2011 Blood Lead Surveillance Report

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Introduction

This 2011 Blood Lead Surveillance Report describes the activities of the Minnesota Department of Health (MDH) Lead Poisoning and Healthy Homes Program (LPHHP) and the data resulting from the MDH Blood Lead Information System (BLIS) for the 2011 calendar year. The report contains a description of the trends in lead testing and elevated blood lead levels in Minnesota, and summarizes activities taking place in Minnesota to prevent childhood lead poisoning. It also will contain an overview of steps taken to implement a healthy homes program in Minnesota. The intent of this report is to provide information for stakeholders in Minnesota, document activities of the LPHHP, and assist local efforts to address housing-based health threats.

As the number of elevated blood lead cases in Minnesota has continued to steadily decline, the MDH LPHHP has been incorporating "healthy homes" approaches into routine lead program activities. Applying healthy homes strategies will help use existing lead poisoning prevention resources to address additional housing-based environmental health threats, including asthma, pests, fire safety, radon, carbon monoxide, and mold/moisture.

Budget cuts at the federal level in 2012 have eliminated future funding for BLIS and most future activities planned for the LPHHP. MDH is reviewing available options with other public health programs and collaborating partners to prioritize program functions and identify supporting resources. Without additional resources or restoration of federal funding, it appears likely that the capacity of LPHHP to prevent childhood lead poisoning and implement healthy homes strategies will be significantly diminished in future years.

Lead poisoning

Although the toxicity of lead has been known for thousands of years, lead poisoning remains one of the most common environmental health threats to children. There are many sources of lead, such as soil contaminated from years of leaded gasoline, lead dust accidentally brought home from parents' workplaces and hobby areas, imported candies, traditional remedies, pottery, and toys. However, deteriorated lead paint in homes is the primary source of lead exposure for U.S. children today.

Lead paint is most often found in homes built before 1950, but may be found in any home built before 1978, the year lead paint was banned for residential use. More than 80% of all homes built before 1978 in the U.S. have lead based paint. Old homes with lead paint may be found in both urban and rural areas. Lead paint may deteriorate as visible paint chips, but is more commonly found as fine dust, identical in appearance to ordinary house dust. Lead-painted windows are a special problem because the action of raising and lowering the window creates lead paint dust that settles on floors and window wells, even when new paint is put over the old lead paint. Remodeling activities in old homes can create large quantities of lead dust that may be inhaled or ingested by all family members.

Children less than six years old, and especially ages one to three years, are most vulnerable to lead's toxicity due to their growing bodies, nutritional needs, mouthing behavior and spending

time on the floor. Pregnant women and the developing fetus are also at risk because lead easily passes through the placenta to the fetus, and the changing nutritional needs of the mother cause release of lead stored in bone. The Centers for Disease Control and Prevention (CDC) has recently discarded their "level of concern" (10 micrograms of lead per deciliter whole blood (μg/dL)) in favor of a reference value (5 ug/dL) based on the average blood lead level in the American population. Confirmed blood lead test results above the 5 ug/dL reference value are now expected to trigger a public health response. CDC also acknowledged that "no measureable level of blood lead is known to be without deleterious effects, and once engendered, the effects appear to be irreversible in the absence of any other interventions, public health, environmental and housing policies should encourage prevention of all exposures to lead."

Certain populations of children are at increased risk of lead poisoning. For example, children enrolled in Medicaid or other medical assistance programs are more likely to live in older homes in poor condition, have poor nutrition, and live in urban areas that may contain lead-contaminated soils. Refugees and immigrants are also at increased risk because they are likely to have lead exposure in their home countries, may have poor nutritional status, and may live in substandard housing once in the U.S.

Recognizing and treating lead poisoning can be difficult. Elevated levels of lead occurring during the first years of life may not produce symptoms until the children enter school and display learning difficulties, reduction in IQ, or behavior problems. At that point it is too late for prevention of lead poisoning and the effects are likely to be permanent.

Healthy Housing Strategic Plan

In 2011 MDH engaged the Sustainable Resources Center (SRC), along with their partner the National Center for Healthy Homes (NCHH), for assistance in preparing a strategic plan for healthy housing in Minnesota. The Healthy Housing Strategic Plan (HH Plan) was a required aspect of CDC funding requirements, but will be very useful in organizing and evaluating program goals and timelines. The HH Plan is scheduled to be completed in 2012 and will contain:

- A mission statement (a draft has been developed: "*Promote Healthy Homes for all Minnesotans*");
- An overview of prioritized housing-based hazards to be addressed, high-risk populations, and an assessment of exposure burdens;
- A summary of partners involved or who need to be recruited;
- Resources available for HH Plan implementation and opportunities for collaboration;
- Goals, objectives, and tasks that address identified public health threats;
- Evaluation measures based on scientifically sound data and methods; and
- A sustainability plan to ensure continuity of operations.

SRC, working with Minnesota Green Communities and other partners, is also creating an Alliance for Healthy Homes and Communities in Minnesota (Alliance; funded by the Blue Cross/Blue Shield Foundation). The Alliance will act as a source of information and

collaboration and helps integrate efforts for healthy homes and communities. The HH Plan (the structure) and the Alliance (the people) will work together to provide a framework for goals/tasks and ensure statewide communication and consistency.

To provide guidance in preparing and implementing the HH Plan a Steering Committee was formed that included several programs within MDH (Asthma, Indoor Air, Lead Compliance, Injury Prevention, Tobacco Prevention) and external collaborators:

MN Housing Finance Agency	MN Dept of Labor and Indust.	MN State Fire Marshal
MN Council of Health Plans	MN Public Health Assoc.	MN Medical Assoc.
MN Nurses Assoc.	MN Multi-housing Assoc.	

A statewide kick-off meeting was held in the Twin Cities on March 12, 2012 to create a series of "vision elements" to help organize priorities and goals. The vision elements included:

- Centralized and Accessible Information Clearinghouse
- Increased Public Awareness and Education
- Social Connectedness
- Medical Capacity and Referral System
- Widespread and Comprehensive Healthy Housing Inspections
- Adoption of Safe and Healthy Housing Policies
- Resources and Services
- Sustainable Funding
- Health-centric Leadership
- Evaluation Infrastructure and Documented Outcomes

A series of seven regional meetings were held around the state (Owatanna, Marshall, Fergus Falls, Bemidji, Duluth, Eagan, and Minnetonka) in April and May 2012 to present background information on housing and community conditions, gather feedback on the vision elements, identify local resources, and help develop a shared vision for the future. A wide range of partners were invited to participate. The information from the regional meetings will be used to draft the HH Plan, which will be reviewed/approved at a final statewide meeting in July 2012.

Progress reports and all previous versions of the Plan will be available at the MDH Lead Program website: www.health.state.mn.us/lead .

The MN Blood Lead Information System (BLIS)

MDH maintains an electronic blood lead information system (BLIS) to monitor trends in blood lead levels in adults and children in Minnesota. Analyzing laboratories submit results to the MDH lead program, as mandated by Minnesota Statute 144.9502. The data are used to help identify populations at risk for elevated blood lead levels (EBLLs), to help ensure that screening services are provided to groups identified as having the highest risk of lead poisoning and to ensure that environmental and medical follow up are provided to children with EBLLs. In April 2010 MDH entered the millionth record into BLIS, which was started in 1995.

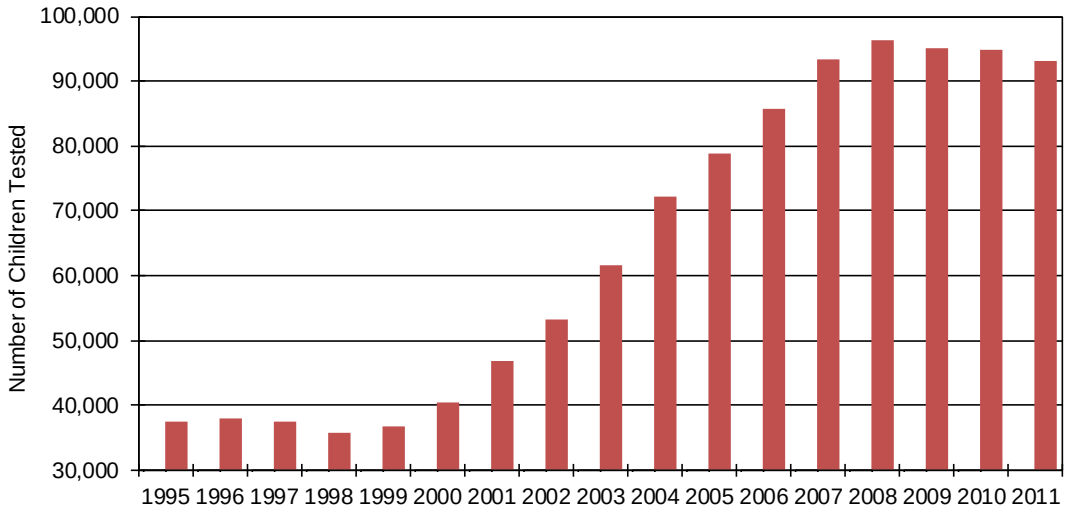
Statewide surveillance data

The two main types of blood specimens used in blood lead testing are capillary and venous. Capillary blood specimens are drawn from a finger stick and the blood is collected either in capillary tubes or on filter paper. They are considered "screening" tests because they are prone to falsely high results due to surface contamination when hands are not properly washed with soap and water. However, capillary tests tend to be more acceptable to parents and may be performed in a wider range of settings. Venous specimens are considered "diagnostic" tests because they are drawn directly from a vein, but they can be less acceptable to some parents due to discomfort for the child, and necessitate greater expertise in drawing the blood.

Since not all Minnesota children have a high risk for lead exposure, targeted screening based on established risk factors is currently recommended for most areas of the state. Universal screening is recommended for children at one and two years of age, and children up to six years of age who have not previously been screened, and for children living within the city limits of Minneapolis or St. Paul. The goal is to test all children at risk for exposure to lead.

The number of children tested for lead in Minnesota increased dramatically between 1998 and 2008 and has recently leveled off, with 93,170 children tested in 2011 (Figure 1).

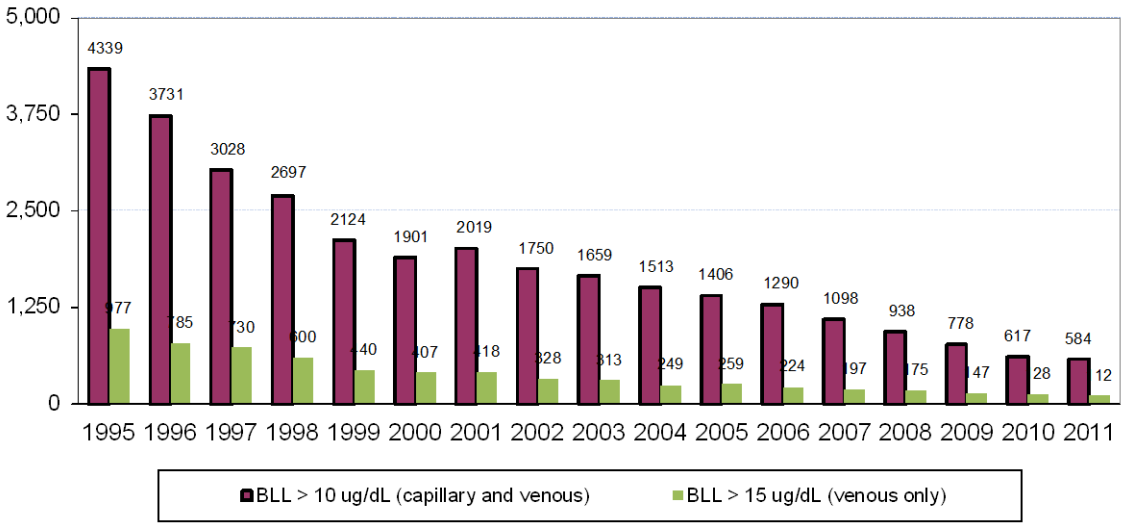
Figure 1: Number of Children Tested (Less than 6 Years of Age)



Blood Lead Levels in Children

The trends in the number of EBLL cases in Minnesota children may be compared across years (Figure 2). Fortunately the number of EBLL cases has continued to decrease. In 2011 there were 584 Minnesota children with blood lead levels of 10 µg/dL or greater, and 112 children had venous blood lead levels of 15 µg/dL or greater.

Figure 2: Number of Children with Elevated Blood Lead Levels



County-specific data on blood lead testing and EBLL rates are provided at the end of this report in Table 3.

Case Management

The LPHHP provides technical assistance to all local public health agencies in the state of Minnesota through the State Case Monitor position. Assistance is provided to ensure case management services are available for children with EBLLs. These activities include:

- Assuring case management activities and follow-up testing for children and pregnant women that have EBLLS above 5 µg/dL are performed consistent with MDH guidelines;
- Providing educational materials, in other languages as needed, to assist in communicating lead exposure prevention measures;
- Communicating regularly with the Asbestos and Lead Compliance Unit to assess progress on open lead cases and facilitate communication between the Asbestos and Lead Compliance Unit and local lead case managers.

Case monitoring activities have helped clinicians improve their adherence to Childhood Blood Lead Guidelines for Minnesota procedures and have provided increased collaboration between public health and housing staff at both the state and local level.

Special populations

Medicaid Children

National studies have shown that Medicaid-enrolled children are three times more likely to have elevated blood lead levels than non-enrolled children. Medicaid's Early and Periodic Screening Diagnosis and Treatment (EPSDT) program requires that well-child visits include blood lead testing at both 12 and 24 months. Recent data show a general trend toward higher rates of testing

in MHCP-enrolled children, along with declining rates of EBLLs in both MHCP-enrolled and non-enrolled children. However, MHCP-enrolled children remain twice as likely to have an EBLL compared to non-enrolled children.

The Minnesota DHS continues to include provisions in their managed care contracts which encourage blood lead testing. A $30 incentive is provided for every child above the previous year's level of testing. DHS also includes a blood lead screening among the performance goals that must be met for health plans to receive the 5% of their contract amount that is withheld at the beginning of each contract year. To help assess blood lead testing rates MDH routinely matches BLIS data with information from health plans (using a data sharing agreement to ensure data privacy) and reports on test reports received. The matched data are important to ensure that reporting to federal agencies on mandatory testing is as accurate as possible.

In 2009 CDC issued recommendations (August 7, 2009; MMWR:58(RR09)1-11) examining evidence that children in low-income families are experiencing decreases in BLLs, suggesting that the EBLL disparity between Medicaid-eligible children and non-Medicaid-eligible children is diminishing. CDC concludes that because state and local officials are more familiar than federal agencies with local risk for EBLLs, they should have the flexibility to develop blood lead screening strategies that reflect local risk for EBLLs (rather than enforcing universal testing nationwide). After considering testing rates and risk factors, MDH concluded that it would be most appropriate for Minnesota to continue universal testing of Medicaid-eligible for lead exposure and has not suggested a variance from established federal requirements.

Refugee Children

Refugees are a population at high risk for lead poisoning. Refugees may have lead exposure in their countries of origin, such as use of leaded gasoline, herbal remedies, cosmetics or spices that contain lead, cottage industries that use lead in an unsafe manner, and limited regulation of emissions from larger industries. Once they are in the U.S., refugees frequently move into older, inner city housing, with potential for exposure to lead-based paint. The Division of Infectious Disease Epidemiology, Prevention, and Control at MDH collect demographic data on all refugees entering the state who receive an initial health screening.

Historically MDH has linked refugee data with the blood lead test results from BLIS to describe lead testing and EBLL rates in refugees. Due to diminished staff capacity resulting from federal budget cuts, MDH was unable to perform refugee data matching and analysis for 2011 data. Data from previous years are available in previous Annual Surveillance Reports on the MDH Lead Program website (www.health.state.mn.us/lead).

Adults

CDC recommends a level of concern for adult exposure to lead of 25 µg/dL, while the Occupational Safety and Health Administration (OSHA) requires action in exposed workers at a level of 40 µg/dL. Minnesota's Adult Blood Lead Epidemiology and Surveillance (ABLES) program began identifying eligible adults on January 1, 1998. The total number of tests reported in 2011 for adults in Minnesota is presented in Table 1.

Table 1: Minnesota residents 16 years or older with a reported blood lead test in 2011

# of reports	# of individuals	Range of reported results
9,577	7,972	0.0 to 94 µg/dL

There were 952 adults with BLLs of 10 to 24 µg/dL, 193 adults with BLLs of 25 to 39 µg/dL, and 9 adults with reported levels of 40 µg/dL or greater.

Evaluation of BLIS

In 2011 the MDH BLIS received blood lead test results from over 100 separate laboratories. There also were nearly 100 clinics reporting using ESA LeadCare analyzers, continuing the steady increase in the use of these portable analyzers. The test type for individuals documented by MDH consisted of 75,092 capillary specimens (81%), 15,585 venous specimens (16%), and 2,493 tests of unknown type (3%). Routine quality checks, performed on data throughout 2011, showed MDH blood lead data continued to be of high quality. Data entry procedures and quality control remained consistent from previous years.

State Blood Lead Guidelines

MDH has developed a set of four guidelines for lead: Childhood Blood Lead Screening, Childhood Blood Lead Case Management, Childhood Blood Lead Clinical Treatment, and Blood Lead Screening for Pregnant Women. These guidelines were developed by collaborative workgroups and have been endorsed by a range of professional health organizations. All four guidelines may be found at the MDH website at www.health.state.mn.us/lead.

In addition to the guidelines from MDH, local public health agencies may review risk factors for elevated blood lead and the available blood lead screening data to assess concerns about lead poisoning in their areas. This allows local agencies to develop interventions tailored to the risks in their areas. Factors to be considered locally are the age and condition of housing stock, the size of the population, screening practices of the area health care providers, occupational and community sources of lead, socio-economic status of the population and other unique risk factors in the community. The assessment should address the amount of screening that takes place relative to the size of the childhood population, the relative number of elevated cases that are found, and the use of other screening tools, such as questionnaires, to identify risk factors.

In response to concerns over the effects of low-level lead exposure in children, the 2009-2010 Legislature directed MDH to revise clinical and case management guidelines to include recommendations for protective health actions and follow-up services when a child's blood lead level (BLL) exceeds 5 µg/dL. Changes for both sets of guidelines included adding new guidelines for BLLs between 5 and 9.9 µg/dL, and shifting some of the guidelines previously listed for all BLLs < 10 µg/dL to a new category of all BLLs < 5 µg/dL. In addition, for the 5-9.9 µg/dL range, a recommendation was added for a confirmatory venous test within 3 months to ensure that medical management is targeted only to those cases with confirmed lead exposure above 5µg/dL.

The final format of the guidelines is the result of a compromise between concerns over low-level lead exposure and the best use of limited resources. On balance, the new guidelines reflect, to the best extent possible, the diverse recommendations of the expert panel. While recommendations for test results < 10 ug/dL are appropriate, it is critical to remember that results > 10 ug/dL are, and should remain, the highest priority for medical and public health resources.

Children participating in the Supplemental Food Program for Women, Infants, and Children (WIC) have traditionally been considered to be at risk for exposure to lead. In 2010 the Minnesota WIC population was removed from the current definition of high risk based on data from a series of pilot studies. In 2005-2006, MDH funded studies of blood lead levels in WIC recipients in Hennepin and Ramsey Counties, counties with the highest proportion of EBLLs among children less than six years old in the state. Results showed the proportion of EBLLs and the average BLL among WIC children were below corresponding figures in the general population, based on BLIS data. Additional data was collected from four counties (Blue Earth, St. Louis, Stearns, and Winona) and showed similar results. Therefore, participation in WIC in Minnesota does not appear to indicate an additional risk to lead exposure. All MDH lead guidelines have been revised to remove WIC as a specific, independent exposure risk factor.

Childhood Blood Lead Screening Guidelines

The MDH Childhood Blood Lead Screening Guidelines direct physicians to order blood lead tests for 1) children residing in specific geographic areas that have a high rate of cases of elevated blood lead; and 2) children matching specific demographic groups that have a high rate of elevated blood lead. Universal screening is recommended for children residing in Minneapolis and St. Paul and those recently arriving from other major metropolitan areas or other countries. Screening is also recommended for children receiving Medicaid. The test is typically performed when the child is one and two years old, but may be done at any time if the parent is concerned or if a high-risk activity (e.g. remodeling a home built before 1950) has recently occurred.

Childhood Blood Lead Case Management Guidelines

The MDH Childhood Blood Lead Case Management Guidelines are intended to establish standardized, minimum levels of care for providing services to children with EBLLs. However, those counties that have greater resources available may wish to take a more rigorous approach to case management. The objective is to ensure that a qualified case manager is available to oversee the treatment and recovery of each child, and to ensure that steps are taken to prevent further exposure of the child to potential sources of lead. The Case Management Guidelines work in concert with the MDH Blood Lead Screening Guidelines for Minnesota to identify and manage lead exposure in children. Appropriate steps are presented for both capillary and venous test results. The guidelines recommend providing educational materials to the family of children with test results between 5 and 10 μg/dL.

Childhood Blood Lead Clinical Treatment Guidelines

The Childhood Blood Lead Clinical Treatment Guidelines were designed for physicians to assist them in treating a patient with an EBLL, thus ensuring that all EBLL cases in Minnesota receive

a consistent level of care. When a child is diagnosed with an EBLL, making sure the child's environment is lead-safe—and remains lead-safe—is an essential part of the child's care. Providing information to understand potential lead risks and a lead-safe environment for the lead-exposed child is a joint responsibility, involving the public health nurse, the lead risk assessor assigned to the case, and the child's physician.

Blood Lead Screening Guidelines for Pregnant Women in Minnesota

In June 2004, MDH developed Blood Lead Screening Guidelines for Pregnant Women in Minnesota. They are designed for Ob/Gyn physicians, nurse practitioners, and midwives to assist them in screening and treating pregnant women for elevated blood lead levels, thus ensuring that both the women and their children receive intervention to reduce their lead exposure. Not every woman is at risk for lead exposure, so a risk screening questionnaire should be used to decide when to test a pregnant, or potentially pregnant, woman for lead.

Prenatal lead exposure is of concern because it may have an effect on intellectual development. In addition to fetal risk, lead may be a risk to the mother. For example, there are data showing that lead exposure is related to cardiovascular disease. Lead is transferred from mother to the fetus through the placenta. Therefore, it may be assumed that fetal blood contains the same concentration of lead as maternal blood.

Other information resources available from LPHHP

The Lead Program maintains a web page through the MDH website that provides a number of lead education materials for providers, regulated parties, and the general public (www.health.state.mn.us/lead). This site contains information on hot topics (including current data, projects and requirements), numerous fact sheets, a list of "frequently asked questions", all publications and reports (including guidelines for screening children and pregnant women, case management, and clinical treatment in children), and links to many external lead resources.

The Lead Program posts relevant information to the Minnesota Collaborative Lead Education and Assessment Network (MCLEAN) group email list and encourages other state groups or individuals to post and respond to information. This group will be transitioning to incorporate healthy homes issues and be renamed "Healthy Homes Minnesota."

St. Paul Prevention Project

Since 2006, the LPHHP had contracted with Saint Paul/Ramsey County Department of Public Health to provide Lead Supervisor Training for small contractors working in targeted census tracts with high risk factors for childhood lead poisoning. In 2011 the project resulted in:

- Additional workers being trained to complete window replacement projects using lead safe work practices;
- Contractors involved in the project actively bidding on window replacement projects with the City, thereby increasing the available contractor pool and building lead safe infrastructure;

- Work was completed on 28 projects. Each home was occupied by very young children and families well below the 80% median income level (most were below the 50%). Each home was owner occupied.

Minneapolis Contractor Training

In 2008 the City of Minneapolis passed an ordinance requiring rental property owners to take a Lead Safe Work Practice class when they are ordered to perform maintenance on lead paint hazards. MDH has worked with Minneapolis to facilitate lead safe work practices training for rental property owners in both English and Spanish. Lead safe work practice courses were offered at public venues throughout the City in 2011. Over 100 individuals were trained, including homeowners, contractors, City housing inspectors, and City building inspectors. Students trained were a mixture of rental property owners, contractors, rental property building maintenance, HUD grant recipients, Minneapolis building and housing inspectors and section 8 inspectors.

Lead in Venison

Many states have programs in which hunters may donate venison to food shelves by bringing their shot deer to meat processors, who provide the processed venison to food charities. In 2008 the Minnesota Department of Agriculture (MDA) staff obtained venison packages from Minnesota food shelves and examined them for the presence of lead. The results showed 22% of packages having measurable lead fragments. As a result of this discovery, MDA suspended venison distribution from food shelves in Minnesota for the remainder of 2008.

MDH, MDA and the Department of Natural Resources (DNR) responded to requests to testify regarding HF2171/SF1943 in the 2012 legislative session. MDH provided background information on lead toxicity, exposure pathway and calculations, and long-term health implications of various blood lead levels. The bills were not passed into law.

More information is available on the MDH Lead Program website at www.health.state.mn.us/lead and the DNR website at www.dnr.state.mn.us/hunting/lead .

Transition to Healthy Homes

Housing-related health and safety hazards have been identified through an in-home survey in 1189 Twin Cities area homes. These homes are similar in demographic and building characteristics to homes receiving lead hazard reduction. The top five hazards observed or reported include 1) home not tested for radon (93%), 2) chipping or peeling paint (57%), 3) no CO alarm (43%), 4) mold/moisture issues (38%), and 5) fall hazards (18%).

Minnesota data compiled by MDH show that these housing-based hazards can have a significant impact on health and wellness:

- One in three Minnesota homes has high levels of radon and there is no area of the state that has a "low" radon exposure potential. Radon exposure increases the risk for lung cancer of Minnesota residents.
- Over 100,000 falls statewide were reported to the Minnesota Injury Data Access System in 2010; CDC estimates that about half of falls reported each year occur in the home.
- One in 14 children (about 7.0 %), and one in 13 adults (about 7.6 %), in Minnesota reported that they had asthma in 2010.
- Between 2002 – 2008, 131 Minnesotans died from unintentional exposure to carbon monoxide (CO).

The anticipated transition of the Lead Program to a healthy homes approach will be significantly impacted by the loss of CDC funding effective September 1, 2012. Although there are efforts at the federal level to restore the CDC support, MDH is preparing information on the scope and value of implementing healthy homes. The information may then be used by state decision makers to assess public health priorities and assign resources as appropriate. Absent federal or new state funding, the LPHHP will no longer be able to support BLIS (thus terminating reporting to local public health, identification of vulnerable populations, and annual trends), lead guidelines (which may not remain consistent with published literature), pilot studies (contractor training, data matching), or education/outreach.

Ending lead surveillance would be in conflict with state statute (MS 144.9502) which states:

> *The commissioner of health shall establish a statewide lead surveillance system. The purpose of this system is to:*
>
> *(a) monitor blood lead levels in children and adults to identify trends and populations at high risk for elevated blood lead levels;*
> *(b) ensure that screening services are provided to populations at high risk for elevated blood lead levels;*
> *(c) ensure that medical and environmental follow-up services for children with elevated blood lead levels are provided; and*
> *(d) provide accurate and complete data for planning and implementing primary prevention programs that focus on the populations at high risk for elevated blood lead levels.*

Further Lead Information

More information about lead poisoning prevention in Minnesota is available at the MDH Lead Program website: www.health.state.mn.us/lead or by calling 651-201-4620.

Table 3: Blood Lead Testing by County in 2011 (Children Less than 6 Years of Age)

County	5 to 9.9 µg/dL		10 to 14.9 µg/dL		15 µg/dL or greater		Total Children Tested		
	Venous	Capillary	Venous	Capillary	Venous	Capillary	All test types	Population (2000)	Percent Tested
Aitkin	0	12	0	1	0	1	173	858	20%
Anoka	14	82	2	7	3	3	6,202	27,287	23%
Becker	3	17	1	1	3	0	531	2,244	24%
Beltrami	0	12	0	0	1	0	673	3,394	20%
Benton	1	11	1	0	0	0	996	2,949	34%
Big Stone	0	3	0	0	0	0	80	336	24%
Blue Earth	7	17	1	1	0	0	895	3,709	24%
Brown	3	9	1	3	0	0	428	1,752	24%
Carlton	3	11	0	1	0	0	669	2,266	30%
Carver	1	14	1	2	0	1	1,132	7,493	15%
Cass	0	5	0	1	0	0	433	1,688	26%
Chippewa	3	6	0	1	1	1	209	922	23%
Chisago	1	13	1	1	0	0	729	3,750	19%
Clay	0	12	0	0	0	0	840	3,826	22%
Clearwater	0	0	1	1	0	1	61	594	10%
Cook	0	0	0	0	0	0	51	292	17%
Cottonwood	3	1	0	0	0	0	126	862	15%
Crow Wing	1	16	1	1	0	2	742	3,999	19%
Dakota	19	85	5	10	1	7	6,909	33,353	21%
Dodge	0	5	0	0	0	0	306	1,613	19%
Douglas	1	9	1	0	0	0	646	2,216	29%
Faribault	3	3	0	2	2	3	195	1,025	19%
Fillmore	2	11	0	1	0	0	176	1,458	12%
Freeborn	6	22	2	5	1	1	478	2,209	22%
Goodhue	1	24	3	1	2	2	614	3,258	19%
Grant	0	4	0	0	0	0	103	392	26%
Hennepin	289	392	57	43	42	20	22,118	88,005	25%
Houston	1	16	0	4	1	2	286	1,389	21%
Hubbard	0	4	0	0	0	0	241	1,232	20%

County	5 to 9.9 µg/dL		10 to 14.9 µg/dL		15 µg/dL or greater		Total Children Tested		
	Venous	Capillary	Venous	Capillary	Venous	Capillary	All test types	Population (2000)	Percent Tested
Isanti	1	9	0	1	0	1	828	2,497	33%
Itasca	2	14	0	2	0	1	789	2,825	28%
Jackson	1	1	0	0	0	0	144	723	20%
Kanabec	1	3	0	0	0	0	207	1,116	19%
Kandiyohi	7	25	2	3	0	1	860	3,080	28%
Kittson	0	1	0	0	0	0	14	407	3%
Koochiching	1	2	1	3	0	1	217	958	23%
Lac Qui Parle	4	3	0	1	3	0	112	508	22%
Lake	0	9	0	0	0	0	191	670	29%
Lake of the Woods	0	0	0	0	0	0	37	244	15%
Le Sueur	4	7	0	0	0	1	317	1,923	16%
Lincoln	1	3	0	0	0	0	85	435	20%
Lyon	5	25	4	3	1	0	807	2,009	40%
McLeod	1	10	0	1	0	0	650	2,935	22%
Mahnomen	0	2	0	0	0	0	60	453	13%
Marshall	0	3	0	0	0	0	63	703	9%
Martin	6	15	2	2	0	0	310	1,449	21%
Meeker	2	9	0	0	0	0	359	1,760	20%
Mille Lacs	0	12	0	1	0	1	485	1,648	29%
Morrison	1	7	0	0	0	2	737	2,513	29%
Mower	11	3	1	0	1	0	496	2,860	17%
Murray	0	4	0	0	0	0	131	600	22%
Nicollet	2	6	1	2	0	0	439	2,143	20%
Nobles	4	22	0	4	2	0	581	1,736	33%
Norman	0	2	0	0	0	0	44	556	8%
Olmsted	5	9	4	3	4	3	1,423	10,691	13%
Otter Tail	0	12	1	1	0	1	505	3,772	13%
Pennington	0	1	0	0	1	0	135	999	14%
Pine	1	9	0	1	0	2	436	1,784	24%
Pipestone	0	3	0	0	0	0	129	678	19%
Polk	9	3	2	0	0	0	153	2,261	7%
Pope	0	15	1	1	0	0	184	660	28%
Ramsey	194	542	35	53	27	31	12,282	41,990	29%

County	5 to 9.9 µg/dL		10 to 14.9 µg/dL		15 µg/dL or greater		Total Children Tested		
	Venous	Capillary	Venous	Capillary	Venous	Capillary	All test types	Population (2000)	Percent Tested
Red Lake	0	1	0	0	0	0	26	289	9%
Redwood	2	17	2	0	1	1	287	1,252	23%
Renville	2	11	0	1	0	1	314	1,260	25%
Rice	4	26	2	5	1	3	1,175	4,206	28%
Rock	0	6	0	0	0	0	104	733	14%
Roseau	0	1	0	0	0	0	133	1,460	9%
St. Louis	14	81	4	10	0	3	3,237	12,737	25%
Scott	5	13	1	1	5	2	2,242	10,001	22%
Sherburne	0	23	0	0	0	1	1,703	6,497	26%
Sibley	3	20	1	2	0	0	257	1,227	21%
Stearns	4	20	1	4	2	2	2,650	10,311	26%
Steele	2	20	0	0	1	1	779	2,832	28%
Stevens	1	8	0	0	0	0	160	631	25%
Swift	1	8	0	0	0	0	166	775	21%
Todd	2	15	0	1	0	1	516	1,743	30%
Traverse	0	1	0	0	0	0	34	277	12%
Wabasha	2	5	0	0	0	0	218	1,540	14%
Wadena	0	3	0	0	0	1	231	1,014	23%
Waseca	2	4	1	2	0	0	390	1,554	25%
Washington	12	122	3	5	3	3	3,437	18,636	18%
Watonwan	2	10	0	0	1	1	220	1,022	22%
Wilkin	1	3	0	1	0	0	86	548	16%
Winona	6	5	4	3	2	1	431	3,385	13%
Wright	3	21	2	2	0	1	2,200	8,947	25%
Yellow Medicine	2	7	0	1	0	1	160	757	21%
Unknown	6	20	0	0	0	0	762	N/A	N/A
Minnesota Totals	701	2078	153	207	112	112	93,170	**397,581**	**23%**