2009 Blood Lead Surveillance Report

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Table of Contents

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Introduction

This 2009 Blood Lead Surveillance Report describes the activities of the Minnesota Department of Health (MDH) Childhood Lead Poisoning Prevention Program (CLPPP) and the data resulting from the MDH Blood Lead Information System (BLIS) for the 2009 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. The intent of this report is to provide information for lead poisoning prevention stakeholders in Minnesota, document activities of the CLPPP, and assist local efforts to prevent childhood lead poisoning, and is also a companion to the State of Minnesota plan to eliminate childhood lead poisoning.

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, and 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. This correlates to nearly one million homes in Minnesota. 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) and MDH consider children and pregnant women to have elevated blood lead levels (EBLLs) if their blood test results are greater than or equal to 10 micrograms of lead per deciliter whole blood (µg/dL).

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.

Minnesota statute 144.9504 mandates environmental interventions for venous blood lead levels of 15 µg/dL or greater in children less than six years old. For levels of 10 µg/dL or greater, local public health nurses work with families to bring down elevated lead levels. For most children and adults with lead poisoning, identification and elimination of the source of lead is the main treatment. Chelation to quickly reduce the blood lead level is advised only for blood lead levels of 45 µg/dL or greater. Research has shown no benefit in long-term outcome for chelation of blood lead levels less than 45 µg/dL. For this reason, primary prevention, or preventing lead poisoning before it can start, is crucial.

Lead Poisoning Elimination Plan

In 2004 a workgroup consisting of partners from federal, state, and local governments, community based organizations, housing, real estate, landlord, and tenant organizations, and many other disciplines, created the State of Minnesota Childhood Lead Poisoning Elimination Plan (Plan). The stated goal of the plan is: "To create a lead-safe Minnesota where all children have blood lead levels below 10 µg/dL by the year 2010." The plan advocates for a collaborative, housing-based approach to promoting primary prevention of childhood lead exposure, while incorporating ongoing lead poisoning prevention programs at both the state and local level. This is consistent with the federal strategy to act before children are poisoned, identify and care for lead poisoned children, conduct research, and measure progress to refine lead poisoning prevention strategies.

The 2008 version of the Plan updates the version of the Plan released in July 2006. As with all previous versions of the Plan, the 2008 Plan contains background on lead exposure in Minnesota, an assessment of risk factors for lead, and an overview of modifications to the Plan proposed by Advisory Members. A new version of the Plan will be issued in 2010.

Data was collected from collaborating partners in 2009 to assess progress on individual tasks in the 2008 Plan. The overall distribution of the status of all tasks in 2009 reflects sustained efforts to institutionalize lead program efforts into ongoing routine practice. Specifically, in 2009 there are 68 tasks (64 %) classified as completed or ongoing (green), 23 (22 %) classified as in planning or implementation (yellow) status, and 15 (14 %) considered for later years (red). The task status distribution in 2009 documents a 12% increase in "ongoing" tasks from 2008 to 2009. The complete assessment done in 2009 and all previous versions of the Plan are available at the MDH Lead Program website: www.health.state.mn.us/lead .

The MN Blood Lead Information System (BLIS)

MDH maintains a blood lead information system (BLIS) for the purpose of monitoring 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.

It can often take several weeks for blood lead data to be reported and processed into the MDH surveillance database. The CLPPP is addressing this issue by promoting use of electronic reporting formats, which allow for greater efficiency in handling large numbers of records. MDH currently receives approximately 65% of reports electronically, up from 27% in 1997. Staff at MDH currently are working to facilitate electronic reporting of blood lead tests by the Quest laboratory, which would bring the percentage of tests reported electronically to approximately 75%. In 2009 the CLPPP also worked with the newly established Minnesota Electronic Disease Surveillance System (MEDSS) to incorporate electronic reporting of blood lead test results in to routine data handling by MDH.

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.

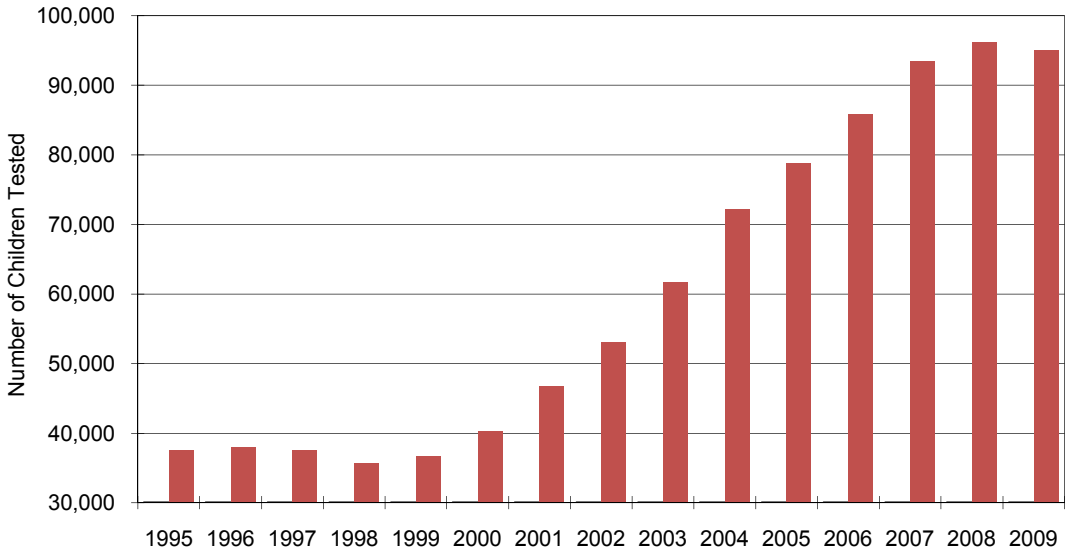
In 2008 MDH completed a study requested by the Legislature to evaluate blood lead testing methods used to confirm elevated blood lead status. The study assessed the accuracy and methods for performing capillary blood lead testing, reviewed existing state and federal guidelines, and provided recommendations on blood lead testing issues. Surveillance data showed that 68% of elevated capillary results reported to MDH were false positives. An overview of methods demonstrated that hand washing was a key step in preventing contamination in capillary samples. In the report MDH recommended that capillary tests not be used to initiate an environmental investigation of an elevated lead result (currently, venous tests are required) and that the environmental investigation threshold should remain at 15 ug/dL (rather than be lowered to 10 ug/dL). The full report is available at: http://www.health.state.mn.us/divs/eh/lead/reports/legislativerept07.pdf.

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 currently recommended for children at one and two years of age, and children up to six years

of age who have not previously been screened, 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 has been generally increasing since 1998, with approximately 95,000 children tested in 2009 (Figure 1).

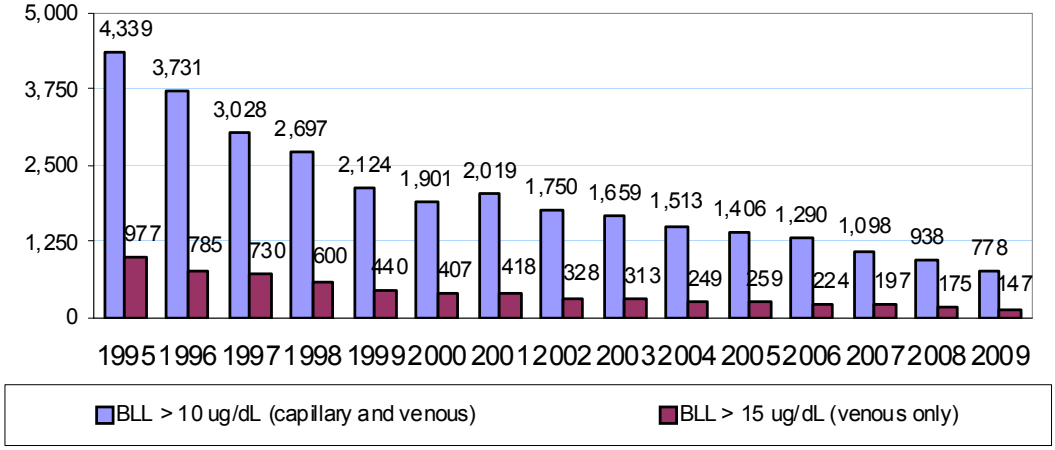
Figure 1: Number of Children Tested (Less than 6 Years of Age)



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 2009 there were 778 Minnesota children with blood lead levels of 10 µg/dL or greater, and 147 children had venous blood lead levels of 15 µg/dL or greater.

Figure 2: Number of Children with Elevated Blood Lead Levels



Blood Lead Testing by County

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

Case Management

The CLPPP 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 10 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 Minnesota Guideline procedures and have provided increased collaboration between public health and housing staff at both the state and local level.

Follow-up Testing

MDH guidelines recommend follow-up blood lead tests for children with elevated blood lead levels. The period of time recommended for re-testing varies according to the initial blood level, but the maximum time is 90 days for any child with a blood lead level of 10 µg/dL or greater (e.g. an EBLL). Of the 778 Minnesota children identified with EBLLs in 2009, 473 (61%) received a follow-up test. Of these, 376 (48% of the total children with EBLLs) were retested within 90 days of their initial EBLL. While the number of EBLLs in Minnesota has been steadily declining for the past 15 years, rates for the total number of follow-up tests and those done within 90 days have remained relatively consistent, at about 60% and 50%, respectively over the past six years. Increasing the follow-up rate and reducing the time between tests will take the combined efforts of providers, case managers, families, and the MDH Lead Program.

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.

A joint study between the MDH Lead Program and Minnesota Department of Human Services (DHS) released in 2002 showed that children enrolled in Minnesota Health Care Programs (MHCP) had higher lead poisoning rates. Of those children receiving blood lead tests between 1995 and 1998 and found to have EBLLs, 72% were enrolled in MHCP. MHCP children were nearly twice as likely as non-MHCP children to have EBLLs (9.8% compared to 5%). However, despite their high-risk status, only 13.3% of MHCP children were tested for blood lead in 1998.

The 9-30 month age group is used in analysis since this captures children tested around their one and two-year well-child visit as recommended in both DHS and MDH guidelines. Analysis of 1999-2003 data for Minnesota children enrolled in Medicaid funded programs provided good news about testing in the Medicaid-enrolled population, and was published in *Minnesota Medicine* in May 2006. The rate of blood lead testing in the total population of 9- to 30-month-old children enrolled in MHCP increased from 17% to 29% between 1999 and 2003. The rate of elevated blood lead levels EBLLs in tested children declined from 6% in 1999 to 2.7% in 2003. However, there remained a two-fold higher rate of elevated blood lead levels in MHCP children in 2003 (3.4% and 1.5% for MHCP and non- MHCP children, respectively). The percentage of children with elevated blood lead levels who were re-tested within three months increased from 39% in 1999 to 50% in 2003. To help sustain these gains, 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. The Minnesota Medicine article is also available at www.minnesotamedicine.com in the May 2006, Volume 86 issue.

When combined with data from the report described above, the data for 2004 through 2009 also show a general trend toward higher rates of testing in MHCP-enrolled children in the past decade (Figure 3), along with declining rates of EBLLs in both MHCP-enrolled and non-enrolled children (Figure 4).

Figure 3. Children Enrolled in MHCP Tested for Blood Lead

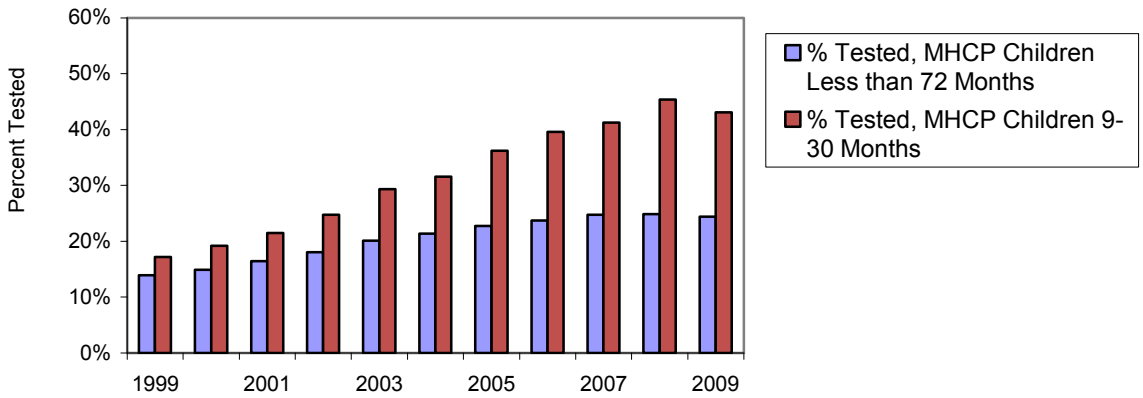
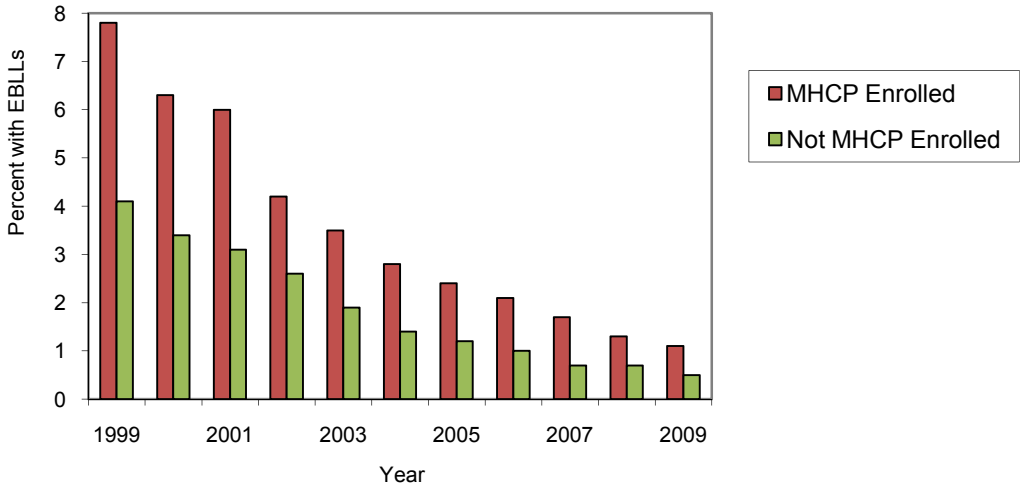


Figure 4. Percentage of Tested Children Less than 72 Months Old with EBLLs



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 collects demographic data on all refugees entering the state who receive an initial health screening. The 2009 refugee data were linked with the blood lead test results from BLIS to describe lead testing and EBLL rates in refugees. Refugee children in Minnesota comprise a wide range of ethnic origins, as shown in Table 1. Of the children seen for an initial health screen in 2009, 88% were tested for blood lead.

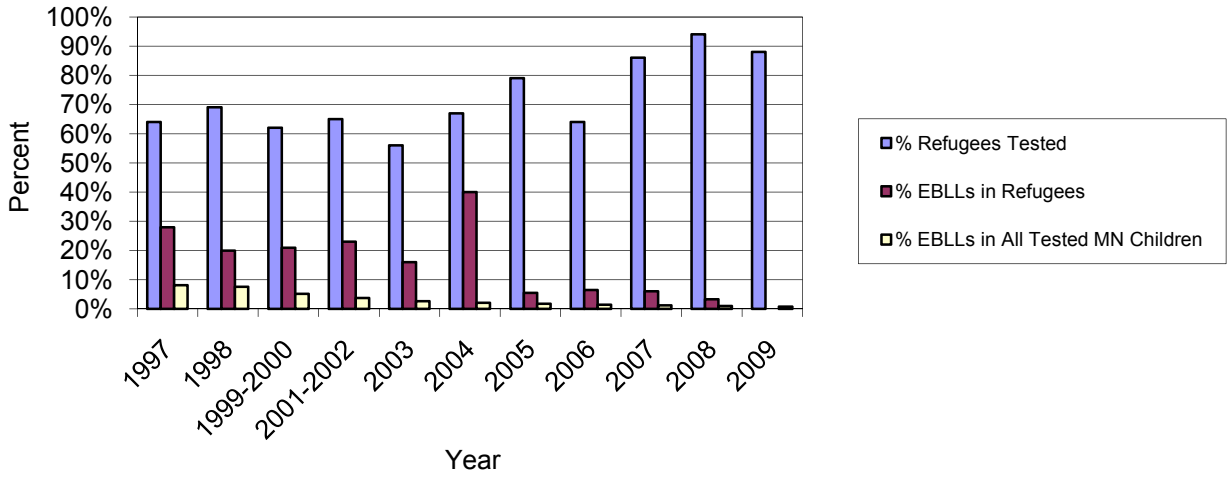
Table 1. Number and Percent of Refugee Children Tested and with Elevated Blood Lead Levels in 2009 by Country of Origin

Country/ Region of Origin	# of Refugee Children*	# of Children Tested for Lead		Of Children Tested for Lead, # Tested Within Three Months of Arrival		Children w/Elevated Level (10 µg/dL)	
Bhutan	12	12	100%	11	92%	0	0%
Burma	85	79	93%	76	96%	0	0%
Former USSR	11	8	73%	8	100%	0	0%
Iraq	25	22	88%	17	77%	0	0%
Somalia	63	54	86%	39	72%	0	0%
Other Africa	12	8	67%	8	100%	0	0%
Other	1	1	100%	1	100%	0	0%
Total	**209**	**184**	**88%**	**160**	**87%**	**0**	**0%**

*Data obtained from MDH Infectious Disease Epidemiology, Prevention and Control Division

Blood lead tests were also matched to refugee information in past years (Fig. 5). The rate of elevated blood lead levels for refugees has dropped in the past several years. In 2009, no refugees had blood lead levels of 10 ug/dL or greater.

Figure 5. Lead Testing and EBLLs in Refugee Children



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 2009 for adults in Minnesota is presented in Table 2.

Table 2: Minnesota residents 16 years or older with a reported blood lead test in 2009

# of reports	# of individuals	Range of reported results
9,997	8,905	0.0 to 75.0 µg/dL

There were 411 adults with BLLs of 10 to 24 µg/dL, 96 adults with BLLs of 25 to 39 µg/dL, and 5 adults with reported levels of 40 µg/dL or greater.

Evaluation of BLIS for 2009

In 2009 there were 114,571 total blood lead tests reported to the MDH BLIS. The tests were received from 72 separate laboratories; 40,265 (35%) received on paper through mail or fax and 74,306 (65%) received through electronic reporting (mailed disks, encrypted email, or secure website downloads). A total of 26,156 tests (23% of the total) were received from 47 clinics using ESA LeadCare analyzers. The tests received by MDH consisted of 85,326 capillary

specimens (74%), 26,942 venous specimens (24%), and 2,303 tests of unknown type (2.0%). The median difference between specimen date (date the blood lead specimen was drawn) and date of analysis was one day. The difference between the date received at MDH and date of analysis had a median of 5 days, with a median of 5 days for paper laboratories and 4 days for electronic records laboratories. The time between received date and date of entry into BLIS had a median of 2 days for all tests, with a median of 0 days for electronic records and 27 days for paper records. The median total time between specimen date and entry date was 14 days, with a median of 35 days for paper records and 8 days for electronic. These data help indicate the advantages of electronic reporting. Electronic transfer of medical data significantly improves timeliness, in addition to requiring less staff time for entry of records into BLIS.

Data completeness is an important component of any surveillance system, and MDH staff make extensive efforts to ensure the most complete data possible in BLIS. Even after efforts to find missing addresses, they are still the most frequently missing component of data in blood lead tests reported to BLIS. In 2009 both city and zip code were missing 5.2% of the time (down from 8.5% in 2006), and street address was missing 5.0% of the time (down from 8.8% in 2006). The patient's date of birth was missing for 3 records, and these were all confirmed to be adult patients. MDH routinely works with data providers to emphasize data completeness and continues to make steady improvement.

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 Web site 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.

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.

The screening guidelines were published in 2000. Since that time, EBLL rates have significantly dropped and primary prevention activities have increased in Minnesota. Therefore, the CLPPP convened a workgroup of stakeholders to formally re-evaluate the Blood Lead Screening Guidelines during fall 2007. Although EBLL rates in Minneapolis and St. Paul have decreased substantially since 2000, the group felt that given the education and outreach that has occurred over the past several years, the benefits of maintaining a universal testing recommendation for these two cities outweighed the benefits that might be gained by recommending targeted blood lead testing for these areas.

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 below 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. Although the current "actionable" level for lead case management and clinical treatment activities in Minnesota is 10 µg/dL, the CLPPP strongly supports providing guidance from public health and medical professionals to families with documented lead exposures below this threshold. Clinical treatment guidelines for blood lead levels less than 10 µg/dL were reviewed by a group of five physicians during 2005. Their consensus was that education should be provided and encouraged for children with blood lead levels of 5-10 µg/dL, but further clinical treatment is not required. As a result of legislation passed in the 2010 session, the Childhood Blood Lead Clinical Treatment Guidelines will be reevaluated in the 2011 fiscal year by a workgroup consisting of a diverse group of stakeholders.

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. The CDC and MDH consider 10 µg/dL and above to be an elevated blood lead level for pregnant women as well as children.

In many cases, high levels of lead in pregnant women arise from maternal occupational exposure. However, other lead exposures may occur, such as: remodeling a home containing lead paint; a family member's occupation or hobby; using non-commercial home remedies or cosmetics that contain lead; using glazed pottery for cooking; and pica behavior of the mother. There may also be exposure of the fetus to lead coming out of the mother's bones. This may arise from long-term previous exposures of the mother even though lead exposure is not happening during the pregnancy. Lead may come out of maternal bones faster during pregnancy and lactation because of the mother and fetus's need for calcium. A diet rich in iron and calcium may help reduce absorption of lead during pregnancy.

Other information resources available from CLPPP

The Lead Program maintains a web page through the MDH Web site 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.

St. Paul Prevention Project

Since 2006, the CLPPP 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 2009 the project resulted in:

- Three supervisors representing window replacement contractors being trained as EPA/MDH Lead Supervisors;
- Six 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;
- Completion of 14 window replacement projects in high-risk homes; and
- An estimated 60 additional homes each year (e.g. the total number of homes worked on in a year by the contractors involved in the project) that will have windows replaced by these contractors using much safer installation methods than in previous years.

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. Eleven lead safe work practice courses were offered between April 1 and June 30, 2009 in Minneapolis. 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) have been working together to monitor and refine the program. These three agencies provide guidance for hunters and their families about consumption of venison, whether it is processed at home or by a commercial processor, and provide training to processors to reduce the risk of lead remaining in venison. Several changes to the donation program were implemented for Fall 2008 hunting season and were further modified in 2009. Data from MDA has shown that only 6% of venison tested in 2009 contained lead. Additional steps (additional processor training and reimbursement, raising awareness of the program with hunters) are being implemented.

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

Further Lead Information

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

Table 3: Blood Lead Testing by County in 2009 (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	0	0	0	223	858	26%
Anoka	58	1049	2	6	3	4	6,383	27,287	23%
Becker	2	19	0	2	1	0	515	2,244	23%
Beltrami	1	16	0	0	1	0	511	3,394	15%
Benton	1	30	1	2	0	0	1,082	2,949	37%
Big Stone	1	12	0	1	0	0	74	336	22%
Blue Earth	3	20	5	4	1	0	941	3,709	25%
Brown	0	10	0	0	0	1	319	1,752	18%
Carlton	0	23	0	2	0	2	665	2,266	29%
Carver	2	22	0	0	1	1	1,249	7,493	17%
Cass	0	19	1	0	0	2	486	1,688	29%
Chippewa	3	15	0	0	0	1	241	922	26%
Chisago	5	36	0	0	0	1	769	3,750	21%
Clay	1	17	1	1	1	0	722	3,826	19%
Clearwater	0	1	0	0	0	0	66	594	11%
Cook	0	3	0	0	0	1	72	292	25%
Cottonwood	3	6	0	0	1	0	120	862	14%
Crow Wing	1	75	1	2	1	2	1,033	3,999	26%
Dakota	60	658	1	12	3	5	6,219	33,353	19%
Dodge	1	12	0	0	0	1	253	1,613	16%
Douglas	1	23	0	1	2	1	565	2,216	25%
Faribault	0	12	5	3	1	0	213	1,025	21%
Fillmore	4	24	0	1	1	0	209	1,458	14%
Freeborn	1	16	1	1	2	0	386	2,209	17%
Goodhue	1	26	2	3	1	0	547	3,258	17%
Grant	0	7	0	0	0	0	102	392	26%
Hennepin	440	2,393	66	78	50	33	21,098	88,005	24%
Houston	1	17	0	5	0	4	246	1,389	18%
Hubbard	0	4	0	0	0	0	159	1,232	13%

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	0	43	1	1	1	2	827	2,497	33%
Itasca	0	22	1	3	0	1	846	2,825	30%
Jackson	4	3	0	1	1	1	145	723	20%
Kanabec	0	9	0	0	1	0	250	1,116	22%
Kandiyohi	9	68	0	0	3	1	1,003	3,080	33%
Kittson	0	4	0	0	0	0	51	407	13%
Koochiching	0	8	1	3	0	0	147	958	15%
Lac Qui Parle	4	8	1	0	0	0	87	508	17%
Lake	1	14	0	2	0	0	178	670	27%
Lake of the Woods	0	1	0	1	0	0	42	244	17%
Le Sueur	0	9	0	1	0	0	368	1,923	19%
Lincoln	2	1	0	0	0	0	59	435	14%
Lyon	1	30	1	3	1	0	671	2,009	33%
McLeod	1	24	0	1	0	1	654	2,935	22%
Mahnomen	0	0	0	0	0	0	54	453	12%
Marshall	0	6	0	0	0	0	105	703	15%
Martin	2	17	0	6	1	0	321	1,449	22%
Meeker	2	21	0	0	1	0	384	1,760	22%
Mille Lacs	0	27	1	3	0	3	395	1,648	24%
Morrison	1	20	2	2	1	1	710	2,513	28%
Mower	13	13	3	0	4	1	626	2,860	22%
Murray	0	8	0	0	1	2	111	600	19%
Nicollet	1	17	2	1	1	1	518	2,143	24%
Nobles	5	41	1	1	0	1	589	1,736	34%
Norman	0	0	0	0	0	0	58	556	10%
Olmsted	11	37	4	1	2	0	1,455	10,691	14%
Otter Tail	1	5	0	0	0	0	403	3,772	11%
Pennington	0	5	0	0	0	0	138	999	14%
Pine	0	14	2	4	0	1	478	1,784	27%
Pipestone	0	6	2	0	1	0	90	678	13%
Polk	8	11	3	1	0	0	286	2,261	13%
Pope	1	10	0	0	0	0	160	660	24%
Ramsey	390	2,990	55	91	37	22	11,901	41,990	28%

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	36	289	12%
Redwood	6	16	0	2	1	0	276	1,252	22%
Renville	4	20	1	1	3	3	338	1,260	27%
Rice	1	49	2	5	0	3	1,173	4,206	28%
Rock	2	13	0	2	0	0	137	733	19%
Roseau	0	4	0	0	0	0	150	1,460	10%
St. Louis	5	195	3	21	5	13	3,398	12,737	27%
Scott	4	52	1	1	1	2	1,916	10,001	15%
Sherburne	2	147	1	1	0	2	1,749	6,497	17%
Sibley	2	13	3	1	0	0	267	1,227	4%
Stearns	8	110	4	5	0	0	3,040	10,311	29%
Steele	1	31	0	0	1	2	792	2,832	28%
Stevens	0	6	0	0	0	1	169	631	27%
Swift	2	16	1	1	1	0	207	775	27%
Todd	2	26	1	4	0	1	446	1,743	26%
Traverse	0	3	0	0	0	0	49	277	18%
Wabasha	2	16	0	1	1	1	242	1,540	16%
Wadena	0	10	0	0	0	1	171	1,014	17%
Waseca	1	11	1	0	0	0	324	1,554	21%
Washington	50	538	2	6	1	3	3,257	18,636	17%
Watonwan	1	10	2	0	1	0	197	1,022	19%
Wilkin	0	3	0	0	0	0	73	548	13%
Winona	12	27	4	4	4	1	567	3,385	17%
Wright	2	81	1	1	2	0	2,533	8,947	28%
Yellow Medicine	5	14	0	1	0	0	194	757	26%
Unknown	28	98	0	1	0	0	3,693	N/A	N/A
Minnesota Totals	1,187	9,579	193	308	147	130	94,972	397,581	24%