



MARYLAND DEPARTMENT OF THE ENVIRONMENT

Lead Poisoning Prevention Program

Childhood Blood Lead Surveillance in Maryland

Annual Report 2014

July, 2015



MARYLAND CHILDHOOD LEAD REGISTRY

ANNUAL SURVEILLANCE REPORT 2014

EXECUTIVE SUMMARY

The Maryland Department of the Environment's Statewide Childhood Lead Registry (CLR) performs childhood blood lead surveillance for Maryland. The CLR receives the reports of all blood lead tests performed on Maryland children 0-18 years of age, and the CLR provides blood lead test results to the Department of Health and Mental Hygiene, including Medicaid and local health departments as needed for case management, and upon request to third parties for research and planning.

Since 1995, the CLR has released a comprehensive annual report on statewide childhood blood lead testing along with five "Supplementary Data Tables" which include detailed breakdowns of blood lead data by age, jurisdiction, blood lead level, incident and prevalent cases, and the trends of blood lead level over the years. This current report presents the childhood blood lead test results for calendar year (CY) 2014. All numbers are based on blood lead testing (venous or capillary) on children. The CLR does not receive any reports on lead screening based on the lead risk assessment questionnaire. With few exceptions all numbers referred to children 0-72 months of age.

CY 2014 Surveillance Highlights:

- During CY 2014, a total of 109,031 (20.7%) children were tested of the 527,304 children 0-72 months of age, as identified in the 2010 Maryland census population. This was a decrease of 1,051 children tested compared to 110,082 (21.2%) during CY13. The population of children 0-72 months of age increased from CY13 to CY14 by 8,441 children.
- During CY 2014, of the 109,031 children 0-72 months tested for blood lead Statewide, 355 (0.3%) were found to have blood lead levels ≥ 10 $\mu\text{g/dL}$ (prevalent cases), of whom 262 had their very first blood lead level (BLL) ≥ 10 (incident cases) in 2014. During CY 2014 2,004 children had a blood lead level of 5-9 $\mu\text{g/dL}$, of whom 1,607 had the very first blood lead level.
- Although there has been a drop in blood lead testing (1,020 less) in 2014 compared to 2013, the drop in cases of BLL ≥ 10 and BLL 5-9 $\mu\text{g/dL}$ does not appear to be due to fewer children being tested in 2014. The drop in total blood lead testing in 2014 was less than one percent (0.9%) compared to 2013. The drops in percent of children with BLL ≥ 10 and BLL 5-9 $\mu\text{g/dL}$ in 2014 compared to 2013 were 4.6% and 10.8%, respectively.
- Baltimore City had the highest testing rate for children 0-72 months (30.6%), followed by Somerset County (28.7%), Allegany County (25.1%), and Prince George's County (24.5%).
- Allegany County (65.7%) had the highest testing rate for children at 1 year and 2 years of age followed by Somerset County (58.8%), Baltimore City (57.2%), and Dorchester County (52.3%).

- More than 90% of addresses were geo-coded at the longitude, latitude level. The county assignment however is based on: 1) census tract as determined by geocoding, 2) child's zip code address, and 3) the original county name if it were included in the address information.
- In 2014 CLR received blood lead reports from 55 establishments (laboratories and/or clinics/medical offices) nationwide, a 28% increase compared to 2013. About 87% of reports received electronically were from eight (8) establishments and the rest (13%) were received in hard copy through fax or mail from the other 47 establishments. The average reporting time, from the time sample is drawn to the time the result enters the CLR database, is about 6 days. The average time for reporting elevated blood lead results ≥ 10 micrograms per deciliter ($\mu\text{g/dL}$) is approximately 30 hours.
- There is no Statewide requirement for universal blood lead testing in Maryland. The State targeting plan of 2004 required children to have blood lead tests at ages one and two years if they meet following criteria:
 - a) Live in an indented "at risk" zip code;
 - b) Participate in Maryland's Medicaid Early Periodic Screening, Diagnosis, and Treatment (EPSTD) Program; "or"
 - c) Give a positive response to the "Risk Assessment Questionnaire" conducted at regular medical checkup, up to six years of age.

SIGNIFICANT INCREASE IN LEAD SAFE PROPERTIES

On January 1, 2015, the Law that once only regulated owners of rental properties built prior to 1950, expanded to include all rental properties built prior to 1978. This increased the regulated community to include an additional 250,000 rental properties built between 1950 and prior to 1978. MDE has seen a significant increase in the number of properties that meet the "lead safe" standard in law. In CY 2013 there were approximately 28,000 properties that met his standard. In CY 2014, this number has more than doubled to over 57,603 properties.

Overview

Exposure to lead is still the most significant and widespread environmental hazard for children in Maryland, although substantial reduction in lead exposure and lead poisoning have been achieved. While the prevalence and incidence of elevated blood lead levels in children in Maryland have declined dramatically over the years, there are still children with historically elevated blood lead levels and a number of children who are newly exposed to lead every year. Children are at the greatest risk from birth to age six while their neurological systems are developing. Exposure to lead can cause long-term neurological damage that may be associated with learning and behavioral problems and with decreased intelligence.

There is no evidence of a blood lead level below which there are no health effects. The Centers for Disease Control and Prevention (CDC) concurs that the evidence shows that there is no threshold level for blood lead that can be considered “safe”. In March 2012 CDC dropped its standard of a blood lead level ≥ 10 $\mu\text{g/dL}$ as the “Level of Concern” to 5 $\mu\text{g/dL}$ which is the new “Reference Value”. Currently the State of Maryland is planning to adopt new criteria for its case management and primary prevention efforts.

Statistical Report

In CY 2014, a total of 109,031 children 0-72 months were tested for lead exposure Statewide. Table One provides a summary for Statewide statistics of blood lead testing in 2014.

Findings

The overall proportion of children with blood lead levels ≥ 5 $\mu\text{g/dL}$ (Figure One) declined in 2014. Additionally, the proportion of children with the very first blood lead level ≥ 10 $\mu\text{g/dL}$ (incident cases) also declined, from 0.3% in 2013 to 0.2% in 2014 (Table Two, Figure Two).

Sources of Childhood Lead Exposure

Lead paint dust from deteriorated lead paint or from renovation of old houses is the major source of exposure for children in Maryland. Out of estimated of 2,387,285 occupied residential houses in Maryland 438,082 (18.5%) were built before 1950 and 931,980 (39.1%) between 1950 and 1979. (Source: US Census Bureau, 2009-2013 American Community Survey, 5-Year Estimates) A significant number of pre-1950 and 1950-1979 residential rental units have been made lead free. Untreated units in those groupings are highly likely and likely to have lead based paint respectively.

Water, air, and soil, may provide low-level, “background” exposure, but rarely may cause childhood lead poisoning.

Imported products, parental occupations, hobbies, and imported traditional medicines occasionally may cause lead exposure among children.

In-utero exposure to lead may affect fetal development. This can be of more significance among certain subgroup populations who may be more at risk of environmental lead exposure.

The decline in lead exposure is further demonstrated by the decline in percent of children tested for lead and had the highest blood lead level of 5-9 $\mu\text{g/dL}$ (Figure Three.)

Appendix A provides a breakdown of blood lead testing and the status of children by age groups of 0-35 months and 36-72 months by jurisdiction in 2014, and Appendix B provides summary results for the past eight (8) years at the State, Baltimore City, and County levels. For detailed breakdowns of blood lead data, the reader is referred to the supplementary data tables: Supplements 1-5.

Table One
Calendar Year (CY)
2014 Statistical Report¹

Item	Number	Percent (%)
All Children		
Number of tests	126,820	
Number of children	120,644	
Children 0-72 Months		
Number of tests	114,918	
Number of children	109,031	100.0
Age		
Under One Year	10,604	9.7
One Year	38,092	34.9
Two Years	30,789	28.2
Three Years	10,551	9.7
Four Years	10,965	10.1
Five Years	8,030	7.4
Sex		
Female	53,400	49.0
Male	55,424	50.8
Undetermined	207	0.2
Highest Blood Lead Level (µg/dL)		
≤4	106,672	97.8
5-9	2,004	1.8
10-14	230	0.2
15-19	67	0.1
≥20	58	0.1
Mean BLL (Geometric mean)	1.35	
Blood Specimen		
Capillary	28,498	26.1
Venous	73,269	67.2
Undetermined ²	7,264	6.7

1. For detailed analysis and breakdown of numbers refer to Supplementary Data Tables 1-5.
2. In supplementary data tables blood tests, with sample type unknown were counted as capillary.

Table Two
Population of Children Tested
Blood Lead Testing of Children 0-72 Months by Jurisdiction in 2014¹

County	Population of Children ²	Children Tested		Blood Lead Level 5-9 µg/dL						Blood Lead Level ≥ 10 µg/dL					
				Old Cases ³		New Cases ⁴		Total		Old Cases ⁵		New Cases ⁶		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Allegany	5,019	1,262	25.1	7	0.6	28	2.2	35	2.8	3	0.2	5	0.4	8	0.6
Anne Arundel	49,907	9,320	18.7	10	0.1	55	0.6	65	0.7	4	0.0	4	0.0	8	0.1
Baltimore	69,520	16,301	23.4	22	0.1	188	1.2	210	1.3	3	0.0	22	0.1	25	0.2
Baltimore City	58,622	17,961	30.6	292	1.6	708	3.9	1,000	5.6	65	0.4	129	0.7	194	1.1
Calvert	7,406	636	8.6	0	0.0	2	0.3	2	0.3	0	0.0	1	0.2	1	0.2
Caroline	3,345	651	19.5	1	0.2	9	1.4	10	1.5	2	0.3	2	0.3	4	0.6
Carroll	13,498	1,260	9.3	5	0.4	17	1.3	22	1.7	0	0.0	5	0.4	5	0.4
Cecil	9,356	1,473	15.7	0	0.0	22	1.5	22	1.5	2	0.1	2	0.1	4	0.3
Charles	13,708	2,337	17.0	3	0.1	28	1.2	31	1.3	0	0.0	1	0.0	1	0.0
Dorchester	2,892	642	22.2	2	0.3	13	2.0	15	2.3	1	0.2	2	0.3	3	0.5
Frederick	21,697	2,849	13.1	4	0.1	26	0.9	30	1.1	3	0.1	5	0.2	8	0.3
Garrett	2,302	464	20.2	1	0.2	3	0.6	4	0.9	0	0.0	1	0.2	1	0.2
Harford	21,824	2,853	13.1	3	0.1	19	0.7	22	0.8	0	0.0	2	0.1	2	0.1
Howard	25,557	2,387	9.3	2	0.1	27	1.1	29	1.2	0	0.0	3	0.1	3	0.1
Kent	1,454	257	17.7	0	0.0	4	1.6	4	1.6	0	0.0	2	0.8	2	0.8
Montgomery	92,252	19,308	20.9	13	0.1	120	0.6	133	0.7	3	0.0	16	0.1	19	0.1
Prince George's	84,039	20,560	24.5	15	0.1	197	1.0	212	1.0	2	0.0	46	0.2	48	0.2
Queen Anne's	4,000	634	15.8	0	0.0	8	1.3	8	1.3	1	0.2	1	0.2	2	0.3
Saint Mary's	10,982	1,384	12.6	1	0.1	12	0.9	13	0.9	1	0.1	2	0.1	3	0.2
Somerset	1,834	526	28.7	1	0.2	8	1.5	9	1.7	0	0.0	2	0.4	2	0.4
Talbot	2,739	584	21.3	3	0.5	5	0.9	8	1.4	1	0.2	0	0.0	1	0.2
Washington	13,126	2,699	20.6	7	0.3	77	2.9	84	3.1	1	0.0	5	0.2	6	0.2
Wicomico	8,874	1,937	21.8	4	0.2	22	1.1	26	1.3	0	0.0	4	0.2	4	0.2
Worcester	3,351	746	22.3	1	0.1	9	1.2	10	1.3	1	0.1	0	0.0	1	0.1
Total	527,304	109,031	20.7	397	0.4	1,607	1.5	2,004	1.8	93	0.1	262	0.2	355	0.3

1. The table is based on the selection of the highest blood lead test for each child in calendar year 2014 in the order of venous, unknown, or capillary.
2. Adapted from Maryland census population 2010 provided by the Maryland Data Center, Maryland Department of Planning, www.planning.maryland.gov/msdc
3. Children with the blood lead level of 5-9 µg/dL in 2014 and with a history of blood lead level ≥ 5 µg/dL in the past.
4. Children with the very first blood lead level of 5-9 µg/dL in 2014. These children were either not tested in the past or all their tests had blood lead levels <5 µg/dL.
5. Children with a history of blood lead level ≥10 µg/dL. These children may have carried from 2013 or had a blood lead test with blood lead levels ≥10 µg/dL in the previous years.
6. Children with the very first blood lead level ≥10 µg/dL. These children may not have been tested in the past or all their blood lead tests had blood lead levels <10 µg/dL. This criterion may not match the criteria for the initiation of case management.

Figure One
Blood Lead Distribution of Children 0-72 Months Tested for Lead in 2013 and 2014

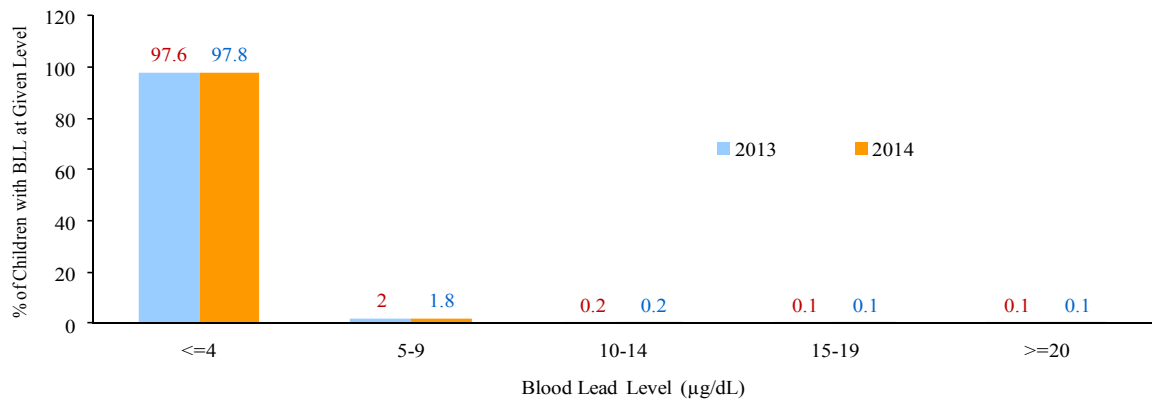
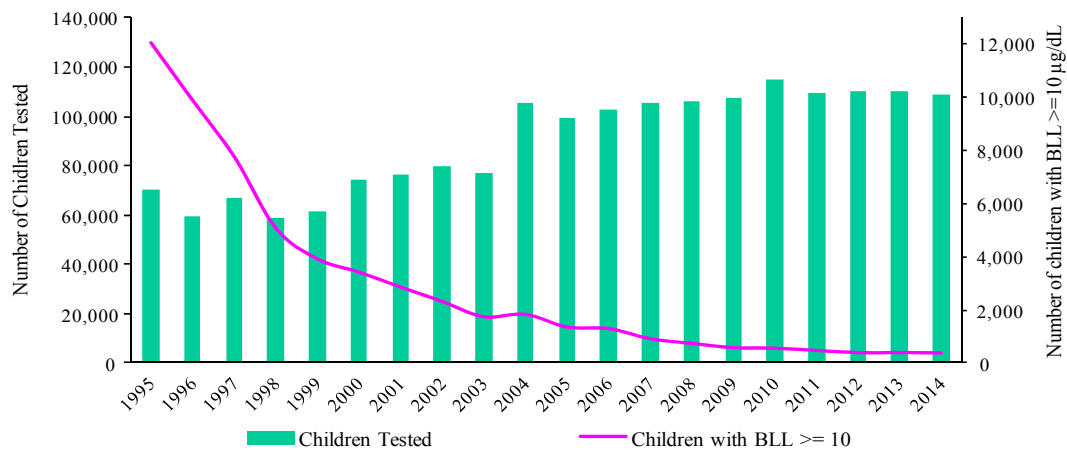


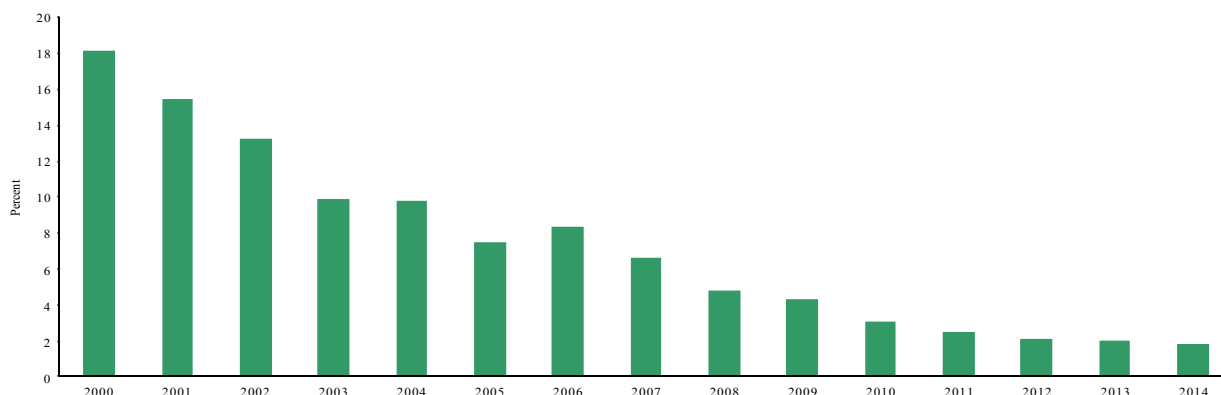
Figure Two
Number of Children 0-72 Months Tested for Lead and Number Reported to Have Blood Lead Level ≥ 10 µg/dL: 1995-2014



Identifying Children with Lead Exposure

The critical issue in childhood lead poisoning is early detection. Because there are no specific clinical symptoms, a blood lead test is the most reliable technique to identify children with elevated blood lead levels. If there is any suspicion that a child is exposed to lead, a health care provider should do a blood lead test.

Figure Three
Percent of Children 0-72 Months Tested for Lead with the Highest Blood Lead Level
5-9 µg/dL: 2000-2014



Statewide Activities to Reduce (Eliminate) Childhood Lead Poisoning

The State Elimination Plan calls for zero new cases of blood lead level ≥ 10 µg/dL. The plan focuses on primary prevention (removal and elimination of lead hazards) while maintaining well-established secondary prevention (identifying children who may be at risk of lead exposure) and tertiary prevention (case management of children exposed to lead) efforts in the State.

Primary Prevention: Much of the decline in blood lead level is the result of implementation and enforcement of Maryland’s “Reduction of Lead Risk in Housing” law. The law requires each pre-1950 rental dwelling to be issued a Full Risk Reduction certificate at tenant turnover. In 2001, at least 50% of the owner's affected properties were required to be in compliance with the Full Risk Reduction Standard, 100% compliance was required in 2006. Effective October 1, 2004, the law requires rent court judges and local housing registry officials to not accept cases and applications from pre-1950 rental property owners who cannot present lead certificates that indicate that their rental properties are in compliance with the Reduction of Lead Risk in Housing law.

With the implementation of the law and the compliance of owners of rental properties, the housing conditions of pre-1950 rental properties improved to the extent that the assumption that only children living in pre-1950 rental properties are at risk of having blood lead level ≥ 10 µg/dL is no longer valid.

Secondary Prevention: The second element of the Elimination Plan is to identify children who may be at risk of lead exposure, so that preventive action can be implemented. Children ages one and two, because of their mouthing behavior, are most likely to be exposed to lead. To that end, the State of Maryland requires that children at ages one and two years be tested. The percentage of one and two year old children tested for lead has increased substantially since 2004 (Figure Five). More than 38% of children one and two years old were tested for lead Statewide in 2014 with rate as high as 66% for Allegany County and almost 59% for Somerset County (Table Three).

Table Three: Blood Lead Testing of Children One and Two Years Old by Jurisdiction in 2014¹

County	One Year Old			Two Years Old			Total ²		
	Population of Children	Children Tested		Population of Children	Children Tested		Population of Children	Children Tested	
		Number	Percent		Number	Percent		Number	Percent
Allegany	813	548	67.4	845	542	64.1	1,658	1,090	65.7
Anne Arundel	8,522	3,961	46.5	8,387	2,715	32.4	16,909	6,676	39.5
Baltimore	11,956	6,000	50.2	11,572	5,453	47.1	23,528	11,453	48.7
Baltimore City	10,487	6,445	61.5	10,022	5,277	52.7	20,509	11,722	57.2
Calvert	1,170	306	26.2	1,191	137	11.5	2,361	443	18.8
Caroline	550	266	48.4	552	242	43.8	1,102	508	46.1
Carroll	2,114	544	25.7	2,182	321	14.7	4,296	865	20.1
Cecil	1,611	580	36.0	1,558	335	21.5	3,169	915	28.9
Charles	2,224	809	36.4	2,390	800	33.5	4,614	1,609	34.9
Dorchester	495	274	55.4	498	245	49.2	993	519	52.3
Frederick	3,471	1,370	39.5	3,658	510	13.9	7,129	1,880	26.4
Garrett	346	166	48.0	387	148	38.2	733	314	42.8
Harford	3,605	1,051	29.2	3,605	751	20.8	7,210	1,802	25.0
Howard	4,081	937	23.0	4,293	595	13.9	8,374	1,532	18.3
Kent	249	109	43.8	230	86	37.4	479	195	40.7
Montgomery	15,575	5,480	35.2	15,548	4,800	30.9	31,123	10,280	33.0
Prince George's	14,482	5,947	41.1	14,126	5,046	35.7	28,608	10,993	38.4
Queen Anne's	642	256	39.9	641	214	33.4	1,283	470	36.6
Saint Mary's	1,813	581	32.0	1,803	417	23.1	3,616	998	27.6
Somerset	315	215	68.3	330	164	49.7	645	379	58.8
Talbot	487	264	54.2	481	228	47.4	968	492	50.8
Washington	2,145	922	43.0	2,228	761	34.2	4,373	1,683	38.5
Wicomico	1,541	781	50.7	1,487	717	48.2	3,028	1,498	49.5
Worcester	573	280	48.9	560	285	50.9	1,133	565	49.9
Statewide	89,267	38,092	42.7	88,574	30,789	34.8	177,841	68,881	38.7

1. For selection criteria and population data refer to Table 1.

2. For breakdown of blood lead testing for other age groups and blood lead level refer to “Supplementary Data Tables: Supplement #3”.

The State 2004 targeting plan called for universal blood lead testing of children who were living in the areas of the State that were declared “At-Risk” areas. The determination was based on a higher proportion of pre-1950 housing in these areas. At-Risk area includes Baltimore City, and Allegany, Caroline, Dorchester, Frederick, Garrett, Somerset, Washington, Wicomico, and Worcester Counties. Table Four presents blood lead testing in the At-Risk and Not-At-Risk areas of the State.

Table Four
Blood Lead Testing and New (Incidence) Cases of Blood Lead Levels of 5-9 and ≥ 10 $\mu\text{g}/\text{dL}$
In At-Risk and Not-At-Risk Areas in 2014

Area	Population	Children Tested		Children with BLL 5-9 $\mu\text{g}/\text{dL}$		Children with BLL ≥ 10 $\mu\text{g}/\text{dL}$	
		Number	Percent	Number	Percent	Number	Percent
At-Risk	121,063	29,737	24.6	903	3.0	155	0.5
Not-At-Risk	406,241	79,294	19.5	704	0.9	107	0.1
Statewide	527,304	109,031	20.7	1,607	1.5	262	0.2

Figure Five
Percent of Children 0-72 Months Tested for Lead by Major Age Group: 1996-2014



Another group of children at risk of lead poisoning are children on Medical Assistance programs. Upon a memorandum of understanding between the MDE Lead Program and the Office of Medicaid Administration of the Maryland Department of Health and Mental Hygiene (DHMH), childhood blood lead data is provided, on a quarterly and an annual basis, to the Medicaid Program to be matched with the list of children on the Medical Assistance Program. The Medicaid Program prepares and distributes the reports of blood lead testing of children under the Medicaid Program for the State and local jurisdictions. For information and access to the reports refer to the Office of Medicaid Administration at DHMH.

Tertiary Prevention: Maryland's Lead Poisoning Prevention Program has well-established case management guidelines and environmental investigation protocols for follow-up of children with elevated blood lead levels (Tables Five and Six). A venous blood lead test ≥ 10 $\mu\text{g/dL}$ initiates case management and an environmental investigation. Currently, one venous or two capillary blood lead tests ≥ 10 $\mu\text{g/dL}$ trigger the Notice of Elevated Blood Lead Level (Notice of EBL) to be sent to the owner of a Pre-1950 residential dwelling unit (Affected Property). Under the "Reduction of Lead Risk in Housing Act," an owner who receives a Notice of EBL is required to perform specific lead risk reduction treatments to limit further exposure to a child. Furthermore, effective June 1, 2012 the Department, health departments, or other local jurisdictions have the authority to order abatements in response to an investigation report of a child with an elevated blood lead level.

Table Five
Blood Lead Diagnostic and Follow-Up: Confirmation of a Capillary Blood Lead Test

BLL (µg/dL)	Confirm with venous blood lead test within
5-9	1-3 months
10 –44	1 week to 1 month*
45 – 59	48 hours
60-69	24 hours
≥70	Urgently as emergency test

* The higher the BLL, the more urgent the need for confirmatory testing.

Table Six
Blood Lead Diagnostic and Follow-Up: Follow-Up for Venous Blood Lead Testing¹

BLL (µg/dL) Venous	Early follow-up(First 2-4 tests after identification)	Late follow-up (After BLL begins to decline)
≤4	Routine blood lead test according to protocol	
5-9	3 months	6 – 9 months
10 - 19	1 - 3 months ²	3 – 6 months
20 - 24	1 - 3 months ²	1 – 3 months
25 - 44	2 weeks – 1 month	1 month
≥45	As soon as possible	Chelation with subsequent follow-up

1. Seasonal variation of BLLs exists and may be more apparent in colder climate areas. Greater exposure in the summer months may necessitate more frequent follow-up.
2. Some case managers or health care providers may choose to repeat blood lead tests on all new patients within a month to ensure that their BLL level is not rising more quickly than anticipated.

Tables adapted from: *Centers for Disease Control and Prevention.*

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

b. *Low Level Exposure Harms Children: A Renewed Call for Primary Prevention. Report of the Advisory Committee on Childhood Lead Poisoning Prevention, January 2012.*

During Calendar Year 2014 (CY14) there were 233 children in the State of Maryland having a “**Confirmed**” blood lead level, a first time venous blood lead level ≥ 10 µg/dL, which resulted in the child receiving medical and environmental case management. As a result, 41 less children required case management in CY14 compared to CY13, which totaled 274 children.

Maryland’s counties observed 114 Confirmed cases compared to 117 during CY13, a drop of 3 cases. During the year, Prince George’s County observed the highest number of children (42) requiring medical and environmental case management. Of Prince George’s County’s 42

“**Confirmed Cases**”, 23 of the cases were the result of refugee families’ relocation from Afghanistan into the State. As a result, MDE coordinated efforts with the Department of Health and Mental Hygiene’s Office of Immigrant Health to develop outreach and educational material highlighting lead hazards in cultural remedies, herbs, and make-up.

During CY14, the Baltimore City Health Department responded to 119 children who required medical and environmental case management. This was a decrease of 38 children requiring case management when compared to CY13 which saw 157 “**Confirmed Cases**”.

To view a breakdown of blood lead levels ≥ 10 $\mu\text{g/dL}$ and age of housing, see Table Seven. A further breakdown of housing type and confirmed cases by jurisdiction can be seen in (Table Eight).

Table Seven

Percent of Children 0-72 Months with Blood Lead Levels ≥ 10 $\mu\text{g/dL}$ in 2014 and Age of the Housing

Property Type Baltimore City CY 2014		
	Percentage of Housing	Number of Cases
Pre-1950 Rental	60%	72
Post-1949 Rental	2%	2
Owner Occupied	38%	45
Total Cases		119

Property Type Maryland Counties CY 2014		
	Percentage of Housing	Number of Cases
Pre-1950 Rental	17%	19
Post-1949 Rental	50%	57
Owner Occupied	33%	38
Total Cases		114

Table Eight
MARYLAND DEPARTMENT OF THE ENVIRONMENT
Lead Poisoning Prevention Program: Childhood Lead Registry
Property Status of New Cases for Calendar Year 2014
By Jurisdiction

County	Number Properties	Owner-Occupied		Affected Property		Non-affected Property	
		Number	Percent	Number	Percent	Number	Percent
Allegany	6	5	83%	1	17%	0	0%
Anne Arundel	5	3	60%	0	0%	2	40%
Baltimore	20	4	20%	2	10%	14	70%
Baltimore City	119	45	38%	*72	60%	2	2%
Calvert	1	1	100%	0	0%	0	0%
Caroline	2	1	50%	1	50%	0	0%
Carroll	1	1	100%	0	0%	0	0%
Cecil	2	2	100%	0	0%	0	0%
Charles	0	0	0%	0	0%	0	0%
Dorchester	2	1	50%	1	50%	0	0%
Frederick	4	2	50%	2	50%	0	0%
Garrett	1	0	0%	1	100%	0	0%
Harford	0	0	0%	0	0%	0	0%
Howard	3	2	67%	0	0%	1	33%
Kent	2	2	100%	0	0%	0	0%
Montgomery	10	2	20%	2	20%	6	60%
Prince George's	42	8	19%	2	5%	32	76%
Queen Anne's	1	1	100%	0	0%	0	0%
Saint Mary's	1	0	0%	1	100%	0	0%
Somerset	2	0	0%	1	50%	1	50%
Talbot	0	0	0%	0	0%	0	0%
Washington	5	3	60%	2	40%	0	0%
Wicomico	4	0	0%	3	75%	1	25%
Worcester	0	0	0%	0	0%	0	0%
Counties' Total	114	38	33%	19	17%	57	50%
Statewide	233	83	36%	91	39%	59	25%

Notes:

* Ten properties with construction year unavailable are assumed to be constructed prior to 1950.

Sources:

Maryland Department of the Environment: STELLAR

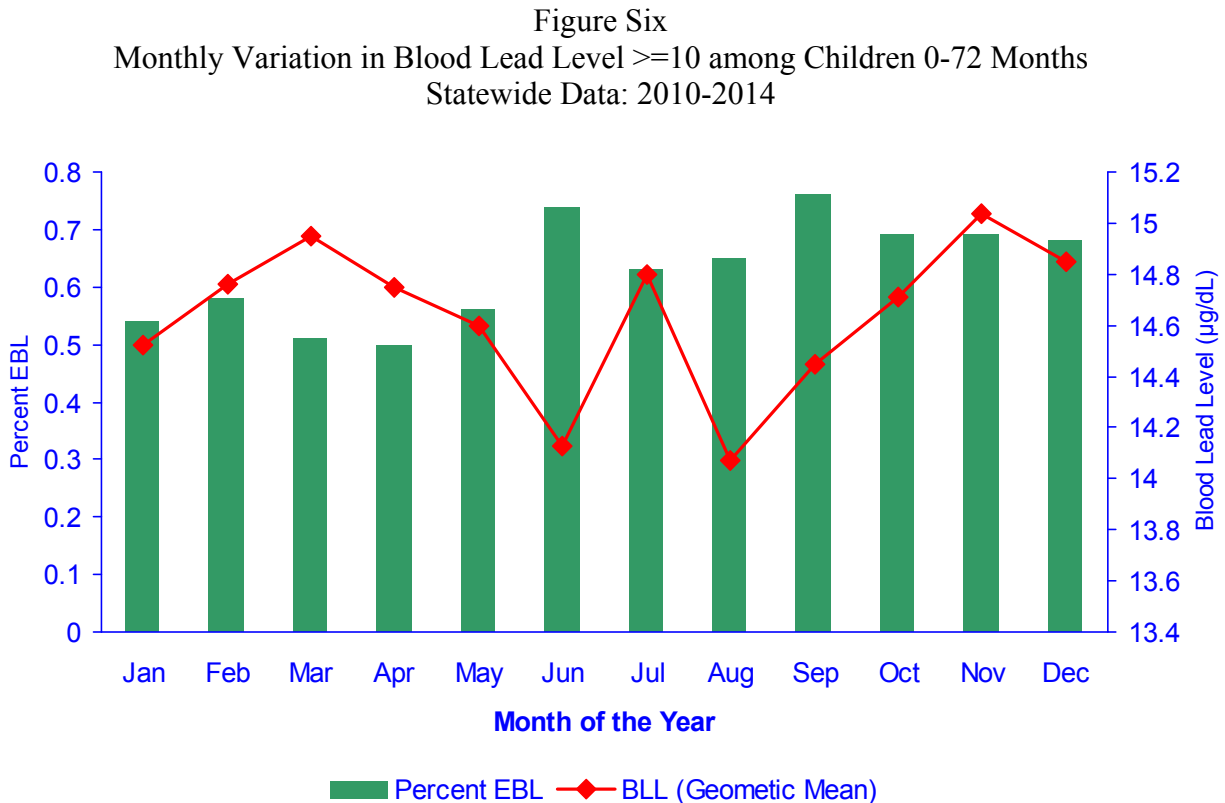
Baltimore City Health Department: STELLAR

Maryland Department of the Environment: Rental Registry

Department of Assessments & Taxation: Real Property Search

Seasonal Variation of Lead Exposure Among Children

There has been interest in finding whether the extent and severity of lead exposure among children may vary by month and season. It is speculated that during warmer months of the year and longer daylight hours children may be exposed more to lead than during other time of the year. Figure Six shows the percentage of children 0-72 months who were tested for lead for each month from 2010 to 2014 and were found to have blood lead levels ≥ 10 $\mu\text{g}/\text{dL}$. The Figure also presents the average (geometric mean) blood lead level of children with blood lead levels ≥ 10 $\mu\text{g}/\text{dL}$. It does not seem that the month or season of the year has any effect on the extent or severity of lead exposure among children.



Data Quality

The CLR is maintained in the “Systematic Tracking of Elevated Lead Levels and Remediation” (STELLAR) surveillance system, obtained from the CDC Lead Poisoning Prevention Program. The CLR staff makes all efforts to further improve data quality with respect to completeness, timeliness, and accuracy. Staff keep daily track of laboratory reporting to make sure laboratories are reporting all blood lead tests no later than biweekly. The law requires blood lead results ≥ 20 $\mu\text{g}/\text{dL}$ to be reported (faxed) within 24 hours after a result is known. However, upon CLR request, laboratories have agreed to report (fax) the result of all blood lead tests ≥ 10 $\mu\text{g}/\text{dL}$ within 24 hours. With the CDC’s position that the blood lead level of concern is 5 $\mu\text{g}/\text{dL}$, some laboratories fax reports of blood lead tests of ≥ 5 $\mu\text{g}/\text{dL}$. Staff checks the completeness of data with respect to the child’s and guardian’s name, address, and telephone number.

In 2014, 86.8% of blood lead tests were reported to the CLR electronically. This is a drop of about three (3.0) points in electronic reporting from 2013 (89.8%). The drop is because of an increase in

number of clinics and establishments using “Point of Care Instruments”, or hand held lead analyzers and reporting the result to the CLR in hard copy. Over the years there has been a gradual increase in the use of hand held lead analyzers. This increase has not necessarily resulted in an increase in the number of blood lead testing, rather a shift in blood lead testing by laboratories to clinics (Table Nine). The average reporting time, from the time a sample is drawn to the time the result enters the CLR database is approximately 6 days. The average time for elevated blood lead results (≥ 10 $\mu\text{g/dL}$) reporting is approximately 30 hours.

Table Nine
Method of Blood Lead Reporting by Laboratories: 2010-2014

Lab Reporting	2010		2011		2012		2013		2014	
	Number of		Number of		Number of		Number of		Number of	
	Labs	Reports	Labs	Reports	Labs	Reports	Labs	Reports	Labs	Reports
Electronic Report	8	115,878	9	113,824	8	115,940	8	113,952	8	110,062
Hard Copy	30	9,702	31	12,072	32	11,041	35	12,908	47	16,758
Total	38	125,580	40	125,896	40	126,981	43	126,860	55	126,820
Percent Electronic	92.3		90.4		91.3		89.8		86.8	
% of Children Tested	23.4		21.9		21.7		21.2		20.7	

Table Ten provides the summary reports for completeness of data as required by law (Figure Seven). Completeness of data does not necessarily means accuracy of the data.

Table Ten
Completeness of Data for 2014

Item	% Complete
Child's name	100.0
Date of Birth	99.9
Sex/Gender	99.7
Race	56.7
Guardian's name	60.3
Sample type	94.0
Test date	99.8
Blood lead level	99.9
Address (geocoded)	90.0
Telephone number	91.8

Figure Seven

Blood Lead Laboratory Reporting Requirement

The amended law and regulations* of 2001 and 2002 require that:

1-The following child's demographic data included in each blood lead test reported:

- Date of Birth;
- Sex;
- Race;
- Address;
- Test date;
- Sample type; and
- Blood lead level.

2-Blood lead results ≥ 20 $\mu\text{g/dL}$ are to be reported (faxed) within 24 hours after the result is known. All other results are to be reported every two weeks.

3-Reporting format should comply with the format designed and provided by the CLR.

4-Data should be provided electronically.

* EA §6-303, Blood lead test reporting (COMAR 26.02.01, Blood lead test

Appendix A
Blood Lead Testing of Children 0-72 Months by Major Age Group and Jurisdiction in 2014

Age Group	Population of Children	Children Tested		Blood Lead Level 5-9 µg/dL						Blood Lead Level ≥10 µg/dL					
				Old Cases		New Cases		Total		Old Cases		New Cases		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Allegany County															
0-35 Months	2,526	1,117	44.2	5	0.4	25	2.2	30	2.7	1	0.1	5	0.4	6	0.5
36-72 Months	2,493	145	5.8	2	1.4	3	2.1	5	3.4	2	1.4	0	0.0	2	1.4
Total	5,019	1,262	25.1	7	0.6	28	2.2	35	2.8	3	0.2	5	0.4	8	0.6
Anne Arundel County															
0-35 Months	25,471	7,251	28.5	3	0.0	42	0.6	45	0.6	4	0.1	4	0.1	8	0.1
36-72 Months	24,436	2,069	8.5	7	0.3	13	0.6	20	1.0	0	0.0	0	0.0	0	0.0
Total	49,907	9,320	18.7	10	0.1	55	0.6	65	0.7	4	0.0	4	0.0	8	0.1
Baltimore County															
0-35 Months	35,422	12,834	36.2	9	0.1	149	1.2	158	1.2	1	0.0	18	0.1	19	0.1
36-72 Months	34,098	3,467	10.2	13	0.4	39	1.1	52	1.5	2	0.1	4	0.1	6	0.2
Total	69,520	16,301	23.4	22	0.1	188	1.2	210	1.3	3	0.0	22	0.1	25	0.2
Baltimore City															
0-35 Months	31,378	12,971	41.3	101	0.8	534	4.1	635	4.9	28	0.2	100	0.8	128	1.0
36-72 Months	27,244	4,990	18.3	191	3.8	174	3.5	365	7.3	37	0.7	29	0.6	66	1.3
Total	58,622	17,961	30.6	292	1.6	708	3.9	1,000	5.6	65	0.4	129	0.7	194	1.1
Calvert County															
0-35 Months	3,525	559	15.9	0	0.0	1	0.2	1	0.2	0	0.0	1	0.2	1	0.2
36-72 Months	3,881	77	2.0	0	0.0	1	1.3	1	1.3	0	0.0	0	0.0	0	0.0
Total	7,406	636	8.6	0	0.0	2	0.3	2	0.3	0	0.0	1	0.2	1	0.2
Caroline County															
0-35 Months	1,647	520	31.6	1	0.2	8	1.5	9	1.7	1	0.2	2	0.4	3	0.6
36-72 Months	1,698	131	7.7	0	0.0	1	0.8	1	0.8	1	0.8	0	0.0	1	0.8
Total	3,345	651	19.5	1	0.2	9	1.4	10	1.5	2	0.3	2	0.3	4	0.6

Appendix A
Blood Lead Testing of Children 0-72 Months by Major Age Group and Jurisdiction in 2014

Age Group	Population of Children	Children Tested		Blood Lead Level 5-9 µg/dL						Blood Lead Level ≥10 µg/dL					
				Old Cases		New Cases		Total		Old Cases		New Cases		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Carroll County															
0-35 Months	6,285	1,006	16.0	3	0.3	14	1.4	17	1.7	0	0.0	5	0.5	5	0.5
36-72 Months	7,213	254	3.5	2	0.8	3	1.2	5	2.0	0	0.0	0	0.0	0	0.0
Total	13,498	1,260	9.3	5	0.4	17	1.3	22	1.7	0	0.0	5	0.4	5	0.4
Cecil County															
0-35 Months	4,714	1,026	21.8	0	0.0	20	1.9	20	1.9	2	0.2	1	0.1	3	0.3
36-72 Months	4,642	447	9.6	0	0.0	2	0.4	2	0.4	0	0.0	1	0.2	1	0.2
Total	9,356	1,473	15.7	0	0.0	22	1.5	22	1.5	2	0.1	2	0.1	4	0.3
Charles County															
0-35 Months	6,884	1,884	27.4	3	0.2	23	1.2	26	1.4	0	0.0	1	0.1	1	0.1
36-72 Months	6,824	453	6.6	0	0.0	5	1.1	5	1.1	0	0.0	0	0.0	0	0.0
Total	13,708	2,337	17.0	3	0.1	28	1.2	31	1.3	0	0.0	1	0.0	1	0.0
Dorchester County															
0-35 Months	1,508	529	35.1	1	0.2	11	2.1	12	2.3	0	0.0	2	0.4	2	0.4
36-72 Months	1,384	113	8.2	1	0.9	2	1.8	3	2.7	1	0.9	0	0.0	1	0.9
Total	2,892	642	22.2	2	0.3	13	2.0	15	2.3	1	0.2	2	0.3	3	0.5
Frederick County															
0-35 Months	10,584	1,993	18.8	3	0.2	24	1.2	27	1.4	1	0.1	5	0.3	6	0.3
36-72 Months	11,113	856	7.7	1	0.1	2	0.2	3	0.4	2	0.2	0	0.0	2	0.2
Total	21,697	2,849	13.1	4	0.1	26	0.9	30	1.1	3	0.1	5	0.2	8	0.3
Garrett County															
0-35 Months	1,105	320	29.0	1	0.3	2	0.6	3	0.9	0	0.0	1	0.3	1	0.3
36-72 Months	1,197	144	12.0	0	0.0	1	0.7	1	0.7	0	0.0	0	0.0	0	0.0
Total	2,302	464	20.2	1	0.2	3	0.6	4	0.9	0	0.0	1	0.2	1	0.2

Appendix A
Blood Lead Testing of Children 0-72 Months by Major Age Group and Jurisdiction in 2014

Age Group	Population of Children	Children Tested		Blood Lead Level 5-9 µg/dL						Blood Lead Level ≥10 µg/dL					
				Old Cases		New Cases		Total		Old Cases		New Cases		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Harford County															
0-35 Months	10,725	2,074	19.3	1	0.0	16	0.8	17	0.8	0	0.0	2	0.1	2	0.1
36-72 Months	11,099	779	7.0	2	0.3	3	0.4	5	0.6	0	0.0	0	0.0	0	0.0
Total	21,824	2,853	13.1	3	0.1	19	0.7	22	0.8	0	0.0	2	0.1	2	0.1
Howard County															
0-35 Months	12,436	1,713	13.8	1	0.1	16	0.9	17	1.0	0	0.0	3	0.2	3	0.2
36-72 Months	13,121	674	5.1	1	0.1	11	1.6	12	1.8	0	0.0	0	0.0	0	0.0
Total	25,557	2,387	9.3	2	0.1	27	1.1	29	1.2	0	0.0	3	0.1	3	0.1
Kent County															
0-35 Months	728	201	27.6	0	0.0	3	1.5	3	1.5	0	0.0	1	0.5	1	0.5
36-72 Months	726	56	7.7	0	0.0	1	1.8	1	1.8	0	0.0	1	1.8	1	1.8
Total	1,454	257	17.7	0	0.0	4	1.6	4	1.6	0	0.0	2	0.8	2	0.8
Montgomery County															
0-35 Months	46,659	13,678	29.3	5	0.0	87	0.6	92	0.7	2	0.0	13	0.1	15	0.1
36-72 Months	45,593	5,630	12.3	8	0.1	33	0.6	41	0.7	1	0.0	3	0.1	4	0.1
Total	92,252	19,308	20.9	13	0.1	120	0.6	133	0.7	3	0.0	16	0.1	19	0.1
Prince George's County															
0-35 Months	43,582	13,387	30.7	5	0.0	120	0.9	125	0.9	2	0.0	31	0.2	33	0.2
36-72 Months	40,457	7,173	17.7	10	0.1	77	1.1	87	1.2	0	0.0	15	0.2	15	0.2
Total	84,039	20,560	24.5	15	0.1	197	1.0	212	1.0	2	0.0	46	0.2	48	0.2
Queen Anne's County															
0-35 Months	1,940	483	24.9	0	0.0	7	1.4	7	1.4	1	0.2	1	0.2	2	0.4
36-72 Months	2,060	151	7.3	0	0.0	1	0.7	1	0.7	0	0.0	0	0.0	0	0.0
Total	4,000	634	15.9	0	0.0	8	1.3	8	1.3	1	0.2	1	0.2	2	0.3

Appendix A
Blood Lead Testing of Children 0-72 Months by Major Age Group and Jurisdiction in 2014

Age Group	Population of Children	Children Tested		Blood Lead Level 5-9 µg/dL						Blood Lead Level ≥10 µg/dL					
				Old Cases		New Cases		Total		Old Cases		New Cases		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Saint Mary's County															
0-35 Months	5,446	1,154	21.2	1	0.1	8	0.7	9	0.8	0	0.0	2	0.2	2	0.2
36-72 Months	5,536	230	4.2	0	0.0	4	1.7	4	1.7	1	0.4	0	0.0	1	0.4
Total	10,982	1,384	12.6	1	0.1	12	0.9	13	0.9	1	0.1	2	0.1	3	0.2
Somerset County															
0-35 Months	963	389	40.4	1	0.3	7	1.8	8	2.1	0	0.0	2	0.5	2	0.5
36-72 Months	871	137	15.7	0	0.0	1	0.7	1	0.7	0	0.0	0	0.0	0	0.0
Total	1,834	526	28.7	1	0.2	8	1.5	9	1.7	0	0.0	2	0.4	2	0.4
Talbot County															
0-35 Months	1,384	502	36.3	1	0.2	5	1.0	6	1.2	0	0.0	0	0.0	0	0.0
36-72 Months	1,355	82	6.1	2	2.4		0.0	2	2.4	1	1.2	0	0.0	1	1.2
Total	2,739	584	21.3	3	0.5	5	0.9	8	1.4	1	0.2	0	0.0	1	0.2
Washington County															
0-35 Months	6,528	1,776	27.2	2	0.1	51	2.9	53	3.0	0	0.0	4	0.2	4	0.2
36-72 Months	6,598	923	14.0	5	0.5	26	2.8	31	3.4	1	0.1	1	0.1	2	0.2
Total	13,126	2,699	20.6	7	0.3	77	2.9	84	3.1	1	0.0	5	0.2	6	0.2
Wicomico County															
0-35 Months	4,557	1,539	33.8	2	0.1	18	1.2	20	1.3	0	0.0	3	0.2	3	0.2
36-72 Months	4,317	398	9.2	2	0.5	4	1.0	6	1.5	0	0.0	1	0.3	1	0.3
Total	8,874	1,937	21.8	4	0.2	22	1.1	26	1.3	0	0.0	4	0.2	4	0.2
Worcester County															
0-35 Months	1,698	579	34.1	1	0.2	8	1.4	9	1.6	0	0.0	0	0.0	0	0.0
36-72 Months	1,653	167	10.1	0	0.0	1	0.6	1	0.6	1	0.6	0	0.0	1	0.6
Total	3,351	746	22.3	1	0.1	9	1.2	10	1.3	1	0.1	0	0.0	1	0.1

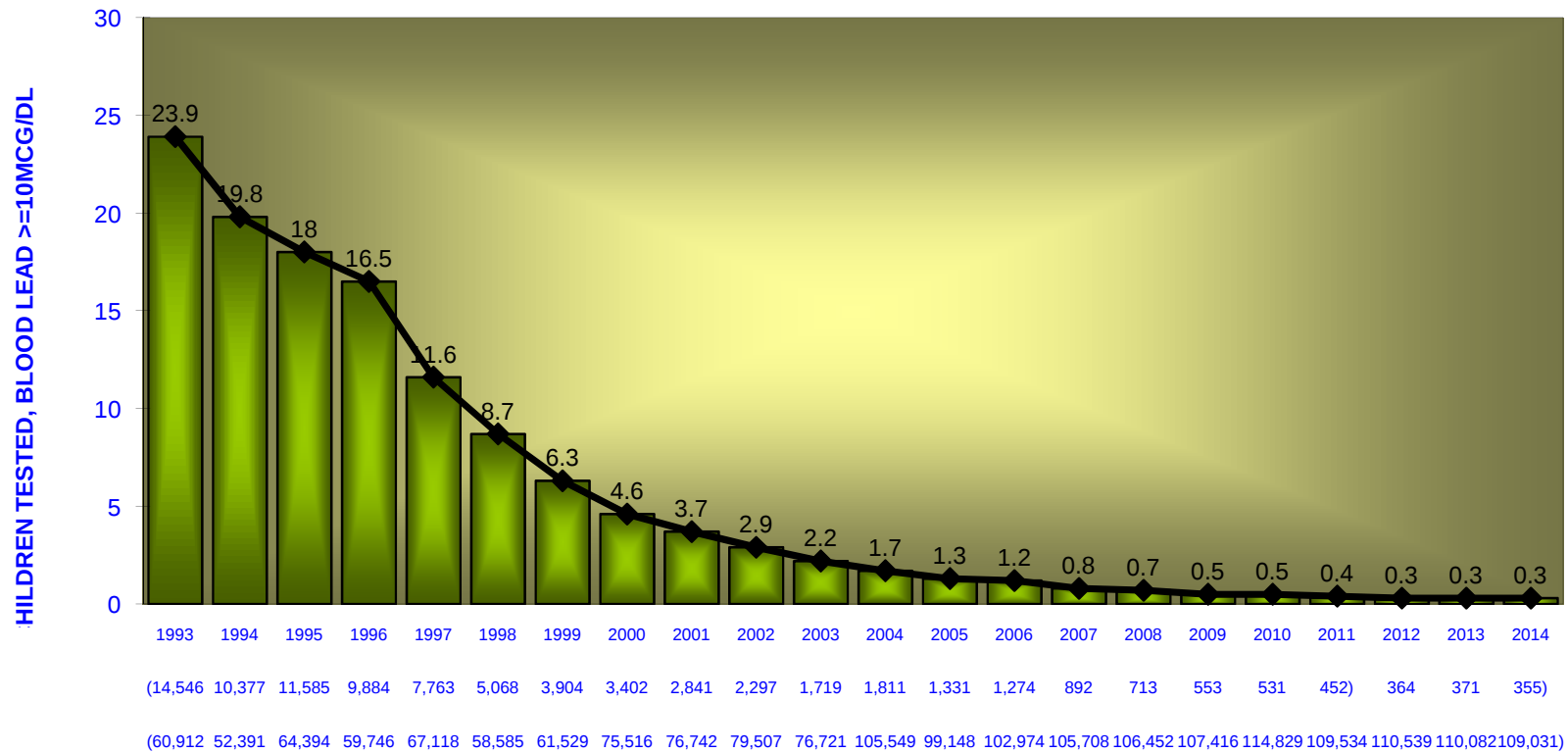
Appendix A
Blood Lead Testing of Children 0-72 Months by Major Age Group and Jurisdiction in 2014

Age Group	Population of Children	Children Tested		Blood Lead Level 5-9 µg/dL						Blood Lead Level ≥10 µg/dL					
				Old Cases		New Cases		Total		Old Cases		New Cases		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Statewide															
0-35 Months	267,696	79,485	29.7	150	0.2	1,199	1.5	1,349	1.7	43	0.1	207	0.3	250	0.3
36-72 Months	259,608	29,546	11.4	247	0.8	408	1.4	655	2.2	50	0.2	55	0.2	105	0.4
Total	527,304	109,031	20.7	397	0.4	1,607	1.5	2,004	1.8	93	0.1	262	0.2	355	0.3

Appendix B
Blood Lead Testing of Children 0-72 Months, and Prevalence and Incidence of Blood Lead Level ≥ 10 $\mu\text{g/dL}$: 2007-2014

Calendar			<u>Blood Lead Tests</u>		<u>Prevalence</u>		<u>Incidence</u>	
Year		Population	Number	Percent	Number	Percent	Number	Percent
2007								
	Baltimore City	55,142	17,670	32.0	624	3.5	435	2.5
	Counties	413,248	87,760	21.2	267	0.3	218	0.2
	County Unknown		278		1		1	
	Statewide	468,390	105,708	22.6	892	0.8	654	0.6
2008								
	Baltimore City	55,959	18,622	33.3	468	2.5	302	1.6
	Counties	418,941	87,830	21.0	245	0.3	187	0.2
	County Unknown		69		0		0	
	Statewide	474,900	106,452	22.4	713	0.7	489	0.5
2009								
	Baltimore City	56,431	19,043	33.7	347	1.8	214	1.1
	Counties	422,488	88,368	20.9	206	0.2	165	0.1
	County Unknown		5					
	Statewide	468,390	107,416	22.4	553	0.5	379	0.4
2010								
	Baltimore City	57,937	19,702	34.0	314	1.6	229	1.2
	Counties	433,661	94,650	21.8	217	0.2	170	0.2
	County Unknown		477		0		0	0.0
	Statewide	491,598	114,829	23.4	531	0.5	399	0.3
2011								
	Baltimore City	55,681	19,049	34.2	258	1.4	182	1.0
	Counties	445,021	90,481	20.3	194	0.2	160	0.2
	County Unknown		4		0		0	
	Statewide	500,702	109,534	21.9	452	0.4	342	0.4
2012								
	Baltimore City	56,701	18,717	33.0	219	1.2	148	0.8
	Counties	453,184	91,747	20.2	143	0.2	104	0.1
	County Unknown		75		2		3	
	Statewide	509,885	110,539	21.7	364	0.3	255	0.2
2013								
	Baltimore City	57,693	18,535	32.1	218	1.2	170	0.9
	Counties	461,171	91,539	19.8	152	0.2	134	0.1
	County Unknown		8		0		1	
	Statewide	518,864	110,082	21.2	371	0.3	304	0.3
2014								
	Baltimore City	58,622	17,961	30.6	194	1.1	129	0.7
	Counties	468,682	91,070	19.4	161	0.2	133	0.1
	County Unknown							
	Statewide	527,304	109,031	20.7	355	0.3	262	0.2

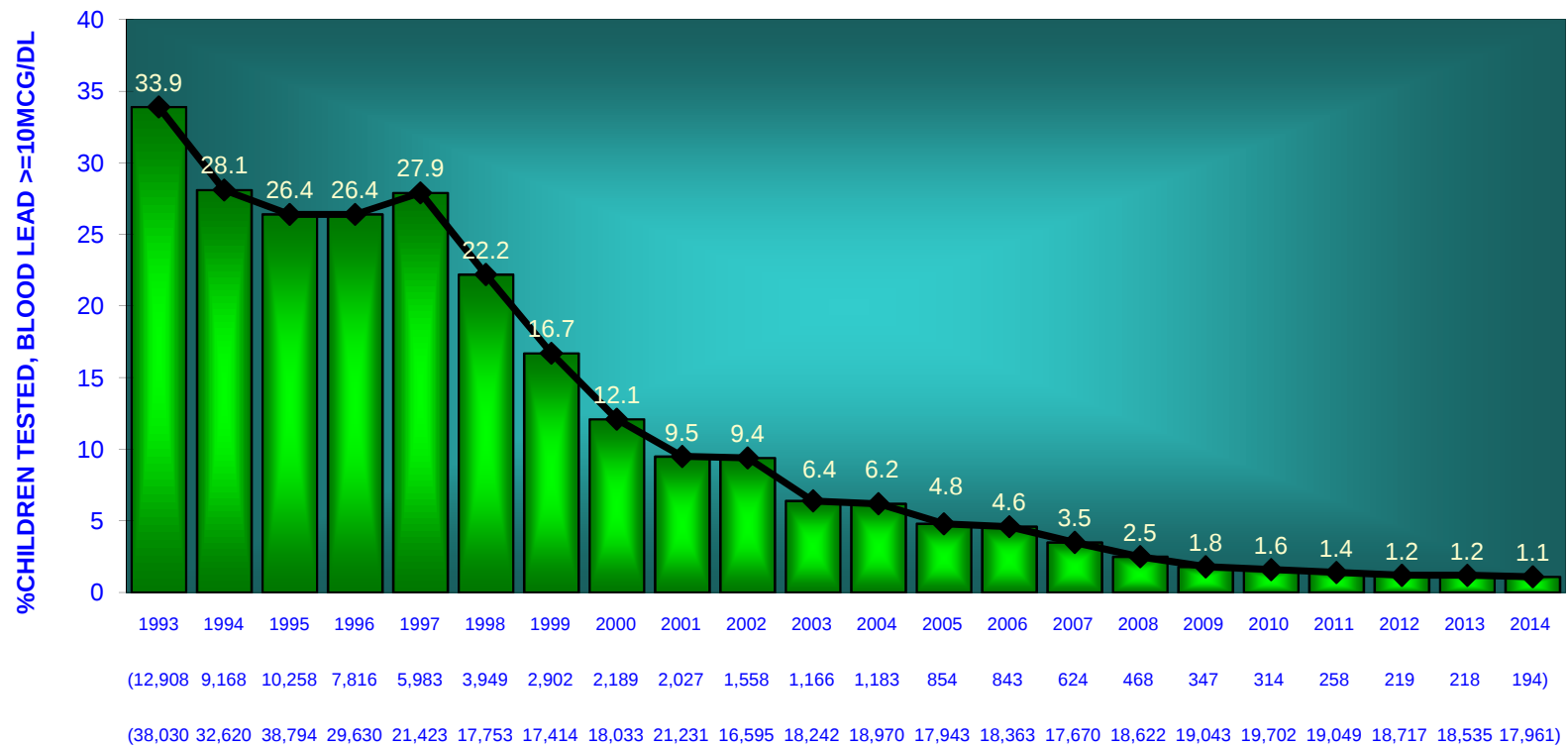
**MARYLAND DEPARTMENT OF THE ENVIRONMENT
CHILDHOOD BLOOD LEAD SURVEILLANCE
STATEWIDE 1993-2014**



CALENDAR YEAR
(Number of Children with BLL $\geq$ 10mcg/dl)
(Number of Children Tested)



**MARYLAND DEPARTMENT OF THE ENVIRONMENT
CHILDHOOD BLOOD LEAD SURVEILLANCE
BALTIMORE CITY 1993-2014**



CALENDAR YEAR
(Number of Children with BLL ≥ 10 mcg/dl)
(Number of Children Tested)