



State of Illinois  
Department of Public Health

# Illinois Lead Program 2016 Annual Surveillance Report



October 2017 Edition





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October 2017

Dear Colleagues,

The Illinois Department of Public Health (IDPH) is pleased to present the 2016 annual surveillance report on childhood lead-poisoning prevention activities within the state. The goals of the Illinois Lead Program are:

- Primary prevention
- Early detection through blood lead testing and surveillance
- Monitoring of children exposed to lead sources and linkage to services

There is no safe level of lead in the body. Childhood lead poisoning is known to contribute to learning disabilities, developmental delays, behavioral problems, as well as a number of other negative health effects.

The burden of Illinois childhood lead poisoning remains one of the highest in the nation. Illinois law also requires reporting of all blood lead tests to IDPH. Of the approximately 237,000 children tested in 2016, more than 8,000 had blood lead levels at the public health intervention level recommended by the Centers for Disease Control and Prevention (CDC). Illinois provided case management services to lead-poisoned children with committed efforts to prevent or eliminate further lead exposure. Per Illinois law, environmental investigations were conducted to identify lead hazards that required mitigation.

Following the re-emergence of water as a source of lead poisoning, a new Illinois law requires all elementary schools and day care centers built before 1987 to test their drinking water source by the end of 2017, and schools constructed between 1987 and 2000 to test by December 31, 2018.

This report is intended to serve as a standard public reference for legislators, decision-makers, community-based organizations, city, state, and federal agencies, as well as health professionals, researchers, and all who seek information on lead poisoning prevention in Illinois.

As we diligently work together to prevent childhood lead poisoning, the Illinois Lead Program looks forward to a continued collaboration with local health departments and other partners at the federal, state, and local levels.

Very truly yours,

Nirav D. Shah, M.D., J.D.  
Director

**PROTECTING HEALTH, IMPROVING LIVES**

*Nationally Accredited by PHAB*



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**To report the results of all blood lead tests or  
for more information about the elimination of childhood lead poisoning, contact the  
Illinois Lead Program at 866-909-3572 or 217-782-3517 or visit  
<http://www.dph.illinois.gov>  
The hearing impaired may dial 800-547-0466.**

### Scope of the Illinois Lead Program Surveillance

- *Estimate the extent of elevated blood-lead levels among Illinois children*
- *Monitor and promote the follow-up of children with elevated blood-lead levels*
- *Identify potential sources of lead exposure and other housing related health hazards*
- *Help allocate resources for lead poisoning prevention activities*
- *Provide information for education and policy*

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## Acronyms and Symbols used in this Annual Report

ABLR	Adult Blood Lead Registry
ACOG	The American College of Obstetricians and Gynecology
BLL	Blood Lead Level
CDC	U.S. Centers for Disease Control and Prevention
CLIA	Clinical Laboratory Improvement Amendments
CLRQ	Childhood Lead Risk Questionnaire
CPSC	Consumer Product Safety Commission
FDA	U.S. Food and Drug Administration
IDPH	Illinois Department of Public Health
IPCB	Illinois Polluting Control Board
DHS	Illinois Department of Human Services
EBLL	Elevated Blood Lead Level
HFS	Illinois Department of Healthcare and Family Services
HHLPSS	Healthy Housing and Lead Poisoning Surveillance System
HP2020	Healthy People 2020
HUD	United States Department of Housing and Urban Development
IQ	Intelligence Quotient
OSHA	Occupational Safety and Health Administration
PPB	Parts per billion
Program	Illinois Lead Program
STELLAR	Systematic Tracking of Elevated Lead Levels and Remediation
U.S. EPA	United States Environmental Protection Agency
µg/dL	Micrograms per deciliter
WIC	Women, Infants, and Children Nutrition Program
≥	Greater than or equal to

## Definitions

**Capillary blood draw:** Blood samples collected by finger-stick method

**Case Management:** Any activity that involves coordinating, providing and overseeing the services required to reduce blood lead levels

**Children:** 6 years of age or younger at the time of testing except otherwise stated

**Confirmed blood lead level:** a blood lead level resulting from a single venous blood test

**Elevated blood lead:** Blood lead level  $\geq 10\mu\text{g/dL}$

**Evaluation:** Administration of the CLRQ to the parent by a health care provider

**Housing unit:** A house, apartment, mobile home, group of rooms, or single room that is occupied or intended for occupancy (U.S. Census Bureau)

**Percent of children tested:** The number of children tested for blood lead divided by the population of children multiplied by 100 (U.S. Census Bureau)

**Reference Value:** Current recommended federal public health intervention level of  $\geq 5\mu\text{g/dL}$  of lead in blood

**Regulated facility:** A residential building or child care facility

**Test:** The quantifiable result of a blood lead drawn on a child



## Executive Summary

This is the Illinois Lead Program's (Program) 23rd annual surveillance report of the childhood lead poisoning prevention activities within the state and covers January through December 2016. This report is intended to serve as a standard reference for legislators, community-based organizations, city, state, federal agencies, as well as health care professionals, and researchers who seek information on lead poisoning prevention in Illinois. The report provides information on childhood lead poisoning prevention activities within the state by county, age, gender, race, and poverty status.

The Illinois Lead Poisoning Prevention Act [410 ILCS 45], passed by the Illinois General Assembly, authorized IDPH's Office of Health Protection, Division of Environmental Health to create the Lead Program to promulgate, administer, and enforce the Illinois Lead Poisoning Prevention Code (77 IL. Admin Code 845). IDPH, as well as approved local health departments, known as delegate agencies, administer and enforce the Act and Code. In 2016, IDPH had grant agreements with 81 delegate agencies to provide case management care for lead-poisoned children in 86 of 102 counties. Additionally, 16 of the delegate agencies also had grant agreements to provide environmental investigation services. In the 16 counties with no delegate agency agreements, IDPH provided case management services. In 2016, IDPH was responsible for environmental investigations for lead-poisoned children in 85 counties.

**Problem:** There is no safe level of lead in the body. Lead poisoning is one of the most prevalent and preventable environmental health hazards. Lead poisoning can affect the brain and the nervous systems of children and adults. Childhood lead poisoning is known to contribute to learning disabilities, developmental delays, and behavioral problems as well as a number of other negative health effects.

**Lead Burden:** The burden of childhood lead poisoning in Illinois remains one of the highest in the nation. In 2016 there were 8,381 Illinois children who had blood lead levels (BLL) at the federal reference value of  $\geq 5$   $\mu\text{g}/\text{dL}$ , and 1,792 of those children met the current Illinois elevated blood lead level (EBLL) of  $\geq 10$   $\mu\text{g}/\text{dL}$ .

**Children at highest risk for lead poisoning:** Those with persistent oral behaviors; exposed to lead-containing products; and those residing in low-income or poorly maintained pre-1978 housing. Fifty-nine percent of pre-1978 housing units have lead-based paint prevalence and 41 percent have significant lead-based paint hazards.

**Mission:** The mission of the Program is to eliminate the incidence of childhood lead poisoning.

**Vision:** The vision of the Program is to provide a lead-safe environment for all children.

### Goals:

- Prevent childhood lead poisoning through community education and public awareness campaigns
- Identify lead-poisoned children and provide prompt interventions to reduce BLLs and improve health and developmental outcomes

**Funding:** The program is currently supported by the Lead Poisoning Screening, Prevention, and Abatement Fund; Illinois State General Revenue Funds; U.S. Centers for Disease Control and Prevention (CDC); and the U.S. Environmental Protection Agency (U.S. EPA).

**Highlights of 2016 Childhood Blood Lead Surveillance:** According to CDC Wonder, there were an estimated 1.1 million children 6 years of age and younger in Illinois.

- A total of 273,493 blood lead test results were received for 237,252 children six years of age and younger at time of testing. About 59 percent of children tested had at least one venous blood lead test.
- BLLs in children averaged 2.2 $\mu$ g/dL (geometric mean of 1.9 $\mu$ g/dL, median of 2.0 $\mu$ g/dL).
- Children with a confirmed EBLL totaled 1,338 (one in 178).
- Of the 8,381 (3.5 percent/one in 49) children tested in 2016 with BLLs at the CDC reference value for public health intervention:
  - 58 percent had a confirmatory venous test
  - 53 percent were males
  - 61 percent were 2 years of age or younger
  - 79 percent benefited from programs administered by Medicaid
  - 79 percent had lead levels in the 5 - 9 $\mu$ g/dL range and 21 percent had lead levels  $\geq$ 10 $\mu$ g/dL
  - 31 percent were Black or African American compared to 37 percent White

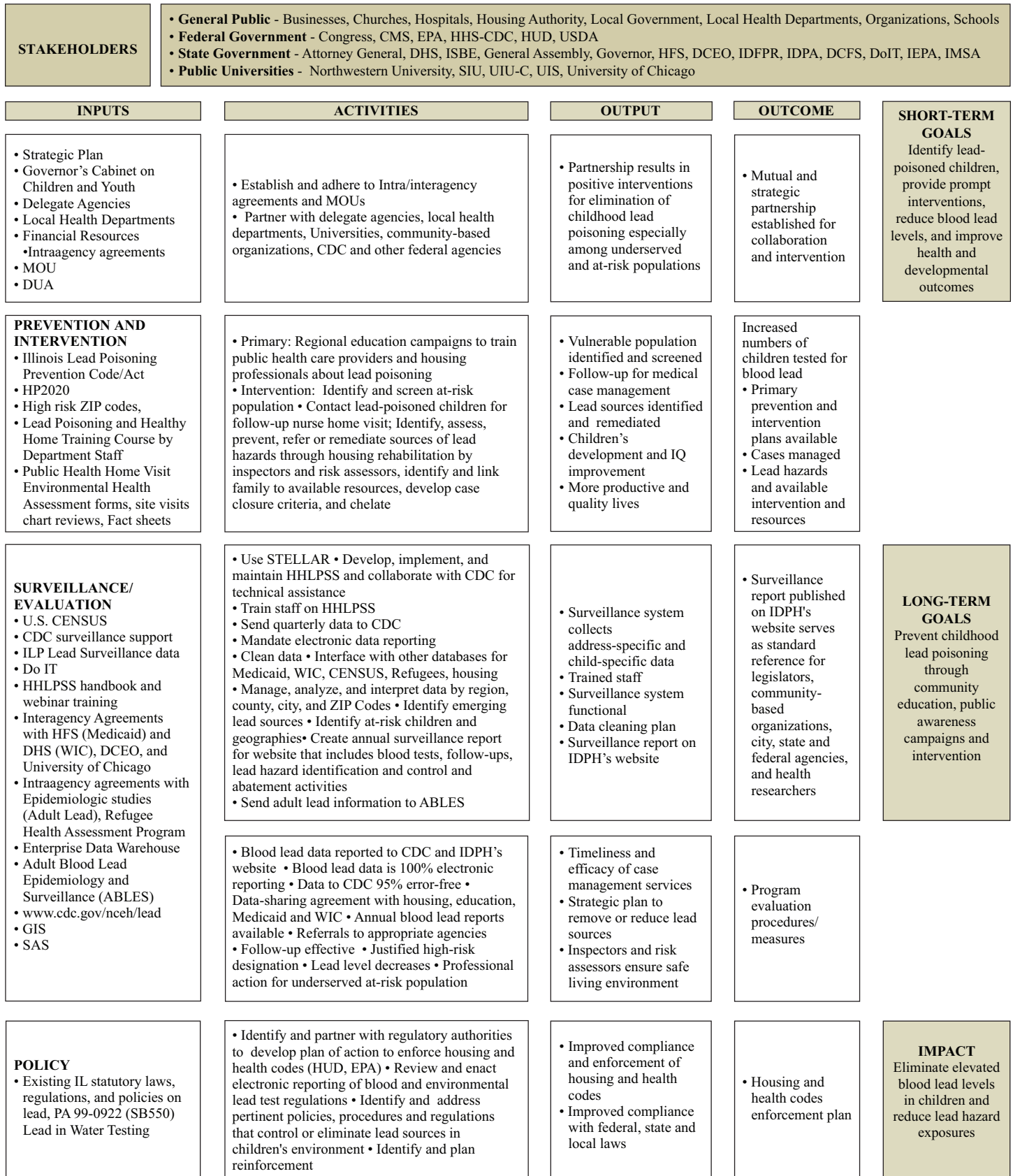
*The burden of Illinois childhood lead poisoning remains one of the highest in the nation.*

<http://www.cdc.gov/nceh/lead/data/national.htm>



# Illinois Lead Program 2016 Annual Surveillance Report

**Figure 1: Lead Program Logic Model: Input, Activities, Output and Outcome**



## Sources of Lead Exposure



**Figure 2:** Sources of Lead Exposure

Dust from deteriorated or disturbed **lead-based paint** in homes is the primary source of lead poisoning. Children are most likely to ingest lead **dust** through hand-to-mouth activities. Adults are most likely to inhale lead via **airborne emissions** resulting from occupational exposure, hobbies, and home renovations. Improper post-work hygiene, smoking, eating, or drinking in work areas may increase lead exposure (Figure2).

There is also evidence that children may be exposed through **maternal** means, such as during prenatal development or via breast milk consumption (from a lead-exposed mother).

**Consumer products** such as supplements, remedies, foods, spices, cosmetics, toys, jewelry, charms, amulets, and ceramic wares may contain high lead levels. All manufactured children's products are limited to less than 100 parts per million of total lead content in accessible parts and less than 0.009 percent (90 parts per million) lead in paint and surface coatings.

For more information about sources of lead exposure, refer to the following websites:

<http://www.atsdr.cdc.gov/csem/csem.asp?csem=7&po=6>

<http://www.epa.gov/lead/pubs/leadpdf.pdf>

*FDA Warning - High Levels Of Lead: .. parents and caregivers do not use "Balguti Kesaria (or Kesaria Balguti) Ayurvedic Medicine" due to the risk of lead poisoning*  
<https://www.fda.gov/Safety/MedWatch/SafetyInformation/SafetyAlertsforHumanMedicalProducts/ucm570257.htm>

**Water:** According to CDC, lead found in tap water usually comes from the corrosion of metal water taps, older metal interior water pipes, or from the solder that connects pipes in the plumbing system. When water sits in lead pipes for an extended period, the lead may leach into the water supply.

Exposure to lead in drinking water may be reduced by:

- Anti-corrosion treatment
- Lead service line replacement
- Cold water use for cooking or drinking; hot water is likely to have higher levels of lead than cold water in homes built before 1986

Regulations to reduce lead in tap water include:

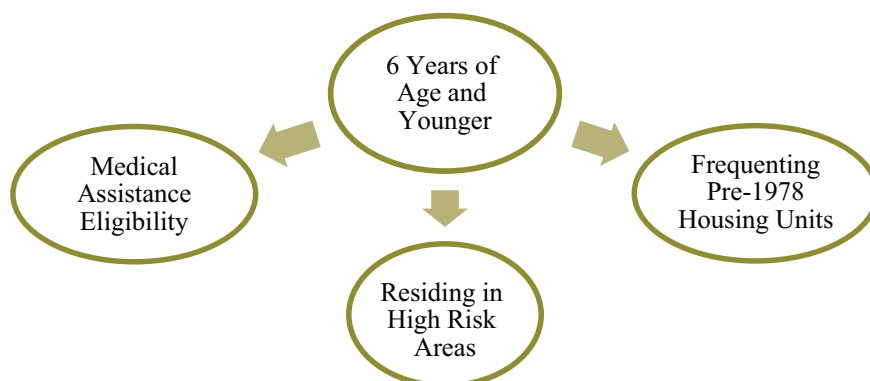
- Safe Drinking Water Act (<http://www.epa.gov/sdwa>)
- U.S. EPA Lead and Copper Rule (<http://www.epa.gov/dwreginfo/lead-and-copper-rule>)
- Primary Drinking Water Standards for Public Water Supplies under the authority of the Safe Drinking Water Act in Illinois (35 IAC Part 611 of the Illinois Polluting Control Board Regulations which also includes the Lead/Copper Rule)  
(<http://www.ipcb.state.il.us/SLR/IPCBandIEPAEnvironmentalRegulations-Title35.aspx>)
- The Public Area Sanitary Code, 77 IAC 895, covers any residential properties that are not a public water supply or a single family owner occupied residence. It includes a maximum contaminant level for lead.  
<http://www.ilga.gov/commission/jcar/admincode/077/07700895sections.html>

For more information about lead in drinking water, refer to the following websites:

- IEPA/IDPH - Preliminary Report on Lead in Public Water Systems  
<http://dph.illinois.gov/sites/default/files/publications/publicationsohpiepa-preliminary-report-lead-pws.pdf>
- IDPH Lead in Water website  
<http://www.dph.illinois.gov/topics-services/environmental-health-protection/lead-in-water>
- IEPA [http://water.epa.state.il.us/dww/Maps/Map\\_Template.jsp](http://water.epa.state.il.us/dww/Maps/Map_Template.jsp)
- CDC <http://www.cdc.gov/nceh/lead/tips/water.htm>
- U.S. EPA
  - <http://www.epa.gov/safewater/dwinfo/index.html>
  - <https://safewater.zendesk.com/hc/en-us>
- National Ground Water Association <http://www.wellowner.org>
- Environmental Science and Technology <http://pubs.acs.org/doi/abs/10.1021/es4003636>

Does water from lead-based service lines contribute to childhood lead poisoning from Illinois? Next issue

## Children at Highest Risk for Lead Poisoning



**Figure 3:** Children at Highest Risk for Blood Lead Exposure

**Young children are most often exposed by:** Lead ingestion occurring from hand-to-mouth activities or inhalation after exposure to surfaces with lead-contaminated dust (e.g., crawling on the floor, playing near a window). In 2016, of the 237,253 children tested, 1,792 (0.8 percent) had BLLs of  $\geq 10\mu\text{g}/\text{dL}$  and 1,338 (75 percent) were confirmed with a venous blood test. Also, 8,381 (3.5 percent) had BLLs of  $\geq 5\mu\text{g}/\text{dL}$  and 4,876 (58 percent) were confirmed with a venous blood test.

- **Children in low-income households:** In 2016, among Illinois children enrolled in Medicaid, WIC, Head Start, and All Kids, 0.8 percent had BLLs of  $\geq 10\mu\text{g}/\text{dL}$  and 3.7 percent had BLLs of  $\geq 5\mu\text{g}/\text{dL}$ .
- **Children exposed to imported products containing lead:** Such products include imported toys, cosmetics (surma, kohl), medicine (folk remedies), pottery, candies, and spices. <https://www.cpsc.gov/en/>
- **Children with compromised nutritional status:** Iron and calcium deficiencies contribute to increased lead absorption.
- **Lead prevalence and pre-1978 housing:** Older homes in deteriorated condition continue to be the leading source of lead poisoning cases in Illinois. Based on a national survey, 59 percent of pre-1978 Illinois housing units have a prevalence of lead-based paint and 41 percent have significant lead-based paint hazards (Table 1).

*...in 6-year-old children, every five micrograms per deciliter of increase in blood lead levels increased the risk of being arrested for a violent crime as a young adult by almost 50 percent...*

<http://www.theepochtimes.com/n3/2145046-lead-poisoning-a-significant-cause-of-inner-city-crime-say-researchers/>

**Table 1:** Estimates of Pre-1978 Housing Units with Lead Hazards in Illinois

Year Structure Built	Illinois Estimate	Prevalence of Lead-based Paint <sup>2</sup>		Significant Lead-based Paint Hazard <sup>1</sup>	
		% with Lead	Illinois Units with Lead	% with Lead	Illinois Units with Lead Hazards
1960 to 1977	1,242,263	23.8	295,659	7.7	95,654
1940 to 1959	1,026,575	73.7	756,586	48.7	499,942
Pre-1940	1,189,270	82.6	982,337	68.5	814,650
<b>Pre-1978</b>	<b>3,458,108</b>	<b>59.0</b>	<b>2,040,284</b>	<b>41.0</b>	<b>1,417,824</b>

**Source:** U.S. Census Bureau, 2011-2015 American Community Survey 5-year estimate Year Structure Built Table B25034 , <sup>1</sup>Table 5-1 and <sup>2</sup>Table 4-1, American Healthy Homes Survey, 2011: [http://portal.hud.gov/hudportal/documents/huddoc?id=AHHS\\_REPORT.pdf](http://portal.hud.gov/hudportal/documents/huddoc?id=AHHS_REPORT.pdf)

Deteriorated lead-based paint remains the primary source of lead exposure to children in Illinois. Approximately 65 percent of Illinois housing units were built prior to the residential lead paint ban of 1978 (Table 2).

Table 2 indicates that 60 percent of Illinois children tested were two years of age or younger and accounted for 65 percent of the children with BLLs  $\geq 10\mu\text{g/dL}$ . About 44 percent of Illinois counties and/or delegate agencies had blood lead prevalence above the state level ranging from 1.1-5.6 percent. Positively, 19 counties/delegate agencies that tested between 21-386 children had no child younger than 3 years of age with BLLs  $\geq 10\mu\text{g/dL}$ .





**Table 2:** Pre-1978 Housing Units and Children Two Years of Age and Younger with Blood Lead Levels at the Federal and Illinois Intervention Levels by County or Delegate Agencies: 2016

Illinois/County/ City/ Delegate Agencies <sup>a</sup>	Total Housing Units (N) <sup>b</sup>	Pre-1978 Housing Units Estimates (%) <sup>c</sup>	All BLLs of Children 2 Years of Age or Younger ( $< 3$ years of age) at Time of Testing		
			Tested (N) <sup>d</sup>	Tested $\geq 5\mu\text{g/dL}$ (%) <sup>e</sup>	Tested $\geq 10\mu\text{g/dL}$ (%) <sup>f</sup>
<b>Illinois</b>	<b>5,303,675</b>	<b>65</b>	<b>142,759</b>	<b>4.0</b>	<b>1.0</b>
Adams	29,976	71	1,004	10.8	2.8
Alexander	3,969	71	63	9.5	4.8
Bond	7,081	55	189	2.6	1.6
Boone	19,968	44	591	2.9	1.4
Brown	2,454	69	44	9.1	2.3
Bureau	15,647	78	219	11.4	2.7
Calhoun	2,828	59	21	4.8	0.0
Carroll	8,435	71	135	5.2	2.2
Cass	5,799	74	173	7.5	1.7
Champaign	88,981	54	1,504	1.5	0.1
Christian	15,539	75	382	3.7	0.3
Clark	7,744	62	223	2.7	0.0
Clay	6,380	63	206	6.3	0.0
Clinton	15,504	53	320	0.9	0.6
Coles	23,464	67	750	2.8	0.8
Cook w/o Chicago	984,005	71	22,704	2.2	0.5
Chicago	1,192,544	81	47,554	3.3	0.7
Crawford	8,643	70	192	3.1	1.0
Cumberland	4,858	62	125	1.6	0.0
DeKalb	41,009	52	727	2.8	0.8
DeWitt	7,522	73	155	12.3	1.3
Douglas	8,392	69	199	5.0	3.0
DuPage	357,016	52	4,422	1.6	0.5
Edgar	8,753	76	209	6.2	1.9
Edwards	3,170	69	53	5.7	1.9
Effingham	14,727	55	320	4.1	0.3
Fayette	9,234	64	298	3.0	0.3
Ford	6,302	77	115	13.0	1.7
Franklin	18,586	68	386	10.6	0.0
Fulton	16,167	80	218	9.6	3.2
Gallatin	2,736	64	63	1.6	0.0
Greene	6,362	75	170	5.3	0.6
Grundy	20,249	46	258	4.3	0.8
Hamilton	4,068	62	80	2.5	0.0
Hancock	9,227	74	174	5.7	1.7
Hardin	2,290	64	22	18.2	0.0

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Illinois/County/ City/ Delegate Agencies <sup>a</sup>	Total Housing Units (N) <sup>b</sup>	Pre-1978 Housing Units Estimates (%) <sup>c</sup>	All BLLs of Children 2 Years of Age or Younger ( $< 3$ years of age) at Time of Testing		
			Tested (N) <sup>d</sup>	Tested $\geq 5\mu\text{g/dL}$ (%) <sup>e</sup>	Tested $\geq 10\mu\text{g/dL}$ (%) <sup>f</sup>
<b>Illinois</b>	<b>5,303,675</b>	<b>65</b>	<b>142,759</b>	<b>4.0</b>	<b>1.0</b>
Henderson	3,811	69	44	2.3	0.0
Henry	22,112	78	448	7.4	1.6
Iroquois	13,409	76	187	8.0	4.3
Jackson	28,641	59	682	2.2	0.4
Jasper	4,326	61	71	2.8	0.0
Jefferson	16,873	58	399	4.5	1.3
Jersey	9,979	54	319	1.6	0.3
Jo Daviess	13,578	59	139	4.3	0.7
Johnson	5,573	48	104	15.4	1.0
Kane	183,384	48	6,290	3.3	0.6
Kankakee	45,184	62	1,350	4.0	0.7
Kendall	40,930	25	552	1.8	0.2
Knox	23,945	81	543	9.4	3.7
Lake	261,229	46	4,632	1.8	0.3
LaSalle	49,935	69	958	6.1	1.4
Lawrence	5,921	75	200	5.5	2.5
Lee	15,047	74	91	8.8	2.2
Livingston	15,847	73	373	5.6	0.8
Logan	11,722	80	267	4.5	1.1
McDonough	14,403	72	287	8.7	2.4
McHenry	116,772	39	1,155	2.4	0.3
McLean	70,897	50	2,437	3.8	0.7
Macon	50,391	74	1,513	10.2	3.0
Macoupin	21,558	68	464	5.4	1.7
Madison	117,919	65	2,671	3.0	0.6
Marion	18,195	63	505	5.9	1.2
Marshall	5,912	73	143	10.5	2.1
Mason	7,030	78	146	13.0	3.4
Massac	7,097	61	56	10.7	1.8
Menard	5,651	59	67	4.5	0.0
Mercer	7,359	79	151	9.9	2.0
Monroe	13,678	38	272	4.4	0.0
Montgomery	12,758	68	353	4.5	0.8
Morgan	15,449	70	337	8.3	2.1
Moultrie	6,325	71	125	4.8	0.8
Ogle	22,583	63	270	3.7	0.7
Peoria	83,476	73	1,672	8.7	1.8

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Illinois/County/ City/ Delegate Agencies <sup>a</sup>	Total Housing Units (N) <sup>b</sup>	Pre-1978 Housing Units Estimates (%) <sup>c</sup>	All BLLs of Children 2 Years of Age or Younger ( $< 3$ years of age) at Time of Testing		
			Tested (N) <sup>d</sup>	Tested $\geq 5\mu\text{g/dL}$ (%) <sup>e</sup>	Tested $\geq 10\mu\text{g/dL}$ (%) <sup>f</sup>
<b>Illinois</b>	<b>5,303,675</b>	<b>65</b>	<b>142,759</b>	<b>4.0</b>	<b>1.0</b>
Perry	9,454	66	182	9.3	0.5
Piatt	7,321	65	107	4.7	0.0
Pike	7,941	76	180	5.6	1.1
Pope	2,652	60	15	6.7	0.0
Pulaski	3,139	67	44	6.8	0.0
Putnam	3,106	64	50	0.0	0.0
Randolph	13,762	67	285	3.5	0.4
Richland	7,492	64	176	4.0	0.0
Rock island	65,791	77	1,885	8.0	1.9
St. Clair w/o ESHD	91,236	52	3,276	4.3	0.9
Saline	11,644	65	323	3.4	0.3
Sangamon	90,433	61	1,854	6.6	1.1
Schuyler	3,441	69	57	10.5	0.0
Scott	2,435	76	102	7.8	2.9
Shelby	10,450	69	220	5.0	0.5
Stark	2,662	84	90	11.1	5.6
Stephenson	21,957	74	691	14.0	5.6
Tazewell	57,958	71	1,226	2.8	0.7
Union	7,914	65	135	6.7	0.7
Vermilion	36,093	78	994	2.8	0.1
Wabash	5,539	73	128	8.6	2.3
Warren	7,690	85	249	7.2	3.2
Washington	6,575	66	92	5.4	2.2
Wayne	7,905	62	229	3.5	0.4
White	7,129	71	167	4.2	1.2
Whiteside	25,750	75	669	5.7	1.6
Will	239,232	38	5,499	2.8	0.5
Williamson	30,688	56	710	10.7	0.6
Winnebago	125,720	64	3,298	4.6	1.0
Woodford	15,325	61	367	2.7	1.4
Egyptian <sup>1</sup>	21,509	67	553	3.4	1.5
ESH <sup>2</sup>	26,713	81	1,659	5.4	1.1
Evanston	32,155	83	891	2.7	0.4
Oak Park	23,718	90	744	5.4	1.2
Skokie	24,594	84	576	1.9	0.2
Southern Seven <sup>3</sup>	32,634	62	439	10.3	1.4
Stickney	2,548	91	56	0.0	0.0

## Illinois Lead Program 2016 Annual Surveillance Report

**Data Source:**<sup>d,e,f</sup>Illinois Department of Public Health <sup>a</sup>Pre-1978 housing unit was estimated from U.S. Census Bureau, 2010-2014 5-Years American Community Survey, Table B25034-Year Structure Built

<sup>1</sup>Egyptian Counties: Galatin, Saline, and White

<sup>2</sup>ESHD or East Side Health District includes the cities of Alorton, Brooklyn, Cahokia, Centreville, East St. Louis, Fairmont City, Lovejoy, National Stock Yards, Sauget, and Washington Park

<sup>3</sup>Southern Seven Counties: Alexander, Hardin, Johnson, Massac, Pope, Pulaski and Union

<sup>a</sup>Data reported for U.S., Illinois, county, and delegate agencies

<sup>b</sup>Total Housing Units - U.S. Census Bureau, 2010-2014 5-Years American Community Survey, Table B25034-Year Structure Built

<sup>c</sup>Pre-1978 Housing Units Estimates: U.S. Census Bureau, 2010-2014 5-Years American Community Survey, Table B25034-Year Structure Built

<sup>d</sup>Total number of children 2 years of age or younger at the time of blood lead testing in calendar year 2016 (test date – birthdate  $\leq$  2 years old). Children are considered to be 2 years of age until their 3rd birthday.

<sup>e</sup>Percentage of children 2 years of age or younger tested with elevated blood lead levels  $\geq 5\mu\text{g}/\text{dL}$  (numerator) based on all children 2 years of age or younger tested in 2016 (denominator).

<sup>f</sup>Percentage of children 2 years of age or younger tested with elevated blood lead levels  $\geq 10\mu\text{g}/\text{dL}$  (numerator) based on all children 2 years of age or younger tested in 2016 (denominator).

While the current acceptable error range is  $\pm 4\mu\text{g}/\text{dL}$ , most laboratories that do blood lead analyses perform at an error range within  $\pm 2\mu\text{g}/\text{dL}$ . The portable desktop blood-lead analyzers operate within a  $\pm 3\mu\text{g}/\text{dL}$  error range.

Note: As required by the Act (410 ILCS 45/7), health care providers shall report all blood lead test results to IDPH. If a child has multiple tests, the highest venous result is selected for this report. If there is no venous test on a child, the peak capillary blood lead result is selected for this report. A child was counted only once for each year in which he or she was tested or had a follow-up test. Counties and delegate agencies were ranked based on the percentages of pre-1978 housing units and children tested in 2016 with EBLs.

## High Ranking Counties or Delegate Agencies for Childhood Lead Poisoning Risks

Rankings were based on the presence of more than 50 children, two years of age or younger, who were tested for lead, the percentage of pre-1978 housing units, and percentage of children tested with BLL  $\geq 10\mu\text{g}/\text{dL}$ .

**25 highest-risk health agency jurisdictions in 2016:** Stark County, Warren County, Knox County, Fulton County, Mason County, Bureau County, Village of Oak Park, Mercer County, Iroquois County, Scott County, Rock Island County, Stephenson County, Ford County, Lawrence County, East Side Health District, Henry County, Edgar County, Logan County, Macon County, Lee County, Alexander County, City of Chicago, Wabash County, Whiteside County, and Cass County. (Childhood blood lead prevalence of  $\geq 10\mu\text{g}/\text{dL}$  ranged from 0.7 - 5.6 percent and percentage of pre-1978 housing units ranged from 71-90).

*A blood lead level of  $\geq 10\mu\text{g}/\text{dL}$  is the current level for public health intervention in Illinois.*

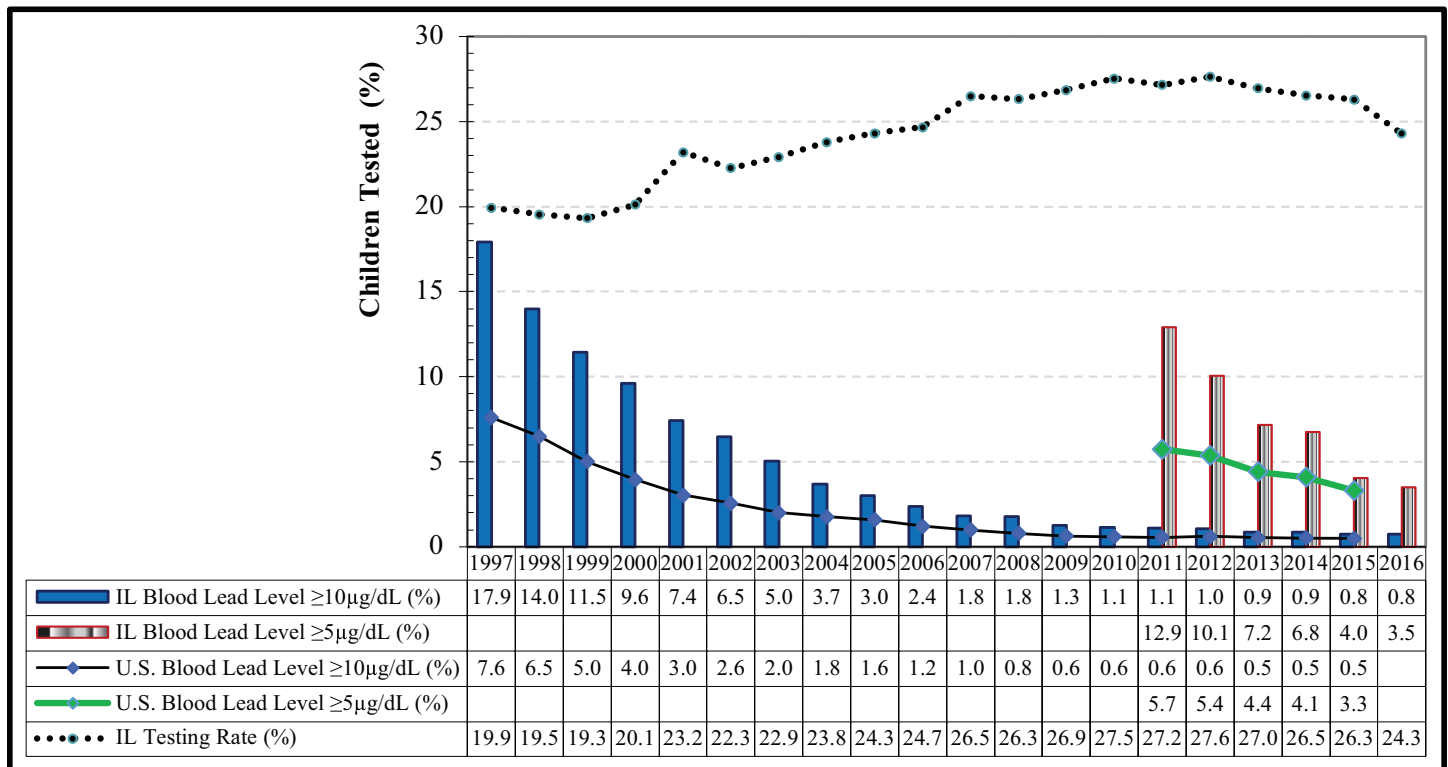


## Illinois and U.S. Childhood Blood Lead Prevalence: 1997 - 2016

Illinois continues to make progress reducing childhood blood lead poisoning. In 2016, there were 1,792 Illinois children, six years of age and younger identified with a BLL  $\geq 10\mu\text{g}/\text{dL}$ , and 1,338 (75 percent) of them were confirmed with a venous test. Of those confirmed, 523 were tested for the first time in 2016.

Figure 4 represents the percentage of children five years of age and younger at time of testing with BLL  $\geq 10\mu\text{g}/\text{dL}$  and  $\geq 5\mu\text{g}/\text{dL}$ , respectively. Illinois BLLs  $\geq 10\mu\text{g}/\text{dL}$  has significantly decreased from 17.9 percent in 1997 to 0.8 percent in 2016.

**Figure 4:** Illinois and U.S. Children with Blood Lead Levels at the Federal Reference Value and the Illinois Public Health Intervention Level 1997 – 2016



**Source:** Illinois Lead Program Surveillance Data, 1997-2016; Illinois population of five years of age and younger from CDC WONDER; the United States average is based on data reported by the CDC at <http://www.cdc.gov/nceh/lead/data/national.htm>. **Please note:** In order to compare with national data compiled by CDC this figure only includes children five years of age and younger. Venous BLLs  $\geq 10\mu\text{g}/\text{dL}$  triggers a public health intervention in Illinois children.

*There is no safe level of lead in the body...About 20 percent of baby food samples tested from 2003 to 2013 had detectable levels of lead...89 percent of grape juice samples, 86 percent of sweet potatoes samples and 47 percent of teething biscuits samples*  
<https://www.edf.org/health/lead-food-hidden-health-threat>

## Illinois and U.S. Blood Lead Testing Activities: 1997 - 2016

The only way to know that a child is lead-poisoned is to perform a blood lead test. The Act requires children six years of age and younger to be tested for lead poisoning if they reside in an area defined as high-risk; or evaluated for risk using the Childhood Lead Risk Questionnaire (*CLRQ, Appendix 2*) if they reside in areas defined as low-risk by IDPH. IDPH is authorized to maintain a system for the collection and analysis of childhood blood lead data.

### Lead testing is required for:

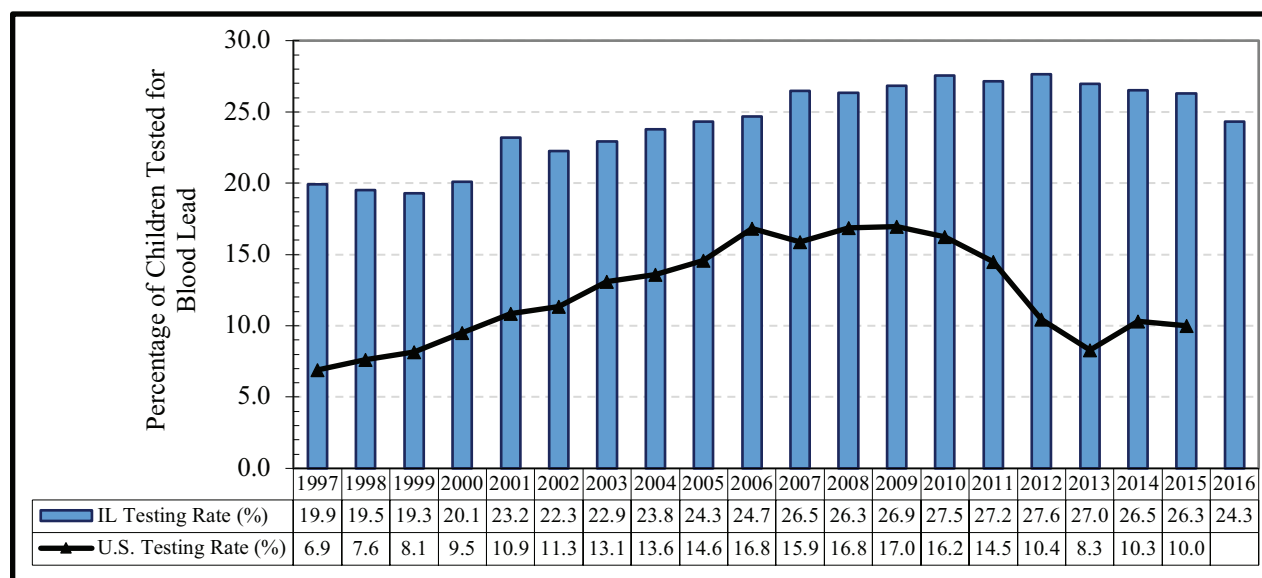
- Children residing in high-risk areas for lead exposure or who answer “YES” or “I DO NOT KNOW” to any question on the CLRQ
- Children receiving services from Medicaid, Head Start, All Kids, Women, Infants and Children (WIC)

### Evaluation is performed:

- Using CLRQ
- On children before they attend a licensed day care, school, or kindergarten as required by law

The testing rate for blood lead in Illinois and U.S. children is shown below on Figure 5. Based on the population of children five years of age or younger, the CDC reported a national blood lead testing rate of 10 percent for 2016 compared to a 24.3 percent testing rate in Illinois in the same year.

**Figure 5:** Illinois and U.S. Blood Lead Testing Rates for Children Five Years of Age and Younger: 1997-2016

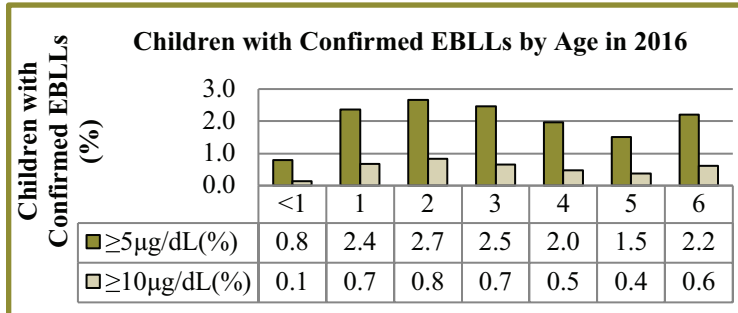


**Source:** Illinois Lead Program Surveillance Data, 1997-2016; Illinois population of five years of age and younger from CDC WONDER; United States average is based on data reported to CDC at: <http://www.cdc.gov/nceh/lead/data/national.htm>. CDC only reported blood lead data for children 5 years of age or younger so this figure only includes children of that age group.

## Blood Lead Levels and Age

Illinois law requires physicians to perform a blood lead test on all children six years of age or younger who live in high-risk areas. All of the city of Chicago is defined as a high-risk area for childhood blood-lead poisoning. The percentage of Illinois children with EBLs all peaked at approximately two-three years of age (Figure 6 and Table 4).

**Figure 6:** Children with Confirmed Blood Lead Levels for Public Health Intervention by Age in 2016



A child must be evaluated for lead risk, if residing in a low-risk area. Illinois law also requires parents or legal guardians to provide a statement from a physician or health care provider that the child has been tested or evaluated for lead poisoning before attending a licensed daycare, kindergarten, or school.

Source: Illinois Lead Program Surveillance Data, 2016

**Table 3:** Children Tested for Blood Lead by Age from January 1 to December 31, 2016

Age (Years)	Estimated Population <sup>a</sup>	Children Tested										Geomean Blood Lead Level, µg/dL
		Total Tested		<5 µg/dL		≥5µg/dL			≥10µg/dL			
		n	%	n	%	n		%	n		%	
						Capillary	Venous		Capillary	Venous		
<1	155,304	32,806	21.1	32,107	97.9	441	258	2.1	45	48	0.3	1.92
1	155,672	60,587	38.9	58,139	96.0	1019	1429	4.0	145	410	0.9	
2	155,913	44,448	28.5	42,464	95.5	801	1183	4.5	106	367	1.1	
3	157,878	32,294	20.5	31,005	96.0	494	795	4.0	67	214	0.9	1.83
4	158,895	31,539	19.8	30,509	96.7	408	622	3.3	50	150	0.6	
5	160,511	27,845	17.3	27,141	97.5	285	419	2.5	32	102	0.5	
6	159,624	7,734	4.8	7,507	97.1	57	170	2.9	9	47	0.7	
<b>Total</b>	<b>1,103,797</b>	<b>237,253</b>	<b>21.5</b>	<b>228,872</b>	<b>96.5</b>	<b>3,505</b>	<b>4,876</b>	<b>3.5</b>	<b>454</b>	<b>1,338</b>	<b>0.8</b>	<b>1.88</b>

Source: Illinois Department of Public Health - Illinois Lead Program Surveillance Database, 2016. Data includes one venous blood lead test result per child by age; if there was no venous test then the highest capillary test results were used. <sup>a</sup>Population data compiled from bridged-race Vintage 2015 (2010-2015) post-censal population estimates (released by NCHS June 28, 2016) accessed at <http://wonder.cdc.gov/bridged-race-v2015.html> on July 25, 2016.

A total of 10,031 children seven to 15 years of age were also tested for blood lead in 2016. Of the 311 children in this age group with BLLs ≥5µg/dL, 81 percent were confirmed by a venous test. Among the 80 children in this age group with EBLs ≥10µg/dL, 88 percent were confirmed by a venous test.

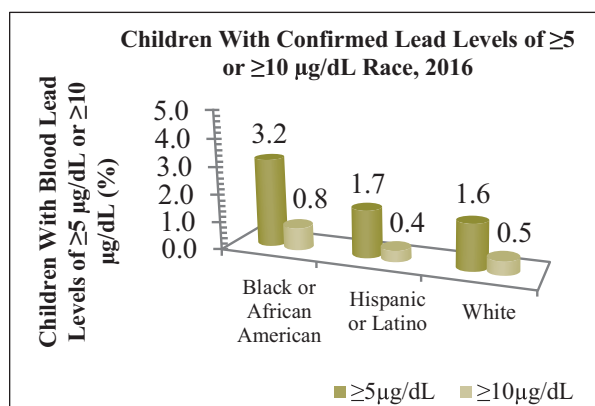
*Rates of testing and EBL stratified by age, birth cohort, and ZIP is detailed in Appendix 1*



## Blood Lead Levels and Race

Figure 7 and Table 4 indicate that Black/ African American children are disproportionately burdened by lead poisoning compared to their White or Hispanic counterparts.

**Figure 7:** Childhood BLLs by Race in 2016



Source: Illinois Lead Program Surveillance Data, 2016

Through intra/interagency data agreements with IDPH’s Vital Record and HFS, all children tested for lead poisoning were matched against the childhood lead database to populate some missing race fields omitted by healthcare providers. Based on the Uniform Racial Classification Act (20 ILCS 50/5), more than 92 percent of the 237,253 children tested in 2016 were racially classified. Race status recorded was for 34 percent Whites, 24 percent Blacks or African Americans, 29 percent Hispanic or Latino, 4 percent Asians, 0.1 percent for American Indians/Alaskan Natives, Native Hawaiian or other pacific islanders. Of the 55,928 Black or African American children identified, 3.2 percent had confirmed BLLs  $\geq 5$   $\mu\text{g/dL}$ . Of 80,821 White children identified as tested, approximately 1.6 percent had confirmed BLLs  $\geq 5$   $\mu\text{g/dL}$ . Of 68,087 Hispanic or Latino children identified, approximately 1.7 percent had confirmed BLLs  $\geq 5$   $\mu\text{g/dL}$ .

**Table 4:** Children Tested for Blood Lead by Race/Ethnicity - January 1 to December 31, 2016

Racial Classification	Estimated Population <sup>a</sup>	Children Tested by Race in 2016										Geomean Blood Lead Level in $\mu\text{g/dL}$
		Total Tested		$< 5$ $\mu\text{g/dL}$		$\geq 5$ $\mu\text{g/dL}$			$\geq 10$ $\mu\text{g/dL}$			
		n	%	n	%	n		%	n		%	
						Capillary	Venous		Capillary	Venous		
Black or African American	183,694	55,928	30.4	53,371	95.4	769	1,788	4.6	136	470	1.1	1.9
White	580,389	80,821	13.9	77,827	96.3	1,682	1,312	3.7	183	416	0.7	1.9
Hispanic or Latino	274,056	68,087	24.8	66,424	97.6	538	1,125	2.4	55	278	0.5	1.8
Other <sup>b</sup>	65,658	12,676	19.3	11,931	94.1	414	331	5.9	69	115	1.5	
Unidentified <sup>c</sup>		19,741		19,319	97.9	102	320	2.1	11	59	0.4	
<b>Total</b>	<b>1,103,797</b>	<b>237,253</b>	<b>21.5</b>	<b>228,872</b>	<b>96.5</b>	<b>3,505</b>	<b>4,876</b>	<b>3.5</b>	<b>454</b>	<b>1,338</b>	<b>0.8</b>	<b>1.9</b>

Source: Illinois Department of Public Health - Illinois Lead Program Surveillance Database, 2016. <sup>a</sup>Population data compiled from bridged-race Vintage 2015 (2010-2015) post-censal population estimates (released by NCHS June 28, 2016), accessed at <http://wonder.cdc.gov/bridged-race-v2015.html> on July 25, 2016. Data includes one venous blood lead test result per year; if there was no venous test, then the highest capillary test results were used. Racial classifications with fewer numbers reported were suppressed to prevent identification of individuals; <sup>b</sup>includes other self-identified racial classifications and; <sup>c</sup>children whose racial information were unavailable.

## Illinois Lead Program 2016 Annual Surveillance Report

As Table 5 illustrates, 50 percent of the children tested in 2016 were males and 53 percent of children with lead levels  $\geq 5\mu\text{g/dL}$  were males. Approximately 1.5 percent of children tested had no gender data collected and are classified as gender unidentified.

**Table 5: Children Tested for Blood Lead by Gender - January 1 to December 31, 2016**

Gender	Estimated Population <sup>a</sup>	Children Tested by Race in 2016										Geomean Blood Lead Level in $\mu\text{g/dL}$
		Total Tested		<5 $\mu\text{g/dL}$		$\geq 5\ \mu\text{g/dL}$			$\geq 10\ \mu\text{g/dL}$			
		n	%	n	%	n		%	n		%	
						Capillary	Venous		Capillary	Venous		
Female	541,052	114,353	21.1	110,477	96.6	1,667	2,209	3.4	223	608	0.7	1.87
Male	562,745	119,456	21.2	115,015	96.3	1,818	2,623	3.7	230	723	0.8	1.9
Gender unidentified		3,444		3,380	98.1	20	44	1.9	1	7	0.2	1.96
<b>Total</b>	<b>1,103,797</b>	<b>237,253</b>	<b>21.5</b>	<b>228,872</b>	<b>96.3</b>	<b>3,505</b>	<b>4,876</b>	<b>3.5</b>	<b>454</b>	<b>1,338</b>	<b>0.8</b>	<b>1.88</b>

**Source:** Illinois Department of Public Health - Illinois Lead Program Surveillance Database, 2016. <sup>a</sup>Population data compiled from bridged-race Vintage 2015 (2010-2015) post-censal population estimates (released by NCHS June 28, 2016), accessed at <http://wonder.cdc.gov/bridged-race-v2015.html> on July 25, 2016. Data includes one venous blood lead test result per child; if there was no venous test then the highest capillary test result was used.

About 60 percent of children tested for lead exposure had at least one venous blood lead test with a geometric mean BLL of  $1.84\mu\text{g/dL}$  (Table 6).

**Table 6: Children Tested for Blood Lead by Collection Method - January 1 to December 31, 2016**

Blood Specimen Type	Blood Lead Tests Reported to IDPH <sup>1</sup>		Children Tested in 2016								Range	Geomean
			Total		<5 $\mu\text{g/dL}$		$\geq 5\ \mu\text{g/dL}$		$\geq 10\ \mu\text{g/dL}$			
	n	%	n	%	n	%	n	%	n	%		
Venous	163,603	59.8	139,498	58.8	134,622	96.5	4,876	3.5	1338	1.0	1-99	1.84
Capillary <sup>2</sup>	109,890	40.2	97,755	41.2	94,250	96.4	3,505	3.6	454	0.5	1-73	1.94
<b>Total</b>	<b>273,493</b>		<b>237,253</b>		<b>228,872</b>	<b>96.5</b>	<b>8,381</b>	<b>3.5</b>	<b>1,792</b>	<b>0.8</b>	<b>1-99</b>	<b>1.88</b>

**Source:** Illinois Department of Public Health - Illinois Lead Program Surveillance Database, 2016. Data includes one venous blood lead test result per child; if there was no venous test, then the highest capillary test result. <sup>1</sup>Data includes multiple tests per child; <sup>2</sup>Capillary also includes unknown blood specimen type.

*The Illinois Lead Program maintains a surveillance system of blood lead test results for **children 15 years of age and younger**. Illinois law requires reporting of all blood lead test results by physicians, laboratories, hospitals, clinics, and other health care facilities to the Illinois Lead Program. Blood lead test results for persons 16 years of age and older are entered into the Adult Blood Lead Registry.*

The Program received approximately 80 percent of blood lead test results electronically. For paper-reported results, the Program contracted with an agency to perform the data entry. The ultimate goal is to eliminate all paper reporting (Table 7).

**Table 7: Number of Blood Lead Tests by Methods of Reporting - January 1 to December 31, 2016**

Blood Lead Tests Reported to IDPH in 2016	Blood Tests Reported in 2016 (%)
Paper reported (mail or fax)	20
Electronic reporting	80

**Source:** Illinois Department of Public Health - Illinois Lead Program Surveillance Database, 2016.

**Blood Lead Tests Analyzed at IDPH Laboratory:** A total of **273,493** blood lead samples collected from 237,253 children were analyzed by 284 laboratories, as reported to IDPH. Three laboratories including the IDPH laboratory analyzed more than 50 percent of all the blood lead tests in Illinois. Approximately 14 percent of the blood lead tests were analyzed at IDPH laboratory accounting for 16 percent of children with lead levels  $\geq 5 \mu\text{g/dL}$ . For delegate agencies, there continues to be a financial advantage for sending blood samples to be analyzed for lead at IDPH’s Division of Laboratories because these grantees are compensated for each blood specimen submitted.

**Portable Desk Top Blood Analyzer:** LeadCare is a portable, CLIA-waived, capillary blood lead testing device with a maximum reading of  $65\mu\text{g/dL}$  that operates within  $\pm 3.3\mu\text{g/dL}$  error range. Approximately 19.4 percent (53,098) of all blood lead tests reported to IDPH in 2016 were from LeadCare users. In 2016, there were 391 LeadCare users in Illinois. Among the users, 251 reported at least one capillary blood lead test result and 49 percent (191 users) reported BLL results  $\geq 5 \mu\text{g/dL}$ . A follow-up confirmatory venous test is strongly recommended following an elevated capillary BLL.

**Systematic Tracking of Elevated Lead Levels and Remediation (STELLAR) to Healthy Homes and Lead Poisoning Surveillance System (HHL PSS):** IDPH has adopted a CDC-sponsored, web-based data system to replace STELLAR.

*FDA Warns Against Using Magellan Diagnostics LeadCare Testing Systems (LeadCare, LeadCare II, LeadCare Plus, and LeadCare Ultra) with Blood Obtained from a Vein...The testing systems may underestimate BLLs and give inaccurate results when processing venous blood samples:  
 FDA Safety Communication..May17, 2017  
<https://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm558733.htm>*



**Estimated Population and Children Tested for Blood Lead by County and Delegate Agencies:** In 2016, BLLs in children ranged from 1.0 µg/dL to 99 µg/dL with a mean of 2.3µg/dL, median of 2.0, and mode or most frequent level of 3.0µg/dL. Table 8 reflects the number of children tested for the first time in 2016 as well as those retested for follow-up by county, lead level, and blood specimen collection type.

**Table 8:** Children Tested for Blood Lead by County and Delegate Agencies in 2016

Illinois/ County/ Delegate Agency	Estimated Population 6 Years of Age and Younger <sup>a</sup>	All Children Tested by County, Blood Collection Type and BLL										Children Tested for the First Time in 2016						
		All Children Tested in 2015					All Children Tested in 2016					Children Tested for the First Time in 2016	By Blood Draw Type and Level, µg/dL					
		Total Tested 2015		Capillary and Venous in µg/dL (%) <sup>b</sup>			Total Tested 2016		Capillary and Venous in µg/dL (%) <sup>b</sup>				Venous (%) <sup>c</sup>			Capillary (%)		
		N	%a	<5	5-9	≥10	N	%a	<5	5-9	≥10		<5	5-9	≥10	<5	5-9	≥10
<b>Illinois</b>	<b>1,103,797</b>	<b>256,545</b>	<b>23.2</b>	<b>96.0</b>	<b>3.3</b>	<b>0.8</b>	<b>237,253</b>	<b>21.5</b>	<b>96.5</b>	<b>2.8</b>	<b>0.8</b>	<b>115,189</b>	<b>49.1</b>	<b>1.2</b>	<b>0.5</b>	<b>47.5</b>	<b>1.5</b>	<b>0.2</b>
Adams	5,960	1,500	25.2	90.1	7.0	2.9	1,513	25.4	89.0	8.5	2.4	893	24.7	2.2	0.8	66.3	4.7	1.2
Alexander	648	126	19.4	90.5	5.6	4.0	128	19.8	90.6	5.5	3.9	78	61.5	3.8	3.8	30.8	0.0	0.0
Bond	1,120	232	20.7	96.1	2.6	1.3	227	20.3	97.8	0.9	1.3	143	11.2	0.0	0.7	87.4	0.7	0.0
Boone	4,367	958	21.9	98.3	1.3	0.4	930	21.3	98.1	1.1	0.9	428	54.4	0.7	0.7	43.2	0.7	0.2
Brown	404	87	21.5	93.1	6.9	0.0	68	16.8	91.2	7.4	1.5	49	28.6	0.0	2.0	65.3	4.1	0.0
Bureau	2,605	504	19.3	94.6	3.0	2.4	394	15.1	91.9	5.8	2.3	268	63.1	3.7	1.5	29.1	1.9	0.7
Calhoun	369	43	11.7	90.7	9.3	0.0	27	7.3	96.3	3.7	0.0	10	40.0	0.0	0.0	50.0	10.0	0.0
Carroll	956	201	21.0	97.5	2.5	0.0	248	25.9	94.4	3.6	2.0	152	40.1	2.0	2.0	53.9	1.3	0.7
Cass	1,065	362	34.0	89.5	7.7	2.8	283	26.6	92.9	4.9	2.1	169	24.9	1.8	1.2	69.2	3.0	0.0
Champaign	15,925	2,296	14.4	98.2	1.4	0.4	2,005	12.6	98.6	1.2	0.2	1,482	45.0	0.7	0.2	53.5	0.5	0.0
Christian	2,622	620	23.6	96.0	3.2	0.8	620	23.6	96.9	2.9	0.2	366	52.7	1.1	0.0	44.5	1.6	0.0
Clark	1,329	294	22.1	95.9	3.7	0.3	275	20.7	97.1	2.9	0.0	195	26.2	1.5	0.0	71.8	0.5	0.0
Clay	1,136	272	23.9	92.3	7.4	0.4	277	24.4	93.9	5.8	0.4	179	2.2	0.6	0.0	93.9	3.4	0.0
Clinton	2,884	365	12.7	97.8	1.6	0.5	363	12.6	99.2	0.3	0.6	246	39.8	0.4	0.4	59.3	0.0	0.0
Coles	3,566	831	23.3	94.0	4.8	1.2	892	25.0	97.1	2.2	0.7	549	9.8	0.2	0.2	87.6	1.6	0.5
Cook w/o Chicago	211,323	40,003	18.9	94.4	5.3	0.3	40,023	18.9	98.0	1.6	0.4	19,380	58.8	0.8	0.3	38.9	1.0	0.2
Chicago	253,669	94,559	37.3	96.6	2.6	0.8	90,571	35.7	96.8	2.5	0.7	34,957	70.8	1.8	0.5	26.1	0.7	0.1
Crawford	1,471	225	15.3	92.0	7.6	0.4	254	17.3	96.5	2.8	0.8	186	6.5	1.1	0.5	90.3	1.6	0.0
Cumberland	943	158	16.8	97.5	1.9	0.6	166	17.6	97.6	2.4	0.0	86	7.0	0.0	0.0	91.9	1.2	0.0
DeKalb	8,525	1,432	16.8	98.2	1.5	0.3	1,396	16.4	98.3	1.3	0.4	795	40.6	0.8	0.5	57.4	0.8	0.0
DeWitt	1,205	166	13.8	94.0	5.4	0.6	205	17.0	87.8	10.7	1.5	161	14.9	1.9	0.0	72.7	9.3	1.2
Douglas	1,900	235	12.4	96.2	2.6	1.3	252	13.3	94.4	2.8	2.8	171	19.9	0.0	1.2	76.0	1.8	1.2

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		N	%a	<5	5-9	≥10	N	%a	<5	5-9	≥10		<5	5-9	≥ 10	<5	5-9	≥10
<b>Illinois</b>	<b>1,103,797</b>	<b>256,545</b>	<b>23.2</b>	<b>96.0</b>	<b>3.3</b>	<b>0.8</b>	<b>237,253</b>	<b>21.5</b>	<b>96.5</b>	<b>2.8</b>	<b>0.8</b>	<b>115,189</b>	<b>49.1</b>	<b>1.2</b>	<b>0.5</b>	<b>47.5</b>	<b>1.5</b>	<b>0.2</b>
DuPage	78,007	8,626	11.1	98.6	1.2	0.3	7,388	9.5	98.3	1.2	0.5	4,538	44.5	0.5	0.4	53.8	0.7	0.2
Edgar	1,285	260	20.2	95.4	4.2	0.4	321	25.0	95.0	3.4	1.6	226	31.0	0.9	0.4	64.6	2.7	0.4
Edwards	514	103	20.0	97.1	2.9	0.0	88	17.1	96.6	2.3	1.1	64	7.8	0.0	1.6	90.6	0.0	0.0
Effingham	3,102	459	14.8	95.2	4.4	0.4	479	15.4	96.7	3.1	0.2	274	3.3	0.4	0.0	92.7	3.6	0.0
Fayette	1,673	344	20.6	96.8	2.0	1.2	349	20.9	96.3	3.2	0.6	216	3.2	0.5	0.0	94.4	1.9	0.0
Ford	1,105	169	15.3	91.1	6.5	2.4	154	13.9	88.3	9.7	1.9	93	16.1	6.5	2.2	71.0	4.3	0.0
Franklin	3,357	512	15.3	98.4	1.0	0.6	582	17.3	91.6	8.2	0.2	405	33.1	0.2	0.0	57.8	8.6	0.2
Fulton	2,447	395	16.1	90.6	8.1	1.3	406	16.6	91.4	6.4	2.2	299	11.4	2.0	1.0	82.3	2.7	0.7
Gallatin	354	108	30.5	98.1	1.9	0.0	93	26.3	97.8	2.2	0.0	56	3.6	0.0	0.0	94.6	1.8	0.0
Greene	1,029	259	25.2	91.5	6.9	1.5	236	22.9	94.9	4.7	0.4	128	21.1	0.8	0.8	77.3	0.0	0.0
Grundy	4,529	648	14.3	96.6	2.6	0.8	513	11.3	96.3	3.3	0.4	301	27.2	0.7	0.3	69.1	2.7	0.0
Hamilton	664	119	17.9	95.8	3.4	0.8	115	17.3	98.3	1.7	0.0	89	22.5	0.0	0.0	75.3	2.2	0.0
Hancock	1,380	295	21.4	91.2	6.1	2.7	239	17.3	93.3	5.0	1.7	158	34.8	0.0	0.6	60.8	3.8	0.0
Hardin	280	40	14.3	92.5	7.5	0.0	50	17.9	88.0	12.0	0.0	29	41.4	3.4	0.0	48.3	6.9	0.0
Henderson	479	67	14.0	92.5	7.5	0.0	68	14.2	91.2	8.8	0.0	43	65.1	0.0	0.0	30.2	4.7	0.0
Henry	3,890	719	18.5	92.6	6.0	1.4	762	19.6	92.7	6.0	1.3	490	12.0	0.6	1.0	81.2	4.5	0.6
Iroquois	2,191	392	17.9	93.6	5.9	0.5	313	14.3	93.6	3.8	2.6	206	23.8	1.0	2.4	69.4	1.9	1.5
Jackson	4,210	997	23.7	98.8	1.0	0.2	1,010	24.0	98.0	1.7	0.3	604	40.9	0.3	0.2	57.3	1.2	0.2
Jasper	836	97	11.6	97.9	2.1	0.0	92	11.0	96.7	3.3	0.0	65	0.0	1.5	0.0	95.4	3.1	0.0
Jefferson	3,344	516	15.4	96.1	2.7	1.2	537	16.1	95.7	3.4	0.9	398	30.7	0.3	0.3	65.8	2.5	0.5
Jersey	1,648	417	25.3	95.7	3.8	0.5	430	26.1	97.9	1.6	0.5	216	16.2	0.0	0.0	83.3	0.5	0.0
Jo Daviess	1,460	239	16.4	94.6	4.2	1.3	220	15.1	95.5	2.7	1.8	122	40.2	0.0	0.0	56.6	3.3	0.0
Johnson	813	111	13.7	93.7	3.6	2.7	171	21.0	87.1	12.3	0.6	111	36.9	0.0	0.9	53.2	9.0	0.0
Kane	49,807	13,015	26.1	97.0	2.4	0.7	11,460	23.0	97.0	2.4	0.6	5,045	26.4	0.7	0.2	71.0	1.4	0.2
Kankakee	9,429	2,405	25.5	96.2	3.0	0.7	2,198	23.3	95.4	3.7	0.9	1,089	13.7	0.4	0.2	82.8	2.6	0.4
Kendall	12,948	721	5.6	98.2	1.7	0.1	786	6.1	98.3	1.4	0.3	565	70.6	0.9	0.0	27.6	0.7	0.2
Knox	3,642	927	25.5	87.1	10.0	2.9	846	23.2	89.5	7.4	3.1	533	55.5	4.9	1.9	36.2	1.5	0.0
Lake	59,737	8,384	14.0	98.7	1.1	0.2	8,159	13.7	98.4	1.3	0.3	4,670	52.8	0.7	0.2	45.4	0.7	0.1

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LaSalle	8,456	1,486	17.6	93.5	4.6	1.9	1,544	18.3	93.6	4.8	1.6	989	55.9	2.4	1.1	39.2	1.1	0.2
Lawrence	1,216	273	22.5	95.6	2.9	1.5	259	21.3	94.2	3.1	2.7	170	10.6	0.0	1.2	87.1	0.6	0.6
Lee	2,482	155	6.2	95.5	3.9	0.6	171	6.9	94.7	4.1	1.2	120	65.0	3.3	1.7	28.3	1.7	0.0
Livingston	2,780	511	18.4	95.9	3.9	0.2	526	18.9	94.9	4.6	0.6	313	5.1	0.6	0.6	89.5	3.8	0.3
Logan	2,034	364	17.9	94.2	3.6	2.2	372	18.3	94.9	4.0	1.1	249	12.4	1.6	0.0	83.1	2.4	0.4
McDonough	2,066	374	18.1	89.8	7.0	3.2	401	19.4	92.0	5.0	3.0	249	40.2	3.2	0.4	53.0	2.8	0.4
McHenry	24,299	1,919	7.9	97.9	1.9	0.2	1,881	7.7	97.4	2.3	0.3	1,177	18.0	0.2	0.1	80.0	1.6	0.1
McLean	14,521	3,054	21.0	96.6	2.6	0.8	3,032	20.9	96.2	3.1	0.7	2,006	4.6	0.2	0.0	92.3	2.4	0.4
Macon	9,235	1,828	19.8	93.3	4.8	1.9	2,600	28.2	89.6	8.3	2.1	1,368	23.8	2.0	1.1	66.8	5.2	1.2
Macoupin	3,290	640	19.5	95.5	3.1	1.4	656	19.9	94.2	3.8	2.0	402	28.1	1.5	1.0	66.9	1.5	1.0
Madison	22,060	4,243	19.2	97.3	2.1	0.7	4,171	18.9	97.0	2.4	0.6	2,369	40.9	0.9	0.3	56.1	1.7	0.1
Marion	3,365	747	22.2	96.0	3.1	0.9	706	21.0	94.5	4.4	1.1	428	11.9	0.7	0.9	82.5	3.7	0.2
Marshall	883	191	21.6	94.2	4.7	1.0	240	27.2	91.7	6.7	1.7	132	11.4	5.3	0.8	81.1	1.5	0.0
Mason	996	292	29.3	88.0	7.2	4.8	231	23.2	88.3	8.7	3.0	106	6.6	0.0	1.9	89.6	1.9	0.0
Massac	1,215	154	12.7	95.5	3.9	0.6	138	11.4	92.8	6.5	0.7	97	64.9	2.1	0.0	28.9	4.1	0.0
Menard	963	98	10.2	99.0	1.0	0.0	95	9.9	95.8	4.2	0.0	64	43.8	1.6	0.0	51.6	3.1	0.0
Mercer	1,158	267	23.1	92.5	5.6	1.9	230	19.9	91.3	6.5	2.2	149	17.4	0.7	0.7	76.5	2.7	2.0
Monroe	2,534	331	13.1	96.1	3.3	0.6	333	13.1	94.0	6.0	0.0	247	27.1	0.8	0.0	68.0	4.0	0.0
Montgomery	2,181	474	21.7	95.6	4.0	0.4	479	22.0	96.5	2.9	0.6	312	21.8	1.6	0.0	75.0	1.0	0.6
Morgan	2,570	759	29.5	92.5	6.6	0.9	631	24.6	91.8	6.3	1.9	354	36.2	1.1	1.4	56.5	4.2	0.6
Moultrie	1,346	198	14.7	94.9	4.0	1.0	173	12.9	95.4	3.5	1.2	125	18.4	0.8	0.8	76.8	2.4	0.8
Ogle	3,818	372	9.7	96.8	2.4	0.8	444	11.6	96.6	2.7	0.7	284	67.6	1.4	0.4	29.9	0.7	0.0
Peoria	18,122	2,852	15.7	90.8	6.8	2.4	2,124	11.7	89.5	8.3	2.2	1,288	23.3	4.3	1.3	69.3	1.6	0.2
Perry	1,506	332	22.0	94.9	4.8	0.3	313	20.8	93.3	6.4	0.3	167	38.3	0.6	0.0	54.5	6.6	0.0
Piatt	1,255	162	12.9	97.5	0.6	1.9	151	12.0	94.7	5.3	0.0	117	65.0	2.6	0.0	29.9	2.6	0.0
Pike	1,224	269	22.0	91.1	7.8	1.1	253	20.7	94.9	4.3	0.8	184	6.5	0.5	0.5	87.0	4.9	0.5
Pope	180	29	16.1	93.1	6.9	0.0	32	17.8	87.5	12.5	0.0	22	40.9	4.5	0.0	50.0	4.5	0.0
Pulaski	417	81	19.4	95.1	2.5	2.5	68	16.3	94.1	5.9	0.0	52	44.2	1.9	0.0	50.0	3.8	0.0

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Putnam	347	46	13.3	100.0	0.0	0.0	68	19.6	100.0	0.0	0.0	59	64.4	0.0	0.0	35.6	0.0	0.0
Randolph	2,320	400	17.2	96.3	2.8	1.0	370	15.9	96.5	3.2	0.3	243	23.0	0.0	0.0	72.8	3.7	0.4
Richland	1,360	214	15.7	89.3	8.4	2.3	214	15.7	94.9	4.7	0.5	143	7.0	0.0	0.0	90.9	2.1	0.0
Rock Island	12,901	3,367	26.1	91.5	6.6	1.9	2,949	22.9	91.9	6.2	1.9	1,766	21.6	1.7	0.8	70.9	4.1	0.8
St. Clair w/o ESHHD	17,044	2,672	15.7	97.1	2.4	0.5	2,386	14.0	97.0	2.4	0.6	1,392	25.1	0.6	0.2	71.9	1.9	0.3
Saline	2,014	475	23.6	98.1	1.5	0.4	507	25.2	95.5	3.9	0.6	319	7.8	0.3	0.0	88.1	3.4	0.3
Sangamon	16,703	3,032	18.2	93.9	4.5	1.6	2,810	16.8	93.6	5.1	1.4	1,609	29.3	0.9	0.6	64.8	3.8	0.6
Schuyler	437	104	23.8	93.3	4.8	1.9	83	19.0	91.6	8.4	0.0	58	15.5	1.7	0.0	79.3	3.4	0.0
Scott	328	92	28.0	88.0	8.7	3.3	124	37.8	92.7	4.8	2.4	81	27.2	0.0	2.5	65.4	4.9	0.0
Shelby	1,660	258	15.5	95.7	2.3	1.9	282	17.0	95.4	4.3	0.4	175	18.3	0.0	0.0	77.7	4.0	0.0
Stark	416	127	30.5	84.3	12.6	3.1	129	31.0	87.6	8.5	3.9	79	3.8	6.3	3.8	82.3	1.3	2.5
Stephenson	3,587	1,203	33.5	85.7	10.2	4.1	1,161	32.4	86.3	8.6	5.1	564	55.1	3.0	2.0	34.4	3.2	2.3
Tazewell	11,421	1,716	15.0	96.9	1.9	1.2	1,437	12.6	96.8	2.4	0.8	943	4.6	0.7	0.4	92.7	1.5	0.1
Union	1,316	241	18.3	97.1	2.1	0.8	213	16.2	94.4	5.2	0.5	148	54.1	2.0	0.0	40.5	3.4	0.0
Vermilion	7,467	1,537	20.6	96.9	2.5	0.6	1,501	20.1	97.1	2.4	0.5	988	80.9	1.3	0.2	17.2	0.3	0.1
Wabash	905	192	21.2	93.2	6.8	0.0	185	20.4	90.3	6.5	3.2	139	5.8	0.0	1.4	86.3	5.0	1.4
Warren	1,566	313	20.0	88.8	10.5	0.6	350	22.3	92.3	4.9	2.9	227	81.5	3.5	2.2	12.8	0.0	0.0
Washington	1,046	151	14.4	94.7	3.3	2.0	145	13.9	95.2	2.8	2.1	99	45.5	0.0	1.0	50.5	3.0	0.0
Wayne	1,360	267	19.6	88.4	11.2	0.4	313	23.0	96.5	2.9	0.6	209	19.1	1.0	0.5	77.5	1.9	0.0
White	1,272	245	19.3	94.7	4.5	0.8	235	18.5	95.3	3.4	1.3	165	19.4	0.6	0.6	77.0	2.4	0.0
Whiteside	4,661	1,097	23.5	95.6	3.3	1.1	1,059	22.7	94.5	4.0	1.5	645	28.1	1.1	0.6	66.0	3.3	0.9
Will	58,874	9,851	16.7	97.5	2.1	0.4	9,873	16.8	97.4	2.2	0.4	4,910	27.6	0.3	0.2	69.8	1.9	0.2
Williamson	5,440	868	16.0	97.6	2.0	0.5	1,075	19.8	89.4	9.9	0.7	740	30.1	0.5	0.0	59.3	9.6	0.4
Winnebago	24,920	5,452	21.9	94.9	3.9	1.2	4,824	19.4	94.9	3.9	1.2	2,467	66.6	2.2	0.6	29.3	1.1	0.2
Woodford	3,497	519	14.8	97.7	2.3	0.0	451	12.9	96.9	1.6	1.6	287	6.6	1.0	1.4	88.9	1.0	1.0



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		All Children Tested in 2015					All Children Tested in 2016					Children Tested for the First Time in 2016	By Blood Draw Type and Level, µg/dL					
		Total Tested 2015		Capillary and Venous in µg/dL (%) <sup>b</sup>			Total Tested 2016		Capillary and Venous in µg/dL (%) <sup>b</sup>				Venous (%) <sup>c</sup>			Capillary (%)		
		N	%a	<5	5-9	≥10	N	%a	<5	5-9	≥10		<5	5-9	≥10	<5	5-9	≥10
<b>Illinois</b>	<b>1,103,797</b>	<b>256,545</b>	<b>23.2</b>	<b>96.0</b>	<b>3.3</b>	<b>0.8</b>	<b>237,253</b>	<b>21.5</b>	<b>96.5</b>	<b>2.8</b>	<b>0.8</b>	<b>115,189</b>	<b>49.1</b>	<b>1.2</b>	<b>0.5</b>	<b>47.5</b>	<b>1.5</b>	<b>0.2</b>
Egyptian <sup>1</sup>	3,661	828	22.6	97.1	2.7	0.2	835	22.8	95.7	3.6	0.7	540	10.9	0.4	0.2	85.4	3.0	0.2
ESHD <sup>2</sup>	6,611	3,077	46.5	93.9	4.9	1.1	3,073	46.5	94.6	4.2	1.2	1,218	26.8	1.1	0.2	68.1	2.4	1.4
Evanston	6,043	1,568	25.9	97.8	1.7	0.5	1,297	21.5	97.0	2.4	0.6	753	45.8	2.3	0.3	50.6	0.8	0.3
Oak Park	4,837	1,084	22.4	96.9	2.3	0.8	1,040	21.5	95.4	3.7	1.0	585	29.4	1.5	0.2	65.5	2.7	0.7
Skokie	4,980	902	18.1	98.3	1.6	0.1	870	17.5	98.2	1.7	0.1	525	54.9	0.6	0.0	43.0	1.3	0.2
Southern Seven <sup>3</sup>	4,996	782	15.7	94.6	3.7	1.7	800	16.0	91.3	7.8	1.0	537	51.4	2.0	0.7	41.3	4.5	0.0
Stickney	583	109	18.7	99.1	0.0	0.9	110	18.9	99.1	0.9	0	43	67.4	0	0	30.2	2.3	0

**Source:** Illinois Department of Public Health – Illinois Lead Program Surveillance Database 2015 and 2016. <sup>a</sup>Population data compiled from bridged-race Vintage 2015 (2010-2015) post-censal population estimates (released by NCHS June 28, 2016) accessed at <http://wonder.cdc.gov/bridged-race-v2015.html> on August 25, 2016. <sup>b</sup>Capillary or venous blood draw. <sup>c</sup>Confirmed test in Illinois is a venous blood draw. Actual numbers are available at IDPH. Due to rounding, decimals may not add up perfectly.

<sup>1</sup>Egyptian Counties: Galatin, Saline, and White

<sup>2</sup>ESHD or East Side Health District includes the cities of Alorton, Brooklyn, Cahokia, Centreville, East St. Louis, Lovejoy, National Stock Yards, Sauget, Washington Park and Fairmont City. Source: U.S. Census Bureau, 2010 Census. Single Years of Age and Sex: Summary File 1, Table PCT12. QT-P2

<sup>3</sup>Southern Seven Counties: Alexander, Hardin, Johnson, Massac, Pope, Pulaski and Union

In 2016, most laboratories that analyzed blood lead were able to quantify and accurately report levels below 5µg/dL compared to previous years. While the current acceptable error range is ±4µg/dL, most laboratories that do blood lead analyses perform at an error range within ±2µg/dL. The portable desktop blood-lead analyzers operate within a ±3µg/dL error range. As required by the Act (410 ILCS 45/7), all health care providers are required by law to report all blood lead test results to IDPH. If a child has multiple tests, the highest venous result is selected. If there is no venous test on a child, the peak capillary blood lead result is selected.

## Lead Testing Activities in Illinois, Chicago, and the United States: 2014-2016

CDC only reported blood lead data for children five years of age and younger. In order to compare Illinois data to the national data published by CDC, **Table 9 only included children five years of age and younger (<72 months) whose BLL results were reported to IDPH in 2014, 2015, and 2016.**

**Table 9: Blood Lead Burden for Children Five Years of Age and Younger in Illinois, Chicago, and the United States: 2014-2016**

	2014		2015		2016	
	N	%	N	%	N	%
<b>Illinois Children Tested</b>	252,732	26.6	248,223	26.3	229,519	24.3
BLL≥10µg/dL Illinois intervention level	2,162	0.9	1,871	0.8	1,736	0.8
BLL≥5µg/dL Federal Reference Value	17,063	6.8	10,040	4.0	8,154	3.6
<b>Illinois without Chicago</b>	160,404		161,420		143,174	
BLL≥10µg/dL	1,438	0.9	1,211	0.8	1,152	0.8
BLL≥5µg/dL	13,357	8.3	7,033	4.4	5,399	3.8
<b>Chicago</b>	92,328		86,803		86,345	
BLL≥10µg/dL	724	0.8	660	0.8	584	0.7
BLL≥5µg/dL	3,706	4.1	3007	3.5	2,755	3.2
<b>United States<sup>1</sup></b>	2,496,140	10.3	2,415,604	10.0	*	
BLL≥10µg/dL	13,265	0.5	11,681	0.5		
BLL≥5µg/dL	100,775	4.2	79,957	3.3		

**Source:** Illinois Lead Program Surveillance Data, 2014-2016 and U.S. Centers for Disease Control and Prevention (CDC) Blood Lead Surveillance available at the time at: <http://www.cdc.gov/nceh/lead/data/national.htm> (downloaded August 29, 2016). \*Not available at time of publication

Due to strict data reporting requirements, Illinois data with missing core address fields are often under-reported nationally, which may contribute to a denominator differential of Illinois data as reported by CDC.

***Children's products:** No person, firm, or corporation shall sell, have, offer for sale, or transfer the items... that is more than 0.004% (40 parts per million) but less than 0.06% (600 parts per million) by total weight or a lower standard for lead content as may be established by federal or State law or rule unless that item bears a warning statement...shall contain at least the following: "WARNING: CONTAINS LEAD. MAY BE HARMFUL IF EATEN OR CHEWED. COMPLIES WITH FEDERAL STANDARDS" (410 ILCS 45/6) (from Ch. 111 1/2, par. 1306) Sec. 6.b)*



## Lead Levels of Children Who Benefited from Medical Assistance Programs

Medical assistance programs refer to the authorized Social Security Acts of Title XIX that include Medicaid, All Kids, and Moms & Babies, which are administered by HFS.

<https://www.illinois.gov/hfs/MedicalPrograms/AllKids/Pages/default.aspx>

The only way to determine whether a child has been exposed to lead is via blood lead testing. State and Federal mandates require that all children enrolled in HFS' medical programs be considered at-risk for lead poisoning and receive a blood lead test prior to 12 and 24 months of age. If a child is three-six years of age and has not been tested, a blood lead test is required. All children enrolled in HFS Medical Programs are expected to be tested regardless of where they live.

**Bonus Payment for High Performance:** HFS provided annual bonus payments to Illinois Health Connect (IHC) Primary Care Providers who met the benchmark for blood lead testing of qualifying patients. The bonus payment was based on the number of children who had at least one capillary or venous blood lead test performed by the age of 24 months (as of December 1, 2016).

Provider Blood Lead Screening Report can be accessed at:

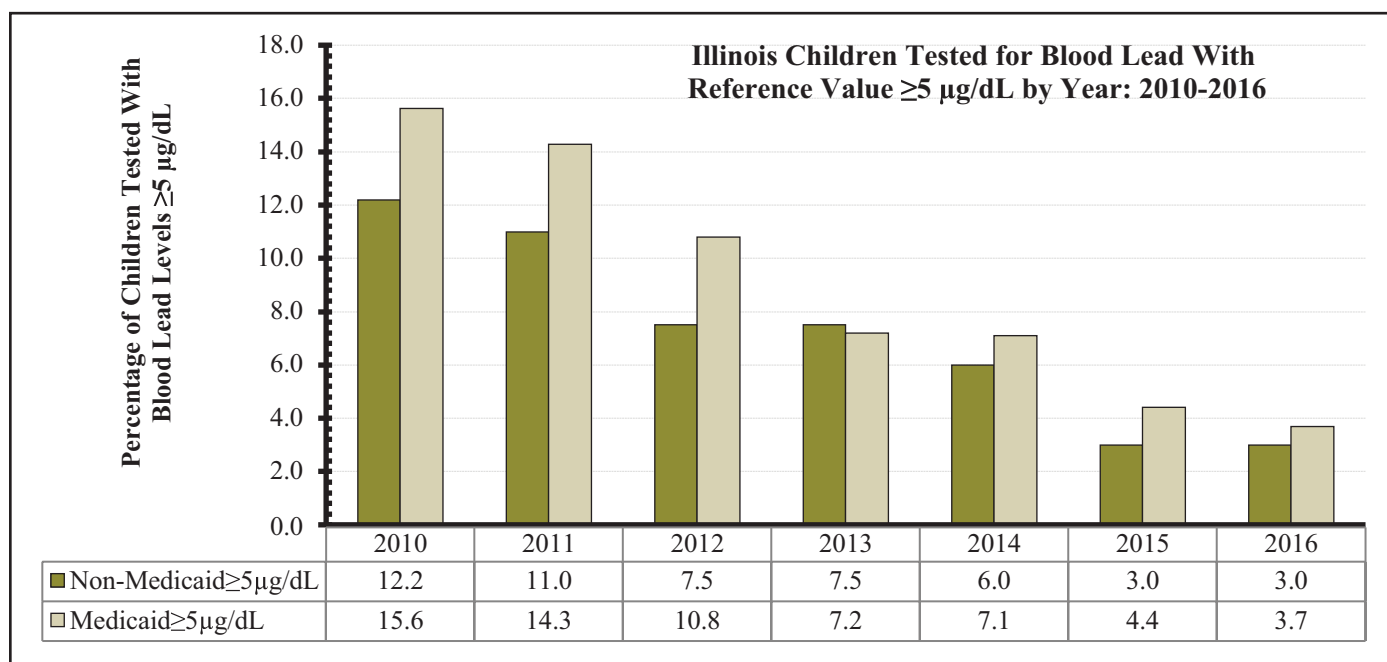
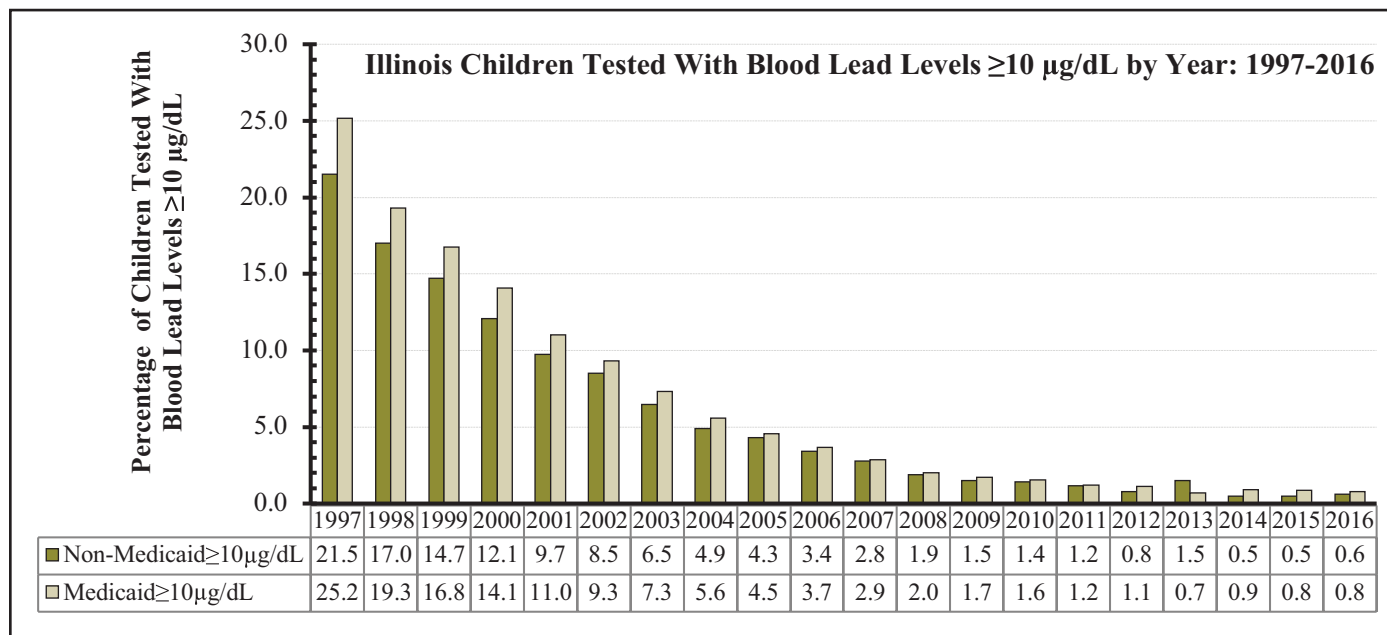
<https://www.illinois.gov/hfs/MedicalProviders/NonInstitutional/Pages/ProviderBloodLead.aspx>

For specific questions about the lead test performance bonus measure go to the IHC website or call the IHC Provider Services Help Desk at 1-877-912-1999.

**Medicaid and Non-Medicaid Enrolled Children:** Of all children tested in 2016, 76 percent were Medical Assistance Program recipients. Of the 76 percent, 3.7 percent had lead levels at the reference value, while 3.0 percent of non-recipients had lead levels at the reference value. Figure 8 highlights a significant decrease in childhood lead poisoning among Illinois children.

The Provider Handbook may be accessed at: <https://www.illinois.gov/hfs/SiteCollectionDocuments/hk200.pdf>

**Figure 8:** Elevated Blood Lead Level of Medicaid and Non-Medicaid Enrolled Children: 1997-2016



**Source:** Illinois Department of Public Health-Illinois Lead Program Surveillance Database: 1996-2016 and the Illinois Department of Healthcare and Family Services Enterprise Data Warehouse

Table 10 reflects the percentage of children enrolled in Medical Assistance Programs who were tested for BLL in 2016.

**Table 10: Percentage of Children Tested for Blood Lead in 2016 Enrolled for Medical Assistance**

County	Total Number of Children Tested in 2016	Medicaid Enrolled Children (%)			Non-Medicaid Enrolled Children (%)		
		Children Tested Who Were Medicaid-Enrolled (%)	Percentage of Medicaid - Enrolled Children Tested At		Children Tested Who Were Non-Medicaid-Enrolled (%)	Percentage of Non-Medicaid - Enrolled Children Tested At	
			≥10 µg/dL	≥5 µg/dL		≥10 µg/dL	≥5 µg/dL
<b>Illinois</b>	<b>237,253</b>	<b>75.7</b>	<b>0.8</b>	<b>3.7</b>	<b>24.3</b>	<b>0.6</b>	<b>3.0</b>
Adams	1,513	73.0	2.7	12.6	27.0	1.7	6.6
Alexander	128	91.4	3.4	9.4	8.6	9.1	9.1
Bond	227	75.3	1.8	2.9	24.7	0.0	0.0
Boone	930	85.3	0.5	1.6	14.7	2.9	3.6
Brown	68	61.8	2.4	14.3	38.2	0.0	0.0
Bureau	394	70.6	2.2	8.3	29.4	2.6	7.8
Calhoun	27	44.4	0.0	91.7	55.6	0.0	6.7
Carroll	248	68.1	1.8	0.0	31.9	2.5	3.8
Cass	283	73.5	2.9	8.7	26.5	0.0	2.7
Champaign	2,005	65.1	0.3	1.6	34.9	0.0	1.1
Christian	620	75.8	0.2	3.6	24.2	0.0	1.3
Clark	275	70.5	0.0	2.6	29.5	0.0	3.7
Clay	277	83.8	0.4	7.3	16.2	0.0	0.0
Clinton	363	65.8	0.8	1.3	34.2	0.0	0.0
Coles	892	70.9	0.6	3.5	29.1	0.8	1.5
Cook	130,594	77.0	0.6	2.9	23.0	0.5	2.7
Crawford	254	72.4	1.1	4.9	27.6	0.0	0.0
Cumberland	166	77.7	0.0	3.1	22.3	0.0	0.0
De Kalb	1,396	80.2	0.5	2.1	19.8	0.0	0.4
De Witt	205	64.9	2.3	16.5	35.1	0.0	4.2
Douglas	252	69.4	3.4	6.9	30.6	1.3	2.6
Du Page	7,388	65.3	0.5	1.7	34.7	0.5	1.8
Edgar	321	68.5	1.4	6.4	31.5	2.0	2.0
Edwards	88	62.5	1.8	5.5	37.5	0.0	0.0
Effingham	479	85.8	0.2	3.6	14.2	0.0	1.5
Fayette	349	87.4	0.7	3.9	12.6	0.0	2.3
Ford	154	79.2	2.5	10.7	20.8	0.0	15.6
Franklin	582	78.7	0.2	8.7	21.3	0.0	7.3
Fulton	406	70.9	1.7	8.0	29.1	3.4	10.2
Gallatin	93	75.3	0.0	2.9	24.7	0.0	0.0
Greene	236	75.8	0.6	6.1	24.2	0.0	1.8
Grundy	513	58.3	0.7	2.7	41.7	0.0	5.1
Hamilton	115	59.1	0.0	2.9	40.9	0.0	0.0
Hancock	239	67.8	2.5	8.6	32.2	0.0	2.6
Hardin	50	88.0	0.0	11.4	12.0	0.0	16.7
Henderson	68	80.9	0.0	10.9	19.1	0.0	0.0
Henry	762	68.5	1.1	8.4	31.5	1.7	5.0

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		Children Tested Who Were Medicaid-Enrolled (%)	Percentage of Medicaid - Enrolled Children Tested At		Children Tested Who Were Non-Medicaid-Enrolled (%)	Percentage of Non-Medicaid - Enrolled Children Tested At	
			≥10 µg/dL	≥5 µg/dL		≥10 µg/dL	≥5 µg/dL
<b>Illinois</b>	<b>237,253</b>	<b>75.7</b>	<b>0.8</b>	<b>3.7</b>	<b>24.3</b>	<b>0.6</b>	<b>3.0</b>
Iroquois	313	71.2	3.6	7.6	28.8	0.0	3.3
Jackson	1,010	83.2	0.2	2.0	16.8	0.6	1.8
Jasper	92	80.4	0.0	2.7	19.6	0.0	5.6
Jefferson	537	76.4	1.2	5.4	23.6	0.0	0.8
Jersey	430	64.2	0.4	2.5	35.8	0.6	1.3
Jo Daviess	220	77.7	2.3	4.7	22.3	0.0	4.1
Johnson	171	78.9	0.7	11.1	21.1	0.0	19.4
Kane	11,460	81.5	0.6	2.9	18.5	0.5	3.2
Kankakee	2,198	72.7	1.0	4.9	27.3	0.5	3.7
Kendall	786	60.7	0.0	1.7	39.3	0.6	1.6
Knox	846	74.5	4.0	11.6	25.5	0.5	7.4
Lake	8,159	67.6	0.2	1.4	32.4	0.5	2.0
La Salle	1,544	73.9	1.9	7.0	26.1	0.7	4.7
Lawrence	259	81.1	3.3	7.1	18.9	0.0	0.0
Lee	171	70.2	1.7	5.0	29.8	0.0	5.9
Livingston	526	73.4	0.8	5.7	26.6	0.0	3.6
Logan	372	79.0	1.0	4.8	21.0	1.3	6.4
McDonough	401	71.3	4.2	9.4	28.7	0.0	4.3
McHenry	1,881	64.3	0.2	2.8	35.7	0.3	2.1
McLean	3,032	59.3	0.8	4.0	40.7	0.4	3.5
Macon	2,600	82.0	2.2	11.4	18.0	1.5	5.8
Macoupin	656	75.2	1.8	5.9	24.8	2.5	5.5
Madison	4,171	75.0	0.6	3.3	25.0	0.5	2.2
Marion	706	81.7	1.2	5.9	18.3	0.8	3.9
Marshall	240	67.5	1.9	9.9	32.5	1.3	5.1
Mason	231	82.3	3.7	12.6	17.7	0.0	7.3
Massac	138	85.5	0.8	6.8	14.5	0.0	10.0
Menard	95	68.4	0.0	3.1	31.6	0.0	6.7
Mercer	230	64.3	0.7	9.5	35.7	4.9	7.3
Monroe	333	39.9	2.3	6.0	60.1	0.0	6.0
Montgomery	479	72.9	0.0	4.0	27.1	0.0	2.3
Morgan	631	76.1	2.1	8.3	23.9	1.3	7.9
Moultrie	173	65.9	0.9	4.4	34.1	1.7	5.1
Ogle	444	71.2	0.6	3.5	28.8	0.8	3.1
Peoria	2,124	68.8	3.1	14.0	31.2	0.2	2.9
Perry	313	79.9	0.4	7.6	20.1	0.0	3.2
Piatt	151	49.7	0.0	6.7	50.3	0.0	3.9
Pike	253	66.0	1.2	7.2	34.0	0.0	1.2
Pope	32	87.5	0.0	7.1	12.5	0.0	50.0

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		Children Tested Who Were Medicaid-Enrolled (%)	Percentage of Medicaid - Enrolled Children Tested At		Children Tested Who Were Non-Medicaid-Enrolled (%)	Percentage of Non-Medicaid - Enrolled Children Tested At	
			≥10 µg/dL	≥5 µg/dL		≥10 µg/dL	≥5 µg/dL
<b>Illinois</b>	<b>237,253</b>	<b>75.7</b>	<b>0.8</b>	<b>3.7</b>	<b>24.3</b>	<b>0.6</b>	<b>3.0</b>
Pulaski	68	94.1	0.0	6.3	5.9	0.0	0.0
Putnam	68	50.0	0.0	0.0	50.0	0.0	0.0
Randolph	370	77.6	0.3	3.5	22.4	0.0	3.6
Richland	214	86.9	0.5	4.8	13.1	0.0	7.1
Rock Island	2,949	77.0	2.0	8.6	23.0	1.3	6.5
St. Clair	5,459	84.0	0.9	4.4	16.0	1.0	3.9
Saline	507	75.1	0.8	4.2	24.9	0.0	5.6
Sangamon	2,810	78.4	1.5	6.9	21.6	1.0	4.8
Schuyler	83	71.1	0.0	6.8	28.9	0.0	12.5
Scott	124	71.0	2.3	9.1	29.0	2.8	2.8
Shelby	282	76.2	0.5	4.7	23.8	0.0	4.5
Stark	129	76.7	3.0	11.1	23.3	6.7	16.7
Stephenson	1,161	81.7	5.8	14.5	18.3	1.9	10.3
Tazewell	1,437	63.5	1.0	3.6	36.5	0.6	2.5
Union	213	72.3	0.6	5.8	27.7	0.0	5.1
Vermilion	1,501	80.9	0.4	3.0	19.1	0.7	2.1
Wabash	185	71.9	3.0	9.8	28.1	3.8	9.6
Warren	350	73.7	3.1	7.4	26.3	2.2	8.7
Washington	145	58.6	2.4	5.9	41.4	1.7	3.3
Wayne	313	75.4	0.8	3.8	24.6	0.0	2.6
White	235	70.2	1.8	5.5	29.8	0.0	2.9
Whiteside	1,059	76.1	1.7	6.0	23.9	0.8	4.0
Will	9,873	73.8	0.5	2.6	26.2	0.2	2.7
Williamson	1,075	72.4	1.0	11.1	27.6	0.0	9.4
Winnebago	4,824	83.8	1.2	5.4	16.2	1.0	3.3
Woodford	451	47.0	2.4	4.2	53.0	0.8	2.1

**Source:** Illinois Department of Public Health – Illinois Lead Program Surveillance Database and Illinois Department of Healthcare and Family Services Enterprise Data Warehouse, 2016 through an interagency data agreement. The SAS (statistical analysis software) and SQL (Structured Query Language) codes were used to query databases.

Approximately 2.6 percent of all children tested were Medicaid-enrolled and had lead levels at the reference value of  $\geq 5$  µg/dL, compared to only 0.7 percent of children who did not participate in any medical assistance program. Based on all children tested in 2016, of those with BLLs  $\geq 10$  µg/dL, 0.6 percent were Medicaid-enrolled and 0.1 percent were non-Medicaid. The overall geometric mean BLL in 2016 was about 1.9 µg/dL irrespective of Medicaid-enrolled status.



## Blood Lead Levels in Refugee Children

IDPH's Minority Health Program manages the Refugee Health Assessment Program. This program monitors the testing of refugee children for blood lead poisoning following the CDC guidelines as part of the initial domestic refugee health assessment.

In 2016, there were 564 refugee children six years of age and younger at the time of testing who completed the initial health assessment in Illinois. Of those assessed, 509 children (90 percent) had blood lead results recorded at IDPH Refugee Health Assessment Database (Table 11).

**Table 11:** BLLs in Refugee Children 6 Years of Age and Younger in 2016

Number and Percentage of Refugee Children	N	%
Total number of children who completed the initial health assessment	564	
Children who completed the initial health assessment including a blood lead test	509	90
BLL $\geq$ 5 $\mu$ g/dL	67	13

**Source:** Illinois Department of Public Health – Center for Minority Health, 2016

## Recommendations for Refugee Children Post-Arrival Lead Testing

1. Check BLL of all refugee children six months–16 years of age upon their arrival in the United States
2. Within three–six months post-resettlement, a follow-up blood lead test should be conducted on all refugee children aged six months–six years of age, regardless of the initial testing BLL result.
3. Within 90 days of their arrival in the United States, children aged six months through six years of age should also undergo nutritional assessment and testing for hemoglobin or hematocrit level.
4. Provide daily pediatric multivitamins with iron to all refugee children aged six months through six years of age.

**Source:** Adapted from <http://www.cdc.gov/immigrantrefugeehealth/guidelines/lead-guidelines.html> For more information on the Refugee Health Assessment Program, go to <http://www.dph.illinois.gov/topics-services/life-stages-populations/minority-health>

*Beware of lead in some cultural products, i.e.: pay-loo-ah, daw tway gaw mo, greta, azarcon, litargirio, surma, tiro (tozali or kwalli), lozeena, tamarind, lead-glazed ceramics, make-up and beauty products.*

## Adult Blood Lead Registry

The Program and the Adult Blood Lead Registry (ABLR) comprise the Illinois blood lead surveillance systems (Figure 9).

**Figure 9:** Illinois Blood Lead Surveillance Programs



Approximately 99 percent of lead absorbed by an adult can be excreted within a few weeks compared to only 33 percent excretion by children. Lead exposure in adults may result in short- or long-term cognitive dysfunction, adverse reproductive outcomes, and cardiovascular or kidney damage. Adults may also suffer from complications during pregnancy, high blood pressure, or neurological disorders.

The **ABLR**, maintained by Division of Epidemiologic Studies, collects blood lead data for adults 16 years of age and older and notifies federal enforcement agencies to trigger inspections and/or interventions. Laboratories are now mandated to report levels of  $\geq 10$   $\mu\text{g}/\text{dL}$ . According to the 2016 Illinois ABLR annual report:

- ABLR made 10 referrals to the Occupational Safety and Health Administration (OSHA) for seven companies with employees who had BLL  $\geq 40$   $\mu\text{g}/\text{dL}$  in calendar year 2016. These quarterly ABLR reports to OSHA led to four safety inspections with one inspection that resulted in proposed fines totaling \$12,549 in OSHA violations.
- ABLR notified OSHA within 24 hours of any case with an EBLL  $\geq 60$   $\mu\text{g}/\text{dL}$ .
- Data collection and OSHA notification continues at  $\geq 40$   $\mu\text{g}/\text{dL}$  BLL.
- **Funding and other resources:** In 2013, the National Institute of Occupational Safety and Health (NIOSH) cancelled all contracts to fund state Adult Blood Lead programs in accordance with the Budget Control Act of 2011 and that lack of funding continues.
- During the 2016 calendar year, 2,918 lab reports were added to the ABLR database which now contains 18,117 records.

Illinois Health and Hazardous Substances Registry Annual Reports:

<http://dph.illinois.gov/sites/default/files/publications/publicationsoppsfy16-ihhsr-annual-report.pdf>

For more information on the Illinois ABLR visit:

<http://dph.illinois.gov/data-statistics/epidemiology/occupational-disease-registry>

## Blood Lead Testing During Pregnancy

Pregnant women with BLLs  $\geq 10$   $\mu\text{g}/\text{dL}$  should receive environmental assessments to identify and eradicate sources of excessive lead exposure. Providers should offer education on preventing further exposure, housekeeping and proper nutrition, particularly related to stopping the ingestion of non-food substances that contain lead.

### Potential adverse health effects on pregnancy

- Gestational hypertension
- Spontaneous abortion
- Low birthweight
- Impaired neurodevelopment

Each 1  $\mu\text{g}/\text{dL}$  increase in umbilical cord blood lead was found to be associated with a reduction of 0.6 points in the mental development index scores of the Bayley Scales of Infant Development at age three months, with similar results at age six months (Dietrich et. al. 1987).

### Common risk factors for lead poisoning in pregnant women

- Past exposures
- Recent immigration status
- Consumption of non-food items (pica)
- Consumption of lead-contaminated water
- Occupation or hobbies
- Cultural practices, (e.g., use of traditional medications or cosmetics)
- Use of traditional lead glazed pottery
- Compromised nutritional status

### Management of blood lead levels of pregnant persons

A pregnant person with a BLL  $\geq 10$   $\mu\text{g}/\text{dL}$  should have an obstetric evaluation, regardless of whether symptoms are present. A [Prenatal-risk Evaluation for Lead Exposure](#) should be conducted (Appendix 3).

<http://dph.illinois.gov/sites/default/files/forms/prenatal-risk-evaluationfor-lead-exposure-and-guidelines-042116.pdf>.

Special attention should be directed to:

- The pregnant person's detailed health history, including the presence or absence of clinical symptoms, the existence of pica, nutritional status (especially iron and calcium intake), dietary habits, family history of lead poisoning, potential sources of lead exposure (including exposure due to home renovation), and previous blood lead measurements
- Detailed hobbies and occupational histories of adults in the household

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- Detailed environmental histories where the pregnant person resides or frequents
- The physical examination, with particular attention to the neurological examination and psychosocial and language development
- A neurobehavioral evaluation for pregnant persons receiving chelation therapy
- An evaluation of ferritin levels

In October of 2015, the Program started collecting blood lead data as enacted by the ACT (410 ILCS 45/6.2, Testing children and pregnant persons). <http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=1523&ChapterID=35>

Preliminary data of pregnant persons tested in 2016 is displayed on Table 12.

**Table 12:** Distribution of Age and Blood Lead Levels for Pregnant Persons

Mean Age (years)	25		
Age Range (Years)	14 - 51		
Mean BLL	1.3		
BLL, µg/dL	N	Capillary, %	Venous, %
BLL Range			
<5	900	98.7	1.3
5-9	6	100	0
≥10	5	100	0
Pregnant Persons Tested	911	97.5	2.5

**Source:** Illinois Department of Public Health - Illinois Lead Program Database 2016. \*This is an ongoing study.

According to information obtained from the narrative reports submitted by delegate local health departments from July-December 2016:

- There were 398 pregnant women tested at LHDs
- There were 630 pregnant women referred to their physician for testing

For more information on lead screening during pregnancy and lactation, refer to:

- The Preventing and Testing for Childhood Lead Poisoning – A Reference Guide for Physicians and Health Care Providers <https://dph.illinois.gov/sites/default/files/publications/preventing-and-testing-for-childhood-lead-poisoning-a-reference-guide-for-physicians-and-healthcare.pdf>
- Guidelines for the Identification and Management of Lead Exposure In Pregnant and Lactating Women <http://www.cdc.gov/nceh/lead/publications/LeadandPregnancy2010.pdf>
- American Academy of Pediatrics Guidelines <http://pediatrics.aappublications.org/content/116/4/1036.full>
- American College of Obstetricians and Gynecologists <http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Lead-Screening-During-Pregnancy-and-Lactation>

**Economically**, the elimination of lead poisoning leverages large payoffs for the state of Illinois. Educational costs could be substantially increased because lead poisoning irreversibly damages a child's brain, thereby making it more difficult for a child to learn (Reyes, 2014; Gould, 2009<sup>2</sup>). Additionally, a 2007 economic analysis estimated that children born in 2002 who were exposed to lead would earn more than \$3 billion less over their lifetimes (IDPH, 2007<sup>3</sup>). Furthermore, these children would require an extra \$31 million to cover the added educational needs and medical expenses resulting from lead exposure.

**Source:** <sup>1</sup>Reyes, JW. *The Social Cost of Lead - Effects on Academic Performance and Behavior*. 2014. [http://www.cityofboston.gov/images\\_documents/Jessica%20Reyes.%20Social%20Cost%20of%20Lead\\_tcm3-48540.pdf](http://www.cityofboston.gov/images_documents/Jessica%20Reyes.%20Social%20Cost%20of%20Lead_tcm3-48540.pdf)

<sup>2</sup>Gould E. *Childhood lead poisoning - conservative estimates of the social and economic benefits of lead hazard control*. *Environ Health Perspect*. 2009 Jul;117(7):1162-7. doi: 10.1289/ehp.0800408. Epub 2009 Mar 31.

<sup>3</sup>Illinois Department of Public Health. 2007. *Illinois Lead Safe Housing Advisory Council Recommendation, Report to the Illinois General Assembly pursuant to P.A. 93-789*.



## Lead Poisoning Prevention Activities

### A. Educational Activities

IDPH strives to increase lead poisoning awareness and promote lead safe behaviors by implementing strategies toward the prevention of lead poisoning through education, risk evaluation, and early detection. IDPH encourages all clinicians to use evaluation tools when determining the risk of lead exposure in children and pregnant persons; the need to obtain a blood lead test to determine a BLL; and the required reporting of all blood lead test results. Health professionals providing health care education to parents and guardians of small children and pregnant women play an important role in the primary prevention of lead poisoning. Understanding lead poisoning evaluation methods for lead exposure and blood testing requirements for children and pregnant women is imperative when preventing lead poisoning.

The Program's regional nurses and the education coordinator conducted four lead poisoning prevention training sessions at the regional offices of IDPH for 44 health care professionals. Topics covered in the training included:

- Case management and case follow-up
- Health effects and treatment of lead poisoning
- Specimen collection, submission, and analysis at IDPH's Division of Laboratories
- Outreach and education activities
- Environmental case follow-up and compliance investigations for lead-poisoned children

Additionally, Program staff began training for the implementation of the new Healthy Homes Lead Poisoning Surveillance System (HHLPSS) data collection system, which will replace the STELLAR program. Agencies conducting lead poisoning prevention activities will use the HHLPSS program, provided by CDC, for better utilization of data collection.

Childhood lead exposure can be minimized or prevented through increased public awareness and by:

1. Applying lead-safe work practices when disturbing lead-based paint
2. Keeping the play, study, and living areas of children clean
3. Assuring that children consume a healthy diet that includes calcium and iron
4. Applying prevention strategies integrating health education and affordable housing, developed by the National Center for Healthy Housing in the [blueprint for lead poisoning](#).
5. Utilizing educational interventions for children affected by lead such as the one developed by the National Center for Environmental Health by an expert panel of CDC and non-CDC authors.  
[http://www.cdc.gov/nceh/lead/publications/Educational\\_Interventions\\_Children\\_Affected\\_by\\_Lead.pdf](http://www.cdc.gov/nceh/lead/publications/Educational_Interventions_Children_Affected_by_Lead.pdf)

For more lead poisoning prevention tips, visit CDC at <http://www.cdc.gov/nceh/lead/tips.htm>.

## B. Lead Licensees

IDPH is the agency in Illinois responsible for administration and enforcement of the Act, 410 ILCS 45/1 et. seq. The Act provides authority for IDPH to license inspectors, risk assessors, workers, supervisors, and contractors who conduct lead-based paint-related activities pursuant to the Code.

IDPH requires any person who wishes to conduct lead services in a regulated facility in Illinois to be appropriately licensed. The Program reviews and issues lead licenses for the following: lead abatement workers, lead abatement supervisors, lead inspectors, lead risk assessors, lead abatement contractors, and lead training course providers. Licenses expire annually and must be renewed (Table 13).

- Risk assessor and inspector licenses expire on December 31
- Worker and supervisor licenses expire March 31
- Contractor licenses expire May 31
- Training course provider certifications expire October 15

**Table 13:** Lead Licenses Issued in 2014-2016

	2014			2015			2016		
	Total	New	Renewed	Total	New	Renewed	Total	New	Renewed
<b>Worker</b>	871	247	624	950	217	733	752	200	552
<b>Supervisor</b>	406	20	386	506	45	461	413	33	380
<b>Inspector</b>	62	9	53	64	5	59	45	5	40
<b>Risk Assessor</b>	308	16	292	349	18	331	260	25	235
<b>Contractor</b>	164	15	149	168	18	150	159	14	145

**Source:** Illinois Department of Public Health - Illinois Lead Program Database 2014-2016

Lead training course providers were required to submit notification of all lead courses to IDPH no later than 7 calendar days prior to the start of all IDPH-approved courses (Table 14).

**Table 14:** Total Number of Notifications and Actual Lead Courses Held in 2014-2016

Class notifications and courses held*	2014	2015	2016
Notifications of upcoming lead courses received by the IDPH	408	390	382
Actual number of lead courses held	207	262	220

**Source:** Illinois Department of Public Health - Illinois Lead Program Database 2014-2016.

\*These numbers do not include RRP courses

In 2016, a total of 27 training course providers were approved to teach 117 approved classes compared to 32 providers for 136 classes in 2015. Table 15 reflects the breakdown of the number of approved Training Course Providers and the classes they were approved to teach.

**Table 15:** Total Number of Approved Training Courses and Providers in 2014-2016

Courses and Providers		2014	2015	2016
Approved Training Course Providers		29	32	27
Approved Classes for Training Course Providers				
Approved Classes for Training Course Providers	Worker Initial	13	16	11
	Worker Refresher	12	16	11
	Spanish Worker Initial	3	2	3
	Spanish Worker Refresher	2	2	2
	Polish Worker Refresher	2	1	1
	Supervisor Initial	11	14	12
	Supervisor Refresher	13	14	14
	Inspector Initial	5	4	5
	Inspector Refresher	6	6	6
	Risk Assessor Initial	5	4	5
	Risk Assessor Refresher	7	6	7
	RRP Initial	23	24	21
	RRP Refresher	16	22	19
<b>Total</b>	<b>118</b>	<b>136*</b>	<b>117</b>	

**Source:** Illinois Department of Public Health - Illinois Lead Program Database 2014-2016. \*Includes 5 approved ‘alternative courses’.

All new license applicants for lead abatement supervisor, lead inspector, and lead risk assessor licenses were required to take and pass the third party examination administered by IDPH (Table 16).

**Table 16:** Total Number of Third Party Examinations

Lead License Type	2014	2015	2016
Supervisor	65	64	59
Inspector	8	6	13
Risk Assessor	26	25	33

**Source:** Illinois Department of Public Health - Illinois Lead Program Database 2014-2016.

For approved training providers, go to: [https://data.illinois.gov/dataset/569lead\\_training\\_course\\_provider\\_list](https://data.illinois.gov/dataset/569lead_training_course_provider_list)

*Home inspections by regional office or delegate agency staff were all triggered by an elevated blood lead level. Lead inspection/risk assessment can also be triggered when a HUD inspector conducts a general inspection of the home and finds chipping, cracking or peeling paint. The homeowner is required to seek out a licensed professional to conduct the risk assessment.*



### C. Intervention - Case Management of Children with Elevated Blood Lead Levels

Comprehensive case management is initiated for children with confirmed EBLs  $\geq 10$   $\mu\text{g}/\text{dL}$ . Case management activities include a home visit by a public health nurse who provides:

- Information regarding lead poisoning prevention
- Nutritional counseling
- Information on follow-up blood testing
- Education on proper housekeeping
- Referrals to appropriate services linked to medical and developmental testing

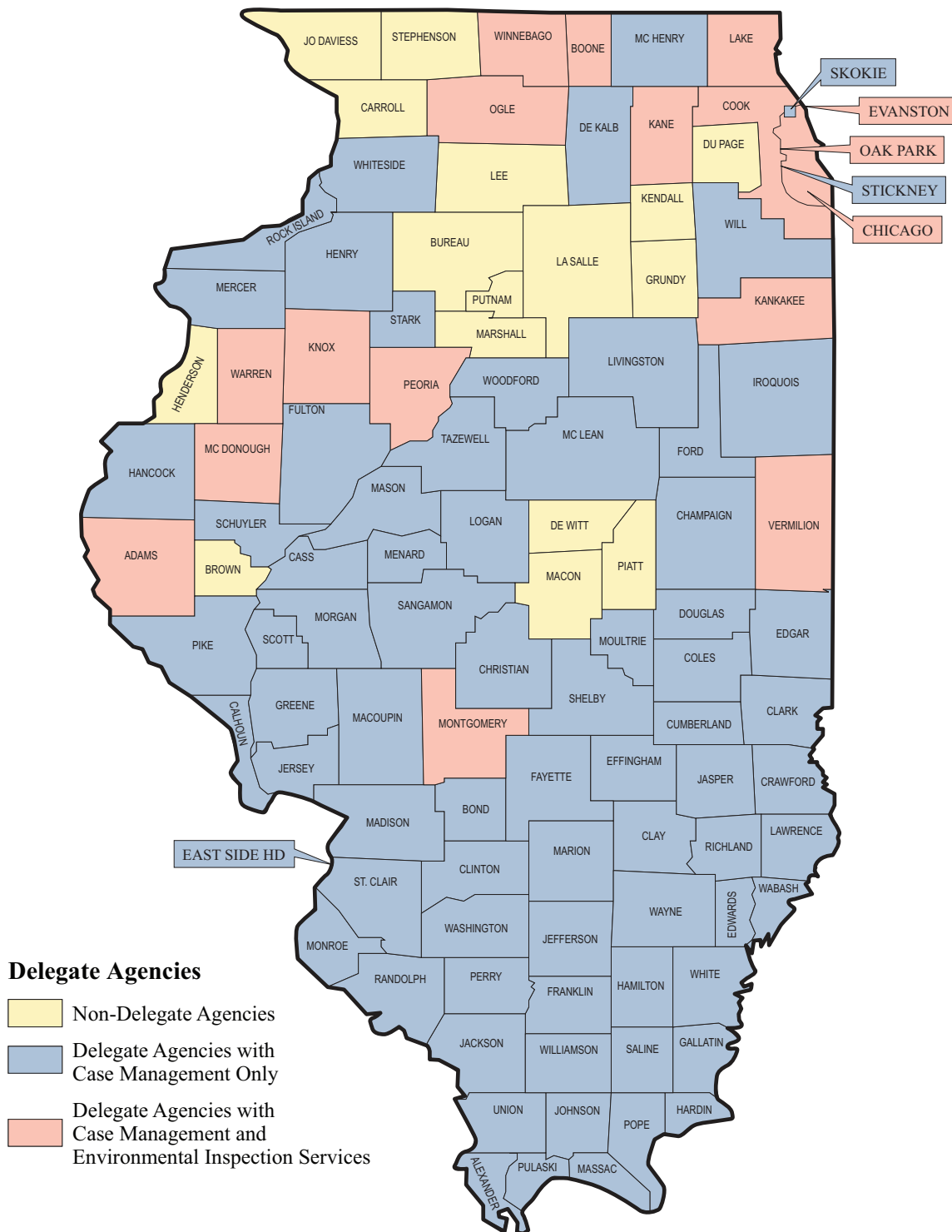
IDPH had grant agreements during 2016 with 81 delegate agencies to provide case management care for lead-poisoned children in 86 of 102 counties. In collaboration with IDPH, these delegate agencies provide outreach and education to health care providers, families of lead-poisoned children, and the general public. Each of the delegate agencies used the STELLAR data processing system to maintain records for case management of children in their jurisdiction.

Local health departments that do not participate in the Illinois Lead Program are considered non-delegate agencies. There were 16 non-delegate agencies where case management services were provided by the IDPH Lead Program Regional Nurse Consultants (Table 17 and Figure 10).

**Table 17:** Non-delegate Agencies with Case Management Services provided by IDPH in 2016

Brown County	Bureau County	Carroll County	Dewitt County
DuPage County	Grundy County	Henderson County	Jo Daviess County
Kendall County	La Salle	Lee County	Macon County
Marshall County	Putnam County	Piatt County	Stephenson County

**Figure 10:** Illinois Lead Program Delegate and Non-delegate Agencies in 2016



**Source:** IDPH - Illinois Lead Program Database, 2016  
Created 04/05/2017

\*Note that Ogle County environmental inspection services were provided by Boone County.

**Questions that parents frequently ask during a case management home visit:**

**1. Is lead found in toys?**

*A. Lead is rarely found in toys but may be in some household items. Lead-based paint remains the most common source of childhood lead exposure.*

**2. Does a child have to eat paint chips to be lead-poisoned?**

*A. While paint chips, if eaten, are a source of poisoning, the most common source is the ingestion of lead-contaminated dust through hand-to-mouth behaviors.*

**3. What does lead poisoning actually do to the body?**

*A. Lead can interfere with brain development, contribute to behavior problems and a lowered IQ, and may cause other serious health problems.*

**4. What can I do to reduce my child's exposure to lead?**

*A. Educate yourself on lead hazards and lead safe work and housekeeping practices. Wash hands frequently.*

**5. How long will it take for the BLL to decrease?**

*A. It varies depending on the child's health status, medical treatment, and how quickly the source of the lead is eliminated from the child's environment.*



## D. Intervention - Environmental Follow-up of Children with Elevated Blood Lead Levels

Investigations by regional offices and delegate agencies were all triggered by an EBLL (Table 18a). The local or regional health department conducted environmental lead investigations to identify lead hazards. The Program served areas not covered by a delegate agency agreement. The six environmental regional offices of IDPH each had lead risk assessors who conducted home inspections for children with a confirmed EBLL. The risk assessor conducted a comprehensive risk assessment and developed a letter and report that were provided to the property owners. The property owners were then required to submit a mitigation plan to IDPH or the delegate agency for review and approval. After lead mitigation or abatement activities were completed, follow-up inspections were conducted and compliance certificates issued.

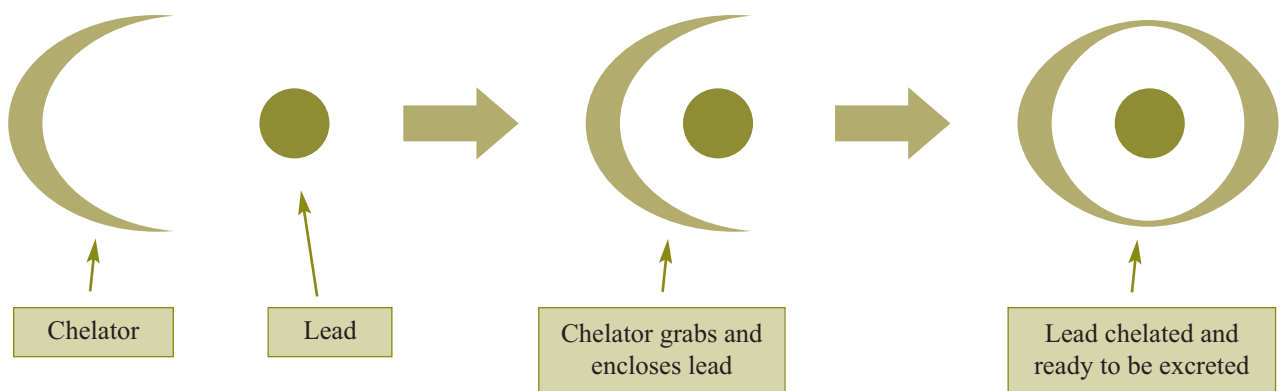
The six IDPH regional offices are presented in Table 18 and Figure 11. Based on 2016 data, 1,941 children were identified for the first time with confirmed venous BLLs  $\geq 5$   $\mu\text{g/dL}$  and 523 of those children had BLLs  $\geq 10$   $\mu\text{g/dL}$ .

A total of 1,061 environmental investigations and follow-up were conducted by IDPH and delegate agencies in 2016 (Table 18b). Certificates of Compliance were issued following the successful completion of mitigations and/or abatements in 2016. For continuous performance improvement, the program activities of delegate agencies were reviewed (18c). Reasons for case closures included:

- No lead hazard identified
- Residence or occupant not located
- Regulated facility demolished, or
- Administrative determination made by delegate agencies with environmental services

## E. Intervention - Chelation of Children with Elevated Blood Lead Levels

Reducing a child's exposure to lead is the best way to treat childhood lead poisoning. However, medical treatment by chelation involving use of chemical compounds that bind to lead to remove the toxic metal from the body may be used for extremely EBLL. Chemical compounds that have been used for lead chelation include succimer, penicillamine, ethylenediaminetetraacetic acid (EDTA), or BAL.



**Table 18:** Environmental Assessment Activities for Lead Sources by Delegate Agencies and the IDPH’s Division of Environmental Health Regions in 2016

18a. Children Tested for Blood Lead		Champaign	Edwardsville	Marion	Peoria	Rockford	West Chicago	TOTAL (N) <sup>2</sup>
Total number of children Tested for the first time only in 2016		8,167	9,713	5,553	9,547	5,577	76,632	115,189
Confirmed cases (venous) identified for the first time only in 2016 (Incidence)	≥10 µg/dL	35	38	18	97	43	290	523
	≥5 µg/dL	113	120	51	320	142	1,193	1,941
All confirmed cases in 2016 (Prevalence)	≥10 µg/dL	68	82	43	210	117	810	1,338
	≥5 µg/dL	237	205	123	679	367	3,212	4,876
<b>18b. Environmental Investigations and Follow-up Conducted in 2016</b>								
	Central Office	Champaign	Edwardsville	Marion	Peoria	Rockford	West Chicago	TOTAL (N)
Delegate Agencies <sup>1</sup>		5	2	0	50	44	431	532
Primary Dwelling	15	5	39	22	11	19	19	130
Secondary Dwelling	0	0	0	5	0	0	5	10
Follow-up Investigations	0	32	157	137	4	50	9	389
<b>18c. Mitigation, Abatement, and Enforcement in 2016</b>								
	Central Office	Champaign	Edwardsville	Marion	Peoria	Rockford	West Chicago	TOTAL (N)
Total Mitigation/ Abatement Complete – Certificate of Compliance Issued	0	10	19	11	4	3	5	52
Public Presentations/Meetings	6	0	0	0	28	0	3	37
Local Health Department Program Review/Audit/Training	15	0	0	0	25	7	20	67

**Source:** Illinois Department of Public Health – Illinois Lead Program Surveillance Databases 2016. <sup>1</sup>Data from the delegate agencies with environmental inspection services; <sup>2</sup>Totals may not add up exactly due to unidentifiable regional address; <sup>a</sup> incomplete data. \*A totals 9,074 children had missing or suppressed addresses. Of those children, 13 had BLLs ≥10 µg/dL and 129 of the children had BLLs ≥5 µg/dL.

*Environmental remediation is required by law when a lead hazard has been identified in a home where a child with an EBLL lives or frequents. Remediation is necessary to prevent ongoing exposure to lead hazards. Children who receive medical chelation and return to an environment where lead hazards still exist remain at risk for further exposure*

Table 19 shows the regional distribution of environmental investigations and case closures performed by delegate agencies in 2016. A total of 532 environmental investigations were performed in 2016 and 580 environmental assessment cases were closed in the same year.

**Table 19:** Environmental Assessment Activities for Sources of Lead Contamination by Delegate Agencies

	Investigation, N	Environmental Closing, N	Total Activity Counts
<b>Champaign Region</b>			
Vermilion County	5	2	7
<b>Edwardsville Region</b>			
Montgomery	2	0	2
<b>Peoria Region</b>			
Knox County	13	5	18
McDonough County	1	0	1
Peoria County	31	6	37
Warren County	5	2	7
Total	<b>50</b>	<b>13</b>	<b>63</b>
<b>Rockford Region</b>			
Boone County	10	1	11
Winnebago County	34	24	58
Total	<b>44</b>	<b>25</b>	<b>69</b>
<b>West Chicago Region</b>			
Chicago	286	378	664
Cook County	72	75	147
Evanston	5	8	13
Kane County	49	52	101
Kankakee County	6	7	13
Lake County	9	16	25
Oak Park	4	4	8
Total	<b>431</b>	<b>540</b>	<b>971</b>

**Source:** Illinois Department of Public Health – Illinois Lead Program Surveillance Databases 2016.

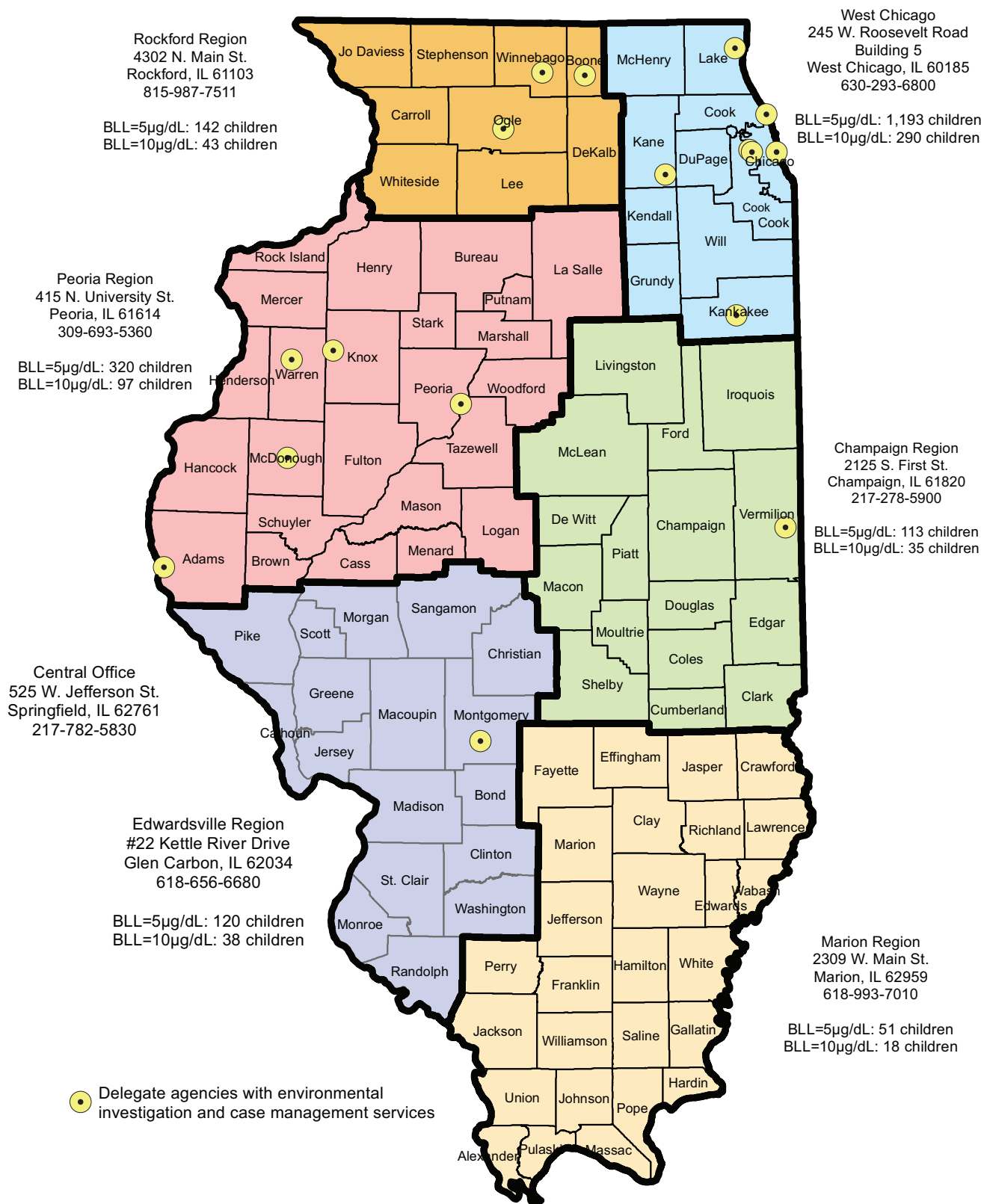
In calendar year 2016, IDPH had grant agreements with 16 delegate agencies to provide environmental inspection services in addition to case management services (Table 20 and Figure 11).

**Table 20:** Delegate Agencies with Case Management and Environmental Investigation Services in 2016

Adams County Health Department	Boone County Health Department	Chicago Department of Public Health	Cook County Health Department
Evanston Health Department	Kane County Health Department	Kankakee County Health Department	Knox County Health Department
Lake County Health Department	McDonough County Health Department	Montgomery County Health Department	Oak Park Health Department
Peoria County Health Department	Vermilion County Health Department	Warren County Health Department	Winnebago County Health Department

\*Note: Ogle County environmental inspection services were performed by Boone County

**Figure 11: Children with Elevated Blood Lead Levels Identified for the First Time in 2016 by Environmental Health Regions**



Source: Illinois Lead Program Surveillance

## F. Compliance and Enforcement

Following the Act and Code, IDPH:

- Conducted on-site investigations of lead mitigation/abatement projects statewide per notifications received by IDPH central office (Table 21):
  - Determined if individuals on-site were properly licensed
  - Ensured lead mitigation/abatement projects were conducted in compliance with the Act and Code
- Sought enforcement action against persons found in violation of the Act and Code, including but not limited to: persons performing lead services, such as lead inspection, risk assessment, mitigation and abatement
- Generated a summary compliance and enforcement action report for IDPH activities

**Table 21:** Total Number of Abatement Projects

Compliance Type	2014	2015	2016
Abatement Projects	834	713	734

**Source:** Illinois Department of Public Health - Illinois Lead Program Database 2014-2016.



Peer reviewers



## Governor’s Cabinet on Children and Youth: Reducing Childhood Lead Burden Committee

Governor Bruce Rauner, in February 2016, established the “Governor’s Cabinet on Children and Youth” with a vision to ensure that all children in Illinois are healthy, safe, well-educated, and self-sufficient. In September 2016, the 15 state agency leadership cabinet adopted “decreasing childhood lead burden” as one of its top three priority projects for fiscal year 2017. The main goal was to decrease childhood exposure to lead in Illinois through:

- increased lead prevention efforts,
- increased environmental assessment and lead mitigation efforts,
- improved, coordinated, and targeted case management and child health services, and
- more comprehensive data analyses to instruct policy decisions.

The Reducing Childhood Lead Burden committee has developed 5 outcome workgroups:

- Improved identification and response
- Ensuring safe homes
- Data-driven decisions
- Connecting to social services
- Prevention education

For more information about the committee on decreasing childhood lead burden, contact the Division of Environmental Health at 217-782-3517 or visit the Children’s Cabinet website at <http://www.illinois.gov/gov/children>.

*Regulations that mandated removal of lead from food canning, gasoline, new residential paint, plumbing, and other sources significantly contributed to the decrease in childhood lead poisoning.*

## Links to References Used in this Annual Surveillance Report

Illinois Department of Public Health (IDPH): Lead Poisoning Prevention Act, P.A. 87-175. 410 ILCS 45/1) (from Ch. 111 1/2, par. 1301 <http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=1523&ChapterID=35>)

IDPH: Lead Poisoning Prevention Code, 77 IL. Admin Code 845  
<http://www.ilga.gov/commission/jcar/admincode/077/07700845sections.html>

CDC's National Surveillance Data (1997-2015) <http://www.cdc.gov/nceh/lead/data/national.htm>

CDC: Lead Toxicity- How Are People Exposed to Lead?  
<http://www.atsdr.cdc.gov/csem/csem.asp?csem=7&po=6>

U.S. EPA: Lead <https://www.epa.gov/lead>

U.S. Food and Drug Administration (FDA): Drugs - Drug Safety and Availability, FDA warns consumers about health risks with Alikay Naturals – Bentonite Me Baby – Bentonite Clay  
<http://www.fda.gov/Drugs/DrugSafety/ucm483838.htm>

U.S.EPA: Safe Drinking Water Act (<http://www.epa.gov/sdwa>)

U.S. EPA: Lead and Copper Rule <http://www.epa.gov/dwreginfo/lead-and-copper-rule>

Illinois Polluting Control Board Regulations (IPCB): Primary Drinking Water Standards for Public Water Supplies under the authority of the Safe Drinking Water Act in Illinois (35 IAC Part 611 IPCB, includes the Lead/Copper Rule) (<http://www.ipcb.state.il.us/SLR/IPCBandIEPAEnvironmentalRegulations-Title35.aspx>)

U.S. EPA: Protect Your Family from Exposures to Lead  
<https://www.epa.gov/lead/protect-your-family-exposures-lead>

CDC: Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women  
<http://www.cdc.gov/nceh/lead/publications/LeadandPregnancy2010.pdf>

U.S. Consumer Product Safety Commission (CPSC): Report an unsafe product – Children's Product  
<http://www.cpsc.gov/Business--Manufacturing/Business-Education/childrens-products>

CDC: Lead – Water <http://www.cdc.gov/nceh/lead/tips/water.htm>

IDPH: The Public Area Sanitary Code, 77 IAC 895  
<http://www.ilga.gov/commission/jcar/admincode/077/07700895sections.html>

IEPA [http://water.epa.state.il.us/dww/Maps/Map\\_Template.jsp](http://water.epa.state.il.us/dww/Maps/Map_Template.jsp)

U.S. EPA: Ground Water and Drinking Water <http://www.epa.gov/safewater/dwinfo/index.html>

U.S. EPA: Ground Water & Drinking Water- frequent questions <https://safewater.zendesk.com/hc/en-us>

National Ground Water Association <http://www.wellowner.org>

Environmental Science and Technology: Detection and Evaluation of Elevated Lead Release from Service Lines: A Field Study <http://pubs.acs.org/doi/abs/10.1021/es4003636>

IEPA/IDPH: Preliminary Report on Lead in Public Water Systems  
<http://dph.illinois.gov/sites/default/files/publications/publicationsohpiepa-preliminary-report-lead-pws.pdf>

Scorecard – The Pollution Information Site <http://scorecard.goodguide.com/env-releases/lead/>

Epoch Times: Lead Poisoning a Significant Cause of Inner-City Crime, Say Researchers  
[http://www.theepochtimes.com/n3/2145046-lead-poisoning-a-significant-cause-of-inner-city-crime-say-researchers/?utm\\_expvariant=D001\\_01&utm\\_expnid=21082672-11.b4WAd2xRR0ybC6ydhoAj9w.1](http://www.theepochtimes.com/n3/2145046-lead-poisoning-a-significant-cause-of-inner-city-crime-say-researchers/?utm_expvariant=D001_01&utm_expnid=21082672-11.b4WAd2xRR0ybC6ydhoAj9w.1)

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[http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml?\\_ts=491408690777](http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml?_ts=491408690777)

American Healthy Homes Survey, 2011  
[http://portal.hud.gov/hudportal/documents/huddoc?id=AHHS\\_REPORT.pdf](http://portal.hud.gov/hudportal/documents/huddoc?id=AHHS_REPORT.pdf)

IDPH: Childhood Lead Risk Questionnaire <http://www.dph.illinois.gov/sites/default/files/forms/childhood-lead-risk-questionnaire-and-guidelines-042116.pdf>

CDC Wonder: <http://wonder.cdc.gov/>

IDPH: Lead Poisoning Prevention: <http://dph.illinois.gov/topics-services/environmental-health-protection/lead-poisoning-prevention>

FDA: FDA Investigates Elevated Lead Levels Linked to Ton Shen Health/Life Rising Dietary Supplements  
<http://www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm518288.htm>

HFS Medical Programs <https://www.illinois.gov/hfs/MedicalPrograms/AllKids/Pages/default.aspx>

HFS. Handbook for Providers of Healthy Kids Services  
<https://www.illinois.gov/hfs/SiteCollectionDocuments/hk200.pdf>

The SAS statistical analysis software Version 9.4

CDC. Screening for Lead during the Domestic Medical Examination for Newly Arrived Refugees  
<http://www.cdc.gov/immigrantrefugeehealth/guidelines/lead-guidelines.html>

IDPH: Annual Report Illinois Health and Hazardous Substances Registry July 2014 through June 2015  
<http://dph.illinois.gov/sites/default/files/publications/ihhsr-ann-rpt-29-fy15-040816.pdf>

IDPH: Adult Blood Lead Registry <http://dph.illinois.gov/data-statistics/epidemiology/occupational-disease-registry>

A Prenatal-risk Evaluation for Lead Exposure <http://dph.illinois.gov/sites/default/files/forms/prenatal-risk-evaluationfor-lead-exposure-and-guidelines-042116.pdf>

CDC: Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women  
<http://www.cdc.gov/nceh/lead/publications/LeadandPregnancy2010.pdf>

ACOG: Lead Screening During Pregnancy and Lactation <http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Lead-Screening-During-Pregnancy-and-Lactation>

IDPH: The Preventing and Testing for Childhood Lead Poisoning – A Reference Guide for Physicians and Health Care Providers <https://dph.illinois.gov/sites/default/files/publications/preventing-and-testing-for-childhood-lead-poisoning-a-reference-guide-for-physicians-and-healthcare.pdf>

American Academy of Pediatrics Guidelines <http://pediatrics.aappublications.org/content/116/4/1036.full>

Gould E. Childhood Lead Poisoning: Conservative Estimates of the Social and Economic Benefits of Lead Hazard Control. *Environ Health Perspect.* 2009 Jul;117(7):1162-7. doi: 10.1289/ehp.0800408. Epub 2009 Mar 31 <http://www.ncbi.nlm.nih.gov/pubmed/19654928>

Reyes, JW. The Social Cost of Lead - Effects on Academic Performance and Behavior. 2014. [http://www.cityofboston.gov/images\\_documents/Jessica%20Reyes.%20Social%20Cost%20of%20Lead\\_tcm3-48540.pdf](http://www.cityofboston.gov/images_documents/Jessica%20Reyes.%20Social%20Cost%20of%20Lead_tcm3-48540.pdf)

IDPH: 2007. Illinois Lead Safe Housing Advisory Council Recommendation; Report to the Illinois General Assembly pursuant to P.A. 93-789 <http://www.ilga.gov/legislation/publicacts/fulltext.asp?Name=093-0789&GA=93>

CDC: Educational Interventions for Children Affected by Lead [http://www.cdc.gov/nceh/lead/publications/Educational\\_Interventions\\_Children\\_Affected\\_by\\_Lead.pdf](http://www.cdc.gov/nceh/lead/publications/Educational_Interventions_Children_Affected_by_Lead.pdf)

National Center for Healthy Housing: Preventing Lead Exposure in U.S. Children: A Blueprint for Action [http://www.nchh.org/Portals/0/Contents/lead%20strategies\\_v8%20\(22%20October%202014\).pdf](http://www.nchh.org/Portals/0/Contents/lead%20strategies_v8%20(22%20October%202014).pdf)

IDPH: Lead Training Course Provider List [https://data.illinois.gov/dataset/569lead\\_training\\_course\\_provider\\_list](https://data.illinois.gov/dataset/569lead_training_course_provider_list)

IDPH: Clear-Win Pilot Phase Evaluation <http://dph.illinois.gov/sites/default/files/publications/publications-ohp-clear-winreport-042016.pdf>

Lead Exposure in Children: Prevention, Detection, and Management - Committee on Environmental Health Pediatrics October 2005, VOLUME 116 / ISSUE 4 <http://pediatrics.aappublications.org/content/116/4/1036.full>

IDPH: Lead Testing and Case Follow-up Guidelines for Local Health Departments  
June 2015 - Recommended Schedule for Follow-up of Blood Lead Draw Obtaining a Confirmatory (Venous) Test for Follow-up of Capillary Blood Draw; Pages 7-8  
<http://dph.illinois.gov/sites/default/files/publications/lead-testing-and-case-followup-guidelines-for-local-health-departments-042116.pdf>

Illinois Morbidity and Mortality Bulletin (IMMB): Childhood Lead Exposure, Testing Rate, and Blood Lead Poisoning Prevalence in Illinois and Chicago, 1996-2012. Vol. 1, Issue 2 Pages 13 – 33.  
<http://www.dph.illinois.gov/sites/default/files/publications/immb-vol1-issue2-040816.pdf>

## Additional Resources

### Illinois Lead Program

Illinois Department of Public Health

525 W. Jefferson St.

Springfield, Il 62761

Phone: 866-909-3572 or 217-782-3517

The hearing impaired may dial 800-547-0466

<http://dph.illinois.gov/topics-services/environmental-health-protection/lead-poisoning-prevention>

### Illinois Public Health Association (IPHA)

<http://www.ipha.com>

### American Public Health Association (APHA)

<http://www.apha.org>

### National Center for Healthy Housing (NCHH)

<http://www.nchh.org>

### U.S. Centers for Disease Control and Prevention (CDC)

<http://www.cdc.gov/nceh/lead>

<http://www.cdc.gov/healthywater/drinking>

### U.S. Consumer Product Safety Commission (CPSC)

<http://www.cpsc.gov>

### U.S. Department of Housing and Urban Development (HUD) Office of Lead Hazard Control and Healthy Homes

<https://www.hud.gov/healthyhomes/>, and

[lead.regulations@HUD.gov](mailto:lead.regulations@HUD.gov)

### U.S. Environmental Protection Agency (U.S.EPA)

<http://www.epa.gov/lead>

(800) 424-LEAD / (800) 424-5323

### Safe Drinking Water Hotline

<http://www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water>

(800) 426-4791

## Appendix 1.

### Testing Rates and Elevated Blood Lead Level Stratified by Age, Birth Cohort, and Zip Code

*Rates of Testing and Elevated Blood Lead Level Stratified by Age, Birth Cohort, and ZIP code by Ali Abbasi, BA/MS/MPhil: Intern from the University of Chicago Pritzker School of Medicine*

#### Introduction

The objective of this study was to measure rates of testing for lead exposure and rates of Elevated Blood Lead Levels (EBLL) for children in Illinois stratified by age, year of birth, and place of birth. Testing rates are not easily calculated, because lead tests are often reported with misspelled names and addresses. This makes it difficult to determine whether two lead tests come from the same child or from two different children. In this analysis, we used a custom matching algorithm that allows for misspelling to link each lead test to a birth record from the Illinois vital records. The vital records also provided an estimate of the total number of children living in each ZIP code which allowed us to convert the number of tests to testing rates. The results from this analysis will help improve lead surveillance in Illinois and inform our recommendations on appropriate ages for testing.

#### Methods

All birth records for children born in 2010-2014 were extracted from the vital records data. Next, all lead tests performed before 12/31/2016 on children born between 2010-2014 were extracted and each lead test was matched to a birth record using a Jarow-Winkler string comparison algorithm on first name, last name and date of birth. When a lead test was linked to multiple birth records (fewer than 0.1% of cases), the lead test was linked to the birth record for which the ZIP code at birth was closer to the ZIP code specified in the lead test. Capillary tests were excluded if they occurred within two months of a venous test, because capillary tests are less accurate than venous tests<sup>1</sup>. ZIP codes were grouped into three categories: High Risk (Chicago), High Risk (Other), Low Risk<sup>2</sup>. Data analysis was conducted in R 3.4.1 using the RecordLinkage package.<sup>3</sup>

#### Results

There were 1,099,856 lead tests that met the criteria specified above. Approximately 91.8% of lead tests matched to a birth record. Of all 803,977 birth records between 2010 and 2014, 60.1% matched to at least one lead test. Figure 1a shows the percentage of children that have been tested at each age stratified by ZIP code group and by birth cohort. Of children born in Chicago, 73.4% received at least one lead test, compared to 74.0% in high risk ZIP codes outside of Chicago and 50.0% in low risk ZIP codes. Children in Chicago are tested earlier than children in other parts of the state. In Chicago, children are first tested at 14.9 months on average, compared to 16.2 months in other high-risk ZIP codes and 16.8 months in low risk ZIP codes. The reason for the earlier testing may be that the Chicago Department of Public health requires 4-5 tests per child between 6 and 36 months of age<sup>4</sup>, compared to the state-wide guidelines which call for 2 tests per child.

<sup>1</sup> Anderson et al., "Using State Lead Poisoning Surveillance System Data to Assess False Positive Results of Capillary Testing."

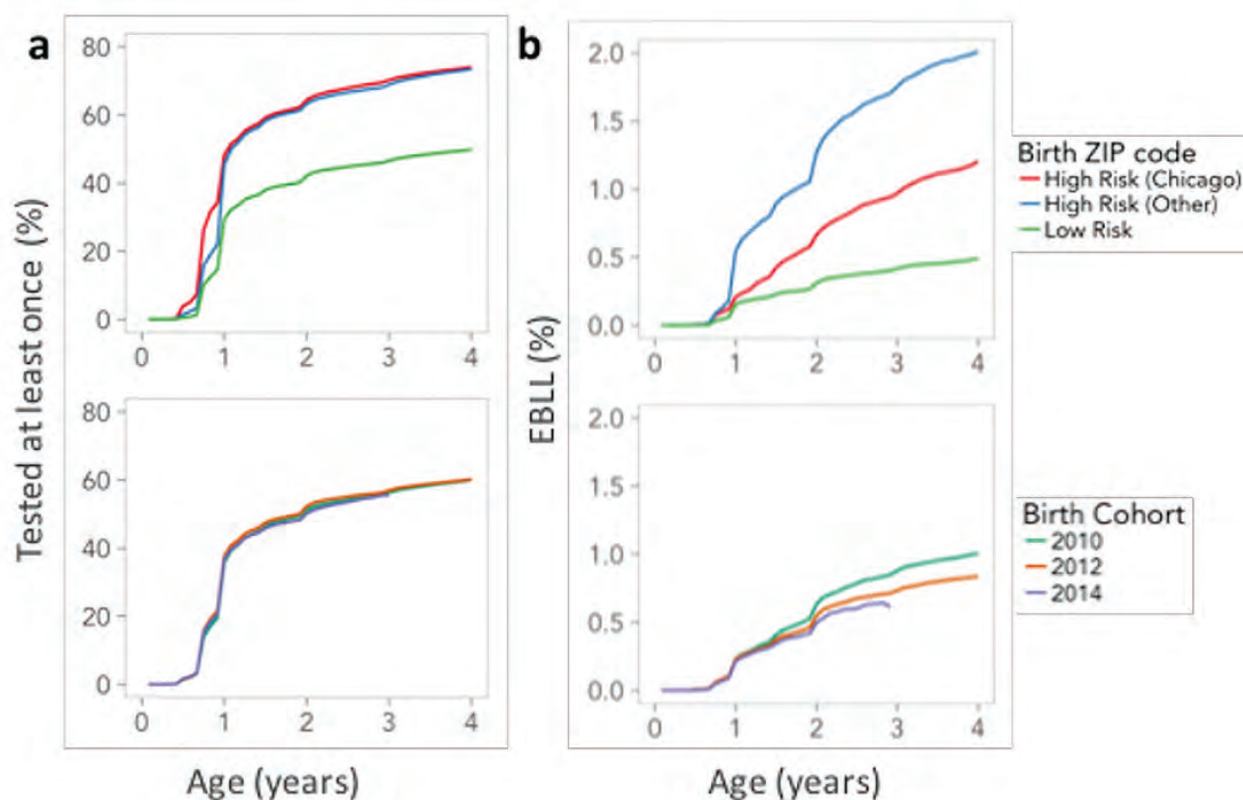
<sup>2</sup> Health care providers in Illinois are required to test children if they reside in a high-risk ZIP code or if they fulfill certain criteria such as receiving public assistance and living in a house built before 1978. There are 629 ZIP codes designated high risk across the state, including all ZIP codes in Chicago.

<sup>3</sup> Murat Sariyar and Andreas Borg, "The RecordLinkage Package: Detecting Errors in Data."

<sup>4</sup> [https://www.cityofchicago.org/city/en/depts/cdph/supp\\_info/inspections---permitting/childhood\\_lead\\_poisoningpreventionandhealthyhomesprogram.html](https://www.cityofchicago.org/city/en/depts/cdph/supp_info/inspections---permitting/childhood_lead_poisoningpreventionandhealthyhomesprogram.html)

Figure 1b shows rates by age of EBLL defined as at least one test result of 10µg or above. The majority of EBLL occur between 11 and 25 months of age with higher rates of EBLL in high risk ZIP codes than in low risk ZIP codes. Between the 2010-2014 birth cohorts there was a noticeable decline in the rates of EBLL. At 25 months of age, 0.68% of children in the 2010 birth cohort had at least one EBLL, compared to 0.59% in the 2012 birth cohort and 0.53% in the 2014 birth cohort. This finding is consistent with the national trend which has posted steady decreases in rates of EBLL over the past decades<sup>5,6</sup>.

This analysis has several limitations. The denominator used in calculating rates of testing and EBLL is the number of children born in each area. This means mobility both between high and low risk ZIP codes and children moving in and out of the state was not accounted for. In reality, the testing rates are higher than reported in this study, because some of the children who are counted as not tested actually moved out of the state before they were due to be tested. Additionally, many lead tests are not reported to IDPH. According to a 2016 report from the Illinois Department of Healthcare and Family Services<sup>7</sup>, 16.5% of Medicaid lead test claims in 2016 could not be matched to a lead test report received by IDPH. This implies that the testing rates estimated in this study are lower limits to the true testing rates.



**Figure 1** a Testing rates b Rates of EBLL **top** stratified by ZIP code type **bottom** stratified by year of birth

<sup>5</sup> Illinois Department of Public Health, “Preventing and Screening for Childhood Lead Poisoning A Reference Guide for Physicians and Health Care Providers.”

<sup>6</sup> Tsoi et al., “Continual Decrease in Blood Lead Level in Americans.”

<sup>7</sup> Illinois Department of Healthcare and Family Services, “Provider Blood Lead Screening Report.”

## Appendix 2.

### Childhood Lead State of Illinois Risk Questionnaire



State of Illinois  
Illinois Department of Public Health

### Childhood Lead Risk Questionnaire

**ALL CHILDREN 6 MONTHS THROUGH 6 YEARS OF AGE MUST BE EVALUATED FOR LEAD POISONING  
(410 ILCS 45/6.2)**

**A blood lead test should be performed on children:**

- with any “Yes” or “Don’t Know” response
- living in a high-risk ZIP code area
- all Medicaid-eligible children should have a blood lead test prior to 12 months of age and 24 months of age. If a Medicaid-eligible child between 36 months and 72 months of age has not been previously tested, a blood lead test should be performed.

**If responses to all the questions are “No”:**

- re-evaluate at every well child visit or more often if deemed necessary

Child’s name \_\_\_\_\_ Today’s date \_\_\_\_\_

Age \_\_\_\_\_ Birthdate \_\_\_\_\_ ZIP Code \_\_\_\_\_

**Respond to the following questions by circling the appropriate answer.**

**RESPONSE**

- |   |     |    |            |
|---|-----|----|------------|
| 1. Is this child eligible for or enrolled in Medicaid, Head Start, All Kids or WIC?   | Yes | No | Don’t Know |
| 2. Does this child have a sibling with a blood lead level of 10 mcg/dL or higher?   | Yes | No | Don’t Know |
| 3. Does this child live in or regularly visit a home built before 1978?   | Yes | No | Don’t Know |
| 4. In the past year, has this child been exposed to repairs, repainting or renovation of a home built before 1978?  | Yes | No | Don’t Know |
| 5. Is this child a refugee or an adoptee from any foreign country?  | Yes | No | Don’t Know |
| 6. Has this child ever been to Mexico, Central or South America, Asian countries (i.e., China or India), or any country where exposure to lead from certain items could have occurred (for example, cosmetics, home remedies, folk medicines or glazed pottery)?  | Yes | No | Don’t Know |
| 7. Does this child live with someone who has a job or a hobby that may involve lead (for example, jewelry making, building renovation or repair, bridge construction, plumbing, furniture refinishing, or work with automobile batteries or radiators, lead solder, leaded glass, lead shots, bullets or lead fishing sinkers)? | Yes | No | Don’t Know |
| 8. At any time, has this child lived near a factory where lead is used (for example, a lead smelter or a paint factory)?  | Yes | No | Don’t Know |
| 9. Does this child reside in a high-risk ZIP code area? (see reverse side of page for list)   | Yes | No | Don’t Know |

**If there is any “Yes” or “Don’t Know” response; and**

- the child has proof of two consecutive blood lead test results (documented below) that are each less than 10 mcg/dL (with one test at age 2 or older), **and**
- there has been no change in the child’s living conditions, a blood lead test is not needed at this time.

Test 1: Blood Lead Result \_\_\_\_\_mcg/dL Date \_\_\_\_\_ Test 2: Blood Lead Result \_\_\_\_\_mcg/dL Date \_\_\_\_\_

\_\_\_\_\_  
*Signature of Doctor/Nurse*

\_\_\_\_\_  
*Date*

**Illinois Lead Program  
866-909-3572 or 217-782-3517  
TTY (hearing impaired use only) 800-547-0466**



## Appendix 2. (continued)

### Pediatric Lead Poisoning High-Risk ZIP Code Areas



State of Illinois  
Illinois Department of Public Health

### Pediatric Lead Poisoning High-Risk ZIP Code Areas

<b>Adams</b> 62301 62320 62324 62339 62346 62348 62349 62365	<b>Christian</b> 62083 62510 62517 62540 62546 62555 62556 62557 61944 62570	<b>DuPage</b> 60519 <b>Edgar</b> 61917 61924 61932 61933 61940 61944 61949 <b>Edwards</b> 62476 62806 62815 62818 <b>Effingham</b> None <b>Fayette</b> 62458 62880 62885 <b>Ford</b> 60919 60933 60936 60946 60952 60957 60959 60962 61773 <b>Franklin</b> 62812 62819 62822 62825 62874 62884 62891 62896 62983 62999 <b>Fulton</b> 61415 61427 61431 61432 61441 61477 61482 61484 61501 61519 61520 61524 61531 61542 61543 61544 61563 <b>Gallatin</b> 62934 <b>Greene</b> 62016 62027 62044 62050 62054 62078 62081 62082 62092	<b>Grundy</b> 60437 60474 <b>Hamilton</b> 62817 62828 62829 62859 <b>Hancock</b> 61450 62311 62313 62316 62318 62321 62330 62334 62336 62354 62367 62373 62379 62380 <b>Hardin</b> 62919 62982 <b>Henderson</b> 61418 61425 61454 61460 61469 61471 61480 <b>Henry</b> 61234 61235 61238 61274 61413 61419 61434 61443 61490 <b>Iroquois</b> 61301 61316 61321 61325 61332 61334 61342 61348 61354 61358 61364 61370 61372 <b>Lawrence</b> 62439 62460 62466 <b>Jackson</b> 62927 62940 62950 <b>Jasper</b> 62432 62434 62459 62475 62480	<b>Jefferson</b> 62883 <b>Jersey</b> 62030 62063 <b>Jo Daviess</b> 61028 61075 61085 61087 <b>Johnson</b> 62908 62923 <b>Kane</b> 60120 60505 <b>Kankakee</b> 60901 60910 60917 60954 60969 <b>Kendall</b> None <b>Knox</b> 61401 61410 61414 61436 61439 61458 61467 61474 61485 61489 61572 <b>Lake</b> 60040 <b>LaSalle</b> 60470 60518 60531 61301 61316 61321 61325 61332 61334 61342 61348 61354 61358 61364 61370 61372 <b>Lawrence</b> 62439 62460 62466 <b>Lee</b> 60553 61006 61031 61042 61310 61318 61324 61331 61353 61378	<b>Livingston</b> 60420 60460 60920 60921 60929 60934 61311 61313 61333 61740 61741 61743 61769 61775 <b>Logan</b> 62512 62518 62519 62548 62543 62635 62643 62666 62671 <b>Macon</b> 62514 62521 62522 62523 62526 62537 62551 <b>Macoupin</b> 62009 62033 62069 62085 62088 62093 62626 62630 62640 62672 62674 62685 62686 62690 <b>Madison</b> 62002 62048 62058 62060 62084 62090 62095 <b>Marion</b> None <b>Marshall</b> 61369 61377 61424 61537 61541	<b>Massac</b> 62953 <b>McDonough</b> 61411 61416 61420 61422 61438 61440 61470 61475 62374 <b>McHenry</b> 60034 <b>McLean</b> 61701 61720 61722 61724 61728 61730 61731 61737 61770 <b>Menard</b> 62642 62673 62688 <b>Mercer</b> 61231 61260 61263 61276 61465 61466 61476 61486 <b>Monroe</b> None <b>Montgomery</b> 62015 62019 62032 62049 62051 62056 62075 62077 62089 62091 62094 62538 <b>Morgan</b> 62601 62628 62631 62692 <b>Marion</b> None <b>Marshall</b> 61369 61377 61424 61537 61541	<b>Peoria</b> 61451 61529 61539 61552 61602 61603 61604 61605 61606 <b>Perry</b> 62832 62997 <b>Piatt</b> 61813 61830 61839 61855 61929 61936 <b>Pike</b> 62312 62314 62323 62340 62343 62345 62352 62355 62356 62357 61231 62362 62363 62366 62370 <b>Pope</b> None <b>Pulaski</b> 62956 62963 62964 62976 62992 <b>Putnam</b> 61336 61340 61363 <b>Randolph</b> 62217 62242 62272 <b>Richland</b> 62419 62425 <b>Rock Island</b> 61201 61236 61239 61259 61265 61279	<b>Saline</b> 62930 62946 <b>Sangamon</b> 62625 62689 62703 <b>Schuyler</b> 61452 62319 62344 62624 62639 <b>Scott</b> 62621 62663 62694 <b>Shelby</b> 62438 62534 62553 <b>Stark</b> 61421 61426 61449 61479 61483 61491 <b>Stephenson</b> 61018 61032 61039 61044 61050 61060 61062 61089 <b>Pulaski</b> 62956 62963 62964 62976 62992 <b>Putnam</b> 61336 61340 61363 <b>Randolph</b> 62217 62242 62272 <b>Richland</b> 62419 62425 <b>Rock Island</b> 61201 61236 61239 61259 61265 61279	<b>Warren</b> 61412 61417 61423 61435 61447 61453 61462 61473 61478 <b>Washington</b> 62214 62803 <b>Wayne</b> 62446 62823 62843 62886 <b>White</b> 62820 62821 62835 62844 62887 <b>Whiteside</b> 61037 61243 61251 61261 61270 61277 61283 <b>Will</b> 60432 60433 60436 <b>Williamson</b> 62921 62948 62949 62951 <b>Winnebago</b> 61077 61101 61102 61103 61104 <b>Woodford</b> 61516 61545 61570 61760 61771
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## Appendix 2. (continued)

### Guidelines for Lead Risk Evaluation and Blood Lead Testing



State of Illinois  
Illinois Department of Public Health

### Guidelines for Lead Risk Evaluation and Blood Lead Testing

- **Lead risk** evaluation is the use of the Childhood Lead Risk Questionnaire to determine the risk of potential for lead exposures.
- **Blood lead testing** is defined as obtaining a blood lead test either by capillary or venous methodology.
- **It is always appropriate to obtain a diagnostic blood lead test when a child is symptomatic or a potential exposure to lead has been identified, regardless of child's age.**
- Federal mandates and the Illinois Department of Healthcare and Family Services' (HFS) policy require that all children enrolled in HFS medical programs be considered at risk for lead poisoning and receive a blood lead test prior to age **12 months and 24 months**. Children older than the age of 24 months, up to 72 months of age, for whom no record of a previous blood lead test exists, also should receive a blood lead test. **All children enrolled in HFS medical programs are expected to receive a blood lead test regardless of where they live.** (Consult Handbook for Providers of Healthy Kids Services, Chapter HK-203.3.1, for more blood lead testing and reporting information.)
- Illinois has defined ZIP code areas at high risk and low risk for lead exposure based on housing age and poverty rates. Review the list of ZIP codes and determine status of ZIP codes in your area.

#### Childhood Lead Risk Questionnaire

- ◆ Complete the Childhood Lead Risk Questionnaire during a health care visit for children through 6 years of age, beginning at 6 months
  - If responses to all the questions are "NO," re-evaluate at every well child visit or more often if deemed necessary.
  - If any response is "YES" or "DON'T KNOW," obtain a blood lead test.
- ◆ If the child is age 3 years to 7 years **and**
  - there are any "YES" or "DON'T KNOW" answers **and**
  - has had two successive blood lead test results that were each less than < 10 mcg/dL with one of these tests at age 2 years or older **and**
  - risks of exposure to lead have not changed, **further blood lead tests are not necessary.**
- ◆ If the child is 3 years to 7 years of age, **and**
  - all answers to the Childhood Lead Risk Questionnaire are "NO," a blood lead test is not necessary.

#### For children living in Chicago:

Lead evaluation and testing guidelines differ for the city of Chicago. For information for the Chicago Department of Public Health's you may access their Web site at [www.cityofchicago.org/health](http://www.cityofchicago.org/health).

Illinois Lead Program  
866-909-3572 or 217-782-3517  
TTY (hearing impaired use only) 800-547-0466

# Appendix 3.

## Prenatal-Risk Evaluation for Lead Exposure



State of Illinois  
Illinois Department of Public Health

### Prenatal-risk Evaluation for Lead Exposure

Testing is only recommended for women who are at risk. If a woman answers "yes" to any of these questions, she is at risk for lead exposure and should have a blood lead test.

**Please Print**

Name \_\_\_\_\_ Date of Birth \_\_\_\_\_  
Last First

Address \_\_\_\_\_ Phone Number \_\_\_\_\_

City \_\_\_\_\_ County of Residence \_\_\_\_\_

Medicaid Number \_\_\_\_\_ (if applicable)

**RESPONSE**

1. Do you live in a house built before 1978?  Yes  No
2. Do you live in a house built before 1978 with ongoing renovations that generate dust from sanding and scraping?  Yes  No
3. Have you ever had an elevated blood lead level?  Yes  No  
 If "yes", when? \_\_\_\_\_
4. Do you live with someone who has an elevated blood lead level?  Yes  No  
 If "yes", who? \_\_\_\_\_
5. Do you crave or have you eaten a non-food item during this pregnancy?  Yes  No  
 (Sometimes pregnant women have the urge to eat things, which are not food, such as clay, soil, pottery, plaster or paint chips.)
6. Do you have or have you had any oral piercings?  Yes  No  
 (Oral piercing jewelry may contain lead which can cause lead poisoning.)
7. Do you use any imported cosmetics, herbal remedies, or food products?  Yes  No
8. Do you use pottery, painted china, leaded glass or other products that were made in another country?  Yes  No
9. Do you or others in your household have an occupation, hobby or activity which may expose you or them to lead?  Yes  No
10. Were you born, or have you spent any time outside of the United States?  Yes  No  
 (Many identified lead-poisoned pregnant women are foreign born.)
11. Are you eligible for or enrolled in the Women's, Infants and Children (WIC) Program or Medicaid?  Yes  No

\_\_\_\_\_  
Signature of Doctor/Nurse Date of Evaluation

Provider's full address \_\_\_\_\_ Provider # \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Phone Number \_\_\_\_\_

Blood Lead Test Result \_\_\_\_\_  Capillary  Venous

Date of Test \_\_\_\_\_ Date Reported \_\_\_\_\_

**If this questionnaire includes a blood lead test result, please fax to:**

**Illinois Lead Program**  
 525 West Jefferson Street, Third Floor  
 Springfield, Illinois 62761-0001  
 Phone: 217-782-3517 • Fax: 217-557-1188  
 TTY (hearing impaired use only) 800-547-0466

## Appendix 3. (continued)

### Prenatal-Risk Evaluation for Lead Exposure



State of Illinois  
Illinois Department of Public Health

### Guidelines for Prenatal-risk Evaluation for Lead Exposure

#### **What is the influence of lead exposure on health outcomes during pregnancy?**

The Centers for Disease Control and Prevention (CDC) has determined that lead exposure negatively affects health during pregnancy and that the threshold for exposures causing effects has not been established. Lead exposure is associated with increased risk for gestational hypertension. For the child, prenatal lead exposure, even at maternal blood lead levels (BLLs)  $<10 \mu\text{g/dL}$ , is inversely related to fetal growth and neurodevelopment.

#### **What blood lead level is considered “elevated” in a pregnant woman?**

The CDC has published recommended strategies of medical care for pregnant women having a blood lead level at or above  $5 \mu\text{g/dL}$  and public health actions to reduce lead exposures for pregnant women who have a BLL at or above  $10 \mu\text{g/dL}$ . National surveys indicate that about 1% of U.S. women of child-bearing age have a BLL at or above  $5 \mu\text{g/dL}$  and 0.3% have a BLL at or above  $10 \mu\text{g/dL}$ .

#### **How do I identify pregnant women in need of blood lead testing?**

The CDC has recommended that pregnant women routinely be evaluated for risk for lead exposures. Those having a risk factor for lead exposure should have blood lead measured when initiating prenatal care. IDPH has developed a questionnaire for evaluation of prenatal lead risk exposure to help identify pregnant women in need of blood lead testing.

#### **How do I provide care for pregnant women who have a BLL at or above $5 \mu\text{g/dL}$ ?**

Medical management strategies include assessment for sources of lead exposure, lead avoidance counseling, and nutritional assessment and counseling. Nutritional strategies can reduce release of lead from bone stores and lower efficiency of lead absorption.

Please refer to <http://www.cdc.gov/nceh/lead/publications/leadandpregnancy2010.pdf>. Table 1 provides guidance on time to follow-up testing for BLLs by BLL value.

#### **How will the IDPH Lead Program help me manage lead exposures for a pregnant woman with a BLL at or above $10 \mu\text{g/dL}$ ?**

Effective January 2015, the Illinois Department of Public Health Lead Program will provide services to pregnant women who have a BLL at or above  $10 \mu\text{g/dL}$ . Services IDPH will provide will include an environmental assessment to identify and reduce lead exposures, education on applying recommended nutritional practices, and recommendations on breastfeeding and infant follow-up.

## Appendix 3. (continued)

### Prenatal-Risk Evaluation for Lead Exposure



State of Illinois  
Illinois Department of Public Health

### Guidelines for Prenatal-risk Evaluation for Lead Exposure

**Table 1: Frequency of Maternal Blood Lead Follow-up Testing During Pregnancy and Actions for Lead Management Care of Pregnant Women**

Blood Lead Level* µg/dL	Actions for Care of Pregnant Women	Time Frame for Follow-up Blood Lead Tests†
<5 µg/dL	<ul style="list-style-type: none"> <li>Provide anticipatory guidance and health education materials</li> </ul>	<ul style="list-style-type: none"> <li>No follow-up testing needed</li> <li>Re-evaluate at next visit</li> </ul>
5 – 9 µg/dL	<ul style="list-style-type: none"> <li>Confirm and refer, as appropriate</li> <li>Attempt to determine source of lead exposure and reduce/eliminate exposure</li> <li>If occupational exposure, review proper use of personal protective equipment and consider contacting employer</li> <li>Assess nutritional adequacy and provide nutritional management, as needed</li> </ul>	<ul style="list-style-type: none"> <li>Within 1 month</li> <li>Obtain a maternal BLL‡ or cord BLL at delivery</li> </ul>
10 – 14 µg/dL	<ul style="list-style-type: none"> <li>Above actions</li> <li>Notify health department</li> <li>Refer occupationally exposed women to occupational medicine specialists</li> <li>Recommend removal from occupational exposure</li> <li>Environmental assessment and abatement of lead hazards</li> </ul>	<ul style="list-style-type: none"> <li>Within 1 month</li> <li>Obtain a maternal BLL‡ or cord BLL at delivery</li> </ul>
15 – 24 µg/dL	<ul style="list-style-type: none"> <li>Above actions</li> </ul>	<ul style="list-style-type: none"> <li>Within 1 month and then every 2 - 3 months</li> <li>Obtain a maternal BLL‡ or cord BLL at delivery</li> <li>More frequent lead testing may be indicated based on risk factor history</li> </ul>
25 – 44 µg/dL	<ul style="list-style-type: none"> <li>Above actions</li> </ul>	<ul style="list-style-type: none"> <li>Within 1 – 4 weeks and then every month</li> <li>Obtain a maternal BLL‡ or cord BLL at delivery</li> </ul>
45 – 69 µg/dL	<ul style="list-style-type: none"> <li>Above actions</li> <li>Treat as high-risk pregnancy</li> <li>Consider chelation therapy in consultation with a clinician experienced in the management of pregnant women with BLLs in this range is strongly advised</li> </ul>	<ul style="list-style-type: none"> <li>Within 24 hours and then at frequent intervals, depending on clinical interventions and trend in BLLs</li> <li>Obtain a maternal BLL‡ or cord BLL at delivery</li> </ul>
70 µg/dL or greater	<ul style="list-style-type: none"> <li>Medical emergency</li> <li>Chelation therapy</li> <li>Above actions</li> </ul>	<ul style="list-style-type: none"> <li>Above actions</li> </ul>

\* Venous blood sample is recommended for maternal blood lead testing.

† The higher the blood lead level on the screening test, the more urgent the need for confirmatory testing.

‡ If possible, obtain a maternal blood lead level before delivery because blood lead levels tend to increase over the course of pregnancy.

Source: Modified from Centers for Disease Control and Prevention. Guidelines for the identification and management of lead exposure in pregnant and lactating women. Atlanta (GA): CDC; 2010. Available at: <http://www.cdc.gov/nceh/lead/publications/leadand-pregnancy2010.pdf>. Retrieved February 5, 2015 and <http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Lead-Screening-During-Pregnancy-and-Lactation>. Retrieved February 11, 2015.

## Appendix 3. (continued)

### Prenatal-Risk Evaluation for Lead Exposure



State of Illinois  
Illinois Department of Public Health

### Guidelines for Prenatal-risk Evaluation for Lead Exposure

#### Key Points for Nutrition and Lead for Pregnant and Lactating Women

- The human body's nutritional status affects the absorption, deposition, and excretion of lead and may also affect lead toxicity.
- Lead exposure can also modify the body's ability to utilize nutrients.
- Avoidance of lead exposure remains the primary preventive strategy for reducing adverse health effects. However, the existence of nutrient-lead interactions suggests that optimizing nutritional status during pregnancy and lactation may assist in preventing the adverse consequences of lead exposure.

#### General Nutritional Recommendations for Pregnant and Lactating Women

- All pregnant and lactating women should eat a balanced diet in order to maintain adequate amounts of vitamins, nutrients, and minerals.
- All pregnant and lactating women should be evaluated for iron status and be provided with supplementation in order to correct iron deficiency.
- All pregnant and lactating women should be evaluated for adequacy of their diets and be provided with appropriate nutritional advice and prenatal vitamins.
- Refer women in need of assistance to WIC or the Supplemental Nutrition Assistance Program (SNAP).
- All pregnant and lactating women should avoid the use of alcohol, cigarettes, herbal medicines, and any other substances, that may adversely affect the developing fetus or infant.

#### Nutritional Recommendations for Pregnant and Lactating Women with Elevated Blood Lead Levels

- In pregnant and lactating women with BLLs  $\geq 5\mu\text{g}/\text{dL}$  or with a history of lead exposure, a dietary calcium intake of 2,000 mg daily should be maintained, either through diet or in combination with supplementation.
- Because data on the association of lead and Vitamin D are limited, no specific recommendation is made for supplementation of Vitamin D in lead poisoned pregnant or lactating women. Adequate levels of Vitamin D should be maintained. Therefore, if the mother is Vitamin D deficient supplementation may be necessary.
- Studies of the effects of iron supplementation in lead poisoned women are not available. Thus, iron supplementation in pregnant and lactating women should be consistent with those given for pregnancy and lactation. No additional iron supplementation is recommended for woman with EBLLs. However, iron status of all pregnant women should be evaluated and supplementation should be provided to correct any deficiency.

Source: *Guidelines for the identification and management of lead exposure in pregnant and lactating women.* Atlanta (GA): CDC; 2010. Available at: <http://www.cdc.gov/nceh/lead/publications/leadandpregnancy2010.pdf>. Retrieved February 11, 2015

## Appendix 3. (continued)

### Prenatal-Risk Evaluation for Lead Exposure



State of Illinois  
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### Guidelines for Prenatal-risk Evaluation for Lead Exposure

#### Newborn of a Mother with a BLL at or above 5 µg/dL

The BLL of a child born to a woman with known elevated BLL should be monitored closely. A newborn's BLL is expected to be equal to that of the mother. Medical management strategies should be applied at infant BLLs at or above 5 µg/dL; public health evaluations and appropriate case management activities should be applied at infant BLLs at or above 10 µg/dL, or at infant BLLs at or above 5 µg/dL, if resources permit.

#### Breastfeeding Recommendations for Women with Elevated BLLs

Human milk is the most complete and ideal source of infant nutrition in the first year of life. Mother's with a BLL <40 µg/dL should be encouraged to breastfeed. Studies of lead in breast milk show breast milk to maternal blood lead ratios of approximately 3% or less. Measurement of levels of lead in breast milk is not recommended. Blood lead monitoring of the infant of a mother with an elevated BLL is recommended. Environmental sources of lead exposure should be evaluated for infants whose blood lead levels are rising or failing to fall by 5 µg/dL or more. If no external source of lead is identified, temporary interruption of breast feeding until the mother's blood lead levels decline should be considered.

**Table 2: Actions for Lactating Women**

0 –39 µg/dL	Breastfeeding should be encouraged
5 – 39 µg/dL	Breastfeeding may be continued if infants' BLLs monitored
40 µg/dL or greater	Lactation should be continued, but breast milk should be pumped and discarded until maternal BLL is < 40 µg/dL

Source: *Guidelines for the identification and management of lead exposure in pregnant and lactating women. Atlanta (GA): CDC; 2010.* Available at: <http://www.cdc.gov/nceh/lead/publications/leadandpregnancy2010.pdf>. Retrieved February 5, 2015 and <http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Lead-Screening-During-Pregnancy-and-Lactation>. Retrieved February 11, 2015.

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