

**TARGETING PLAN FOR AREAS AT RISK  
FOR CHILDHOOD LEAD POISONING**

**Childhood Lead Screening Program  
Center for Maternal and Child Health  
Family Health Administration  
Maryland Department of Health and Mental Hygiene  
August 2004**

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## **Introduction**

The Department of Health and Mental Hygiene (DHMH) has recently evaluated the lead targeting plan and updated the at-risk ZIP code list using more recent data. The original lead targeting plan was developed in 2000 to identify areas in which children were at risk for lead poisoning. The 2000 plan identified ZIP codes at risk using a predictive statistical model. Information on poverty, age of housing, and levels of lead poisoning was entered into the statistical model to predict areas in which children were at risk. In early 2004, DHMH reevaluated the statistical model and the targeting plan. This report discusses the methodology and findings of the evaluation of the lead targeting plan and makes recommendations for the future.

## **Background**

Childhood lead poisoning is the most prevalent environmental health hazard for children today. Lead is a biochemical poison that affects a number of organ systems, including the central nervous system. Elevated blood levels have been associated with learning deficits, behavior problems, and growth delays in young children. Children absorb more lead and are more sensitive to its health effects than adults. Lead poisoning occurs primarily among young children exposed to lead-based paint found in older homes. Medical treatment is most optimally begun during the early stages of lead poisoning.

Based on guidance from the Centers for Disease Control and Prevention (CDC), an elevated blood lead (EBL) level has been defined as a level greater than or equal to 10 µg/dl. The CDC recommends that states with targeted screening programs consider screening all children who reside in a ZIP code with an EBL prevalence of  $\geq 12\%$  or with  $\geq 27\%$  housing built before 1950.

## **Lead Testing in Maryland**

According to data collected by the National Health and Nutrition Examination Survey (NHANES) between 1999 and 2000, an estimated 2.2% children ages 1-5 years in the United States had elevated blood lead levels. This is compared to 8.8% of children aged 1-5 years in the 1988-1991 NHANES.

In Maryland, 18.2% (79,507) of all children six years of age or under were tested for lead poisoning in 2002. In Baltimore City, 31.5% of children were tested (despite required universal testing) and in the counties, 16.4% of all children under age six were tested. In 2002, approximately 3% (2297) of Maryland children tested for lead poisoning had elevated blood lead levels. This percentage fell to 2.2% (1719) in 2003. Currently, there are approximately 206,000 children under 6 years of age in Maryland at risk based on the 2000 census.

The Maryland Department of the Environment, in collaboration with DHMH, the Maryland Lead Poisoning Prevention Commission (Lead Commission), and other partners, has developed a Plan to Eliminate Childhood Lead Poisoning by 2010 (2010 Lead Plan). Several federal agencies have required this plan for funding eligibility. Major activities to address surveillance, case management, blood lead testing, coordination of resources, and primary prevention will take place over the next five years. A major five-year goal of the 2010 Lead Plan is that 80% of at-risk children aged 12-36 months will be tested for lead poisoning. In order to increase testing of at-risk children, to target outreach efforts, and to meet the five-year goal of 80% testing, areas of highest risk for childhood lead poisoning must be identified.

### Legislation

In response to the problem of childhood lead poisoning in Maryland, the 1997 Maryland General Assembly enacted legislation requiring DHMH to establish a Childhood Lead Screening Program. The goals of this program are to increase awareness of lead poisoning and ensure screening of children under age six in areas at risk. In collaboration with a number of agencies and organizations, a targeting plan was developed in 2000 to delineate areas in Maryland at risk for childhood lead poisoning. Legislation enacted by the 2000 Maryland General Assembly required testing of children at 12 and 24 months of age in areas of the state at risk for lead poisoning. All children living in Baltimore City and all children receiving services through Medicaid are designated as being at risk and are required to have blood lead testing. In 2003, a law was passed that requires the parent of a child that resides in or has resided in an at-risk area to provide documentation of lead testing at first enrollment into a public school at the level of pre-kindergarten, kindergarten, or first grade.

### **The Maryland Targeting Plan**

#### Methodology

The original 2000 Maryland Targeting Plan was developed after a review of the current literature and recommendations. Studies reflecting the experiences in Massachusetts, Rhode Island, and New York were examined. These studies attempted to identify community characteristics that could facilitate primary prevention efforts by identifying contaminated houses before children were exposed to lead. A number of risk factors for elevated blood lead levels were analyzed in these studies, including socioeconomic status measures, housing environment characteristics, and physiologic status indicators. After review of the literature and recommendations several methodologies were identified. These methodologies were consistent

with the recommendations by the CDC found in: *Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials, 1997.*

Based on the identified methodologies and input from Maryland experts in childhood lead poisoning, the 2000 Maryland Targeting Plan for identifying areas at risk for childhood lead poisoning was developed. After thorough analysis of possible predictors, four variables were found to be significantly associated with the risk of elevated blood lead levels and were included in the model: percent of pre-1950 housing, median housing value, poverty index, and percent of homes built between 1950 and 1980. The number of children tested for elevated blood lead by geographic area was controlled for in the model. These important variables were used to develop a statistical model to determine areas for targeted screening and outreach.

In early 2004, DHMH commissioned the Center for Health Program Development and Management at the University of Maryland, Baltimore County to evaluate and update the 2000 Maryland Targeting Plan. The evaluation and update focused on a few key areas: 1) the analysis of the Model variables, 2) the reapplication of the 2000 Model using current data from the 2000 census, the 2000 Maryland ZIP Code list, and the 2001-2002 Maryland Childhood Lead Registry, 3) the process to create an updated at-risk ZIP code list, and 4) recommendations for the future of lead testing in Maryland.

The updated 2004 ZIP code list of at-risk areas was developed using several steps. The first step was the running of the updated 2004 statistical model with the current data. As a result of the model, ZIP codes were designated as at risk or indeterminate risk. The second step was a review of the distribution of housing stock ages by ZIP code. An at-risk designation was given to those ZIP codes not at risk by the statistical model but that had more than 27% pre-1950 housing stock. Thirdly, the list of at-risk ZIP codes was reviewed and ZIP codes that crossed county boundaries were added to both counties. A summary of the findings of the updated 2004 Maryland Targeting Plan is below.

### Findings

A total of 78 ZIP codes have been added to the at-risk list after evaluation of the targeting plan. Forty-one of these ZIP codes (in 16 counties) were newly designated as at risk by the updated 2004 statistical model. Thirty-five ZIP codes were added to the list as a result of having >27% pre-1950 housing. Two ZIP codes in Frederick County have been created since the 1990 census from ZIP codes that were previously at risk and these were added to the at-risk list. In addition, eighteen ZIP codes were listed under two counties as a result of crossing county borders.

Nine counties now have all ZIP codes at risk for lead poisoning. Five counties are newly designated as having all ZIP codes at risk: Allegany, Dorchester, Garrett, Somerset, and Washington. Wicomico County, Caroline County, Worcester County, and Baltimore City continue to have all ZIP codes at risk. There are seventeen ZIP codes that were newly designated as at risk (by the updated 2004 statistical model) in the five counties that are newly designated as all ZIP codes at risk.

## Conclusions

An increased number of ZIP codes have been identified as at statistical risk for childhood lead poisoning in Maryland. The results of the updated 2004 Maryland Targeting Plan support targeting outreach and education efforts to increase childhood lead testing in those areas at greatest risk, in addition to universal testing as required by law in the EPSDT Program and Baltimore City. However, whatever the risk status assigned to a specific ZIP code or jurisdiction, children remain susceptible to lead exposure from a variety of sources, including the homes of childcare providers, relatives, and friends, and lead-contaminated imported goods. Therefore, all children should be screened at appropriate intervals via a lead risk questionnaire and subsequently tested if there are positive responses. .

## Recommendations

1. Universal blood testing for lead at 12 and 24 months of age for participants of the EPSDT Program should continue, as required by law.
2. Risk assessment for lead exposure, by questionnaire, should be conducted in children up to six years of age, as required. If there are positive answers to the questionnaire the child should be tested with a blood lead level.
3. Blood testing for lead at 12 and 24 months of age should be performed on all children living in areas designated at risk for lead poisoning, as required by law. Efforts should be made to increase testing in this group.
4. Resources should be allocated for promoting general public awareness of the importance of lead poisoning testing.
5. MDE and DHMH, in collaboration with local health departments, should continue joint efforts for developing outreach strategies for all areas in Maryland designated at risk.
6. MDE and DHMH should continue collaborative efforts with the Maryland Coalition to End Childhood Lead Poisoning, the Lead Commission, the American Academy of Pediatrics, the Maryland Academy of Family Physicians, and others to develop outreach materials and strategies to improve blood lead testing for children throughout the state.
7. DHMH and the Maryland State Department of Education (MSDE) should continue to work closely on issues related to the school reporting of lead testing results.
8. The Lead Commission, created to advise MDE and the legislative bodies about lead poisoning prevention, should continue to work with MDE, DHMH, DCHD and MSDE to increase “awareness, coordination, and resource availability” of lead poisoning prevention efforts.
9. Activities to implement the Maryland Plan to Eliminate Childhood Lead Poisoning by 2010 should continue as scheduled.

10. Increasing testing in all areas will help in future analysis to determine risk levels for geographic areas. The Targeting Plan For Areas At Risk For Childhood Lead Poisoning should undergo periodic reassessment with the goal of developing a simpler model for targeted testing for lead poisoning.