

VIRGINIA EPIDEMIOLOGY BULLETIN

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Childhood Lead Poisoning Screening Guidelines

Introduction

An estimated 25,000 children in the Commonwealth have elevated blood lead levels.¹ Each year nearly 500 children with newly diagnosed cases of elevated blood lead are reported to the Virginia Department of Health under the *Regulations for Disease Reporting and Control*. Beginning in January 1999, the regulations required a change in reporting levels from 15 to 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$). This change is expected to increase the number of reported cases by at least 50%. (For related information visit the Lead-Safe Virginia Program's website at <http://www.vdh.state.va.us/fhs/child/lead/data.htm>.)

Lead affects virtually every system in the body, particularly the developing brain and nervous system of fetuses and young children. Levels that were once thought to be safe have now been shown to be harmful. Even with blood lead levels as low as 10 to 20 $\mu\text{g}/\text{dL}$, children have been shown to suffer the adverse effects of decreased intelligence, behavioral disturbances, and developmental disabilities. Lead has lasting effects on the health of children that reach well into their adult years.

Young children are at higher risk of lead poisoning than adults primarily because their normal hand-to-mouth activity causes them to be exposed to, and therefore absorb, more lead than an adult. Sources of lead exposure include: lead-based paint; lead-contaminated soil, dust and water; lead-containing materials used in parental occupations or hobbies; lead-containing ceramicware; and traditional remedies. Lead-based paint and lead-contaminated dust in homes are the most important sources of lead exposure. Although lead was banned from paint in 1978, 83% of

all homes built in the United States before 1978 still contain some lead-based paint.²

Lead poisoning is preventable. The key to childhood lead poisoning prevention is the identification and subsequent elimination or control of the source of exposure. Except in rare instances, childhood lead poisoning is asymptomatic. Only through active screening will the lead-poisoned children in Virginia be found.



Targeted Screening

In 1991, the Centers for Disease Control and Prevention (CDC) published guidelines for preventing childhood lead poisoning through universal screening of blood levels in children six months to six years of age.³ A 1994 survey found that only about one-fourth of all children and one-third of the high-risk children had been screened. Therefore, in November 1997, the CDC published new guidelines calling for states to develop a statewide screening plan that would include targeted screening of children under the age of six years.²

In early 1998, a screening workgroup was formed in Virginia consisting of private physicians, public health professionals, and parents of lead-poisoned children. Following the CDC guidelines and using state-specific information, the workgroup has produced guidelines for childhood lead poisoning screening in Virginia.

The screening guidelines call for using the risk factor questions below to assess all children at 1 year of age and again at age 2. Also, assess children 3-5 years of age who have not previously been assessed. The children determined to be at high risk, based on a "yes" or "unknown" answer to any of the questions, should then have a blood lead test performed.

Is the child:

1. Eligible for or receiving Medicaid, WIC, or Virginia Children's Medical Security Insurance Plan (VACMSIP) benefits?
2. Living in a ZIP Code determined to be high risk based on age of housing and other factors? (see insert)
3. Living in or regularly visiting a house or day care center built before 1950?
4. Living in or regularly visiting a house built before 1978 with peeling or chipping paint or recent (within the last six months), ongoing or planned renovation?
5. Living with or regularly visiting a sibling, housemate or playmate with lead poisoning?
6. Living with an adult whose job or hobby involves exposure to lead?
7. Living near an active lead smelter, battery recycling plant, or other industry likely to release lead?



The risk factor questions emphasize the age of any housing where the child lives or visits frequently. Due to lead-based paint remaining on the walls, housing built prior to 1950 poses the greatest risk. Over 19% of the homes in Virginia were built prior to 1950. A high-risk ZIP Code is one that has been determined to have more than 26% of all housing built before 1950 or is known to have a 12% or higher prevalence of lead poisoning among its children. ZIP Codes are a practical way of defining high risk areas. As screening data become available, the ZIP Code list will be updated.

Lead poisoning is normally an asymptomatic disease and therefore testing must be based on assessed risk, not the appearance of symptoms. Symptomatic lead poisoning at any level is a medical emergency. Both Medicaid and VACMSIP will cover the cost of screening and treatment for eligible children.

The initial screening blood test can be performed with a venous blood or capillary blood sample or with blood on filter paper. A venous sample is the preferred method. Any non-venous sample found to have a result of ≥ 10 $\mu\text{g}/\text{dL}$ must have a confirmatory test performed according to the guidelines (see insert). Surveillance data in Virginia indicate that many children with an initial elevated capillary blood lead level may not be receiving follow-up testing. Any provider planning to use a hand-held testing machine must first call the Lead-Safe Virginia Program (804/225-4455) for approval.

Virginia reporting regulations require all test results $\geq 10\mu\text{g}/\text{dL}$ be reported to the Health Department. The Lead-Safe Virginia Program has asked for voluntary reporting of blood lead test results $< 10\mu\text{g}/\text{dL}$ to determine the total number of tests performed.

This information will help refine screening protocols in the future. Providers are required under the *Regulations for Disease Reporting and Control* to include with all test results the following: child's name, street address, city, ZIP Code, date of birth, race, gender, physician name and address. Other variables requested are sample type (venous or capillary), date of collection, and guardian name. These reports may be made on the Epi-1 Form used for all reportable conditions.

Medical Management

Table 1 contains the general guidelines for the management of children who have confirmed elevated blood lead levels. However, each case of childhood lead poisoning can be different, and the management of lead-poisoned children should be done on a case by case basis. Regional Treatment Centers (listed in Table 1) or local health departments may be contacted when the method of treatment is in doubt.

Benefits of Targeted Screening

Targeted screening, using the risk factor questions, has many advantages over universal screening. The most obvious advantage is better use of resources. By screening only the high-risk children, time and effort are spent more efficiently on the children most likely to be lead-poisoned.

Lead poisoning has societal costs that include medical care, special education, behavioral problems, as well as reduced long-term educational and income attainment. Continu-



ing research on the effects of lead poisoning suggests an association with problems such as criminal behavior and hypertension in adolescents and adults. Targeted screening can reduce these problems by finding the high-risk children and implementing interventions to reduce their risk.

Conclusion

The Lead-Safe Virginia Program, with the aid of the screening workgroup, has developed statewide screening guidelines based on those published by the CDC in November 1997. The screening guidelines call for targeted screening of all children using the risk factor questions.

Implementation of a comprehensive screening plan is anticipated by Fall 1999. The full-scale screening plan includes the screening guidelines, as outlined in this article, educational materials for parents, posters for waiting and examining rooms, and a physician pocket guide. The screening plan will be reviewed and updated periodically for more effective use in identifying children who are at high risk for lead poisoning.

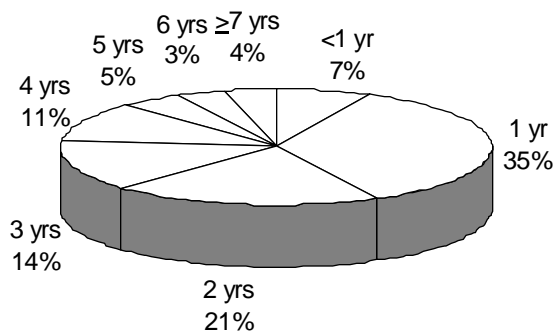
The CDC has set 2011 as the target year for eradication of childhood lead poisoning. Only through active screening and the subsequent treatment of the child and his environment will this goal be reached. The rewards will be healthy children today for healthier adults tomorrow.

References

1. Extrapolated from NHANES III, Phase 2 and Virginia Census Data.
2. Centers for Disease Control and Prevention. *Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials.* November 1997.
3. Centers for Disease Control and Prevention. *Preventing Lead Poisoning in Young Children.* October 1991.

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Virginia Children Reported With Blood Lead Levels ≥ 10 $\mu\text{g}/\text{dL}$, by Age*, for 1998



*Children aged 0-15 years.

Table 1. Management of Children with Confirmed Elevated Blood Lead Levels	
BLOOD LEAD LEVEL (µg/dL)	ACTION (Case manager assures coordinated action and follow-up)
10 - 14	<ul style="list-style-type: none"> • Provide nutritional and risk reduction education. • Provide follow-up testing - venous, within 3 months. • Refer for WIC and social services, if needed.
15 - 19	<ul style="list-style-type: none"> • Obtain medical history. • Provide nutritional and risk reduction education. • Provide follow-up testing - venous, within 3 months. • Refer for WIC and social services, if needed. • Refer to local health department for coordinated case management and environmental exposure source identification if two venous blood lead test results, taken at least 3 months apart, are in this range.
20 - 44	<ul style="list-style-type: none"> • Begin clinical management (complete medical evaluation, including developmental assessment). • Provide nutritional and risk reduction education. • For medical treatment information, contact the local health department or regional treatment center listed below. Chelation may be recommended at >35 µg/dL on a case-by-case basis. • Refer to local health department for coordinated case management and environmental exposure source identification. • Provide follow-up testing - venous, every 2 months or more often as medically necessary. • Refer for WIC and social services, if needed.
45 - 69	<ul style="list-style-type: none"> • Within 48 hours, begin clinical management including medical treatment, complete medical evaluation, and developmental assessment. For medical treatment information, contact the local health department or regional treatment center listed below. • Provide nutritional and risk reduction education. • Refer to local health department for coordinated case management and environmental exposure source identification. • Provide follow-up testing - venous, once a month, or more often as medically necessary. • Refer for WIC and social services, if needed.
70 and above	<ul style="list-style-type: none"> • Hospitalize child and begin medical treatment immediately. For medical treatment information, contact the local health department or regional treatment center listed below. • Begin clinical management (complete medical evaluation, including developmental assessment). • Provide nutritional and risk reduction education. • Refer to local health department for coordinated case management and environmental exposure source identification. • Provide follow-up testing - venous, once a month, or more often as medically necessary. • Refer for WIC and social services, if needed.
Regional Treatment Centers	
Children's Hospital of the King's Daughters (Norfolk)	(757) 668-7179
Medical College of Virginia (Richmond)	(804) 828-7010
University of Virginia (Charlottesville)	(800) 451-1428
Children's National Medical Center (Washington, DC)	(202) 884-5000

Cases of Selected Notifiable Diseases Reported in Virginia*

Total Cases Reported, March 1999

Regions

**Total Cases Reported Statewide,
January through March**

Disease	State	NW	N	SW	C	E	This Year	Last Year	5 Yr Avg
AIDS	76	3	20	10	34	9	174	233	271
Campylobacteriosis	31	14	6	4	5	2	81	102	93
<i>E. coli</i> O157:H7	1	0	1	0	0	0	6	3	3
Giardiasis	23	5	7	0	9	2	75	65	59
Gonorrhea	630	45	56	61	257	211	2406	1828	2518
Hepatitis A	17	0	4	2	7	4	31	60	43
B, acute	15	1	1	4	3	6	23	25	25
C/NANB, acute	0	0	0	0	0	0	6	1	4
HIV Infection	55	7	8	10	23	7	152	243	242
Lead in Children[†]	18	2	3	3	6	4	81	86	114
Legionellosis	2	1	0	1	0	0	4	3	3
Lyme Disease	0	0	0	0	0	0	0	2	3
Measles	0	0	0	0	0	0	0	2	1
Meningococcal Infection	10	1	1	2	4	2	15	14	16
Mumps	1	0	0	0	0	1	2	2	5
Pertussis	0	0	0	0	0	0	7	0	5
Rabies in Animals	42	11	10	6	4	11	98	151	114
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	50	10	18	8	10	4	126	129	161
Shigellosis	7	3	2	0	1	1	18	28	80
Syphilis, Early[§]	33	0	1	14	8	10	98	126	252
Tuberculosis	25	0	12	4	6	3	44	56	72

Localities Reporting Animal Rabies This Month: Accomack 5 raccoons; Amherst 1 raccoon; Charlotte 1 raccoon; Chesapeake 1 raccoon; Fairfax 1 beaver, 6 raccoons; Fauquier 1 cow, 1 raccoon, 1 skunk; Fluvanna 1 raccoon; Frederick 1 fox, 2 skunks; Giles 1 raccoon; Gloucester 1 raccoon; Hanover 1 raccoon; Highland 1 skunk; Isle of Wight 1 raccoon; Loudoun 1 raccoon; Lynchburg 1 skunk; Mathews 1 raccoon; Patrick 1 raccoon; Pittsylvania 1 raccoon; Prince George 2 raccoons; Prince William 1 raccoon, 1 skunk; Rockingham 1 raccoon; Scott 1 skunk; Shenandoah 1 skunk; Suffolk 1 raccoon; Virginia Beach 1 raccoon; Warren 1 raccoon.

Occupational Illnesses: Asbestosis 20; Carbon Monoxide Exposure 1; Carpal Tunnel Syndrome 50; Hearing Loss 42; Lead Exposure 15; Pneumoconiosis 6.

*Data for 1999 are provisional. †Elevated blood lead levels $\geq 10\mu\text{g/dL}$.

§Includes primary, secondary, and early latent.

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