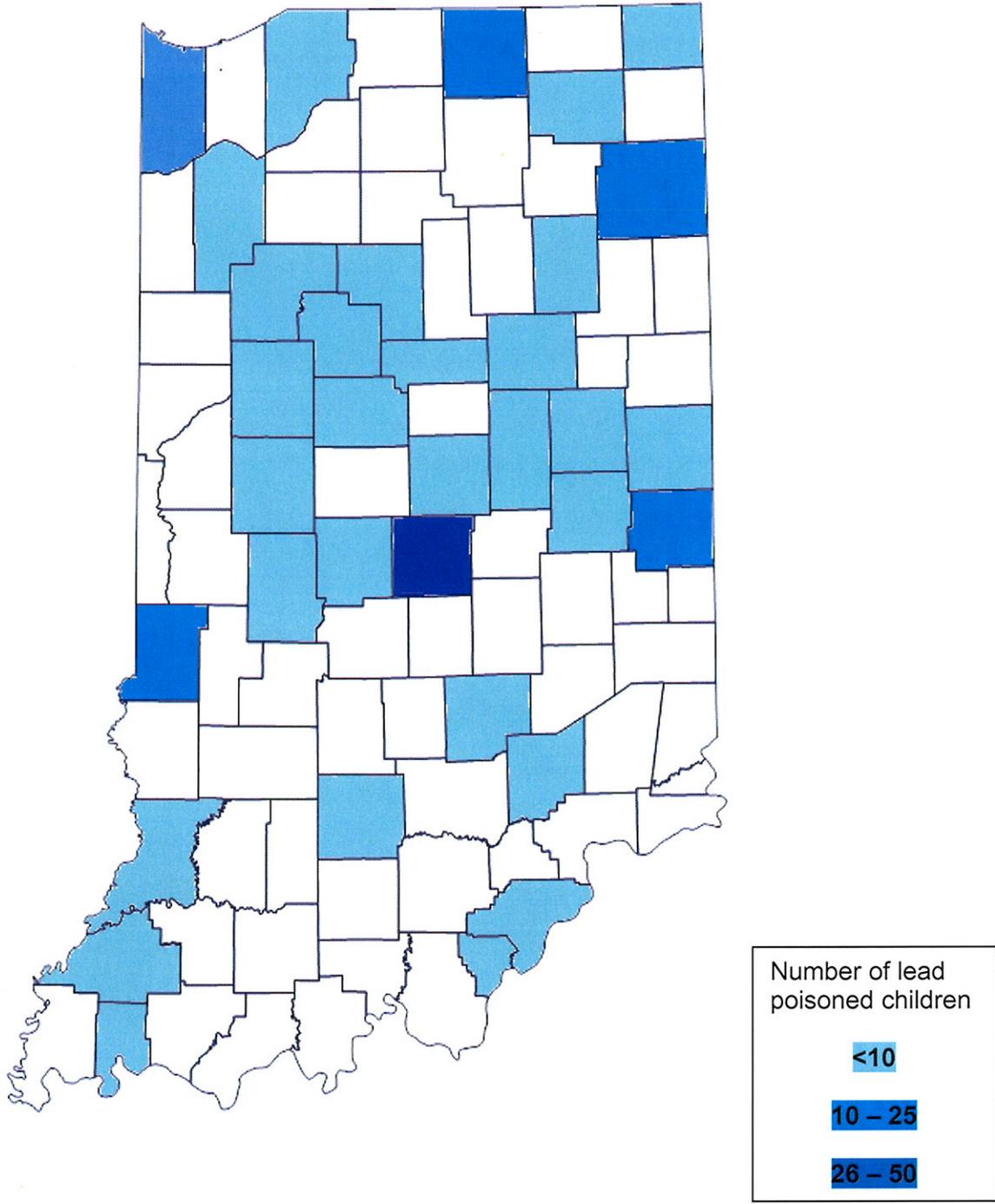
³Confirmatory test may be either a second capillary or a single venous test

⁴False positives are those tests which initially demonstrate EBLL but are found to not be elevated upon confirmatory testing



Geographic distribution of lead poisoned children

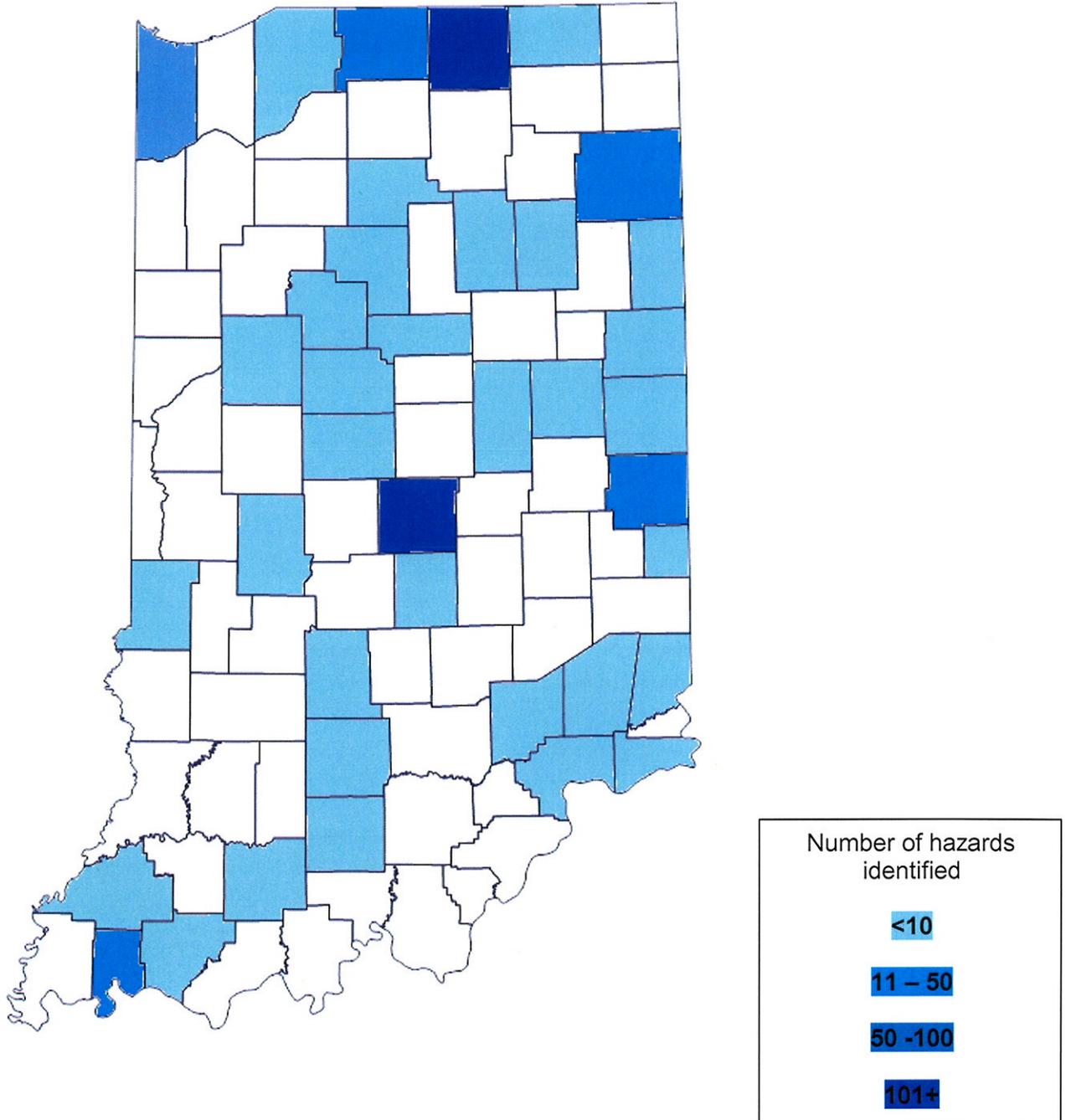
Figure 15





Geographic distribution of locations with identified lead hazards

Figure 16





Glossary

The sources for these definitions are the Medical Dictionary Online (<http://www.online-medical-dictionary.org/>) noted as [1], the Centers for Disease Control and Prevention Epidemiology Glossary (<http://www.cdc.gov/reproductivehealth/epiglossary/glossary.htm#l>) noted as [2], The Free Dictionary (<http://www.thefreedictionary.com/>) noted as [3], the National Center for Healthy Housing (<http://www.nchh.org/What-We-Do/Healthy-Homes-Principles.aspx>) noted as [4], the Centers for Disease Control and Prevention Lead home page (<http://www.cdc.gov/nceh/lead/>) noted as [5], the online article "The Biochemistry and physiology of vitamin D" (<http://vitamind.ucr.edu/biochem.html>), noted as [6].

Blood/brain barrier: Specialized cells that form a transport barrier between the cerebral capillaries and the brain tissue. [1]

Case management: traditional term for all the activities which a physician or other health care professional normally performs to insure the coordination of the medical services required by a patient so that care is continuous and comprehensive. [1]

Colic: Paroxysms of pain. This condition usually occurs in the abdominal region but may occur in other body regions as well. [1]

Confirmed test: a second capillary or a single venous test performed to confirm a blood lead level.

Deciliter: a metric unit of volume equal to one tenth of a liter. [3]

Encephalopathy: any degenerative disease of the brain (often associated with toxic conditions). [3]

Elevated blood lead level (EBLL): An elevated blood lead level in a child is defined as 10 or more micrograms of lead per deciliter ($\mu\text{g}/\text{dL}$) of blood. [5]

Erythrocyte protoporphyrin: genetic disorder of the biosynthesis of the heme -pathway. It causes a severe photosensitivity to visible light. [1]

False positive: a blood test which initially demonstrates an EBLL but which is found to not be elevated upon confirmatory testing.

Frank anemia: name for anemia when the blood lead level is significantly elevated for prolonged periods. [5]

Hemoglobin synthesis: requires the coordinated production of heme and globin. Heme is the prosthetic group that mediates reversible binding of oxygen by hemoglobin. Globin is the protein that surrounds and protects the heme molecule. [1]

Incidence: A measure of the frequency with which an event, such as a new case of illness, occurs in a population over a period of time. [2]

Lead poisoning: Lead poisoning occurs when blood lead levels are equal to or greater than 10 $\mu\text{g}/\text{dl}$ (micrograms per deciliter). [5]



Glossary, cont'd.

Medicaid-eligible: those children who are enrolled in Medicaid but who may or may not have used Medicaid services.

Microgram: A unit of mass equal to one thousandth (10^{-3}) of a milligram or one millionth (10^{-6}) of a gram. [3]

Nephropathy: kidney disease. [3]

Nerve conduction velocity: the speed at which an electrochemical signal propagates down a neural pathway. [1]

Primary prevention: prevention of disease in susceptible individuals or populations through promotion of health and specific protection, such as immunization, as distinguished from the prevention of complications or after-effects of existing disease. [1]

Proportion: A type of ratio in which the numerator is included in the denominator. The ratio of a part to the whole, expressed as a "decimal fraction" (e.g., 0.2), as a fraction (1/5), or, loosely, as a percentage (20%). [2]

Risk assessment: The qualitative or quantitative estimation of the likelihood of adverse effects that may result from exposure to specified health hazards. [1]

Seven principles of healthy housing: Homes that are *Dry*: Damp houses provide a nurturing environment for mites, roaches, rodents, and molds, all of which are associated with asthma; *Clean*: Clean homes help reduce pest infestations and exposure to contaminants; *Pest-Free*: Recent studies show a causal relationship between exposure to mice and cockroaches and asthma episodes in children; yet inappropriate treatment for pest infestations can exacerbate health problems, since pesticide residues in homes pose risks for neurological damage and cancer; *Safe*: The majority of injuries among children occur in the home. Falls are the most frequent cause of residential injuries to children, followed by injuries from objects in the home, burns, and poisonings; *Contaminant-Free*: Chemical exposures include lead, radon, pesticides, volatile organic compounds, and environmental tobacco smoke. Exposures to asbestos particles, radon gas, carbon monoxide, and second-hand tobacco smoke are far higher indoors than outside; *Ventilated*: Studies show that increasing the fresh air supply in a home improves respiratory health; *Maintained*: Poorly-maintained homes are at risk for moisture and pest problems. Deteriorated lead-based paint in older housing is the primary cause of lead poisoning, which affects some 240,000 U.S. children. [4]

Surveillance: The systematic collection, analysis, interpretation, and dissemination of health data on an ongoing basis, to gain knowledge of the pattern of disease occurrence and potential in a community, in order to control and prevent disease in the community. [2]



Glossary, cont'd.

Unconfirmed test: a blood test not confirmed by a second capillary or a single venous test. Tests may be counted as unconfirmed for a variety of reasons, including when a child is not required to return for confirmatory test until a certain time period has elapsed or when a child moves out of the area.

Vitamin D metabolism: the break down of vitamin D₃ by the liver to 25(OH)D₃, for transfer to other organs. [6]