



# MARYLAND DEPARTMENT OF THE ENVIRONMENT

## LEAD POISONING PREVENTION PROGRAM

### Childhood Blood Lead Surveillance in Maryland

1999 Annual Report



*February 2001*

# MARYLAND CHILDHOOD LEAD REGISTRY

## 1999 ANNUAL SURVEILLANCE REPORT

### 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 done on Maryland children 0 - 18 years of age, and provides blood lead test results to local health departments as needed for case management and planning.

Since 1995, the registry has released a comprehensive annual report on statewide childhood blood lead testing. This current report presents the childhood blood lead test results for 1999. All numbers are based on blood lead testing on children. The CLR does not receive any reports on lead screening based on the risk questionnaire.

#### 1999 Surveillance Highlights:

**Overall testing is stable.** The number and percentage of children aged 0-6 years was similar to that of 1998. Testing was stable in Baltimore City, and there was a slight increase in testing in the counties.

**Testing of 1 and 2 year olds shows some increase.** Testing of children at age 1 and 2, the age of greatest exposure risk, showed a slight increase statewide compared to 1998 from 23.4% of 1 year olds to 27.5%, and 15.9% to 17.3% of 2 year olds.

**The number of children tested with elevated blood leads continues to decrease compared to 1998, but remains a significant problem.** Children with blood lead levels above 10 µg/dL, CDC's level of concern, decreased to 3,904 or 6.3% of children tested statewide. Children with blood lead levels of 20 µg/dL and above, or "lead poisoning", decreased to 555 or 0.9% of children tested statewide. This may be from a combination of reductions in lead exposure and increased blood lead testing in lower risk areas.

**The residences of children with elevated blood lead levels continue to be disproportionately concentrated in Baltimore City and other areas of old housing and low income.** Of children tested in Baltimore City, 2,902 or 16.7% had blood lead levels of 10 µg/dL or more, and 446 or 2.6% had confirmed blood lead levels of 20 µg/dL or more.

**Completeness of address reporting from labs continues to decrease.** Completeness of child address and other demographics as reported by laboratories continued to deteriorate during 1999. Assignment of child residence based on the address of the ordering physician rather than the child's address is now up to 41%, compared to 35% in 1998.

## **OVERVIEW OF LEAD POISONING PREVENTION IN MARYLAND**

### **LEAD POISONING IN MARYLAND**

Lead is one of the most significant and widespread environmental hazards for children in Maryland. Children are at greatest risk from birth to age six while their neurological systems develop. Sustained exposure to lead can cause long-lasting neurological damage. Effects include learning disabilities, shortened attention span, irritability, and lowered IQ.

Lead paint dust from deteriorated lead paint or from renovation is the major exposure source in Maryland. Most exposure of children occurs through children's normal hand-to-mouth activity after contact with a source of leaded dust.

Most cases of childhood lead poisoning in Maryland are related to deteriorated or damaged residential lead paint, most commonly in old windows and porches. There are about 529,000 residential houses built before 1950 (95% likely to contain lead paint) and 976,000 houses built between 1950-1978 (75% likely to contain lead paint), based on the 1990 census.

Imported ceramics, parents' occupations and hobbies occasionally present exposure to lead dust or fumes. Water, air, and soil may provide low-level, "background" exposure but are rarely the cause of childhood lead poisoning.

The most effective prevention of childhood lead poisoning is to reduce or eliminate exposure. Maryland has several on-going efforts to reduce risk of children's lead exposure and for early detection. These include:

- enforcing requirements for meeting a standard of care for lead hazard reduction in rental housing built before 1950;
- providing grants and loans for hazard reduction;
- supporting extensive, locally-based outreach programs to parents, health care providers, and property owners; and
- targeting highest risk areas for intensive outreach for blood lead testing for early detection and early intervention.

### **TESTING FOR BLOOD LEAD IN MARYLAND**

During 1999, the following requirements and recommendations about blood lead testing were in effect:

- Mandatory blood lead testing at age 1 and 2 of children enrolled in Medicaid ( Federal Early Prevention Screening and Detection Treatment or "EPSDT" requirements)
- Mandatory evidence of screening within 30 days of entry into daycare for children aged 0 to 6 years with either a blood lead test or risk assessment questionnaire (MD State law, 1997)

- Recommended testing at age one of all children with appropriate follow-up per CDC guidance (State recommendation from MDE and DHMH, 1991)

In Maryland, most blood lead testing is ordered by a child's health care provider. Blood lead specimens are obtained on site at the health care provider office, or off-site, at a private laboratory center. Some local health departments make free or low-cost testing available at the health department. Testing through the health care provider is generally preferred so that follow-up is integrated with the child's overall health care. Follow-up through local health departments is facilitated by MDE reporting for all children with blood lead levels of 15 mcg/dL or more regardless of the site of the testing.

The CLR receives reports of blood lead tests only. There is no means to estimate of the number of children whose risk of lead exposure may have been evaluated by health care providers with the use of the risk assessment questionnaire.

## **LABORATORY REPORTING OF TEST RESULTS**

Laboratories are required by MD statute to report all blood lead test results on all children 0 - 18 years residing in Maryland to the Maryland Childhood Lead Registry.

Completeness of reporting of required demographics such as child's address or date of birth has deteriorated over the past several years. In 1998, 35% of children's test results had incomplete address and were assigned to zip code according to the zip code of the health care provider office. In 1999, this increased to 41% of children's locales assigned according to health care provider office. It is important to note that, in the early 1990's, the Maryland Department of Health and Mental Hygiene Laboratory performed almost 90% of the analysis of blood lead tests. By 1998, that proportion decreased to 5 % as analysis shifted to private laboratories certified by the DHMH.

## **MEDICAL AND PUBLIC HEALTH CASE MANAGEMENT**

Recommended clinical and public health interventions are tied to different blood lead levels. These are summarized in Table 1. Interventions are based on State statute, state regulations, policy, and guidance documents from the Centers for Disease Control.

## **ASSUMPTIONS AND DEFINITIONS USED FOR THIS ANNUAL REPORT**

**Child:** In Maryland, blood lead test results are reported on children 0 - 18 years. Different groups within that range get more intensive analysis. 0 - 6 years has been the focus of CDC's attention for several years. One and two year olds are the focus of EPSDT testing under Medicaid. Children's age is identified as appropriate for each table.

**County and zip code assignment:** Zip code assignment of a child is based on the child's address when available. If the child's address is incomplete, zip code assignment is based on the county and zip code of the health care provider who ordered the blood lead test. Zip codes which cross county borders are assigned to the county in which most of the zip code is located.

**Elevated blood lead (EBL):** Any blood lead level greater than or equal to 10 µg/dL. This includes both capillary (finger stick) and venous blood lead tests.

**Lead poisoning:** is a confirmed venous blood lead level greater than or equal to 20 µg/dL.

**Incidence of EBL:** “New” cases of EBL. This was not calculated for 1999, as the higher proportion of incomplete addresses for children in 1999 made accurate comparison with 1998 difficult.

**Prevalence of EBL:** Both old and new cases, or all children with EBL in 1999. Elevated blood lead can often extend beyond one year. This is especially likely to occur if the child is not relocated to a safe environment so that exposure continues at the original location or begins at a new hazardous location.

**Population estimates:** 1999 are adapted from the US Department of Commerce, Bureau of Census.

**Testing:** Blood lead testing by capillary (finger stick) or venous blood test measures lead in blood.

## **1999 STATEWIDE BLOOD LEAD TESTING PERFORMANCE**

The following tables show what testing is occurring statewide.

**Table 2, " Children 0-6 Years Old By Jurisdiction in 1999"** shows a statewide and county breakout of children tested for blood lead as reported to the Childhood Lead Registry. The table shows numbers of children with elevated blood lead levels of 10 µg/dL or more, and children with lead poisoning of 20 µg/dL or more.

**Table 3 "Age-Specific Blood Lead Testing of Children 0-72 months in Maryland"** shows blood lead testing of children aged 0-72 months in one year groups over three years.

**Table 4 "Blood Lead Testing Among Children 6-17 Years of Age"** shows the age and blood lead level distribution for testing in Maryland children aged 7 - 18 years.

### **Key points on statewide testing**

**Overall testing is stable in 1999** The number and percentage of children aged 0-6 years that received blood lead testing was similar to that of 1998.

**Testing was stable in Baltimore City**, after three years of decreases. This is especially important due to the higher risk of exposure experienced by many Baltimore City children.

**Counties show a slight increase in testing**, following several years of increased testing in the counties.

**Testing in one and two year olds shows a slight increase in 1999** compared to 1998.

## STATEWIDE BLOOD LEAD LEVEL TRENDS OVER TIME

**Table 5 “Childhood Blood Lead Surveillance in Maryland: 1993 – 1999 Summary Children 0-72 months”**, shows summary results for seven years at the State, Baltimore City, and Counties levels.

**Table 6 “Intervention Levels of Childhood Blood Lead Testing: 1995-1999”** shows a summary of children with elevated blood lead levels at different levels that trigger different interventions. The interventions are summarized in Table 1, the chart of public health case management functions.

### Key Observations on elevated blood lead levels statewide

**Prevalence of children with elevated blood leads continues to decrease compared to 1998.** Children tested with blood lead levels above 10 µg/dL, CDC's level of concern, decreased to 3,904 or 6.3% of children tested statewide. Children with confirmed venous blood lead levels of 20 µg/dL and above, or "lead poisoning", decreased to 555 or 0.9% of children tested statewide.

**Prevalence of children with elevated blood lead levels continues to be disproportionately concentrated in Baltimore City and other areas with both old housing and low income.** Of children tested in Baltimore City, 2,902 or 16.7% had blood lead levels of 10 µg/dL or more, and 446 or 2.6% had confirmed blood lead levels of 20 µg/dL or more.

**Decreased prevalence may be the result of decreased exposure, or from decreased testing of at- risk children.** Much of the decline in blood lead levels or case identification is the result of several years of lead poisoning prevention efforts. Increased enforcement of the state law “Reduction of Lead Risk in Housing”, increased awareness by parents and property owners of the hazards of lead poisoning, improved maintenance and prevention of lead exposure, and moving away from older housing into more recently built city or suburban housing, and outreach and education to families and health care providers all contribute to fewer lead poisoning cases. Another possible contributor to the decrease in case identification is the relative increase in testing in areas of undetermined risk, and decreased testing in at- risk areas. This is increasingly difficult to assess due to the rising incompleteness of children's address information.

**1999 SUMMARY** Maryland continues to make progress in reducing lead poisoning in young children. Both the total numbers of children with elevated blood lead levels, and statewide average blood lead levels decreased in 1999. However, lead exposure and lead poisoning continue to occur in significant numbers. Almost 4,000 children had blood lead levels above the Centers for Disease Control's level of concern, and 555 children had confirmed lead poisoning. Blood lead testing needs to increase, especially in at-risk areas, to assure that children most likely to have elevated blood lead levels are identified early.

**Maryland Childhood Lead Poisoning Prevention Program  
Protocol for Prevention, Intervention and Case Management, FY 2001**

**Table 1**

<b>Blood Lead Level</b>	<b>Local Health Department (1)</b>	<b>Health Care Provider</b>	<b>Statewide Law Enforcement(2)</b>
< 9 µg/dL	Anything above zero indicates some exposure or contact with lead. No Community Health Nurse case management services are indicated.	<ul style="list-style-type: none"> <li>• General education about lead and lead poisoning</li> <li>• Assessment for Risk Assessment Questionnaire at all routine child health visits</li> <li>• Repeat blood lead level according to protocol</li> </ul>	Footnote 2
10 – 14 µg/dL	This is the CDC <u>level of concern</u> . No Community Health Nurse case management services are provided (unless resources allow).	As above plus <ul style="list-style-type: none"> <li>• Educate to decrease exposure</li> <li>• Track blood lead levels according to CDC protocol</li> </ul>	
15 – 19 µg/dL	If capillary test, coordinate with provider and guardian to validate with a venous blood lead level within 1 month. If venous test <ul style="list-style-type: none"> <li>• Make telephone contact</li> <li>• Make home visit (if resources available)</li> <li>• Provide educational materials to family (mail or in person)</li> <li>• Send Official Notice of Elevated Blood Lead, when applicable, to Tenant and Rental Property Owner</li> <li>• Coordinate with the provider and guardian for follow-up activities, such as housing and follow-up blood tests</li> </ul> If two consecutive venous tests between 15-19 µg/dL at least 90 days of each other, treat as next level.	As above plus <ul style="list-style-type: none"> <li>• Evaluate for iron deficiency</li> <li>• Take environmental history</li> </ul>	As in footnote 2, plus MDE enforcement of Lead Risk in Housing law, subsections on <ul style="list-style-type: none"> <li>• Notice of Elevated Blood Lead</li> </ul>
20 – 44 µg/dL	If capillary test, coordinate validation of level with a venous blood lead level within 1 week If venous test. <ul style="list-style-type: none"> <li>• Contact and make a home visit in coordination with the Environmental Lead Sanitarian who will complete an environmental investigation within 10 working days</li> <li>• Discuss with the health care provider possible referral to tertiary care centers specializing in management of childhood lead poisoning</li> <li>• Provide appropriate referrals to other agencies (Social Services, Housing, etc.)</li> </ul>	As above plus <ul style="list-style-type: none"> <li>• Complete medical/nutritional history and physical examination</li> <li>• Obtain developmental / psychological evaluation</li> <li>• Consider chelation consultation</li> </ul>	As above, plus MDE and local health department enforcement of <ul style="list-style-type: none"> <li>• Notice of Violations</li> </ul>
≥ 45 µg/dL	If capillary, contact provider within 2 working days. Inform provider to mark all specimens STAT (Highest Priority) and request immediate processing and report from laboratory. If venous, contact provider within 1 working day. Same as above.	As above plus <ul style="list-style-type: none"> <li>• Consult with lead specialist</li> <li>• Perform urgent chelation</li> </ul>	<ul style="list-style-type: none"> <li>• Lead Risk in Housing law, subsections on Qualified Offer</li> </ul>
> 70 µg/dL	Contact the health care provider within 24 hours. If capillary, confirm the result immediately with a STAT venous test. If venous, verify hospitalization as a medical emergency. Same as above.	<b>Hospitalize: Medical emergency:</b>	

1) Maryland Department of the Environment (MDE) Protocol, based on Centers for Disease Control and Prevention (CDC) protocol

2) Environment Article § 6-8, “Reduction of Lead Risk in Housing” subsections on Rental Property Registration, Risk Reduction Treatments at Turnover and Notice of Defect are ongoing primary prevention activities not triggered by blood lead levels.



## BLOOD LEAD TESTING IN MARYLAND

### CHILDREN 0-6 YEARS OLD BY JURISDICTION IN 1999

**Table 2**

County	Population <sup>1</sup>	Children Tested		Children with Elevated Blood <sup>2</sup> Lead		Children with Lead <sup>3</sup> Poisoning	
		Number	Percent	Number	Percent	Number	Percent
Allegany	4,350	1,404	32.3	44	3.1	6	0.4
Anne Arundel	38,064	4,676	12.3	60	1.3	4	0.1
Baltimore	52,040	7,129	13.7	173	2.4	19	0.3
Baltimore City	55,401	17,414	31.4	2,902	16.7	446	2.6
Calvert	6,206	388	6.3	2	0.5	0	0.0
Caroline	2,534	371	14.6	43	11.6	11	3.0
Carroll	12,430	678	5.5	21	3.1	1	0.1
Cecil	6,975	368	5.3	19	5.2	3	0.8
Charles	11,110	1,033	9.3	12	1.2	0	0.0
Dorchester	2,184	406	18.6	60	14.8	3	0.7
Frederick	16,040	977	6.1	19	1.9	4	0.4
Garrett	2,106	237	11.3	2	0.8	0	0.0
Harford	18,818	1,312	7.0	21	1.6	1	0.1
Howard	20,683	1,102	5.3	17	1.5	2	0.2
Kent	1,257	333	26.5	24	7.2	1	0.3
Montgomery	68,975	9,098	13.2	95	1.0	11	0.1
Prince George's	65,986	10,544	16.0	117	1.1	17	0.2
Queen Anne's	3,150	296	9.4	7	2.4	0	0.0
Saint Mary's	8,625	620	7.2	8	1.3	0	0.0
Somerset	1,377	270	19.6	26	9.6	2	0.7
Talbot	2,243	275	12.3	10	3.6	2	0.7
Washington	9,060	676	7.5	20	3.0	5	0.7
Wicomico	6,240	904	14.5	92	10.2	8	0.9
Worcester	3,058	427	14.0	33	7.7	2	0.5
Unknown		588		74		4	
<b>Statewide</b>	<b>418,912</b>	<b>61,529</b>	<b>14.7</b>	<b>3,904</b>	<b>6.3</b>	<b>555</b>	<b>0.9</b>

<sup>1</sup> Adapted from Census Bureau population estimate by age and sex for Maryland for 1998.

<sup>2</sup> Defined as venous or capillary blood lead level  $\geq 10\mu\text{dL}$ .

<sup>3</sup> Defined as venous blood lead level  $\geq 20\mu\text{dL}$ .

**MARYLAND DEPARTMENT OF THE ENVIRONMENT**  
**Lead Poisoning Prevention Program: Childhood Lead Registry**  
Age-specific blood lead testing of children 0-72 months in Maryland  
1997- 1999

Table 3

Age	<i>1997</i>			<i>1998</i>			<i>1999</i>		
	Population of Children	Children tested	%	Population of Children	Children tested	%	Population of Children	Children tested	%
Under One	69,214	9,981	14.4	68,230	8,121	11.9	69,852	9,687	13.9
One Year	67,909	17,373	25.6	67,750	15,870	23.4	68,706	18,894	27.5
Two Years	68,417	12,699	18.6	67,731	10,743	15.9	68,734	11,881	17.3
Three Years	69,652	9,772	14.0	69,064	7,966	11.5	68,702	7,917	11.5
Four Years	71,756	9,123	12.7	71,287	7,821	11.0	70,864	7,527	10.6
Five Years	74,249	5,656	7.6	72,423	5,034	7.0	72,054	4,619	6.4
Age unknown		1,365			3,030			1,004	
Total	421,197	65,969	15.7	416,485	58,585	14.1	418,912	61,529	14.7

Notes:

1. Populations for 1997, 1998, and 1999 are based on annual age (single year)- sex specific estimate for states and counties by the US Bureau of Census.
2. Number of children tested is based on the highest venous or the highest capillary blood lead test that the Childhood Lead Registry (CLR) received from laboratories for a given child in 1997, 1998, or 1999.
3. Blood lead reports with no or inaccurate date of birth were assumed to be from children under six (6) years of age with exact age unknown.
4. For information on age specific elevated blood lead level (EBL) refer to the supplementary data tables of the CLR Annual Reports for 1997, 1998, and 1999.

Blood Lead Testing Among Children 6-17 Years of Age  
(As reported to Childhood Lead Registry for 01/01/1999-12/31/1999)

**Table 4**

<b>Age (Year)</b>	<b>Population</b>	<b>Children tested</b>		<b>Children with Elevated Blood Lead Level*</b>		<b>Children with Lead Poisoning**</b>	
		<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>
6 Years	73,083	2,905	4.0	235	8.1	12	0.4
7 Years	75,959	1,578	2.1	120	7.6	9	0.6
8 Years	74,696	1,234	1.7	72	5.8	4	0.3
9 Years	80,793	885	1.1	47	5.3	2	0.2
>=10 Yrs.	652,144	2,966	0.5	68	2.3	5	0.2
<b>Total</b>	<b>956,675</b>	<b>9,568</b>	<b>1.0</b>	<b>542</b>	<b>5.7</b>	<b>32</b>	<b>0.3</b>

\* Blood lead level  $\geq 10$   $\mu\text{g/dL}$ .

\*\* Venous blood lead level  $\geq 20$   $\mu\text{g/dL}$ .

**Table 5**  
**Childhood Blood Lead Surveillance in Maryland: 1993-1999 SUMMARY**  
**Children 0-72 months**

Calendar Year		Population of Children <sup>1</sup>	Children Tested		Children with Elevated Blood <sup>2</sup> Lead		Children with Lead Poisoning <sup>3</sup>	
			Number	Percent	Number	Percent	Number	Percent
<b>1993</b>								
	City	69,434	38,030	54.8	12,908	33.9	1,850	4.9
	Counties	381,753	22,882	6.0	1,638	7.2	54	0.2
	Total	451,187	60,912	13.5	14,546	23.9	1,904	3.1
<b>1994</b>								
	City	65,255	32,620	50.0	9,168	28.1	1,635	5.0
	Counties	384,720	19,771	5.1	1,209	6.1	156	0.8
	Total	452,975	52,391	11.6	10,377	19.8	1,791	3.4
<b>1995</b>								
	City	65,958	38,794	58.8	10,258	26.4	1,633	4.2
	Counties	383,210	25,600	6.7	1,327	5.2	199	0.8
	Total	449,168	64,394	14.3	11,585	18.0	1,832	2.8
<b>1996</b>								
	City	63,508	29,630	46.7	7,816	26.4	1,646	5.6
	Counties	380,757	27,006	7.1	1,264	4.7	160	0.6
	Unknown <sup>4</sup>		3,110		804		24	
	Total	444,265	59,746	13.4	9,884	16.5	1,830	3.1
<b>1997<sup>5</sup></b>								
	City	60,099	21,423	35.6	5,983	27.9	1030	4.8
	Counties	371,057	44,546	12.0	1654	3.7	202	0.5
	Unknown		1,149		126		1	
	Total	431,156	67,118	15.6	7,763	11.6	1233	1.8
<b>1998<sup>5</sup></b>								
	City	56,967	17,753	31.2	3,949	22.2	669	3.8
	Counties	364,230	40,164	11.0	1,082	2.7	103	0.3
	Unknown		668		37		0	
	Total	421,197	58,585	13.9	5,068	8.7	772	1.3
<b>1999<sup>5</sup></b>								
	City	55,401	17,414	31.4	2,902	16.7	446	2.6
	Counties	363,511	43,524	12.0	925	2.1	102	0.2
	Unknown		591		77		7	
	Total	418,912	61,529	14.7	3,904	6.3	555	0.9

1. Annual population estimate from US Census Bureau age-sex population estimate for state and counties.
2. Defined as a venous or a capillary blood lead level  $\geq 10\mu\text{g/dL}$ .
3. Defined as a venous blood lead level  $\geq 20\mu\text{g/dL}$ .
4. City/county cannot be assigned because of no information on address.
5. The US Post Office list of zipcodes used for city/county assignment.

**Summary Findings of Childhood Blood Lead Testing: 1995-1999**  
**Table 6**

Calendar Year	Population <sup>1</sup>	<u>Blood Lead Testing</u>		<u>BLL<sup>2</sup> <math>\geq</math> 10 mg/dL</u>		<u>Lead Poisoning<sup>3</sup></u>		<u>Average Blood Lead Level<sup>4</sup></u>		
		Number	%	Number	%	Number	%	All	$\geq 10$	$\geq 20$
1995	449,168	64,394	14.3	11,585	18.0	1,832	2.8	4.1	14.6	25.5
1996	444,265	59,746	13.4	9,884	16.5	1,830	3.1	5.1	14.7	25.4
1997	431,156	67,118	15.6	7,763	11.6	1,233	1.8	4.3	14.8	25.4
1998	421,197	58,585	13.9	5,065	8.6	772	1.3	3.9	14.2	25.1
1999	418,912	61,529	14.7	3,904	6.3	555	0.9	3.6	13.9	25.2

1. Adapted from US Bureau of Census Population Estimate by age and sex by calendar year, age 0 – 6 years.
2. Blood Lead Level.
3. Venous blood lead level  $\geq 20$   $\mu\text{g/dL}$ .
4. Geometric mean in  $\mu\text{g/dL}$ .